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Title Power and events

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POWER AND EVENTS
An Essay on Dynamics in Philosophy

THIS book is a study of the foundations of philosophy and the inquiry arrives at original solutions of the cognitive problems of empirical truth and logical validity, of the metaphysical problems of time and causality, and of many other questions and puzzles of philosophy.

The idea of power, the cornerstone of a "dynamic philosophy," allows the author—as he proceeds to show that power has different ways of realization (one of which is conceptualization, and embraces logic)—to integrate various trends in philosophy and do justice to seemingly irreconcilable aspects of the world: thus, according to the author, power is both the source of change or process and a basis of stability in the form of dynamic equilibrium; and, again, nothing but power has the kind of invariance which serves to correlate dissimilar and changeable perspectives, including alternative world views of philosophy.

While the distinction between power and events is a revival, with important modifications, of Aristotle's contrast between potentiality and actuality, the philosophy of power is empiricism. The central part of the book, the second chapter, is a demonstration that power is an observable entity.

The inquiry throws light on the nature of analysis, intuition, probability, logical paradoxes, alternative philosophies, and a variety of other topics. In taking cognizance of the theory of relativity and quantum physics, the author keeps in mind the example of great phi-

(*continued on back flap*)

POWER AND EVENTS

ERRATA

page vii, line 7. *"An"* instead of *"Our"*

page 124, line 1, should read "field of undifferentiated potentiality; in order to stir it into" instead of "like the line connecting the figures of Ariadne and Bacchus"

page 136, line 36. "and" instead of "from"

page 200, line 16. insert "would" before "describe"

page 250, line 21. "," instead of ";"

page 281, line 12. "intrinsic" instead of "instrinsic"

Power and Events

AN ESSAY ON DYNAMICS IN PHILOSOPHY

BY

Andrew Paul Ushenko

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A. U.

PREFACE

THE philosophy of power has not yet been written. This essay only clears the ground by refuting objections, and lays an empirical basis for subsequent developments. The empiricist approach is in agreement with a predominant contemporary tendency, but the leading ideas toward a dynamic philosophy form no less than an attempt at a synthesis of two major ideologies which have shaped the course of philosophy. If we disregard corrections which any sweeping generalization requires, the history of philosophy may be said to fall apart into two successive periods: the classical, inspired by static ideals, extends from the beginning of philosophy to the nineteenth century to be superseded by the romantic period which manifests a turn to the dynamic modes of being. Classical philosophers are interested in eternal values and timeless forms and have little regard for the problems of temporal process and existence; their method of argument is rational analysis. Plato is a perfect representative of the period, while Zeno's paradoxes and McTaggart's "refutation of time" are a *reductio ad absurdum* and therefore demonstrate the limitation of the static conception. Yet, to successfully oppose the limited tradition of centuries, the reaction of romanticism had to wait for an alliance with the empirical sciences of evolution. The opposition came with a declaration of the preeminent reality of time and progress, and a rejection of analysis in favor of intuition. Romanticism, thus understood, is not confined to the so-called romantic school of such comparatively unimportant men as Schleiermacher, Herbart, Schlegel, or even Schelling. The outstanding romantic philosophers are Bergson, Nietzsche, and, with qualifications, Schopenhauer, James, and Whitehead. Of course, romanticism, with its preoccupa-

tion with the temporal, is also one-sided. Already in Whitehead we find a desire to correct the fault of the romanticism of his predecessors by combining their emphasis on process with the Platonic doctrine of timeless forms, and by an allowance for both analysis and intuition. But Whitehead has no new principle of integration and, therefore, the significance of its many subordinate insights notwithstanding, his philosophy has been characterized, with some degree of justice, as eclecticism. To accomplish an integration of the divided thought, a dynamic philosophy introduces *the principle of power or potentiality*. There are different dynamic modes. Romanticism recognized the modes of temporal change and motion, but overlooked the fact that powers combine with one another to bring about dynamic balance or equilibrium. The philosophy of power takes advantage of the mode of dynamic stability to do justice to the elements of truth of a static ideology without joining it in a metaphysical flight into Plato's heaven. The keystone is *conceptualism*. For conceptualization is one among other forms of actualization and therefore is a correlate to power. This point is explained in the chapter on concepts. For the present I merely want to indicate that the concept of power provides a single category which is yet sufficient to integrate the insights of classical and romantic metaphysics leaving out of account the attendant aberrations. The alternative to a dynamic philosophy is a downright rejection of metaphysics. A disposition toward this alternative was already present in the alliance of romanticism with empirical science; and this disposition has been fully developed within the last thirty years by the schools of radical empiricism and naturalism. But the station of an *ancilla scientiae* is no more satisfactory than that of an *ancilla theologiae*. With the demotion of philosophy to servility philosophical intuition is ruled out; analysis is accepted only as a linguistic and conventional procedure; and the outcome is a neo-scholasticism which is a match to similar excesses of the dark ages. This is not to deny that we have learned from the concentration of radical empiricism upon the problems of method and formulation; nor that our own orientation is

a kind of empiricism. The philosophy of power, as I understand it, must have an empirical foundation: *the central part of this essay, the second chapter, is a demonstration that power is an observable entity.* But an empiricism which incorporates ideas of metaphysics is liberal and must be contrasted with the current doctrines of radical empiricism. By way of contrast let me single out for a brief comment the topics of analysis, intuition, and probability. My general contention is that, no less successful than in its mediation between classical and romantic metaphysics, the philosophy of power can reconcile the significant insights of metaphysicians with the positive contributions of radical empiricists.

Analysis in philosophy is sometimes called logical analysis; but I prefer to use the term "logical analysis" in a technical sense to be explained in the chapter on concepts. There is a difference of opinion about the nature and function of philosophical analysis. Some analysts, among the members of the Cambridge school, do not hesitate to identify analysis with philosophy, and all of them would approve of the motive behind this identification. The motive is a conviction that science has a monopoly on cognitive information. This leaves to philosophy the task of organizing and clarifying scientific information, and brings into prominence analysis as a method of clarification. The analyst's position accounts for his rejection of intuition. Philosophers have used intuition in order to obtain infallible or incorrigible information. The analyst opposes this practice by declaring that, with the possible exception of perceptual judgments about sense data, analytic truth is the only infallible or incorrigible truth precisely because it is not informative. The proof that analytic truth contains no information about matters of fact is the observation that a correct statement of analysis is accepted on the basis of an examination of the statement alone, i.e. without the aid of evidence outside discourse. If that which is to be analyzed is called the *analysandum* and that which gives the analysis the *analysans,* then a statement of analysis is a recognition of identity between the analysandum and the analysans, in the sense of "identity" which may be distinguished

as "analytic." The conception of "analytic identity" raises the main problem of analysis. To avoid circularity, "analytic identity" must be paraphrased in terms which omit the adjective "analytic." A further requirement is immunity to the intuitionist criticism. Philosophers of the romantic school, who adhere to intuition, have pointed out that "analytic identity," far from being "identity" in a strict sense, is a transformation of the analysandum into the analysans and that, when the situation under analysis has the dynamic unity of an individual or of a work of art, the transformation is falsification. The analyst has his answer to this criticism; nevertheless there is no doubt that he feels uneasy about it. At any rate, if we consider pronouncements of such masters of philosophical analysis as G. E. Moore and Bertrand Russell, we find that each of the two men makes a concession, although on his own terms or inadvertently, to the critics of the method. Moore is admittedly puzzled by analytic identity. Using a simple illustration, "To be a brother is the same thing as to be a male sibling," he asserts that, as the phrase "the same thing" clearly indicates, the statement of analysis is a statement of identity; nevertheless, he realizes that the statement is no mere tautology, such as "To be a brother is the same thing as to be a brother," but appears to signify some advance in thought. And so he ends by confessing: "Now I own I am not at all clear as to what the solution of the puzzle is." Russell defines analysis as "the operation by which, from examination of a whole *W*, we arrive at '*P* is part of *W*.'" He then proceeds to argue that in the finished product of analysis, i.e. within the statement "*P* is part of *W*," *P* must be understood as a part of a unified whole and not merely as a term within a relational pattern which is exhibited by the whole. This is to say that, according to Russell, a name, say "*W*," which designates the analysandum as a whole, is indispensable in analysis and cannot be replaced by a description of a relational pattern, exemplified by the analysandum, together with the elements arranged in the pattern. Russell's conclusion is, in effect, that the undifferentiated analysandum *W* is not the same thing as the analysans which

gives an enumeration of items correlated within a certain pattern. And his conclusion leaves the matter of "analytic identity" neither fully explained nor justified. For Russell himself admits: "But it is assumed that the whole *W* can preserve its identity throughout the process of analysis: that, e.g., in perception we can begin with *'W!'* as an exclamatory use of an object-word, and arrive, by attention, at *'P* is part of *W,'* without any change in the denotation of the name *'W.'*" I think that both Moore's puzzle and Russell's assumption, which amount to nearly the same thing, can lead to satisfactory results only if we grant that "analytic identity" involves conceptual or cognitive transformation of the kind which I call "perspective." According to the perspective theory of truth, which is the subject of the first chapter, perspective transformation is no more a falsification of the object of knowledge than the change in the appearance of a house, as we walk around it, is a falsification of the house; the identity which the object retains through a cognitive transformation is illustrated by the fact that the house preserves its identity throughout the period of inspection. In the case of analysis, the analysans is a cognitive perspective, which is given in terms of the basic elements of analysis, upon the analysandum; the analysans renders explicitly, by means of an antecedently accepted list of basic elements, the implicit contents of the analysandum. Moore's example does not bring out the point because it is too simple to be an example of philosophical analysis; at any rate, his illustration does not do justice to Moore's own practice of analysis. In my opinion, "To be a brother is the same thing as to be a male sibling" is not analysis but a definition of the word "brother," since "brother" means male sibling; and of course a definition is not a mere repetition of the word, such as "To be a brother is to be a brother." On the other hand, I agree with Moore that analysis is a definition of a concept or idea, and not of a word, but my point is that *conceptual definition is conceptual explication.* Systematic analysis is always relative to a set of undefined terms, the terms of explication. Thus in a calculus of mathematics a theorem is analyzed, and

demonstrated, by showing its construction out of axioms and undefined terms. A chemical compound is analyzed into a combination of ultimate chemical elements. A piece of philosophical analysis is performed by means of the philosopher's basic categories. Russell's translation of "The circle is drawn in black" into "There exists only one x such that x is circular and drawn in black" is, primarily, an example of logical analysis; however, if a philosopher reduces things (including drawings) to complexes of sensory qualities, such as "circular" or "drawn in black," the same translation may illustrate his philosophical analysis. Russell would no doubt admit that the translation is correct only if it carries with it the same meaning; but in his account of analysis he hesitates to recognize the analytic identity between the pre-analytic whole W and the differentiated analysans. The truth is that the unanalyzed and the analyzed propositions are identical; but while the proposition is implicit in the original sentence, it becomes explicit in the outcome of the translation. When the analyst says that analysis is a kind of tautology, he is right. When the intuitionist counters that analysis is transformation, *he* is right. But, to dispel the appearance of opposition, we require the basic intuition that transformation by explication does not undermine the identity between the implicit analysandum and the explicit analysans. This brings me to the defense of cognitive intuition.

Critics have denounced the practice of justifying prejudice and arbitrary decision by an appeal to intuition. But the danger of irrationalism is avoided if intuition is combined with rational analysis along the lines suggested by the preceding paragraph: an intuitive solution of a complex problem can be accepted only upon a thorough analysis of the problem, while the correctness of the analysis is recognized by intuition. Critics have also rejected the intuitionist claim to absolute truth and incorrigible knowledge. And there is no doubt that history has a display of propositions which were for a time approved by intuition only to be discarded later as falsehood. Furthermore, many of these propositions were not unsupported by analysis. For example, Kant's intuition convinced

him that the axiom of Euclid's geometrical analysis "A straight line is the shortest distance between two points" is true of any space, whereas Riemann has subsequently proved that the axiom is false if the space is Riemannian. To meet this kind of objection the intuitionist claim must be restricted and the function of intuition redefined. Let us grant to the intuitionist that intuition is an act of direct or immediate apprehension which gives not only analytic truth but, sometimes, synthetic or informative knowledge. We need not, however, contend that intuitive knowledge is absolute and incorrigible. Intuition, as I understand it, is *incorrigible only in relation to the evidence at hand.* With a change of evidence or, a condition to be noted because it shows the importance of analysis, with a better analysis of the already available evidence, a new intuition may supersede the obsolete knowledge. This relativization still allows intuition to be the final arbiter. For intuition is *self-corrective:* only intuition can tell us whether one evidence is better than another or, given the same evidence, which analysis is superior, or which of the competing intuitions is preferable. In relation to his information Kant's intuition of Euclid's axiom is unobjectionable; but Riemann's additional evidence makes it necessary to qualify Kant's intuition by the clause "if there are straight lines, i.e. if physical space is Euclidean"; and without the aid of Einstein's conception of a curved physical space we should not conclude that Kant is altogether wrong. Moreover, to bring out more clearly the relative truth of an intuition, let me caution the reader that even now, i.e. even with the aid of Riemann and Einstein, the pronouncement that Kant is wrong cannot be made conclusive. For, if we leave out of consideration the controversial problem of the relation between physical and perceptual space, and observe that Kant is concerned with the space of perception, we may still argue that the structure of the visual field is Euclidean and that our knowledge of this structure is intuitive. To carry on the argument let us take up the objection that, as a matter of fact, our judgments about perceptual geometrical relations are often wrong. An illustration of such a wrong

judgment is the pseudo-proof that "Every triangle is isosceles," which W. E. Johnson has discussed in Chapter 9, §6, of the second volume of his *Logic*. The alleged proof depends on a faulty diagram which shows the bisector of an angle and the perpendicular bisector of the base intersecting inside the triangle. Many students take the correctness of the diagram for granted: they do not notice that if the figure were an isosceles triangle the bisectors would coincide, and if it were not, the intersection would be at a point outside the triangle. However, I have come across a few students who could see the error at once. And with those who are taken in the fault is one of analysis and not of intuition. The intuition that the proof would be valid if the drawing were correct is unobjectionable. On the other hand, no claim is ever made that the figure is taken for granted because an intuition certifies to its correctness. The fault of analysis, and the self-corrective function of intuition, are shown by the fact that recognition of the error follows immediately upon comparison with a correct drawing of the figure. More generally, given any intuition p, the relative truth of p is established by a *second-order* intuition that "The proposition p is true in relation to its evidence." The second-order intuition, thus formulated, may appear to be true in a nonrelative sense; but a doubt arises the moment we assign some specific meaning to p. For example, if we let p stand for Kant's intuition "A straight line is the shortest distance between two points," the second-order intuition is true only if our information about the evidence available to Kant is correct. However this may be, the existence of analytic truth proves that sometimes intuition is incorrigible. And since explication of meaning in analysis is a species of development in actualization, we may expect an intuitive recognition that the actual datum is a manifestation of a certain power to be unmistakable. But, of course, the terms of analysis may be chosen by convention, and there may be alternative manifestations of the same power. As a matter of fact, intuition seldom comes pure or in complete isolation from convention or some other element subject to change and improvement. And this may

account for the fact that radical empiricists have overlooked the existence of intuitive certainty altogether, and that the prevalent opinion, in disregard of the certitude with which the opinion itself is always proclaimed, would deny certainty to any empirical knowledge.

My answer to the radical empiricist, who rejects intuition because of his certainty that empirical knowledge can be no more than probable, is that there is no opposition between intuition and probability. The relativization of intuition introduces uncertainty. And, on the other hand, probability itself is, in part, established by intuition. I know that radical empiricism favors the frequency theory and does not want any of the apriorism which would be inevitable on an intuitive basis of probability. But I also notice a growing tolerance to divergent theories of probability. The present form of this tolerance, the admission that the word "probability" has several different meanings, does not impress me. This is not to say that I should deny variations of sense or use, but that I believe in the existence of a common core in the various senses or uses of the word "probability." Instead of allowing for different meanings, I suggest that *there are different ways or methods, to be used either singly or in conjunction, of estimating the same probability.* The emphasis may be on statistical frequency in dealing with physical and social phenomena or on a priori computation in games; but my position is that, as a rule and whatever the emphasis, both frequency and a priori considerations, among other factors, enter into an estimation of probability. By probability I mean the maximum degree of certainty which can be attributed to a proposition, or to an event, on the basis of a specified evidence. The definition is admittedly vague and inaccurate but, in order to argue for a single principal meaning of "probability," I do not need to defend any particular definition. My defense would be an analysis of the actual procedure in an estimation of probability. I can give here only an illustration of the simplest kind. Let us ascertain by means of the best available physical tests that we are in possession of a practically perfect coin. Let other conditions, as

far as they are under control, of a set-up of tosses with the coin be neither in favor of nor against the coin falling heads uppermost. If perfect symmetry of conditions were attainable, with external interference completely eliminated, we should expect, as the result of a throw, the coin to stand on its edge. Bouridan's ass is an imaginative analogue of the expectation. However, under conditions of experimental approximation to symmetry, we expect a priori, at each toss, that the coin is as likely as not to fall heads, i.e. that the probability of heads is $\frac{1}{2}$, because we see no reason why the unlimited multitude of uncontrollable influences should "conspire" in systematically favoring one side at the expense of the other. The a piori expectation is an intuition; the same intuition, in fact, that makes the scientist disregard the incalculable external interference in his assurance that a pattern of physical magnitudes, which exemplifies a causal law, is isolable. For a physicist cannot discount a minute interference simply because it is quantitatively negligible; a great number of minute forces acting in the same direction would combine into an appreciable interference. The physicist must know by intuition that an experimental isolation of a physical pattern is possible because the untoward minute influences are divided approximately evenly; i.e. because they counteract one another through a symmetrical arrangement. The a priori intuition of symmetry is always relative to our knowledge, and control, of the set-up of the experiment. Accordingly, we may correct our original estimation of probability if the subsequent statistical record does not support it. On the other hand, the original intuition is operative in the interpretation of statistical data. Suppose a long series of tosses with our coin shows an overwhelming predominance of heads. I think that, before we corrected our original estimation, we should be inclined to check on the physical tests, and on other conditions of symmetry and fair trial. We might also resolve to obtain better results by extending the series of throws. Common sense, which is a less spectacular form of intuition, tells us when to stop the experiment. Common sense and intuition also enable us to balance a priori antici-

pation with confidence in the fairness of the trial and due regard to statistical data. For the possibility of a final balance requires a basis of comparison and correlation; and our intuitive acceptance of the principle of symmetry provides the required basis. We correlate the a priori symmetry of anticipated results with the symmetry of statistical curves. Our trust in the existence of symmetry, when systematic bias can be eliminated, is partly an outcome of experience. There is symmetry in radiation, in a spreading wave, in the formation of crystals, in the arrangement of organs within an organism, and even in the markings on the fur of an animal. But, ultimately, the bell-shaped curve, which exemplifies the principle of symmetry in statistical diagrams, is a form of art, and symmetry is an aesthetic requirement; therefore I suggest that the basis of our intuition of probability is an artistic truth.

These are only preliminary comments, and the only excuse for leaving them without further development is that the book does not pretend to be a complete philosophy of power. But while the undeveloped statement of a position may not be sufficient to make the position clear, it has brought out the understanding that a dynamic philosophy is not irrationalism. The point, which marks the distinction between romanticism and a dynamic philosophy, is that power, although unintelligible within the context of a rationalist classificatory scheme, is not the same thing as a blind force. This thesis, inevitably paradoxical in an abstract formulation, becomes plausible if we learn how to recognize it in the presentation of contemporary art. Let me explain by quoting from two outstanding English novelists. In *Two or Three Graces,* Aldous Huxley writes:

> . . . The text-books assign to every action its place in the moral hierarchy; the text-book moralists judge men exclusively by their actions. The method is crude and unscientific. For in reality certain characters have the power to sterilise a dirty action; certain others infect and gangrene actions which, according to the books should be regarded as clean. The harshest judges are those who have been so deeply hypnotised by the spell of the text-book words

that they have become quite insensitive to reality. They can think only of words—"purity," "vice," "depravity," "duty"; the existence of men and women escapes their notice.

In the abstract idiom of philosophy we can only second Huxley by saying that without an insight into the reality of formative power the classificatory schemes of moralists are just words. But D. H. Lawrence, in *Aaron's Rod,* is much more to the point:

> . . . We've got to accept the power motive, accept it in deep responsibility. . . . It is a great life motive. It was that great dark power-urge which kept Egypt so intensely living for so many centuries. It is a vast dark source of life and strength in us now, waiting either to issue into true action, or to burst into cataclysm. Power—the power-urge. The will-to-power—but not in Nietzsche's sense. Not intellectual power. Not mental power. Not conscious will-power. Not even wisdom. But dark, living, fructifying power.

Literary art cannot be translated into philosophy. But a literary passage may be more than an inspiration in a philosophical development: there may be relevance, rooted in an implicit idea, which makes the piece of art and the argument of philosophy elucidate one another. If "connection" is taken in this sense of relevance, I should like to connect the quoted passages with the third chapter, on events and actuality. The theme of the chapter is that formative and fructifying power integrates and organizes a diversity of items into the unity of an actual event. A unique power is the basis of a unique perspective with its display of actual percepts. And this perspective organization of actuality, even though not wisdom, is a form of higher reason. For, while differentiation or itemizing by means of formal logic and conceptual analysis is a prerequisite for the incorporation of items into an actual event, the final integration is by reason of *relevance* which items have to one another. The fourth chapter explains the function of formal logic and conceptual analysis in connection with their limitation and, by contrast, points toward the "logic of relevance."

The Appendix is intended to be an introduction to the theory

of perception, which is outlined in the third chapter in the section entitled "Perception and Causality." This introduction includes an account of Russell's relevant ideas. And, in view of Russell's statement that philosophers have misunderstood his theory, I am pleased to be able to report that he finds my exposition "quite correct" and free from "the misunderstandings of the theory which seem common among philosophers."

POWER AND EVENTS

TRUTH

TRUTH BY DESCRIPTION

TRUTH is a property of propositions or statements. I accept this definition in complete disregard of other uses of the word "true." The restriction may not appear too stringent if I add that I admit the existence of implicit propositions and, with their aid, can take care of artistic truth. To give an idea of an implicit proposition let me quote a fable.

> A Doe once passed near a Lioness, saying, "I have many children in a year, and thou only hast in all thy life but one or two." And the Lioness said to her, "It is true; nevertheless, if it be but one, yet he is a Lion."

Since the moral of this fable is not stated, it is an implicit proposition; and the proof that the implicit proposition is there is that anyone, upon request, can make it explicit in some such statement as "Quality comes before Quantity." We usually read implicit propositions between the lines of a communication, but a caption, a title, or a single clever word may be enough to recognize one. When Hamlet says "What should such fellows as I do crawling between earth and heaven," we identify an implicit proposition if we agree with I. A. Richards that "the implication there is that man should not so crawl." (Cf. *The Philosophy of Rhetoric*, "Oxford University Press, 1936, p. 127.) Any idiomatic sentence carries with it an implicit proposition, since to explain the idiom we translate it into an explicit and literal expression of the meaning. An implicit proposition would seem to exist in the mode of a power: to say that words contain an implicit proposition is to

say that whoever understands them has the power of eliciting from them an additional explicit statement.

There is another restriction. Sometimes the truth of a proposition can be ascertained by an examination of the verbal form alone, of the sentence, that is, with no reference to, or comparison with, nonlinguistic events. Such propositions —among which are definitions, tautologies, analytic truths, and, with certain qualifications, theorems of logic and mathematics—will not be discussed. This chapter is dealing with empirical propositions which are true because of their relation, except when the proposition is about words, to something outside discourse. Empirical propositions can be divided into statements of fact and statements of law. If, in spite of their restricted communicability, perceptual judgments such as "This is a bush" or, a still simpler one, "This is red," can be called propositions, they may serve to illustrate a statement of fact. Existence propositions, for example, "There are black panthers," are communicable statements of fact. In distinction from these, statements of law do not refer to a particular fact or group of facts; they are about facts in a negative, and general, sense of denying that a certain description is, or can be, exemplified. For example, "No men are invisible" denies that the description "Invisible man" applies to facts, and therefore the denial is a law about human bodies. The laws of physics can be treated similarly. To take a familiar example, Galileo's law of freely falling bodies is to the effect that, the factor of proportionality being equal to the constant of gravitation, it is false that the description "Distance which is not proportional to the square of the time" applies in the case of freely falling bodies. As the above examples show, what usually passes under the name of knowledge consists of true empirical propositions. Accordingly, the problem of truth of empirical propositions in their relation to facts is the problem of the relation between knowledge and the world. The conformal and the transformal conceptions of truth are two radical ways of dealing with this problem.

This paragraph is an outline of the conformal theory. The

relation between a true proposition and the corresponding fact is to be understood by analogy with the relation of a map to the territory: an empirical proposition is true to the extent to which it portrays a fact. The ideal which inspires the conformist is exact reproduction of reality, i.e. duplication of the world within discourse. A conformist need not be so naïve as to expect a true proposition to give complete truth, in the sense of a portrayal without omissions, but he requires the proposition to be completely true. There may be omission but no change or distortion. Thus a map cannot represent everything within a geographical area, but what it represents must be present there. The analogy with the map is carried one step further. While the geographical pattern is reproduced on a map, the qualitative nature or character of the objects that embody the pattern must be inferred by means of conventional signs, legends, and the like. For example, the curves of a river and a railroad are plotted by two lines of, respectively, the same shapes, but in order to interpret one line as a representation of the river and the other of the railroad we make use of difference of color. A true proposition, like a map, portrays the structure of things or events but need not and, possibly, cannot communicate their qualitative contents except in terms of symbols or words subject to conventional interpretation. The principle of this differentiation between structure and qualitative content is communicability. Public knowledge, by definition, is communicable; therefore qualitative data, which are confined to the private experience of individuals, are excluded. Admittedly, artistic description can produce images of qualitative data but, so long as the objective status of aesthetic experience is a controversial issue, imaginative reproduction may be a psychologically indispensable accompaniment to the act of communication although not a constituent of the communicable proposition itself. But can a proposition portray structure without the aid of an image of the structure to be portrayed? The question shows that the analogy with a map may be pressed too far. A structure need not be a visual shape, and even when it is, it may be communicated by a formula of

analytic geometry. A sophisticated conformist would define structure as that which can be reproduced by a formula or, more generally, by a logical construction. For example, the simple pattern of a fact reproduced by the judgment "This is blue" is a logical relationship between a certain particular and one of its qualities. Although an ally only for a short stretch of the way, Eddington has an eloquent defense of the conformist treatment of structure. He says:

> . . . Since the structure, abstracted from whatever possesses the structure, can be exactly specified by mathematical formulae, our knowledge of structure is communicable, whereas much of our knowledge is incommunicable. I cannot convey to you the vivid knowledge which I have of my own sensations and emotions. There is no way of comparing my sensation of the taste of mutton with your sensation of the taste of mutton; I can only know what it tastes like to me, and you can only know what it tastes like to you. But if we are both looking at a landscape, although there is no way of comparing our visual sensations as such, we can compare the *structures* of our respective visual impressions of the landscape. It is possible for a group of sensations in my mind to have the same structure as a group of sensations in your mind. It is possible also that a group of entities which are not sensations in anyone's mind, associated together by relations of which we can form no conception, may have this same structure. We can therefore have structural knowledge of that which is outside everyone's mind. This knowledge will consist of the same kind of assertions as those which are made about the physical universe in the modern theories of mathematical physics. For strict expression of physical knowledge a mathematical form is essential, because that is the only way in which we can confine its assertions to structural knowledge. Every path to knowledge of what lies beneath the structure is then blocked by an impenetrable mathematical symbol. (*The Philosophy of Physical Science,* N. Y.: The Macmillan Co., 1939, p. 142.)

Not all conformists, however, are uncompromisingly sophisticated; most of them would probably take exception at least to the last statement of the quoted passage. For example, the structure of the statement "The elephant is bigger than a mouse" is expressed by the form *"aRb";* but many conformists, even though they may concede that the sensory appearance of an elephant or mouse is no part of communicable knowledge and that reference to an animal requires

interpretation, are likely to contend that the empirical statement in question is more than a mathematical symbol because of the intended reference, beyond the structure, to elephants and mice. There also are conformists who believe that sense data exemplify universal qualities and that universals are no less communicable than relational structures. There are many versions of the conformal theory. But whatever the differences they must all accept three basic assumptions. First, there exists a world of facts with an objective structure, i.e. with a structure which is independent of cognition. Second, there is communicable knowledge which consists of true propositions. And, third, these propositions are true because their structures duplicate patterns of the corresponding facts.

Adverse criticism comes from the partisans of the transformal theory. The main fault with the conformist, so say his critics, is that he underestimates the part of interpretation in knowledge. The admission that words or symbols used in order to refer to things and to their qualitative nature require interpretation is not enough. Nor can interpretation be confined to mere omission, generalization, and analysis. So long as the conformist endorses the slogan "completely true even though not complete truth," and opposes any cognitive transformation, he cannot understand that his own differentiation between structure and sensory content is inevitably an interpretative transformation of the objective situation. For there is no such thing as *the* structure of an objective situation but there are as many different structures as the difference in perspective or point of view would allow; and what is structure in one way of looking at things becomes a matter of content in another. For instance, an ordinary map gives a bird's-eye view of the shape of a river; if the scale of the reproduction were much larger, the shape would be different; and at close range there are too many irregularities for the shape to be reproduced at all. A further criticism is that the similarity between a structure in the visual field and the associated formula cannot be taken in a literal sense. But let one of the critics speak for himself:

. . . Consider, for example, the pattern exhibited in the trigonometric formula '$y = \sin x$' on the one hand, and on the other hand the pattern exhibited in the sinuous curve which that formula is frequently employed to represent. Where, precisely, is the analogy between the patterns? Or consider the example of the map, so often used in arguing for some kind of 'analogy' between the pattern exhibited by a complex symbol and the pattern found in what the symbol represents. Now in spite of the 'similarity' between the structure of the map and of the area it represents, the map can serve as a representation of the area only if certain *rules of interpretation* are used. Change these rules and you alter what the map signifies; and, conversely, the pattern of relations exhibited in that area can be formulated by a set of symbols markedly unlike the map—for example, by a set of verbal statements which declare the respective distances, directions, etc., between different geographical elements in the area. . . . But isn't there a difference between saying that the relations between things *exemplify* the relational concepts expressed by a sentence, and saying that the former are analogous to the syntactical pattern of the latter? A given straight line exemplifies the relational pattern expressed by the sentence 'This is a straight line'; how does it follow that because the line does this, the pattern exhibited in the line is 'somehow analogous' to the syntactical pattern? (E. Nagel, *The Journal of Philosophy*, 1934, p. 324.)

Thus duplication of reality in discourse is denounced because it cannot take place. And even if it could, it would be a practically inexcusable enterprise. Even without duplication the world is too baffling and complex. A purpose of knowledge is to aid human orientation by means of a simplified and articulated account; and this means cognitive transformation. If the conformist points out that descriptive omission, generalization, and analysis are sufficient to realize the practical purpose of knowledge, he unwittingly deserts the ideal of theoretical reproduction and truth for truth's sake in favor of purely practical or pragmatic considerations. And this shift betrays the instability of the conformal grounds. For, once the need for a pragmatic justification of knowledge is recognized, the next logical step is to favor cognitive transformation, whether we call it distortion or not, provided it proves to be pragmatically more effective or powerful.

The nature of the transformist's criticisms makes it easy

to understand his own position. The essence of the transformal theory is as follows. Facts are shot through with interpretation and the conformist's contrast between the two is a fallacy. Hence the thesis that cognition is transformation must not be understood as an assumption that two stages are required for the attainment of knowledge, an antecedent awareness of the objective world and a subsequent reshaping of the pre-analytic data in accordance with the rules of interpretation. The objective situation has no determinate structure other than the structure or structures which are disclosed through knowledge; the very meaning of an objective situation is to be indeterminate and therefore to yield to the cognitive prescriptions; and the cognitive prescriptions are true, or adequate, descriptions if the situation to be described yields or is subject to their mold. A transformist of the Kantian school may stipulate an unknowable structure of things-in-themselves behind the indeterminate cognitive situation; but all other versions of the transformal theory reject the notion as an anomaly. However, the presence of such an anomaly is a symptom of an inherent weakness in the foundations of the theory.

To a conformist the notion of a structurally indeterminate situation is unintelligible. He points out that if the situation to be described could be entirely indeterminate any fanciful description, a fiction, should fit in with it just as well as a piece of knowledge. Yet only knowledge succeeds. According to the conformist, the transformal theory must choose between two explanations of the success of knowledge but either choice is damaging to the theory. Knowledge may be successful because the rules of interpretation agree with the antecedent structure of the objective situation; this explanation is a repudiation of the notion of an indeterminate cognitive situation. Knowledge may be successful because the rules of interpretation are arbitrary prescriptions which force reality into their molds. If this is the explanation, the transformal theory ceases to uphold truth by description and joins with the prescriptive theories of truth.

A recent controversy between Russell and Dewey on the

subject of an indeterminate or doubtful situation may serve to illustrate the difference between the conformal and the transformal theories, although neither is Russell an unqualified conformist nor Dewey a thorough transformist. Russell is represented by quotations from *An Inquiry into Meaning and Truth* (N. Y.: W. W. Norton & Co., 1940), and Dewey by quotations from his article on "Propositions, Warranted Assertibility, and Truth" (*The Journal of Philosophy*, 1941).

Russell, who takes the external world to be definite and specific in its physical structure and qualities, construes Dewey's "doubtful situation" as doubtful in relation to a personal doubter and not as something intrinsically indeterminate.

> . . . Dr. Dewey *seems* to speak as if a doubtful situation could exist without a personal doubter. I cannot think that he means this, he cannot intend to say, for example, that there were doubtful situations in astronomical and geological epochs before there was life. The only way in which I can interpret what he says is to suppose that, for him, a "doubtful situation" is one which arouses doubt, not only in some one individual, but in any normal man, or in any man anxious to achieve a certain result, or in any scientifically trained observer engaged in investigating the situation. *Some* purpose, i.e. *some* desire, is involved in the idea of a doubtful situation. If my car won't go, that creates a doubtful situation if I want it to go, but not if I want to leave it where it is. The only way to eliminate all reference to *actual* desire is to make the desire purely hypothetical: a situation is "doubtful" in relation to a given desire if it is not known what, in that situation, must be done to satisfy that desire. When I say "it is not known," I must mean, in order to avoid the sort of subjectivity that Dr. Dewey deprecates, that it is not known to those who have the relevant training. Thus suppose I find myself in a situation S, and I desire a situation S', and I believe (rightly or wrongly) that there is something that I could do which would transform S into S', but the experts cannot tell me what to do, then S is, in relation to my desire, a "doubtful" situation. (Page 407.)

But Dewey means by a doubtful situation essentially what Russell cannot think him to mean. And Russell's misunderstanding, inevitable on the premises of the conformal theory, leads to another mistake. If Dewey's "doubtful situation" were doubtful in relation to a personal observer, constructive

interpretation should not be accepted as a true statement of fact, but at best as a hypothetical speculation. And so, on page 408, Russell adds: "One important difference between us arises, I think, from the fact that Dr. Dewey is mainly concerned with theories and hypotheses, whereas I am mainly concerned with assertions about particular matters of fact. . . ."

In his article Dewey corrects both mistakes: ". . . I *do* mean to say that it (a doubtful situation) can exist without a personal doubter. . . . Even were existential conditions unqualifiedly determinate in and of themselves, they are indeterminate (are such in certain instances) in *significance*." (Page 183 f.)

Hence, for Dewey, there is no clear-cut distinction between interpretation and statement of fact. Any statement about an indeterminate situation, in order to be a pragmatic contribution to knowledge, must be an appraisal which endows the indeterminate situation with significance, with an element of interpretation, that is. Accordingly, the answer to Russell's remark that Dewey is concerned with hypotheses rather than with matters of fact cannot be simply "Yes" or "No." "My position is that something of the order of a theory or hypothesis, a meaning entertained as a *possible significance* in some actual case, is demanded, if there is to be *warranted* assertibility in the case of a particular matter of fact." (Page 170.)

And, of course, Dewey sees no point to cognition which would slavishly follow reality without taking advantage of constructive interpretation: "And if one can look directly at the event in *propria persona,* why have a duplicate proposition (idea or percept, according to some theories) about it unless, perhaps, as a convenience in communication with others." (Page 185.)

But if Dewey were right, if the only point to description were interpretation which transforms an intrinsically indeterminate into a determinate situation, we should expect knowledge to be arbitrary scheming rather than truth. Dewey senses the force of this criticism and is ready to qualify the indeterminacy of a doubtful situation. On page 180 he writes:

"Inquiry begins in an indeterminate situation, and not only begins in it but is controlled by its specific qualitative nature." And in a footnote Dewey adds: "No situation which is *completely* indeterminate can possibly be converted into a problem having definite constituents."

But, surely, this is a concession to the conformist. For our knowledge of the initial "specific qualitative nature" of an indeterminate situation, if not of other matters, is a statement of a particular fact free from interpretation or inference. Dewey does not deny the essential difference between inferential elements and observational data but seeks to avoid the trap by refusing to call observational data, even when the latter are conveyed by means of a statement, knowledge: "In my view, they are not cases of *knowledge,* although propositional formulation of them is a *necessary,* but not sufficient, condition of knowledge." (Page 174.)

This is an evasion of the difficulty. Whether or not we call a statement of observational data knowledge is immaterial; the fact remains that what Dewey admits under the name of propositional formulations of data of observation is exactly what Russell means by statements of particular facts whose truth is conformal. The fact that Dewey's position is untenable is shown by his subsequent shift to a different position where the distinction between observation and inference is no longer feasible. Data turn out to be defined only within the context of inquiry and therefore through interpretation: "Inquiry, as the set of operations by which the situation is resolved (settled, or rendered determinate) has to discover and formulate conditions that describe the problem in hand. . . . [Data], on this view, are always data of some specific problem and hence are not given ready-made to an inquiry but are determined in and by it. . . ." (Page 180.)

This conclusion requires a revision of the notion of an indeterminate situation. For if data are defined only in and by an inquiry, the intrinsically doubtful situation, i.e. doubtful without a personal doubter, should be, Dewey's earlier statement notwithstanding, completely indeterminate. On the other hand, data and conditions instituted through inquiry

must be relative to a personal inquirer, since it is absurd to suppose an impersonal inquiry.

Thus the controversy revolves in a circular groove. Since Russell rejects the notion of an intrinsically doubtful situation, he contends that there is factual knowledge which is completely free from interpretation. But, as Dewey has pointed out, knowledge is an outcome of inquiry which is a medium of interpretation. Yet, if interpretation is cognitive transformation, the situation subject to inquiry is intrinsically indeterminate. However, if the cognitive situation were completely indeterminate, transformation through inquiry would be arbitrary. But, since "arbitrary knowledge" is a contradiction, Dewey must allow for a certain amount of initial objective determinateness and admit a description of the initially determinate features to be conformally true. But this admission leads to Russell's position, and if Russell is right, no situation can be doubtful except in relation to a personal doubter. The impasse is the result of taking a one-sided position. If the essence of knowledge is interpretation, then even statements of particular facts are transformations of facts and therefore falsifications. If truth is unconditional faithfulness to facts, then the intervention of interpretation, which in human knowledge is inevitable, must forever remain under suspicion.

To overcome the one-sidedness of either the conformal or the transformal theories, must one do justice to both? But is *conformal transformation* conceivable? Usually the possibility of a constructive interpretation which is completely true is dismissed as wishful thinking. Of course, no one can overlook the example of an artist who resorts to distortion, or even caricature, only to bring out the reality of things with greater effect; but art and knowledge are said to be entirely different. In opposition to the prevalent opinion I contend that both art and knowledge disclose truth through a perspective transformation. Let S be a statement of knowledge and E the event which S describes. The question is, can there be a relation of description which allows S to be a transformation of E that remains faithful to the nature of

the latter? Many would say "No" because they think that the statements "*S* transforms *E*" and "*S* conforms to *E*" are incompatible. And they are right with respect to all uses of the statements except one. The exceptional use is based on the association of both the verb "transform" and the verb "conform" with the same relation of *realization,* which is the relation between a power, or disposition, on the one hand, and its manifestation, or embodiment, on the other. There is no doubt that realization which turns potentiality into actuality is a modification or transformation; yet, as witnessed by anyone who says "Only now do I realize what this meant to me," change through realization is never literally distortion or falsification. But let me illustrate. As you read these lines, which at first glance are so much undifferentiated print, you must experience their transformation, one line after another, into the shape of definite words and sentences. You may misread a word or two, but the fact that you can correct your mistakes proves that you recognize falsification to be different from transformation that conforms to the original print. An indeterminate situation, illustrated by the lines which are not yet differentiated through subsequent reading, is therefore not indeterminable; and a discrimination between the indeterminate and the indeterminable is necessary in order to understand that cognitive transformation is neither arbitrary nor false. To avoid confusion I prefer to speak of a *determinable* rather than indeterminate situation. Any statement about a determinable situation is already conceptual determination; it promotes organization into perceptual units as well as differentiation and specification of detail and therefore is descriptive transformation; the statement is a meaning which belongs to discourse and not to the course of external events. Even a statement of some particular fact is a conceptual transformation. Of course, to be true, the statement must also be conformal. While you are holding this book in your hands, you may assert the true statement "There is a book." Let the statement be called *S* and the situation which it describes *E*. There is a temptation to say that the correspondence between *S* and *E* excludes any element of

transformation. Some Cambridge realists would say that, under the circumstances, the statement "There is a book" is correct English and true because, in fact, there is a book. But, granted that *S* conforms to *E*, must we take the word of a Cambridge realist to be final? To answer "Yes" is to imply something which I do not admit, namely, that the situation *E* is determinate (a definite book) regardless of whether or not the statement *S* has ever been made. But do I not have to admit that even if *S* were never stated, this book would exist just the same? The question is not legitimate: to answer "No" would be denying the truth of *S*, and to answer "Yes" would be, contrary to the hypothesis that *S* has not been asserted, an assertion of *S*. I must, of course, admit that the situation *E* is there, whether *S* has been stated or not, but this is not to say that the book is there. I admit *E* only as a determinable situation although I understand that, *if* you want to specify the situation, you could describe it as a book in your hands. The "If-then" form of the qualification must be employed because we cannot categorically assert a determinate fact when, in the absence of observers, there is only a disposition to become a fact. Imagine that you are suddenly reduced to the size of a molecule. If we are to believe the physicist, you then would find that the region of space, which is supposed to be occupied, i.e. filled up, by your copy of this book, is "in fact" nearly empty with occasional molecules shooting through it at great speed in every direction. Relatively to the perspective of molecular physics, and therefore to the perceptive faculty of a would-be human molecule, there would be no fact of a solid book in your hands. No doubt even a human molecule could conclude that if it were to grow back to the normal size, it should see the book again. But, again, the conclusion would be an "If-then" proposition. The relativity of perceptual "facts" to the scale of perceptual faculties does not allow for a literal interpretation of the categorical statement "There is a book"; the statement is an idiom to be understood as the hypothetical truth "If percipients, like the reader, exist, they can see a book." And since the "If-then" structure of this truth is not

something directly observable, the element of conceptual transformation is undeniable. But, it may be objected, there is, in addition to the truth of the "If-then" form, the truth of the categorical statement "There are percipients like the reader," and the two truths in conjunction entail the truth "There are books," this time a categorical statement. The objection is a mistake. The observation that the reader and other percipients like him exist is unquestionably true, but this truth is too general and vague to serve as a premise for the intended conclusion; and as soon as we attempt a specification, for example, as soon as we explain that the percipients in question have normal human heads, eyes, and so forth, we introduce perceptual "facts" which are no less relative to perceptual faculties than the original "fact" that there are books. The conclusion which follows from the above premises, without the aid of specification, is not the categorical assertion of the existence of books but the weaker statement that books exist while they are perceived by observers like the reader. The question now is Berkeley's: Do books continue to exist in the absence of any observer? If a book were nothing but a collection of sense data, Berkeley's idealism would be the answer because, by definition, a color, a shape, a sound, or any other sense datum, is an element within the field of perception: "Could any of these [sensory elements] exist unperceived? There was an odor, that is, it was smelt; there was a sound, that is, it was heard; there was a color or figure, that is, it was perceived by sight or touch." If Berkeley's words have not convinced the reader, let him consider the question in this form: What does the expression "unperceived sensory quality" mean, or what would a sensory quality look like if there were no onlooker? Of the many sets of size, shape, and shade of color which the same book shows when viewed from different distances or angles of vision, which set should remain upon the withdrawal of observers, and how is the choice of the remaining set to be performed? If the reader suggests that unperceived qualities are identical in appearance with the qualities of objects that are perceived at the closest range, let him not overlook the fact that even

the closest range of vision involves some distance and therefore a percipient separated by the minimum distance from the datum. The dependence of specific sensory qualities on a percipient must be acknowledged. On the other hand, the existence of unperceived determinable qualities makes idealism untenable. Berkeley to the contrary, a physical process is going on, independently of any observer, within the region where an observer would be expected to see a book. This process, if we are to trust the descriptions of physics, is not like anything given to perception. The physicist tells us about an unobservable curvature of space-time or, when he speaks the language of sub-atomic physics, about an equally unobservable distribution of waves of probability. Certainly, the statement *S* is a conceptual transformation of these unobservable and strange things. However, the physicist's description is only an alternative conceptualization within the perspective of technical scientific discourse.

This is no more than an introductory statement of what I call *the perspective theory of truth.* In comparing my position with others, I have already disposed of the transformal and the conformal theories. I can disregard the coherence theory of truth because it has not sufficiently recovered from the realist's damaging criticism to be, for the present, of consequence. But I must explain why I am dissatisfied with Tarski's semantic conception and with the various forms of the prescriptive theory.

An appraisal of the semantic conception of truth requires the understanding of certain linguistic conventions. When we describe an object by means of adjectives, we, as a rule, attach the adjective to the name of the object and not to its direct presentation. For example, we write "Roosevelt is tall," i.e. we write the adjective "tall" in conjunction with the name of the president. The same convention, to be called *C1,* is used even when the objects to be described are purely linguistic, words or sentences, with the aid of the additional convention *C2* that words in quotes are names of the same words written without quotation marks. Let us take two statements:

(a) "Roosevelt" consists of nine letters;

(b) "The moon is round" is an English sentence.

Statement (a) is about the name of the president, (b) is about a sentence and not about the moon; this we know because, in agreement with our conventions, we use in (a) the name of the name of the president and in (b) the name of the sentence which mentions the moon. Convention *C1*, however, is not a hard and fast rule. Occasionally we may attach a descriptive adjective directly to the object. Thus in admiring a sunset, we may exclaim "Beautiful!" and thereby attach this adjective to the sunset itself. The importance of a recognition of exceptions to *C1* will be understood toward the end of our examination, which I find convenient to begin by introducing Tarski's schema of the adequacy-condition for any definition of truth:

(*T*) *X* is true if, and only if, *p*.

An actual equivalence is derived from (*T*) by substituting for "*p*" some indicative sentence and for "*X*" the name of that sentence. For example, we may derive from (*T*):

"The moon is round" is true if, and only if, the moon is round.

According to Tarski, an adequate definition of "true" must conform to the use of this word in the above example as well as in any other instance of the schema. This is to say that "true" is supposed to be attached to, or associated with, a name of a sentence, and the result of this association made equivalent, by the adequate definition, to the sentence itself. My first objection to the semantic conception of truth is that Tarski's adequacy-condition prescribes one use of "true" in disregard of others which are equally good English. Compare two statements:

(1) "The moon is round" is true;

(2) It is true that the moon is round.

Statement (1) is correct English, but so is statement (2), and yet the latter does not conform to Tarski's prescription. In his article "The Semantic Conception of Truth" (*Philosophy and Phenomenological Research*, March, 1944, p. 373),

Tarski makes the following observation which I cannot accept as a satisfactory answer to my objection:

> The phrases '*p* is true' and '*p* is the case' (or better 'It is true that *p*' and 'It is the case that *p*') are sometimes used in informal discussion, mainly for stylistic reasons, but they are considered then as synonymous with the sentence presented by '*p*.'

Referring again to the same examples, I should rather take statement (2) to be synonymous with (1) than with the sentence "The moon is round" since, unlike the latter, both (1) and (2) mention truth. Of course, (1), unlike (2), uses a name of a statement but I am prepared to argue that such a distinction is immaterial when the name is "transparent" and carries a meaning with it, as happens to be the case whenever a statement is named by being written as a quotation. And if the contention that form (2) is used mainly for stylistic reasons implies that (1) is the logically basic and unobjectionable form, I find this contention arbitrary. With at least as much right I can say that the logically basic and correct form is (2), while (1) is used mainly for stylistic reasons. In fact, and this is my second objection, there is good reason, from the point of view of the theory of logic, to give preference to (2). So long as we adhere to convention *C1*, the choice between (1) and (2) is a question of attaching "true" either to a name of a sentence (and thereby describing the sentence as being true) or to the sentence taken as a name of a proposition (so that "true" would characterize a proposition). Clearly, if a sentence, in abstraction from its meaning, i.e. from the proposition, is a string of typographical marks on paper, we should describe it as short or long, unusual or common, or in many other ways, but not as true or false. To be true or false, a statement must claim truth, but only a meaning, viz. a proposition, can be such a claim. This view, to be consistent with my previous remark that statement (1) is good English and that (1) and (2) may be treated as synonymous with each other, requires a different convention for the use of quotation marks. When we want to draw a distinction between a sentence and a proposition which the sen-

tence expresses, we resort to the new convention *C3*, to the effect that we write a sentence in quotes no longer as a name of the sentence but as a way of writing the sentence itself in opposition to the corresponding proposition, while we interpret a sentence without quotation marks as if it were a proposition. According to *C3*, statement (1) is an abbreviation of the following:

The proposition which is the meaning of "The moon is round" is true.

We now may treat statement (2), like the case of attaching "beautiful" to the sunset, as an exception to convention *C1* so as to have "true" in (2) connected with the proposition directly. Thus reinterpreted (1) and (2) are synonymous: both attribute truth to the same proposition. Tarski's disregard for this way of treating (1) and (2) is far from being harmless: it blinds him to the philosophical problem of truth. He himself says: "In general, I do not believe that there is such a thing as 'the philosophical problem of truth.' " (*Ibid.*, p. 361.) Of course, if "true" described sentences, and (*T*) were the condition for an adequate definition of truth, there would be no philosophical problem. The fact is, however, that "true" describes propositions, and the condition for an adequate definition of truth must therefore specify the relation between a true proposition and the corresponding situation outside discourse. Furthermore the specification of this relation is a philosophical problem. Is a true proposition a copy of a fact? Is the proposition a conceptual transformation of an intrinsically indeterminate datum? Is conceptualization a conformal transformation? Or, finally—a question which will be taken up presently—are true propositions not descriptions at all but instruments of successful prediction?

There are two decisive objections to the prescriptive theory of truth. First, even if some knowledge consisted of rules of successful prediction, there also would be knowledge about these rules, to the effect that they are successful, the truth of which is intended to be a record and not a prediction. Suppose you see a lemon and say "This is a lemon"; your statement is a prediction to the extent to which you

anticipate such statements as "It is sour." The statement "It is sour," on the other hand, may well put an end to the matter without implying any further anticipation on your part. I may admit that even the characterization "sour" classifies a sensation and, in this sense, anticipates similarity to any future sensation which belongs to the same class. But anticipation in this sense is not intended to be a prediction: when we describe something as being sour, we do not assert that similar sensations will take place in the future. Secondly, even if all true propositions were rules derived from successful prediction, there is no reason why these rules should not *also* describe the situations to which they are applied. If a rule did not fit in with, or conform to, the situation, the invariable success of its application would be a miracle. Even mechanical tools "tell" something about the nature of the material to be worked upon. And, since propositions are tools of cognition, they also fit in with, and therefore describe, the situation upon which they operate with success.

TERMINOLOGICAL COMMENTS

THE perspective, or conformal transformation, theory of truth is based on the distinction between discourse and events or facts outside discourse. The opposition is not between language and nonlinguistic situations because I am concerned with propositions rather than with sentences and do not overlook implicit propositions which have no linguistic status at all. But the very existence of propositions has been questioned, and to show that propositions as I construe them are not doubtful entities I must explain what I mean by a proposition.

In a *Note* published in the *Journal of Philosophy* on December 17, 1931, I define the proposition as the minimum meaning of a (declarative) sentence. Similar definitions have been accepted since by many logicians, and I am still ready to subscribe to them provided certain ambiguities are cleared

up. First, the condition of the minimum meaning is required to insure the communicability of a proposition. Given a sentence, different meanings can be associated with it by different people or by the same person at different times; hence there would be no single communicable proposition there at all unless the different meanings overlapped, and it is their common part which is the minimum meaning or the proposition. Of course meanings which are assigned arbitrarily or without understanding the sentence, i.e. meanings assigned in disregard or violation of the rules of grammar and of the correct linguistic usage, do not count at all. But I must admit that, even with these and, perhaps, other qualifications, the minimum meaning is an ideal, so that when ideas are stripped of idiosyncrasies, imagery, and embellishments or associated additional information, the residual meanings conveyed by a sentence to different people may still be different. Also in a special context, for example, within the medium of art, one may succeed in communicating to the readers one's own meaning which is not minimal. Then, in that context, a proposition is not the minimum meaning. Nevertheless the identification of a proposition with a minimal meaning is a *practical* ideal. By this I mean not only that, when a sentence is taken out of its context, the residual meanings that can be associated with it differ but slightly from one another but also that progressive approximation to the ideal is always possible within the limits of desirable precision, i.e. for all practical purposes of communication. Second, in a discussion of the meaning of a sentence one usually takes sentences to be unquestionable and identifiable entities. I, for my part, find that the notion of a sentence has not yet been cleared of confusion and difficulties. To illustrate: Let S and S' stand for two sets of words in the order of their succession below:

(S) "The sky is blue";
(S') "The sky is blue."

Is S one sentence and S' another, or are they two instances of the same sentence? Suppose the answer is that S is a dis-

tinct sentence, then what is the nature of *S*? Is *S* the sense-datum or the percept of a reader who has reached the 4th line from the bottom of page 20? If so, the sentence is incommunicable, for no two readers can have the same percept of the line, at least not if sensations or percepts are distributed among percipients as private data. On the other hand, if *S* and *S'* are only two instances of the same sentence, the latter is an evasive and unobservable entity. It may be construed as an idea or type (in a Platonic sense) that can be exemplified in such instances as *S* and *S'*; but this interpretation is unacceptable to an empiricist or, at least, to a nominalist. A more popular position is to identify the sentence with the class of all instances similar to *S* and *S'*. But this identification raises a host of perplexities of its own. No criterion is given to determine how similar the instances ought to be if they are to be identified with the same sentence. Does the color of the typographical ink make a difference? Could two instances of the same sentence be given, one in print and the other in script? And so on. There is no way of telling whether a sentence is a collection of actual instances or whether it includes unlimited possibilities. And then there are difficulties with the notion of a class. At any rate, if a class is said to be an incomplete symbol or a logical fiction or an abstraction, to define sentences in terms of classes does not make things clear. I have no intention of denying the existence of communicable sentences but the difficulties just mentioned make me suspect that to identify a sentence one may need to refer to its meaning, so that of the two entities the proposition is the more basic or ultimate. Thus I should say that *S* and *S'* exemplify the same sentence because of the identity of meaning: on the other hand, *S* and "Le ciel est bleu" exemplify different sentences, even though they express the same proposition, because they use words of different languages. There is, of course, a need for a term to designate indifferently either a proposition or a sentence or a sentential instance; I choose the word "statement" to be such a neutral term.

If propositions rather than sentences are the ultimate units of discourse, how are they to be identified? The answer is

easy. A proposition is what we must understand when we hear or read a statement which we understand; or, to take the active side of communication, a proposition is the thought which one succeeds in conveying to others by means of a written or spoken statement. I open a copy of *Time* magazine and read: "In the eastern Mediterranean, the British and Americans were also preparing." How must I understand this statement? One thing is certain, we all take it to be an assertion. I do not know who the author of the statement is, nor do I know whether he meant to assert it or merely to introduce it for a subsequent refutation. Just taken as it stands, and in isolation from the context, the statement expresses an assertion. Thus a communicable proposition can be defined as an assertion, not in the sense of something actually asserted by someone but as an impersonal assertion, i.e. it is understood by a reader as a claim to truth. Of course the reader may reassert the proposition, but he need not, he may disagree or merely entertain it for consideration, and even if he himself asserts it he does no more than agree with an assertion that is not his own. There is no mystery in the notion of an impersonal assertion. I do not mean to suggest that an impersonal assertion can exist, or subsist, as something independent of a mind; obviously the reader himself puts the assertion into the statement, i.e. interprets the declarative form of a statement as an assertion; nevertheless the assertion is impersonal in the sense that the reader is able to disown it. Let me try to explain what exactly it means to say that an empirical proposition is an assertion. Every empirical proposition has, besides purely formal elements, connotative constituents which make up, in conjunction, a description. For example, the statement quoted from *Time* magazine contains the description "British and American preparations in the eastern Mediterranean." In technical logic descriptions are called propositional functions and are shown to contain, when given a precise formulation, at least one free variable. Now a description or a propositional function is neither true nor false. But the external reference of a description to that which is describable, to events of experience and nature, is either true or false, and therefore is a

proposition. Thus an assertion, which is an empirical proposition, consists of a conceptual reference to the effect that a certain description does (or does not) describe or is (or is not) exemplified by the events of the world. The statement in *Time,* for instance, is to the effect that the quoted description is exemplified among the events of the Second World War. The conceptual constituents of an assertion are, accordingly, as follows: there is the conception of the field of pure description as opposed to the field of describable events or situations, and then there is reference from one field to the other by conceptually connecting or disconnecting them. The fact that reference is conceptual is decisive against those who still hope to get along in logical theory with sentences unaided by propositions. The existence of the declarative or indicative form of sentences is beyond doubt; but this form must be conceptually interpreted in order to be understood as an assertion. Without interpretation the linguistic declarative form is nothing but a set of percepts or, if one prefers, a set of sounds in the air or print on paper; in any case, a series of natural events which are no more assertive than, say, the process of heating a kettle of water. We do not say that natural events, even if they make up a sentence (in abstraction from its meaning or interpretation as an assertion), are either true or false; they simply are as any other natural process simply is or takes place. Thus assertion, or claim to truth, is not a purely linguistic constituent of a statement and therefore clearly differentiates a proposition from a sentence.

There are writers who want to draw a distinction between a proposition and a sentence, and yet fail because of their insistence that a proposition must be separated from any assertive element. Their insistence on being right is rather naïve since the issue is only a question of expediency and agreement with tradition. If one visitor at a zoo corrects another and says "This is a jaguar and not a tiger," he may be definitely right because there are animals known as jaguars and there are different animals known as tigers. But there is nothing known as a proposition prior to a convention or agreement by logicians or, at least, to a unilateral decision

by one writer. Hence writers are at liberty to divorce a proposition from its assertive function if they please. On the other hand, a critic can point out that their treatment is highly unorthodox and linguistically inexpedient. Tradition requires a proposition to have a truth-value, but a proposition could not be false unless it claimed truth. We should not call a man a liar unless he pretends to be truthful. There is also a tradition in symbolic logic according to which the symbols "p" and "$p = 1$" or "It is true that p" are equivalent, and this means, if we discount a confusion between the levels of logic and metalogic, that the claim to truth is a constituent of every proposition. Consideration of expediency is even more decisive. In abstraction from assertion a proposition has nothing left but the same descriptive or connotative contents that belong to the corresponding propositional function; the same contents may also belong to a command or to a question. For example, "John will close the door," "x is a closing of the door by John," "John, close the door," and "Will John close the door?" express the same descriptive contents or ideas. To identify all these expressions under the name "proposition" is to obliterate a number of useful distinctions. Of course, these expressions have an idea in common, the idea of John's closing the door, but the words "idea," "thought," "description," "contents," and others, already serve the purpose of designating the common idea and there is no need to add "proposition" to the list. Some writers argue that to give a command is to express a proposition because the same observations which would establish whether a command was obeyed would determine the truth-value of the corresponding proposition. But the same observations determine the truth-value of the prediction "John will close the door" and, at the time of its verification, of the statement "John is closing the door," and yet the prediction and the statement are certainly different propositions. In any event I should take exception to an argument which is based on an objectionable identification of meaning with the conditions of verification.

The established distinction between a proposition and a sentence provides a context in which we can dispose of the

so-called physical theory of truth without further preliminaries. A brief exposition of the theory is found on page 31 of H. Reichenbach's *Experience and Prediction* (Chicago University Press, 1938).

Let us turn now to the question of truth. When do we call sentences true? We demand in this case that the symbols be in a certain correspondence to their objects; the nature of this correspondence is prescribed by the rules of language. If we examine the sentence *Ktc3* [which describes the position of a knight on the chessboard], we look to that square which has the co-ordinates *c* and *3;* and, if there is a knight at this place, the sentence is true. Verification, therefore, is an act of comparison between the objects and the symbols. It is, however, not a "naïve comparison," such as a comparison which would demand a certain similarity between objects and symbols. It is an "intellectual comparison"—a comparison in which we must apply the rules of language, understanding their contents. We must know for this comparison that the capital denotes the piece, that the letter co-ordinate denotes the column, etc. So the comparison is, in itself, an act of thought. What it deals with, however, is not an imaginary "content" of the symbols but the symbols themselves, as physical entities. The ink marks "*Ktc3*" stand in a certain relation to the pieces on the chessboard; therefore these marks form a true sentence. Truth, therefore, is a physical property of physical things, called symbols; it consists in a relation between these things, the symbols, and other things, the objects. . . . It is important that such a physical theory can be given. We need not split the proposition into its "mental meaning" and into its "physical expression," as idealistic philosophers do, and attach truth to the "mental meaning" only. Truth is not a function of meaning but of the physical signs; conversely, meaning is a function of truth, as we noted before. The origin of the idealistic theory of truth may be sought in the fact that a judgment about truth presupposes thinking; but it does not concern thinking. The statement, "The proposition *a* is true," concerns a physical fact, which consists in a correspondence of the set of signs included in *a,* and certain physical objects.

Clearly, Reichenbach is committed to a repudiation of propositions because they are "imaginary contents of symbols" or "mental meanings." But if we assume, for the sake of argument, that such complex symbols as "*Ktc3*" can be correlated with physical objects without the aid of mental meanings, we must ask: What are the rules of correlation

and how do they differ from propositions? By Reichenbach's admission they are mental meanings, since he describes them as "intellectual comparison." We may grant that the statement "*Ktc3*" is not about a rule of correlation even though such a rule is required to establish the truth of the statement; this merely raises a further question concerning the truth of the statement of a rule: does the latter require a rule of correlation in its turn? Reichenbach illustrates a rule of correlation by the statement "The letter co-ordinate [in "*Ktc3*"] denotes the column [on the chessboard]." Since he says that we *know* that the letter coordinate denotes the column, he must take the statement of his rule to be true. But if this statement of a rule is not a mental meaning, its truth must require another rule of correlation, and the statement of the latter a third, and so on *ad infinitum*. And this is not the only difficulty of the physical theory of truth; there is also a question of communicability. The ink marks "*Ktc3*," according to Reichenbach, form a true sentence. Does he mean any set of ink marks of the same pattern or does he confine truth to the ink marks on page 31 of his own copy of *Experience and Prediction?* To allow for communication he would have to make use of the class of ink marks of a certain pattern and with the admission of a class a mental meaning appears on the stage.

Let me add a remark about the relation between a true proposition and a fact. A distinction may be drawn between the basic and the derivative senses of the word "fact." In its basic sense "fact" designates an actual event or process or any objective situation outside language or discourse (except when, as in this section, discussion is concerned with words and propositions). Thus a fact is the objective basis of the truth of a proposition, while a true proposition is a conceptual articulation, and expression, of a fact. On the other hand, a fact, in a derivative sense, is the same thing as a true proposition about an event. Thus the event of *Napoleon's defeat at Waterloo* is a fact in the basic sense to be distinguished from the derivative fact that *Napoleon was defeated at Waterloo*. I shall nearly always use the word "fact" in its basic sense.

The objective situation, which is asserted and expressed by a proposition, may not be an actual event or process but a power. I use the term "power," following Locke, in its metaphysical significance which is closely allied to the meaning of such words as "potentiality," "tendency," and "disposition." All these words designate a kind of reality which is to be contrasted with actuality; and the contrast, as I see it, is based on the observation that only actual entities are relatively complete. But there are different modes of incompleteness. Potentiality is to be associated with the mode of utter indeterminacy and indefiniteness. I think pure potentiality is a conceptual ideal which is never reached but only approached by a dynamic situation in which a multitude of conflicting and confused tendencies counteract or cancel one another. A distinguishing characteristic of such a confused dynamic situation is the possibility of alternative transformations toward order, differentiation, and actuality. Indeterminate potentiality is transformed into a determinable situation of power when the imposition of a framework of actual conditions suppresses untoward tendencies and eliminates the alternative ways of transformation. Power may be a definite and even determinate source of action, but it is incomplete so long as it tends to find completion in actualization. And even when embodied, although no longer to be called "tendency" or "disposition," power may continue to sustain its own actualization through a sequence of events. In this sustaining function power plays the part of a substance but, unlike "substance" of classical philosophy, power is an observable agency. These remarks, to the extent to which they are more than linguistic conventions, are elaborated, qualified, and justified in the course of subsequent discussions.

Experience of causal compulsion is a mode of observable power which is indispensable in a justification of causality. The point has been obscured by an ambiguity of the terms "cause" and "effect" in connection with the mathematical form of causal laws. To illustrate, let us consider the law of the fall of a particle under the action of gravity "$a = g$," where a represents the acceleration of the particle and g the constant gravitational force. Integration with respect to t

results in the equation of motion "$x = \frac{1}{2}gt^2 + v_0t + x_0$," of which the familiar Galileo's law "$x = \frac{1}{2}gt^2$" is a special case. Both philosophers and physicists have identified the independent variable of the equation with the cause and the dependent variable with the effect. And since the relation between the independent and the dependent variables is functional, and does not involve temporal sequence, the identification has led to the conclusion, V. F. Lenzen's ingenious considerations to the contrary notwithstanding, that experience of compulsion, which is a temporal process, is irrelevant to the problem of causation. This conclusion, however, must be rejected the moment we shift our grounds, in the use of the terms "cause" and "effect," by following the quantum physicist who argues that the causal law breaks down because the antecedent state of an electron, the simultaneous values of its position and velocity, cannot be specified and that therefore a subsequent state cannot be computed. Obviously, the quantum physicist identifies the cause with an antecedent state, the initial conditions v_0 and x_0 in the equation of motion, and the effect with a subsequent mechanical state. In accordance with this identification, to which my own treatment of causality adheres, a causal law is a link, which corresponds to the experience of transition in causal compulsion, between the cause at t_0 and the effect at any subsequent time t.

PERCEPTUAL JUDGMENTS AND TRUTH

PERCEPTUAL judgments differ from other empirical propositions not only because they are, in most cases, incommunicable, but also because they appear to form an exception to the thesis that description is transformation. We are ready to grant that perceptual experiences are utterly unlike the unperceived physical reality which is their source. But when a judgment is not about physical process at all, when we intend it to be no more than a record or account of an actual percept, the truth of our description would seem to exclude

transformation altogether. Why shouldn't we, or at least why can't we, give a faithful description of just what we perceive? Of course, we must note that many perceptual judgments are not about percepts or sense data but only use these in order to refer to a physical situation. When, looking at a tree, you say "This is a tree," only one aspect or part of the physical object, which is the tree, can be (if at all) identified with your visual datum; yet the judgment must refer to the total physical object, i.e. beyond perceptual experience, since, if it did not, it would imply the falsehood that a tree is a part of itself. Our question, however, is confined to perceptual judgments which do not refer to any physical situation. And, I think, we may admit, at least for the sake of argument, that some of them are conformally true. Yet a perceptual judgment which is conformally true can be only an exception to the rule. The point, which I want to emphasize, is that usually a judgment of perception, even when it is not about a physical situation, refers to something which is beyond the data of experience. To explain myself, let me contrast a judgment which is directly about visual data with another which is not about a physical object and yet requires interpretation. Suppose that, after you saw a red spot against a background of green, you have an afterimage which you describe by the statement "This is a green spot against a background of red." We may grant, for the sake of argument, that your description is conformally true. On the other hand, consider the statement "This is a circle" in connection with the figure below.

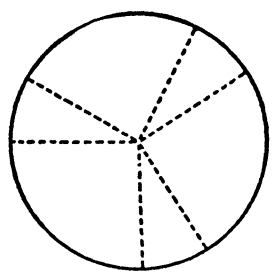


FIG. I

Although it is possible that on certain occasions one may use the sentence "This is a circle" to describe one's own percept, there can be no doubt that in most cases the statement is made with an intention to refer to an objective, perceptible situation and not to a strictly private experience. Thus "This is a circle," meaning "This percept of mine is a circle," as a judgment which may be conformally true, must be contrasted with another meaning of the same sentence (which has so far escaped the attention of epistemologists in spite of being the usual meaning), namely, "The perceptible figure, i.e. Fig. 1, is a circle," which refers beyond one's private percepts to the *perceptible*. Clearly, the perceptible figure must not be identified with the physical processes (as described by the professional physicist) taking place within the region of Fig. 1. For people who are entirely ignorant of scientific physics can refer to Fig. 1 just as well as the scientists. Furthermore, the physical processes are not perceptible and, even if they were, they would not present a smooth uninterrupted curve but rather a ragged range of typographical ink-hills. If the perceptual figure is to be called physical in opposition to the actual percepts, "physical" must be understood in a special sense of a certain dynamic set-up, i.e. as a designation of objective tendencies to find realization in subjective images. In short a perceptible but not yet perceived figure is an instance of a determinable situation, or of a power. This will be better understood if we examine the pattern inside the circle of Fig. 1.

> When the center of this pattern is fixated it will after a while be suddenly transformed. If, for instance, the three narrow angles —in our example angles of 30°—were first seen as a figure, and the large angles as part of the background, after a sudden change the latter will constitute the figure, and the former will recede into the background. Soon this configuration will again be replaced by the first, and so forth. Thus a sequence of abrupt transformations will be observed which, I believe, no subject is able to prevent. (W. Köhler, *Dynamics in Psychology,* N. Y.: Liveright, 1940, p. 68.)

The quoted passage explains why the perceptible figure

can be characterized as a dynamic and objective situation which is not to be identified with the underlying physical process. The situation is dynamic because it *forces* upon the percipient a sequence of abrupt transformations of percepts. These transformations are objective because all percipients share the experience. And finally the objective transformations are not physical, in the physicist's sense, because no abrupt physical process of transformation takes place within the region of Fig. 1, at least no more so than within any other region of the same page.

Consider the nature of truth which a statement about the reversible pattern of Fig. 1 may have. Let us call a percept with the three narrow sectors in the foreground *N* and an alternative percept *W*. We find that no statement given exclusively in terms of these actual percepts can be a true description of Fig. 1. Thus we know that "This is *N*" and "This is *W*," when each is meant to exclude the other, are both false, and this knowledge proves that such statements are not used to describe private percepts since, if they were so used, they would be true. In an attempt to describe Fig. 1, as opposed to a private percept of it, we may try a conjunction or a disjunction in terms of actual percepts alone but the outcome is unsatisfactory. Thus the conjunction "Sometimes the figure is *N* and sometimes it is *W*" would imply that the figure itself changes from time to time, whereas we know that the change is a replacement of percepts. Also there is the implication that when the figure is *N*, it is not *W*, and when it is *W*, it is not *N*. Yet we know that Fig. 1 can be perceived at the same time as *N* by one person and as *W* by another; and even the observer who perceives *N* might have observed *W* instead. The disjunction "Either Fig. 1 is *N* or it is *W*" cannot be true either, since each of the alternatives is already known to be false. Of course, there is a different disjunction, "Fig. 1 appears as either *N* or *W*," which is true; but this truth sets Fig. 1 in opposition to its appearances or manifestations, or, to put the same thing differently, it is a differentiation between the perceptible figure and the actual percepts. Thus a correct description of

the figure refers to a disposition even though the means of reference are visual sense data.

An objection, by the conformist, that the statement "Fig. 1 appears either as *N* or as *W*" is conformally true, overlooks at least two things. The statement in question does not describe the perceptible figure but refers to it while describing its manifestations. And, secondly, the disjunctive form of the statement is a logical construct which involves conceptual transformation. There are no disjunctions in the world outside discourse; "not even the most ardent Platonist would suppose that the perfect 'or' is laid up in heaven, and that the 'or's' here on earth are imperfect copies of the celestial archetype." (B. Russell, *Principles of Mathematics,* 2nd Ed., p. ix). But if the truth of our disjunctive statement is not purely conformal, what is its empirical basis? If we were satisfied with Köhler's description, we should conclude that reference to the perceptible figure, as opposed to either *N* or *W,* goes beyond perceptual experience altogether. But I believe that closer inspection will convince the reader that, even if fairly sudden, the change from *N* to *W,* or from *W* to *N,* is never instantaneous, and that there is an interval, however short, of a state of transition. The experience of this state of transition is elusive and difficult to analyze: there is, as it were, perceptible agitation within the field of the figure, and during this period of unrest the segments of the pattern seem to be set in motion and their contours blurred even though the alternative percepts *N* and *W* have exactly the same contours. Thus the statement "Fig. 1 appears as *N* or *W*" must be replaced by the more complete formulation "Fig. 1 appears either as *N* or as *W* or in a state of transition." One might go one step further and try to identify the state of transition with the perceptible figure itself. For, one might argue, the state of transition is the common source out of which either *N* or *W* emerge, and this fact is the reason for the assignment of *N* and *W* to the *same* figure; also since there is no definite shape or configuration in a state of transition that would exclude any other explicit pattern (in the way the patterns of *N* and *W* exclude each

other), the condition which allows the same power to have alternative realizations is satisfied. But the argument is not conclusive. For we may distinguish between the state of transition which is already on its way toward a definite percept from the ultimate source of transition which is an unstable field of alternative tendencies that does not favor one of them to the exclusion of others. The distinction between the dynamic source and a state of transition can be drawn because there is no transition during the period when one alternative percept actually takes place yet the disruptive power underneath may still be at work. Thus while Fig. 1 appears in the shape of *N* there is no state of transition, but the perceptible figure, in the mode of a power to bring about another transformation, is present just the same. We may say that the experience of a state of transition is the empirical basis for the differentiation between the perceptible figure and an actual percept: our reference to something which brings about the replacement of one actual percept by another is not groundless. Nevertheless, a reference to a hidden source of change is a conceptual extension beyond the given. This means that conceptual transformation, to be called "conceptualization," takes place even when perceptual judgment is intended to be no more than a record of an automatic change in perception.

Conceptualization has a greater part in cognition when the perceptual judgment itself is a factor in "carving" actual percepts out of the perceptible. Another reversible pattern may serve as an illustration. Let us describe our alternative percepts of Fig. 2 by means of the following two statements: (a) Fig. 2 appears with the side *abcd* in the foreground, and (b) Fig. 2 appears with the side *efgh* in the foreground. There is no spontaneous or automatic perceptual transformation within Fig. 2, but either of the two statements may conceptually induce a change from one alternative percept to the other. Let the reader's percept be described by statement (a); by following the specifications of statement (b) he can bring about a perceptual transformation.

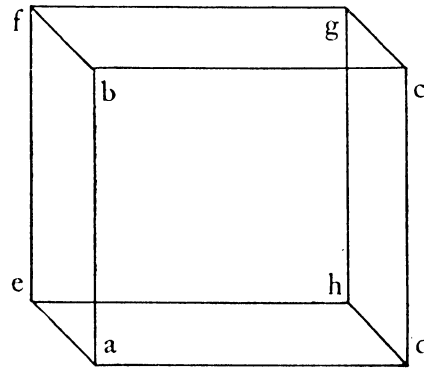


FIG. 2

Conceptually conditioned perception is unmistakable in the case of the so-called puzzle pictures. You look at a picture and, at first, you see only a drawing of a tree. But the caption "Where is the man?" suggests an implicit proposition, "There is a discernible figure of a man among the outlines of the leaves and branches of the tree," and with the aid of this conceptual information you begin to look for the figure until it takes shape perceptually. If the conformist points out that the figure was there all the time, hidden within the drawing of the tree, he is a victim of a confusion between a picture and reality. A real man can be hidden on a tree, because he himself knows, even if no one else does, that he is there. But there is no way of explaining the status of "a drawing which no one perceives" except by some such hypothetical statement as "If you look at the picture in a certain way, you may perceive the figure of a man," and the "If-then" form discloses a requirement for perceptual organization on the basis of an objective disposition. "The hidden drawing" designates a perceptible figure, a disposition to be perceived, and not an actual percept. The situation is quite analogous to a familiar experience of seeing images suggested by the shape of a cloud or some other natural appearance. Let me quote a relevant dialogue:

HAMLET: Do you see yonder cloud, that's almost in shape of a camel?
POLONIUS: By the mass, and 'tis like a camel, indeed.
HAMLET: Methinks, it is like a weasel.
POLONIUS: It is backed like a weasel.
HAMLET: Or, like a whale?
POLONIUS: Very like a whale.

Polonius' replies are servile, but we do not feel that his servility is exaggerated because we know that suggestion can produce alternative images out of the same cloud. We also differentiate between such conceptually molded percepts and the more spectacular phenomena, for example, in hypnotism, when there is no question of truth because images are induced without any basis of an objective determinable situation.

I have already conceded that, if the percipient's intention is to describe his percept rather than the corresponding perceptible situation, a judgment of perception *may* not involve any element of interpretation. The question whether such conformal judgments exist is closely connected with the familiar issue of the incorrigibility of basic propositions. We might think that a basic proposition cannot be false, since its truth is, by definition, "wholly dependent upon the character of one occurrence that he (the percipient) is noticing" (Russell). However, we must not overlook the fact that a basic proposition expressed in words shares in their generality, and the question is whether this generality commits the speaker to a reference beyond the present occurrence. Suppose the percipient notices a green patch and describes his percept by the statement "This is green." Since the word "green" applies to any shade of green while the percept is a particular (more or less determinate) shade, the statement, in effect, asserts: "There exists a certain shade of green and this is it." Thus interpreted the judgment of perception turns out to be an existence proposition and not a basic proposition at all. In order to circumvent linguistic generality, we may coin a special word, for example, "green-1," applicable to the given shade only, and translate the original statement into

"This is green-1." The question now is whether we are merely naming a new experience (a shade of green that we have not seen prior to the present occasion), in which case there would be no judgment but a stipulation, or recognizing an already familiar shade of green. If there is recognition, the existence of basic propositions is still questionable. We may contend that "This is green-1" means, or entails, the general proposition "For every member of the class 'green-1 shade,' this is similar to it" or, at least, some such proposition as "This is similar to the standard experience of the shade 'green-1,'" which involves reference beyond the datum. R. M. Chisholm has argued that, in saying "This is green," we need not compare the datum with a standard occurrence because, if we should contend that predication is always based on comparison, we would be involved in an infinite regress (cf. *The Library of Living Philosophers,* ed. by P. A. Schilpp, vol. v., p. 434 f.). But, even if his argument proves that predication of the two-term predicate "similar" is noncomparative, Chisholm has not shown that predication of any such one-term predicate as "green" can also be noncomparative. There is a better argument but it depends on Russell's hypothesis that a specific shade of color (or any other determinate quality) is not a universal but a particular. For, of course, if the word "green-1" were a proper name of a particular, there would be no distinct instances of the shade "green-1," and therefore no reference to a standard instance. But it remains to be seen whether Russell's hypothesis is tenable. A "causal" interpretation of "This is green," which also forms, with a reservation, a part of Russell's theory of basic propositions, would likewise allow for a noncomparative predication of "green." According to such an interpretation, the sight of green directly causes the percipient, because of an acquired habit or conditioned reflex, to utter the words "This is green" without the intervention of comparison with an antecedent experience. But a "causal" interpretation of basic propositions does not exclude the possibility of error because causal mechanism may get out of order. Furthermore, a basic

proposition is more than a verbal response to a datum since it must also be a belief in the appropriateness of the response. As Russell has pointed out, if we ask the percipient "Why did you say 'This is green'?" the expected answer is "Because this *is* green" rather than "Because something compelled me." And the expected answer, as contrasted with the causally conditioned utterance, raises the problem of reference beyond the datum all over again. Nor is this all. Russell himself suggests that "This is green" represents analysis, viz. "Green is part of the (present) visual field." I am ready to accept his suggestion. But, as I have explained in the Preface, a judgment of analysis is not a statement of strict identity—it is, as Russell puts it, "something different from the logical operation of observing that a rational animal is an animal"—and involves interpretation in the sense of making a meaning explicit. I should still hold that a judgment of perception, which is a basic proposition and an operation of analysis, is incorrigible, but only because I believe that the basis of analysis is intuition.

The bearing of our observations on the perspective theory of truth is this. The verbal form of basic perceptual judgments notwithstanding, they are seldom directly about actual percepts, and therefore unlikely to be true in a strictly conformal sense; usually a perceptual judgment refers to a perceptible situation beyond the actual percept, and employs the latter only as a means of reference. Transformation of a perceptible situation into an actual percept may be antecedent to any judgment; but even when it is, a subsequent perceptual judgment adds to the outcome a transformation of its own, a conceptual interpretation, which refers the percept to a transcendent power and, in case there are alternative percepts, construes the power in the form of a disjunction. Nevertheless conceptualization, if true, is not arbitrary: each term of the disjunction must have as an objective counterpart an alternative tendency within the perceptible situation. This is to say that a perceptible situation is determinable and not indeterminate. For example, we can describe Fig. 2 by a disjunction, i.e. by saying that it appears

either with the side *abcd* or the side *efgh* in the foreground, but we cannot arbitrarily alter the terms of the disjunction; we cannot stipulate another alternative percept, say, with the side *ebcd* to the fore. On the other hand, when an objective basis within a determinable situation is present, conceptualization may take the leading part in the formation of an actual percept.

TRUTH IN SCIENCE

SCIENCE at its best is physics where causal laws are more than empirical generalizations because they have the exact form of mathematical equations. This fact is so characteristic that we may *define* physics as the empirical science which can be translated into the language of mathematics and, by implication, discredit the efforts of psychology and other sciences to become equally mathematical without merging with physics. But, though unquestionably an advantage, mathematical formulation is a problem for the philosophy of truth. Causal laws in the form of mathematical equations are descriptive transformations and we are tempted to doubt whether the transformation is ever conformal. A basic equation of the special theory of relativity, for example, contains the square root of minus one as a constituent; and, since we should hardly expect this constituent to be anything but a symbol of computation, we may be unwilling to treat the equation as a literal transcription of physical nature. The fact that physical laws are not true in a strict conformal sense is widely accepted. But the radical empiricists go too far when they contend that causal laws are only heuristic maxims. The task of a perspective theory of scientific truth is to oppose the empiricist exaggeration and to demonstrate the existence of a conformal aspect in physics.

When the radical empiricist identifies the meaning of a statement with the method of its verification, he does not require actual observation but verification in principle. Yet, as he himself points out, verification in principle, or the pos-

sibility of verification, must not be understood in a sense which is either too narrow or too broad. Thus restriction to verifiability within the resources of modern technology is too stringent because it would rule out many scientific statements that have always been accepted as meaningful. On the other hand, if the possibility of verification were no more than freedom from contradiction, certain metaphysical statements would be empirically legitimate. Hence the radical empiricist is dissatisfied with both interpretations. His own position is that a statement is verifiable if the procedure of verification conforms to the laws of physics. But since, in accordance with this position, the very meaning of an empirical statement depends upon the acceptance of physical laws, the empiricist contention that the latter are only heuristic maxims is not plausible. The requirement for conformity with the laws of physics can be explained only by a conviction that verification takes place under the conditions of physical existence and that these conditions are expressed by causal laws. The point is that verifiability in conformity with physics is meant to provide standards of objective truth which would exclude from meaning anything subjective, fanciful, or arbitrary. Thus, to claim plausibility, the radical empiricist must either reject his theory of meaning or accept the truth of physical laws. And, since the identification of meaning with verifiability seems to be a pet theory, the dilemma can be taken as a presumption in favor of the conformal aspect of physics.

The mathematical form of a physical law is a problem for the philosophy of truth because mathematics is an abstract discipline while physics is empirical knowledge, and there is no apparent reason for their alliance. Why should correlations of pure numbers correspond to relationships of physical magnitudes which are established by experiment? N. R. Campbell explains at length the significance of this question.

> Let us take as an example Galileo's law ($s = ft^2$) . . ., which relates the distance that a body slides down an inclined plane to the interval occupied by the sliding. In establishing this law, we

shall write down in our notebook in parallel columns (1) and (2) pairs of numerals, one representing the distance and the other the interval, thus:—

(1) Distance (cm.)	(2) Interval (sec.)	(3) (2) squared	(4) (3) divided by (1)
10	0.32	0.1024	0.01024
20	0.45	0.2025	0.01012
30	0.55	0.3025	0.01008
40	0.64	0.4096	0.01025

We now perform on the numerals in these columns certain mathematical operations; we square the numerals in (2), getting column (3), and divide them by column (1); the result, column (4), is always as nearly the same as the known accidental "error" in measuring t permits. Accordingly we say that t^2/s is a constant, which we call [the reciprocal of] f; and we write $s = ft^2$. . . . The "mathematical operations" that are performed in columns (1) and (2) in order to derive column (4) are not suggested by the nature of the experiment; they are not indeed suggested by any experiment whatever. They are not operations of the kind suggested by counting or any other operation inherent in the process of measurement. They are operations invented by mathematicians . . . to satisfy their characteristic love for general propositions about abstract ideas. It so happens that these operations (and especially the simpler operations) invented by mathematicians, when applied to numerals resulting from experiment, actually lead to "constants" and therefore to "numerical laws." Physicists are so accustomed to this fortunate accident that they take it as a matter of course and have ceased to be astonished at it: they never draw attention to it. Because it is never pointed out, no philosopher (so far as I am aware) has ever tried to explain it; but it is essential to the practical utility of science, or at least of physics; if any theory concerning the nature of reality is to explain why the activity of physicists has an influence on the lives of mankind so much greater than that of (say) chess players, it should surely give some account of the origin of the accident on which so much of this influence depends. (*Proceedings of Aristotelian Society*, sup. vol. 17, p. 131 ff.)

The word "accident" at the end of the quoted passage is characteristic; the connotation of the word, and the associations that go with it, may have prevented Campbell from solving his problem. For if the alliance between mathematics

and physics were an accident, reference to ultimate irrationality would be the end of the matter. But, I think, analysis leads to a better explanation than accident. Let us not confuse the problem under consideration with the different, even though relevant, question of whether the existence of constant correlations in physical nature can be proved. The latter question is different because it could be asked even if causal laws were not numerical. Furthermore, if there were no constant physical correlations, there would be no point to Campbell's problem; on the other hand, once their existence is granted, the solution of his problem is extremely simple. Campbell's question amounts to this: Why are physical laws numerical or, more explicitly, why are constant correlations of physical magnitudes expressed by functional relations of numbers? The answer is as follows. Measurement of physical quantities gives a set of numerals. Therefore a constant correlation of these quantities must be a constant correlation of numbers. And functional relations in mathematics serve to express constant correlations of numbers. There would be good reason for astonishment if abstract mathematical correlations were imposed upon nature arbitrarily but with success, or if the same mathematical operation were to form the basis of all physical laws. But neither is the case. Given Campbell's columns of numerals, a pure mathematician might try, instead of dividing the numbers in (3) by the corresponding numbers in (1), multiplication, but the products would fail to disclose any physical constant; on the other hand, if columns (1) and (3) were filled up with numerals derived from simultaneous measurements of the pressure and volume of a gas, the products would give a constant of Boyle's law. The point is that different functional relations correspond to different causal laws. And this point establishes the conformal aspect of mathematical physics.

But the assumption that there are constant correlations of physical magnitudes remains to be justified. The nature of this assumption can be best understood by going over the relevant characteristics of the corresponding mathematical

form. A physical law has the form of a functional correlation of a finite, and usually small, number of variables whose values are numbers derived from measurement of certain physical magnitudes. The presence of variables is significant. They represent kinds of physical quantities, which means that a law does not require a recurrence of specific causes with their specific effects but only a recurrence of correlated kinds. The requirement is much less exacting than that of the so-called principle of causality expressed by the familiar saying "Same cause, same effect." The course of nature may never repeat itself, the values of correlated variables may vary within wide limits; yet numerical laws are valid so long as the assignment of initial conditions or values to the variables, agrees with the antecedent state and allows for the prediction of a subsequent state, so long, that is, as there are constant correlations of measurable kinds. Recurrence in kind is unobjectionable; at any rate, outside the field of science we take it as a matter of course. There is the cycle of the seasons with the inevitable variations in detail; the human figure is identifiable through the unending peculiarities of individual size and build; and there is statistical regularity. This is the type of recurrence which favors a perspective theory of truth because it reduces to a minimum the cognitive necessity to conform to data outside discourse. For we need not even assume the existence of specific and definite physical entities, an assumption that would be indispensable if we were confronted with a recurrence of specific causes and effects. The minimum objective basis for the truth of an assertion of a recurrence in kind would seem to be the presence of a determinable power to acquire alternative specifications under different specific conditions. This is to say that, in agreement with a perspective theory of truth, conformal, or ontological, reference is to tendencies rather than to actual entities. And the existence of objective tendencies accounts for another characteristic of the mathematical form, viz. the finite number of variables in a physical law. For this characteristic fits in with the scientist's assumption that sets of factors can be isolated from the rest of physical nature to the extent to which

they exhibit constant patterns of correlation. But the assumption of isolable patterns is a conceptual ideal to which nature responds by approximation only. Everything in the physical world is interlaced with everything else and every event leaves its imprints, however slight they may be, everywhere; and in view of this universal interconnection analysis of the total course of nature into strands of histories within isolated systems is a conceptual transformation. But to show that the transformation is conformal we need only add that there are objective tendencies toward differentiation into clusters of correlated magnitudes. Although never completely isolated, physical systems are isolable. Actual isolation, or a close approximation to it, may and usually does require the scientist's interference with the course of nature; patterns of physical phenomena must be sheltered from untoward external forces of disruption or distortion, and test tubes and other scientific implements provide a shelter. Yet isolation in experiment is not full proof; and the concept of an isolated system is still an ideal which must be justified.

We all know that there are false ideals but we need to be told that an unrealized or even unrealizable ideal may be true. The first to tell us so was Plato:

> In any case, can a theoretical sketch be perfectly realised in practice? or is it a law of nature that performance can never hit the truth so closely as theory? . . . Then do not impose upon me the duty of exhibiting all our theory realised with precise accuracy in fact; but if we succeed in finding out how a state may be organised in very close accordance with our description, you may admit that we have discovered the possibility of realising the plan which you require me to consider. . . . Then our next step apparently must be to endeavour to search out and demonstrate what there is now amiss in the working of our states, preventing their being regulated in the manner described, and what is the smallest change that would enable the state to assume this form of constitution, confining ourselves, if possible to a single change; if not, to two; or else, to such as are fewest in number and least important in their influence. (*The Republic*, Book v, p. 473, tr. by Davies and Vaughan.)

An ideal is true not because it is realizable but because

attempted realization can approach it indefinitely in a series of successive approximations; as Plato saw it, there must be a possibility of progress from the given approximation onward with the least amount of change and disturbance. There is no doubt that the concept of an isolable physical system is a true ideal in Plato's sense. Experiment and test tubes have been progressively perfected to a point where external interference is reduced to the order of magnitude within the error of measurement. And, since the error of measurement depends on the technique in use, the physicist is in a position to prescribe the technical procedure which would reduce regular interference to the scale of the inevitable error. This means that, if the physicist scrupulously complies with the prescriptions for the isolation of an isolable pattern, the exhibition of the pattern is certain to be practically free from distortion. The existence of patterns that cannot be isolated with a prescribed degree of precision is no objection to the truth of the physicist's ideal; such recalcitrant patterns simply do not belong to physics. Physics, if one wishes, may be defined as the science of practically isolable systems of quantities.

The requirement of isolation implies, among other things, that an exhibition of a physical pattern can take place anywhere at any time. This universality is expressed even more clearly by another property of the mathematical form. A causal law is usually derived, by integration and subsequent assignment of numerals to the constants of integration, from a second order differential equation (so that the latter may also be called a law of physics). For example, Galileo's law, $s = ft^2$, which is a special form of the equation "$s = ft^2 + at + b$," is the integral of Newton's second law of motion, $F = ma$, which is a second order differential equation. The integral solutions of a differential equation are continuous functions and, since a continuous function has an infinite number of values, the corresponding law of physics, although testable by a finite number of observations only, must be assumed to be valid for all places and dates which intersperse those of actual observation. The inclusive validity of

a physical law can be described, somewhat paradoxically, by the conjunction of the following two propositions: (1) The law can be verified for any set of correlated values of its variables and (2) The law cannot be verified for all sets of the correlated values. Russell has explained (on page 86 of his *Inquiry into Meaning and Truth*) that such a conjunction is not a contradiction but his explanation is not complete and, I believe, cannot be completed on the grounds of a conformal theory of truth. For if proposition (1) were true in a strictly conformal sense, it would entail, in contradiction to proposition (2) which restricts observation, the possibility of verifying the law for every set of its values. To avoid contradiction we should say that (1), unlike (2), is not a description of an actual situation, and that therefore it may be true only in the sense in which contrary-to-fact suppositions, the subjunctive conditional forms, are sometimes true. Accordingly, to say that (1) is true is to assert that verifiability is not restricted by space or time. In other words, (1) assumes that a law is associated with a disposition for exemplification even though, in accordance with (2), exemplification at certain places and dates is excluded by the actual set-up. The assumption that a physical law is independent of any particular time of verification finds a further expression in the fact that the differential equations of physics do not contain the time explicitly. Of course, to incorporate an assumption into the formulation of physical laws is not to justify the assumption. A justification would have to meet Hume's point that verification in the past does not exclude a possible breakdown of the law in the future. There is, as far as I can see, only one way of dealing with Hume's skepticism: we can discredit his point by proving that it is virtually equivalent to the unplausible notion of an absolute time. If the ways of nature should undergo a complete and unpredictable change at some time in the future, the change would be an explicit function of that time. And a completely unaccountable and unprecedented physical manifestation would be an uncaused event. But the occurrence of an uncaused event at a certain time would single out, as absolute, the date of the occur-

rence. Not only would this mean the existence of an absolute time, but the latter would seem to be empowered with causal efficacy. For there is nothing in the world, no evidence or fact, which could be used in drawing a distinction between the verifiable meanings of the statements "The event *E* occurs without a cause at the moment *M*" and "The moment *M* is the sole cause of the event *E*." Although the two statements are different sets of words, they express the same empirical meaning because whatever would verify one of them would verify the other and whatever would refute one would refute both. An uncompromising skeptic might argue that the identity of meaning merely shows that the assertion of the existence of a cause is redundant and meaningless, i.e. he might interpret the identity of meaning in the sense of a unilateral reduction of the second of the two statements to the first. But such an interpretation would not only allow for events which are not caused in accordance with a law of nature but for absolutely unconditioned events, for occurrences without any rhyme or reason. Even Hume did not go that far. For a world of absolutely uncaused events would be a world of miracles, and a skeptic tolerant of miracles is not a regular skeptic. Furthermore, as will be shown in a later chapter, causation can be experienced in the form of compulsion, and therefore an assertion of the existence of a cause is not meaningless. We may grant that the experience of compulsion is limited to the field of transactions between the animal body and its environment and is not sufficient to justify the laws of physics outside the field of physiology. But we are not concerned here with the possibility of deciding whether a proposed correlation of quantities is actually a physical law. We only want to justify the principle of causal laws. And the justification amounts to this. Since the experience of compulsion proves the existence of productive causes, and since we reject the notion of an absolute time endowed with causal efficacy, we must conclude that, except for an interference from outside, the invariance of a pattern of correlated physical quantities in the past ensures continued invariance in the future. External interference takes place according to

causal laws and therefore is no evidence against the principle of causality.

Although the justification of causality does not justify any particular causal law, further general considerations show that once a law of physics has been established, nothing, not even a negative instance, can invalidate it. A negative instance can always be accounted for in a number of different ways. An unexpected cosmic cataclysm may destroy the earth, the laboratory, and the physicist before the experiment is successfully completed; but a spectacular interference of this kind is in principle as trivial and irrelevant to the truth of the law as the failure of an experiment through a faulty reading of instruments. Even the assumption of a hidden interference may be preferable to the admission of the breakdown of a law. In fact this assumption has sometimes led to scientific discovery. Thus a discrepancy between the calculated and the observed motions of Uranus induced Leverrier to postulate the existence of a hidden planet at the very spot where Neptune was subsequently located. Furthermore, rather than discard his law, the physicist may question other physical laws which are involved in the setting of the experiment. There is also the possibility of treating the law as an approximation which is true under certain limiting conditions. The treatment, when it can be applied, is unobjectionable. For, according to a perspective theory of truth, an empirical statement can be true only under the limiting conditions of a perspective; hence when the limiting conditions are specified, the corresponding approximation is completely true. We may call a statement, or a law, an approximation (even if the statement is wholly true) when it happens to be a special case, or a simplification, of another statement; in particular, when the special case can be derived from the more general statement by an assignment of zero values which reduces the number of variables. And, when the objective situation to be described happens to be simple, a simplified description may tell the truth.

The above remarks on approximation help us to deal with a critic of scientific truth who is unduly impressed by the

evolution of scientific theories. Einstein's law of gravitation has replaced Newton's, but this fact does not prove that the former will be eventually repudiated in its turn or that the latter is false. Let us point out to a skeptic that, unless he accepts a law of an unending scientific progress, he has no right to contend that our present theories, including Einstein's, will be discarded because the theories of the past proved to be obsolete. Even to speculate about the possibility of replacing Einstein's law is to indulge in a frivolous occupation, unless one can specify the reason and manner of a replacement. Newton's law has been replaced by Einstein's because we can specify the evidence which favors the replacement. But the specification shows Newton's law to be an approximation to which Einstein's law is reducible under certain limiting conditions. These limiting conditions were the only knowable conditions in Newton's time; and the evidence in favor of the theory of relativity could not be established in the seventeenth century. In accordance with a perspective theory of truth we may say that our physical world, which includes precision instruments and refined electromagnetic experiments, is not the actual world of Newton. Hence to call Newton's law false because it does not take care of the evidence that belongs to the twentieth century is like calling a geographical description of Asia false because it fails to describe Africa. We cannot admit that our evidence, undiscovered by Newton and his contemporaries, actually existed in the seventeenth century; without lapsing into naïve realism we can admit no more than the potentiality for an evidence to be discovered. Even if a pure mathematician could write down Einstein's equation while no evidence called for a new law, the old law would be preferable, and therefore true, on the grounds of mathematical simplicity. Similar considerations form an answer to the criticism of causal laws by certain quantum physicists. We may grant that a causal law of molar physics is a simplification or an approximation to a statistical law of microscopic physics. To quote from Eddington: "The molar laws are a simplified form to which the microscopic laws converge when the number of particles

or quanta considered is very large." (*Op. cit.*, p. 29.) Eddington's statement is correct; but his subsequent conclusion that only statistical laws are true does not follow. There are, so to speak, two languages in modern physics corresponding to two different ways of observation and conceptual construction. The language of molar physics, which corresponds to the scale of human perception, is adapted to a description of material things that are not affected by the act of observation. Accordingly, the molar laws are descriptions of objective patterns of transaction of identifiable things. On the other hand, the language of microscopic physics corresponds to ultra-refined methods of experiment which affect the results of measurement; and without the aid of unaffected data of measurement the physicist can no longer identify a material particle. Hence the molar laws of identifiable things are no longer applicable. The conclusion is that causal laws do not belong to the idiom of the quantum theory, and not that they are false. At any rate, so long as the concept of identifiable things is applicable, as it is on the scale of human perception, the principle of causality remains true. Why then does Eddington, in company with many other physicists, draw a different conclusion? His point is that causal laws are in principle replaceable by statistical laws even within the field of molar physics. But an observation of irregularities in molar physics, i.e. of deviations from the stability of a statistical average which alone could prove the point, is too improbable to serve as a proof. Suppose that an observer reports that he saw water in a heated kettle freeze. The report cannot be accepted as a scientific record of observation for the simple reason that the probability of a lie or error is much greater than the probability of the reported event. In general, I should argue that statistical laws are no more suited to replace causal laws in the field of molar physics than causal laws to do away with the statistical laws of quantum phenomena. The kinetic theory of gases, although it may appear to be a case to the contrary, does not dispense with causal laws since it assumes the constituent molecules to move subject to the laws of mechanics; furthermore, the

kinetic theory, as well as any other statistical theory in physics, proceeds upon certain assumptions, such as the ergodic hypothesis, which are simplifications no less drastic than those of molar laws. The truth is that conceptual theories inevitably lead to simplifications, but the choice of a simplification varies with different objective situations and perspectives.

The mathematical form of a law is also a simplification, since the same law could be given a mathematically more complicated formulation. The choice of the simplest mathematical form proves that we assume the objective simplicity of nature. To justify this assumption we point out that a cognitive perspective is a mode of nature which yet must be a simplified view. Cognitive transformation is unavoidable because superfluous and obstructing tendencies are always left out of account; but the resultant picture brings out a consistent character of the original the more clearly. We enter here the grounds of aesthetics; and the principle of simplicity in nature may be, in the last resort, an artistic truth.

TRUTH IN ART

In a *Note* on truth in art, published in 1939 in *The Journal of Philosophy,* I said that truth is given either by conceptual description of things which exist outside discourse, as in science, or else by presenting things within, and by means of the imagery of, a work of art. I added that the things realized in art presentation are in themselves, as a rule, dispositions rather than facts of actuality. In a letter of the same year, D. W. Prall, while in general agreement with what I said, objected to the use of the word truth in two different senses: "Taking aesthetic objects as *presented* I can't very well consider anything that is to be called their *truth.* Surely they are not propositions or judgments."

To answer this objection I should have shown that, whether in connection with scientific description or aesthetic presentation, the word truth can be used in essentially the same sense. I shall try to show this now and, to begin with, I must

reject the prevalent misconception that science as a field of abstract propositions should be contrasted with art as a medium of sensations and images, and follow I. A. Richards who said that "the language of the greatest poetry is frequently abstract in the extreme and its aim is precisely to send us 'gliding through an abstract process.' " (Cf. *The Philosophy of Rhetoric,* Oxford University Press, 1936, p. 129.) Accordingly, there is truth in art only where there are propositions. This is not to repudiate the distinction between description as characteristic of science and presentation as characteristic of art. I agree with Prall that while a scientific theory is a complex proposition, a work of art is not. But an element within a work of art may be a proposition. Even so, there is an essential difference. For although the same statement can appear in science and in art, its function is not the same in both: while in science the statement is a complete unit of thought, in art it is one element in cooperation with others within an integrated aesthetic experience not to be severed from the whole without loss of meaning. In the discussion to follow, a work of art is to be understood as an aesthetic experience, a unified field of sense-data, ideas, and emotion, conditioned in a qualified and responsive person by a certain physical object, and not in the sense of that physical object itself. I stipulate without argument that several persons can have essentially similar aesthetic experiences conditioned by the same physical object, and I do not take into consideration any but works of art of generally recognized excellence, masterpieces only.

Explicit propositions which are true are found in poems and novels. To quote one:

> "Music, when soft voices die,
> Vibrates in the memory; . . ."

But the bulk of art is not literature, and even in the art of words one does not always come across an explicit assertion. Nevertheless there is much artistic truth because many truths in art are implicit propositions. The question is how

to tell which elements in a work of art are bearers of implicit truth. In answer to this question many writers would point to the elements of representation. For instance, they might say, since we know that Flaubert wrote *Salammbô* after much research in Punic history, one can expect to find in this novel many historical truths. So one can, but historical truth is not artistic truth; and the aesthetic excellence of *Salammbô* would not suffer even if historians were to deny its scientific accuracy. And if historical truth is essentially irrelevant, even more so is the fact of generic representation, the fact, that is, that outside of music and abstract painting, art is concerned with people, animals, and other familiar kinds of things. About generic representation the writer himself has no illusions, and in a preface to a novel he tells us that "the characters and situations . . . are wholly fictional and imaginary, and do not portray and are not intended to portray any actual person or parties." But when it comes to a decision on aesthetic significance of historical accuracy artists are usually as uncertain as their readers. Yet the reason why truth by representation is irrelevant to the aesthetic quality of an experience is the same whether representation is generic or historical and specific. An aesthetic experience, as is generally recognized, is self-sufficient, self-contained, and autonomous; historical truth and generic representation, on the other hand, consist of references to characters and events which are external to the medium of discourse. Hence the opinion that truth by representation is relevant to art implies the falsehood that external reference is essential to aesthetic experience. In reaching this conclusion, we have rejected an attempt at a conformist theory of artistic truth. But if we must disregard, along with the elements of representation, conformal description and propositions of fact, there would seem to be no choice but to identify artistic truths with statements of law whether explicit or implied by the elements of presentation. For a law, as the case of science has shown, while not only relevant to but aimed at prediction of facts, is not a description of any particular fact or situation; a statement

of law is not a statement of reference to events, it *is* a conceptualized pattern which may never be exemplified, without the aid of artificial isolation in experiment, in the course of nature.

My thesis has the support of the greatest novelist of the twentieth century, Marcel Proust. Contrary to the critics who understood his art as a web of minute observations and subtleties of detail, he himself claims a concern with general laws.

> There was in me one person who was able to observe fairly well, but he functioned intermittently, coming to life only when there was disclosed some general characteristic common to several things, which constituted his sustenance and delight. Then this person would observe and listen, but only a limited distance below the surface, so that the observation did not gain thereby. Like a geometrician who, stripping things of their perceptible qualities, sees only their linear substratum, what people said escaped me because what interested me was not what people wanted to say, but the way they said it in so far as it revealed their characters or their ridiculous traits; or, rather, there was one thing which had always been the object of my investigation because it gave me a very special pleasure, and that was the point that two human beings had in common. . . . And thus the visible, reproducible charm of people escaped me because I no longer possessed the faculty of confining my attention to it, like the surgeon who, under the glistening whiteness of a woman's abdomen, sees the internal disease gnawing away there. It was of no use to go out to dinner, I did not see the guests because, when I thought I was looking at them, I was looking through them as with an X-ray. The result was that, when I came to put together all the notes I had been able to make on all the guests at a dinner, the pattern of the lines I drew represented a collection of psychological generalisations in which the special interest of the guests' remarks occupied hardly any place. But did they destroy all the value of my portraits in as much as I did not offer them as such? If a portrait in the field of painting brings out certain truths with regard to mass, light or motion, does it make it necessarily inferior to another of the same person which does not resemble it at all and in which a thousand details omitted from the first one are minutely recorded, so that one might conclude from the second portrait that the model was a raving beauty, but from the first that she was ugly—a point which may have a documentary and even historic importance, but which is

not necessarily a verity in the realm of art? (*Remembrance of Things Past,* Random House, v. 2, p. 888.)

Of course, what is true of Proust's art need not be characteristic of all art; the only decisive proof would be a specification of particular laws as they are found in particular works of art. Unfortunately a request for a proof of this kind cannot be satisfied. Artistic truth is fully specific only within the works of art themselves; outside the medium of art one can only talk about the truths of art in terms which are general and nonspecific, as when Proust finds that painting brings out certain laws of mass, light, and motion, or as when we say that Proust's own work exhibits laws of certain psychological complexes. A lengthy quotation or a critical essay might do better, but nothing can take the place of the complete aesthetic experience; the true initiates of Proust's art, for example, are found only among those who have gone through all of his volumes. Let me warn the reader against a misunderstanding. I do not mean to say that the law disclosed by a certain work of art cannot be formulated as a single statement; on the contrary, the law must be expressed in a proposition to be true; and the artist himself sometimes "sums up" into an explicit proposition the truth which his work elaborates. But I mean to say that an abstract statement of an artistic truth cannot be fully understood or appreciated in detachment from its source, which is the work of art. Perhaps I had better illustrate. "Beauty is truth, truth beauty. . . ." Here is a law of human values announced as an abstract proposition which might have been found within the context of prose, for example, in an article on aesthetics. But the same statement does not have the same function in and outside the poem. Outside art the meaning of a statement is determined by its grammatical structure together with the dictionary definitions of the constituent words; hence, as a rule, a statement in unartistic prose can be detached from its context without loss of significance or content. Of course such an isolable meaning must be thin. The statement "Beauty is truth, truth beauty," might be easily

dismissed by a reader, if he were ignorant of the context of Keats' poem, as vague and silly, unless he tried his hand at an ingenious interpretation. And while such comments as Dewey's (in his *Art and Experience*), to the effect that "truth" did not mean to Keats' contemporaries what it means to us, are valuable in eliminating wrong interpretations, they should not encourage, and Dewey's own attempt is no exception, attempts at better interpretation. An actual experience, while the poem is being read, invariably betrays the failure of detached interpretations by contrast with the meaning directly exhibited within the context through the interplay of ideas, images, and feelings. The truth of a statement in a poem can be grasped only while its beauty is felt. To generalize from the example of Keats' "Ode" we need only observe that art—at least literary art—is, among other things, a command of metaphors and that even the simplest metaphor is a cooperation of abstract ideas with images. A metaphor unifies two different things, the vehicle and the tenor, to use I. A. Richards' terminology, and in the majority of instances the vehicle is a complex of images while the tenor is an abstract thought. And the effect of a metaphor, as I. A. Richards has shown in a refutation of the older theories which would subordinate everything to the tenor, depends on the "team-work" of the vehicle and the tenor in which both play equally important parts.

> A modern theory would object, first, that in many of the most important uses of the metaphor, the compresence of the vehicle and the tenor results in the meaning (to be clearly distinguished from the tenor) which is not attainable without their interaction. That the vehicle is not normally a mere embellishment of a tenor which is not otherwise changed by it, but that vehicle and tenor in co-operation give a meaning of more varied power than can be ascribed to either. (*Op. cit.*, p. 100.)

Richards' distinction between the complete meaning of a metaphor and its tenor and vehicle is unquestionably correct. To apply his distinction let us go a step further and consider such a poem as the "Ode on a Grecian Urn" to be an expanded metaphor. Let the proposition which identifies

beauty with truth be the tenor and the rest of the poem the vehicle. Then we should understand that Keats' proposition is not an appendix detachable from the whole, and that the "Ode" was not written for the sake, or as a mere illustration, of the tenor. Accordingly, we should reaffirm that art is for art's sake, or at least that art is not a pursuit of truth but is for the sake of the complete meaning which contains truth, if at all, as one element among others. Not only is artistic truth absent unless there are implicit propositions or explicit statements, but these carriers of truth themselves must be cultivated on the more concrete substance of art in order to acquire the significance which alone can justify their claim to truth. If we may make use of the contention that meaning is identical with truth-conditions without introducing the required qualifications, we can go as far as saying that in art the meaning of such a statement as "Beauty is truth" is inalienable from the context, because the context gives the truth-conditions of the statement in a display of images and feelings. Again I can quote from Proust:

> One may list in an interminable description the objects that figured in the place described, but truth will begin only when the writer takes two different objects, establishes their relationship—analogous in the world of art to the sole relationship in the world of science, the law of cause and effect—and encloses them in a necessary ring of a beautiful style, or even when, like life itself, comparing similar qualities in two sensations, he makes their essential nature stand out clearly by joining them in a metaphor, in order to remove them from the contingencies of time, and links them together with the indescribable bonds of an alliance of words. (*Op. cit.*, p. 1008 f.)

I shall not try then to prove, in abstraction from the medium of art, that artistic truth is always a statement of law, but to those who are ready to agree with me I must explain the essential difference between the truths in art and the laws of science. The scientist, or at any rate the physicist, is interested in patterns of forces or dispositions only to the extent to which such patterns are, for all practical purposes, isolable in actual experiment or demonstration. Although an

adequate formulation of a physical law may require a subjunctive conditional form, the physicist is not concerned with what should happen if certain experimental conditions were established, but with what will happen after these conditions have been established; he is bent on prediction and control of actual events. Accordingly the laws of science may be said to deal with patterns of actuality. But not all patterns are ready-made for discernment and isolation, not even under the artifical conditions of experiment and scientific ingenuity. There are complexes of powers that are involved in cross-patterns which cannot be disengaged for an exhibition in actuality; such interlocked, nonisolable, and mutually interfering patterns are no less real for being outside the scope of science; their dynamic effects set problems in social transaction, they are present in the entanglements of individual psychology and in the conflicts of human values. And in these realms, where even artificial experimentation of science must fail, there is no other effective tool but the artist's tool of imaginative isolation. This means that the artist, unlike the actuality-minded scientist, must be skilled in the logic of dispositions, and that the truths of art are laws of powers. For to discern a pattern in a fictitious setting created by imagination the artist must, first, have an insight into unrealized complexes. Some of the great Russian writers have spoken of this artistic insight into hidden dispositions as a gift of divination. Gogol tells us that Pushkin complimented him on his ability to divine the characters of people, "to guess, that is, what the man must have said under such and such circumstances, and to convey this in a style of thought and language peculiar to that man." And Dostoevsky, commenting on the art of painting, says: "An artist studies a face and divines its main thoughts, even if facial expressions at the time of the sitting did not convey these thoughts." But patterns accessible to the genius of an artist remain hidden to a layman or a scientist. And since the artist finds no ready-made means of communication in actuality he must turn to fiction; he must produce, that is, an imaginative realization of his insight. Thus a work of art

is a composition out of communicable images whereby patterns hidden or obscured in the ordinary run of events are isolated and made conspicuous to the world. And an artful exemplification of a law in the medium of imagination is thus distinguished from an artificial demonstration of scientific laws in experiment.

Concern with unrealized dispositions communicable to others only in the medium of images and metaphors favors a transformal theory of artistic truth. In fact there is a strong temptation to deny that art can ever tell truth; thus we find writers who insist on the purely emotive significance of art, others who believe that aesthetic experience is a way of escape from reality, and still others who think that the poetic quality of a work of art necessitates traffic with the supernatural, weird, or fantastic. To oppose these views, and to argue for a perspective theory of artistic truth, we must discredit three misconceptions. First, there is an alleged opposition between art as an esoteric or private concern and reality as the public world of specific sense data. This opposition is fictitious. While the initiative in an insight is indeed original with the artist, once the insight is embodied in a work of art it becomes public property. And an aesthetic experience, objectified as a work of art, is far more specific and organized than ordinary sense-perception. Conceptualized perception is of course the primary source of common orientation in a public world, but conceptualized perception is neither pure nor specific sensation. When a layman argues with an artist that distant hills could not be blue because he knows that they are green, he is in part right: he does not have the artist's sense of a specific color, but a conceptualized perception, conditioned by an antecedent knowledge of vegetation on the hills, of the generic green. When a driver shifts the gear, the act, if not exactly automatic, is not guided by a clear and specific percept. These illustrations are typical. As a rule, the world of public transaction is colorless and specifiable, but not specific. Thus preoccupation with the indeterminate or not yet specified is not the artist's monopoly, even if the generic data of ordinary practice are still to be

contrasted with the patterns of an artistic insight because the former are easily discernible and specifiable. Second, the fictitious setting in a work of art is often misinterpreted as the artist's means of escape from the common sense world toward the unreal, weird, or supernatural. The fallacy of this opinion is exposed by observing that masterpieces are seldom, if ever, found among the works of a fantastic art. And if great art is needed in order to communicate certain ideas, this is not because these ideas are detached from, or irrelevant to, ordinary life, but because isolation and exhibition in an imaginative setting of art makes the same ideas discernible elsewhere. The situation is comparable to a puzzle picture: the hidden figure may not be easy to locate, but anyone who has found it can direct the perception of others. There is a difference, of course. The puzzles of actual life are so difficult that discernment of hidden patterns and figures requires the genius of an artist; and to direct the perception of others he must embody his insight in a work of art. It takes a Shakespeare to discover and portray a Hamlet, but now that the character has been shown, we find Hamlets among ourselves. No sooner was the serial publication of *Crime and Punishment* completed than Moscow witnessed the trial of the student Danilov that brought to life, with minor variations, the story of Raskolnikov. Illustrations of literary anticipation of actual events are many. Great art is often prophetic. And when anticipation takes the form of a statement, or of an implicit proposition, relevance to life is also artistic truth. If these facts of aesthetics are not always recognized, we have a third misconception to blame. We are told that there is no art without poetic quality, and that poetic quality is conditioned by the sense of mystery. So far I agree. But we are further told that there can be no sense of mystery in the course of ordinary events; and this assertion is a mistake. Patterns of power may be embedded in the most common circumstances of life and yet be mysterious if invisible to a common eye. The sense of mystery which infuses art with poetry comes with a new perspective, because through a different way of seeing things the invisible is made apparent.

Thus a perspective theory of artistic truth recommends itself as a way of correcting the fallacy that art is an escape from reality and that therefore the slogan "art for art's sake" means a divorce between truth and poetry.

Although the foregoing remarks are meant to be taken as a statement of a position, rather than as a complete defense, they provide sufficient grounds for answering, by implication, the usual kind of criticism. Let me give one example. Some critics do not deny the existence of true statements in art but believe this truth to be an accident or, at any rate, aesthetically not essential. They have two reasons: first, art is not an appropriate medium for an argument, and therefore cannot be interested in truth to the extent of undertaking its demonstration; second, no other art except literature can have true statements. The first reason has no weight the moment we observe that an artistic truth cannot be isolated from the context in order to be given a scientific demonstration; hence contextual plausibility is the only proof under the circumstances. The second reason is given in disregard of implicit propositions. But even if we were to concede that artistic truth is rare, this would be no proof that truth is not essential in art. Human genius is also rare but without it mankind would not be the same. And whatever we should say of other art, truth is no less essential than any other element in a literary composition so long as all the elements must combine into an integral whole.

TRUTH IN PHILOSOPHY

THIS section is not an ambitious attempt to establish the true nature of philosophy, or even to explain its relation to science and art. I simply *assume* that the kind of argument to be found in this book is philosophy, and that truth arrived at in the course of such argument is an example of philosophical truth. Accordingly, let me examine philosophical truth in connection with the thesis, to be known as thesis *T*, that "The truth of an empirical proposition is a perspective

conceptualization (a conformal transformation) of an objective disposition," and with the affiliated assertion, which I shall call *D*, that "Dispositions exist." The question about the philosophical truth of *D* is: Is *D* subject to *T* or is it an exception? This question must be answered by a separate examination of *D* and *T*, because they seem to be, logically, of two different kinds: while *D* is an empirical statement about the nature of things, *T* is a statement of a theory of empirical statements, or, if we choose to call empirical statements theoretical, *D* is theoretical and *T* is metatheoretical.

To begin with *D*, is it a legitimate empirical statement on a par with such propositions as "Lions exist"? On the strength of a subsequent demonstration that power is an observable entity my answer is "Yes." But if *D* is an empirical proposition, its truth, unlike the truth of ordinary empirical statements, would seem to be strictly conformal. If you say "Chairs exist," there is conceptual transformation in the truth of your statement because its objective physical basis is only a disposition to be perceived as a chair. But then, when we say "Dispositions exist," the objective basis of this empirical truth must, likewise, consist of dispositions; and, in this case, even if the objective dispositions were of a second order, i.e. dispositions to acquire a disposition of the first order rather than dispositions to some such actual manifestation as one encounters in perceiving a chair, there would seem to be nothing but conformal truth. Of course, there would still be conceptualization in the form of generality, which goes with an existence proposition, and analysis. But, whether he is right or wrong, let us grant to the conformist that conceptualization in the form of analysis is innocuous, that it means omission but not alteration. There may be an element of conceptual transformation which varies from one system of philosophy to another and depends on the special meaning with which a philosopher endows the term "disposition" or "potentiality." For example, according to Aristotle, the status of potentiality is relative to the context of an entity, whereas my opinion is that potentiality is an absolute mode of being. Moreover, there are philosophers

who not only take "disposition" to be a conceptual construction but reject the construction as a downright fiction. However, I do not need to enter into these complications, because I have already assumed, for the sake of argument, that my conception of disposition is a philosophical truth. Or, if the reader does not like my assumption, I need no more than ask him to make a weaker assumption that there are dispositions, without committing himself to any particular meaning which "disposition" may connote. With these qualifications understood, let me admit that the statement *D* is conformally true. To admit the conformal truth of *D* I do not have to leave the grounds of the perspective theory of truth. The perspective theory contends that, as a rule, empirical statements involve conformal transformation but it allows for one exception. The exception consists of empirical statements which are transferable from one context of thought to another without modification of meaning or truth-value. This is to say that a true statement is conformally true if, and only if, it remains invariant through any change in the cognitive perspective.

A metatheoretical statement of philosophy, such as *T*, differs from ordinary empirical statements even more than *D*, and therefore could be expected to be, like the latter, conformally true. And, I think, we must admit that some metatheoretical truth in philosophy is conformal. For example, *T* implies a criticism of the conception "empirical fact," and this criticism can be formulated by the metatheoretical statement *F*, to the effect that "Any (theoretical and nonphilosophical) empirical fact is relative to a standpoint of some cognitive perspective." But the truth of *F* cannot be relative to a perspective standpoint since, if it were, there would be another point of view from which nonrelative facts could be observed, and the existence of nonrelative facts would mean the unqualified falsehood of *F*. But, in accordance with the perspective theory, if the truth of *F* is nonrelative, i.e. invariant, it also is conformal. On the other hand, while the truth of *F* is conformal, the truth of *T*, or rather of an amendment of *T*, requires further consideration. Let us call

the amendment, which is necessary because of our finding *D* to be an empirical but conformal truth, *T'*: "The truth of any empirical proposition, with the exception of *D*, is a perspective conceptualization of an objective disposition." This amended thesis would be conformally true, if it were absolutely true, i.e. if we could prove that *D* is the only exception, among true empirical statements, to cognitive transformation. I cannot undertake such a proof; I can only say that as far as I can see, if we exclude the doubtful case of perceptual judgments which are directly about sense data, *D* is the only empirical statement which is conformally true. But there may be philosophers who are more far-sighted than I am. This admission does not mean that I retract my assumption that *T'* (which is, so to speak, a rule of projection which establishes the perspective of this essay) represents a metatheoretical truth of philosophy, but only that I deny absolute truth or, at any rate, the possibility of knowing that there is such a thing. There are alternatives to my cognitive perspective. And if I prefer the perspective based on *T'*, this is not because my philosophy alone conforms to the nature of things. Every perspective conforms to the same invariant properties of things (which, according to this philosophy, are identified with the mode of power), i.e. to properties which remain unchanged under the different rules of projection upon the perspective field of thought. But, and this is the important point, every perspective, including that of *T'*, is subject to its own rules of projection and therefore brings about transformation. Alternatives are dismissed not because they alone distort reality outside discourse—every cognitive transformation is in a sense distortion—but for some such reasons as a narrow range of vision, lack of clarity, or a perspective distribution of items which does not agree with the relative prominence of things. In short a perspective of philosophy is preferable, or true, if its projective rules are superior: if they allow for greater precision and completeness in a cognitive integration of the best available information.

A critic may use the analogy between a philosophy and a

perceptual perspective to observe that my use of terms of valuation, "superior," "greater precision," and the like, shows that truth is not a perspective property. He may point out that when we say that a perceptual perspective is true and gives a better view than its predecessor, or that it takes time, and therefore a change in the perspective standpoint, to learn the true nature of things, we do not use "true" literally since we know that still more time may bring us back to the original view. Furthermore, our opponent may continue, there are perspectives, in space if not in time, which cannot be improved upon even though they obstruct other views which are accessible from a different position. For example, certain features in a profile cannot be shown in a full-face view, and *vice versa;* nor are the complementary appearances combined in any single perspective of space. Hence, the critic concludes, if the analogy is correct, we should expect competing philosophies to disclose only incomplete aspects of reality, and it would be presumptuous to call such incomplete disclosure truth. On the other hand, if the analogy breaks down, and a philosophy is susceptible of unending improvement, then, at any stage of its development, the philosophy is, at best, only an approximation to truth and should be called probable rather than true. The answer to this criticism comes with a further clarification of my position. However, before I proceed, let me make the following general comment: The analogy of a philosophy with a perceptual perspective does break down, and a philosophy is subject to improvement. For a philosophy may not be complete even if it is completely true. But to describe an incomplete philosophy as only approximately true, or probable, is to assume that one can tell what it would mean for a philosophy to be absolutely true: an assumption which would itself be a presumptuous claim to absolute truth.

My position is that T', taken as a philosophical truth, is true because it is more plausible, with reference to the best available evidence, than any competing statement. The strength of my conception of truth in philosophy is that I do not have to deny that it involves certain difficulties. If a

critic raises objections, all I need to answer him is to show that alternative conceptions, based on the same evidence, are even more objectionable. And in order to show this I can always make the following point. The critic can reject my conception only if there is a preferable alternative. But there are only two grounds of preference. Either the critic prefers another conception, because he finds it more plausible in relation to the best available evidence, and then he refutes himself, or else he accepts his view because he thinks he knows it to be an absolute truth, and then he puts himself into an unenviable, and implausible, position of presumption. However, I would rather convince a critic by making my conception of philosophical truth attractive to him. Accordingly, I must emphasize that I do not lead him to subjectivism. There are objective criteria to determine which of the available evidence is most reliable. For example, the last word in physics is unquestionably the best available evidence concerning physical process. And, given the same evidence, a competent critic can rely upon intuitive certainty to decide which of the competing philosophies is more satisfactory. The apparent circularity, in defining a better philosophy as the system that satisfies a competent critic and a competent critic as a man who can recognize a better philosophy, is harmless because we can also specify a number of independent qualifications which are sufficient, in practice, to single out a competent critic. Thus, among other things, a qualified critic must have a sharp sense for the dominant or promising tendencies of his age and culture, be ready to make the necessary effort in order to appreciate an unfamiliar but original thought, be imaginative and intellectually alert, sophisticated, conversant with tradition as well as with the current technique and conventions, and adequately acquainted with mathematics, science, and the arts. To find a man of such quality may be difficult; but there is at least one expert for every generation, the author of the best contemporary philosophy himself. If his philosophy is objectively superior, the author knows this; and, as a rule, the more persuasive philosophy ends by convincing others.

A great philosopher is not unlike a master of chess: superior while the competition lasts because of the ability to foresee and counteract the weaker moves of an opponent, he proves his superiority to the latter by winning the game. And so with a great philosophy; persuasion can be expected but only after the opponent's perusal of the whole range of the component moves or ideas. And this means that the truth of such a statement as T', even though it constitutes the basic standpoint of a perspective of thought, is itself a function of the perspective as a whole. In other words, and this is a part of the assertion that the truth of T' is its *power* of persuasion, the truth of a philosophical statement can be apprehended only within the whole context of a philosophy. Naturally, I assume that the critic and the author are willing to meet half-way: the critic must not be prejudiced in favor of a different type of philosophy and the author must be a skillful writer. This is not assuming too much. History has shown that whenever a great system of philosophy appears, it soon sweeps aside the barriers set by prejudice or envy. The reason is that thinkers will not be satisfied with inferior thought for any length of time, and that the recognition of a novel philosophy requires, along with a perusal of its ideas within their context, no more than an appreciation of the simple and negative fact that no alternative system can take care of the major problems of the age equally well, i.e. give an equally effectual integration to the divergent tendencies of thought and an equally satisfactory resolution of paradoxes. And once established a great truth of philosophy is never unconditionally surrendered. We know of the almost immediate success of Plato's philosophy. And, although we expect an Aristotle to contradict his master, we also know that Aristotle was more of a Platonist than he would want to acknowledge. Hence Whitehead can say: "The safest general characteristic of the European philosophical tradition is that it consists of a series of footnotes to Plato." (*Process and Reality,* Cambridge University Press, 1929, p. 53.) And I. A. Richards agrees with Whitehead when he says about the *Republic:* "It is still true." (*The Nation,* March 28,

1942.) There is an element of exaggeration in both statements; but they serve to remind us that the insights of the past are still with us and are formative even through the process of setting forth new departures and perspectives. The qualification that an old truth survives only through readjustment to the new setting and, in particular, through an adaptation to the current requirements of language and style is inadvertently conceded by Richards himself when he adds: "Plato's style deployed endless exquisite devices for meeting attitudes and expectations in his readers which sprang from their milieu. These attitudes and expectations never arise in us; we have our own." This brings us to a consideration of style in relation to truth. Although not indistinguishable as in art, when all three are there, style, meaning, and truth in philosophy are closely tied up together. This is so because a perspective of thought grows out of a background which is coextensive with the philosopher's total experience, and without the aid of rhetoric the formative influence of the mental background upon the ideas within the perspective could not be communicated to others. An explicit abstract of a philosophical system would never satisfy the philosopher were he not familiar with his own mind and therefore able to read between the lines of the abstract. To convince others as firmly as he has convinced himself, the writer should be able to communicate to the reader the total background of his ideas. The task is impossible; but the problem of style, on which his success as a philosopher depends, is how to convey from the mental background just enough to enable the writer to impose his frame of mind upon the reader. Discourse can reproduce a complete mentality no more than it can be a duplicate of the external world; hence the writer can only hope to create a receptive disposition to his ideas on the part of the reader. This is a warning to certain philosophers, especially to some Cambridge realists, who defeat their purpose by expanding their exposition of a single point into a lengthy paper. Restriction to one topic may allow for complete and thorough exploitation, but the reader's attention flags when he must give equal consideration to every

item, however trivial, which has some relevance to the topic. Explicitness and the momentum of massed ideas would carry with them persuasion if it were not for their interference, which can be counteracted only by a tiresome repetition of the more important considerations, with the proper distribution of emphasis and articulation. Furthermore, there are too many publications, and a lengthy treatment would require the reader's exclusive attention which he is unwilling to give without knowledge of the quality of the article. Therefore style in philosophy is, in part, a reorganization of what otherwise would be a conglomeration of unaccented thoughts into a system of coordination and subordination. A sophisticated reader wants condensation and organization of ideas according to their relative significance. This is to say that the style of exposition must establish a perspective of meaning which, in accordance with the perspective theory of truth, would also be the perspective of truth. On the other hand, this means that an unrecognized philosopher who attributes lack of success to his inability to express himself is likely to be wrong. For his excuse is, in effect, an admission that he has no explicit and articulate philosophy. Hence we can do no more than grant him a disposition to develop a convincing philosophy, and must suspend our judgment until after the realization of the disposition. And when we recognize a disposition we mean something different from the fact of implicit propositions in a piece of philosophical writing: we mean something which has not yet found its way into a set of propositions, whether explicit or implicit, and therefore, since we have agreed to employ the characteristic "true" in connection with propositions only, something which cannot be either true or false. But let us not simply identify style and persuasion in philosophy with truth. We must admit that a great philosophy, written in excellent style, may in time become obscure and remote; and while we call such philosophy obsolete, we should not say that it has lost its truth and turned into falsehood. A statement in a foreign language is not false simply because we cannot understand it. And a philosophy of the past is bound

to be expressed in a strange idiom. However, while we should not call this philosophy false, we cannot be sure, since we do not know what exactly it meant to its contemporaries, whether it was ever true. Richards' remark that Plato's *Republic* is still true is an exaggeration not only because Plato's "truth," to be acceptable, must be readjusted to our own expectations and attitudes, but also because we can never hope to recapture completely the contents of his "truth." Historians of philosophy cannot avoid interpretation and they are misled by wishful thinking if they think that the right interpretation restores the original "truth"; they may be able to rule out a definitely wrong interpretation but they cannot fully appreciate a conception which is no longer a present issue. We sometimes claim complete understanding because we are dealing with a comparatively primitive philosophy, just like aestheticians in their appreciation of primitive art, but even in the act of approval, as the appellation "primitive" betrays, there is an element of condescension which robs ideas of their original power and dignity. We may regret the elusiveness of a truth of the past but, in an anticipation of the eventual incomplete understanding of our own philosophy, we should have no fear for the present truth to be ever denounced as a falsehood. And this point alone would seem to justify the identification of philosophical truth with the most objectively plausible thought-perspective of the age.

But if a great idea of the past cannot be called false, although (and because) it does not maintain the pressure of a contemporary issue, those who insist that the truth of our own philosophy is no more than probability have already lost their grounds. However, let us, for the sake of argument, suppose that the falsehood of the philosophies of the past has been established. We still cannot use this supposition as evidence for the possibility of an eventual rejection of our own philosophical truth. In the first place, in order to establish the falsehood of a philosophy, now or later, we must have, in the statement of our criterion of truth, a piece of philosophical, or perhaps metaphilosophical, knowledge

which is more than mere probability. And, secondly, the evidence of the past justifies an expectation only if the former exemplifies a law; but I do not think that anyone can claim knowledge of a law to the effect that every philosophy must be eventually rejected. And if there is no such law, then, so long as the present philosophy is acceptable, speculations about the eventuality of rejection are idle. Although I do not deny that even a preferable philosophy is not free from difficulties, it would seem to be more reasonable to expect future developments, at least in the near future, to bring solutions to some rather than to pile up new perplexities. The safest position is that the best word is the last so long as there is no evidence to the contrary. The identification of philosophical truth with plausibility is therefore, like the alternative which would replace truth by probability, an attempt to avoid the insecurity of dogmatism: by abandoning any pretension to absolute truth we avoid the possibility of absolute refutation. And truth as plausibility is preferable to mere probability because it allows for an indefinitely lasting philosophy. But suppose that, with all the conditions already mentioned satisfied, the philosopher fails to persuade his critics. This may happen if the originality of a new system is striking to the extent of being shocking to a critic who is trained along the more conservative lines of thought. But then eventual recognition is only a question of time. The publication of *The World as Will and Idea* was for a long time practically unnoticed in spite of the author's anger at the stupidity of his contemporaries; yet in his old age Schopenhauer was world famous. Of course, a critic may prefer his own philosophy to the writer's new system. But the writer has an objective basis for his claim to truth if the critic's philosophy represents an earlier, and therefore comparatively primitive, phase of the writer's own mental development. And the novelty itself, although a temporary impediment to the critic's understanding, is an attraction which contributes to the objective plausibility of a philosophy. There may be no decision reached in the argument; but, unless there can be equally plausible alternative philosophies—a possibility to

be examined presently—the author and the critic are not both right: only one of them *knows* which alternative is more plausible or true.

The fact that reality has many aspects is no more than a reminder to a philosopher that, to be adequate, a perspective must not be a view on one aspect to the exclusion of the others. There would be a real difficulty, however, if one aspect of reality can be known, or specified, only at the expense of another. I am not concerned with the fact of partial representation within a perspective. A complete description of a profile does not interfere with the specification of a shape from any other angle of vision; with the aid of assistants, or of mirrors, we can give different partial specifications simultaneously and with equal precision. On the other hand, the difficulty to be considered is the existence of alternative aspects which cannot be specified at the same time. Complementarity in quantum physics is a case in point. There are two aspects of a physical phenomenon, its position in space-time and its momentum-energy, and the second is at the root of its causal connections. Bohr's principle of complementarity rules out the possibility of a simultaneous specification of both aspects: when the positions of particles are accurately determined, their causal connections become indeterminate, and *vice versa*. The physicist concludes that neither the space-time description alone nor the momentum-energy specification alone is an adequate representation of the physical world. For, like a partial perspective appearance, a physical complementary aspect does not tell the whole story and yet, while perspective appearances can be synthesized in a single geometrical description of a shape, complementary aspects do not yield a single and complete specification. But observe that this duality is incorrigible only in the context of physics. The theory of physics proceeds on the assumption that all physical states are equally actual. Accordingly, the impossibility of a simultaneous specification of two complementary aspects means to the physicist that the measurement of one of them is actually, or physically, destructive of the other. And if philosophy were

bound to share with physics the assumption of inclusive actuality, the existence of complementary aspects, in the physicist's sense, would exclude the possibility of a superior philosophy, i.e. there would be alternative, and equally inadequate, philosophies since each of them would be based on a partial and exclusive aspect of actuality. Democritus and Heraclitus might have brought about, between them, an end to metaphysical speculation if the actual world were a duality of exclusively static and dynamic manifestations. But while the assumption of indifferent actuality is inevitable in physics, since the problem of different modes of being is outside the competence of a physicist, a philosopher, who differentiates between the modes of actuality and power, has a way out where the physicist is helpless. Thus a philosopher may say that physical process involves two opposite sets of tendencies, one toward stabilization and the other purely dynamic, which cannot be simultaneously actualized. Accordingly, the space-time and the energy-momentum specifications would be each an adequate account of an alternative actualization but not of the underlying source of power. The situation is analogous to that of a reversible figure. For, it will be remembered, only one of the alternative "background-foreground" distributions of lines can be given at a time in a perception of a reversible figure; and, while neither of the visualized aspects is a distortion, the perceptible figure must be distinguished from any of its percepts. Assuming the analogy to be correct, we should say that complementary descriptions in physics are equally true rather than equally inadequate. This is not to say, however, that the philosophy of physics, which allows us to recognize certain descriptions in physics as equally true, consists of alternative and equally true theories. The philosophical position which opposes power to complementary actualizations may mean tolerance with regard to alternative descriptions in physics but has no alternative to itself.

When we consider the complexity and magnitude of evidence which a world theory must assimilate and organize into a unified perspective, the idea of alternative and equally

true philosophies appears extremely implausible. The idea might be more plausible if critical evaluation in philosophy were performed by impassive and disinterested judges. But the critics are themselves philosophers who may try to be impartial but are never free of temperamental preferences. And since philosophical truth is plausibility, and thus bound to the effects of style, temperamental preference may decide in favor of a system that has rhetorical appeal even when cold logic finds no advantage over an alternative system. Even if it were possible to suppress individual bias, there is no escape from the temper of the age and culture. The temperament of a philosopher may favor compromise but not if he belongs to one of the competing schools of philosophy. And when he attempts a compromise, the attempt, if not a synthesis which is in effect an entirely new system that supersedes the others, requires some readjustment in the competing philosophies. Hence, as far as I know, S. C. Pepper, in his *World Hypotheses* (University of California Press, 1942), is the only writer to defend the thesis of the existence of alternative and equally true types of philosophy. But, although without precedent, his defense of this thesis is able and systematic, and therefore cannot be disregarded. In his examination of four basic types of philosophy—formism, mechanism, contextualism, and organicism—Pepper characterizes them as only relatively adequate and therefore does not attribute to them equal truth but "the same degree of adequacy" (page 98). Sometimes he even speaks of "the inadequacy of all the world hypotheses" (page 334). And when inadequacy is coupled with mutual incompatibility, as well as with a hint (on page 331 f.) that the inadequate and incompatible world descriptions yet cooperate in "a single enterprise" as complementary approaches to the same objective world, his conception would seem to shift toward something analogous to the principle of complementarity in physics. I take it, however, that Pepper's basic tendency is to treat his four types of philosophy as relatively and equally adequate. Moreover, since his criteria of a relatively adequate world hypothesis are universality, precision,

and internal consistency, which, on any view, would be criteria of plausibility in philosophy, the identification of equally adequate with equally true world views, in my sense of the word "true," is unobjectionable. In fact, Pepper himself is unlikely to object to this identification: "If truth means the possession of cognitive value, then to say that a conventionalistic hypothesis is true (or false) would be a self-contradiction, whereas to say that a structural hypothesis is not true (or false) would be a self-contradiction." (Page 83.)

Let me now proceed with several points of adverse criticism. (1) Pepper does not entirely free himself from temperamental preference and, contrary to his intention, gives a more sympathetic treatment to contextualism than to the other three world-views. (2) Each alternative system of philosophy claims exclusive truth, and the claim is part of the philosophy. Therefore, as far as their irreconcilable claims to truth are concerned, the four basic world hypotheses cannot be equally true but, if there is to be equality at all, must be equally implausible or false. (3) An alternative philosophy is associated with its own conception of truth. For example, as Pepper himself has pointed out, formism is based on the correspondence theory, organicism favors the coherence theory, mechanism the causal-adjustment theory, and contextualism goes with the pragmatic theory of truth. Since we cannot use any of these theories of truth without favoring the associated world hypothesis, comparison of alternative philosophies must proceed on the basis of some neutral conception of truth, such as plausibility, and this means that the systems to be compared are inadequate, at least with regard to their conceptions of truth. (4) If the neutral standard of truth, to be employed in a comparison of alternative philosophies, is objective plausibility, then Pepper's presentation of the four world hypotheses, which expresses their logical structures but robs them of rhetoric and attraction of style, is not fair and cannot justify his contention that they are equally true. An anatomist, dealing with four equally good skeletons, would not argue that they must be skeletons

of four equally good men. Pepper's structural schemes are no doubt more than skeletons of philosophy. But the fact remains that some readers have complained that they do not recognize their type of philosophy in Pepper's presentation; and their reaction is that Pepper's four "supermen" are dummies which enable the author to make his case. Pepper is an aesthetician, and the fact that a great work of art is a total experience and therefore equal to any other great work of art, may have suggested to him the idea of equally adequate world hypotheses; but a more relevant consideration of aesthetics is that the scheme of a composition does not account for the total effect of a work of art. (5) This is a specification of point (4). The reduction of a philosophy to a structure of ideas interferes with an appreciation of their originality or novelty. Because of the nature of his endeavor, Pepper is preoccupied with recurrent types of thought to the detriment of the elusive and unique individuality which is a major attraction during the lifetime of a philosophy. (6) Alternative perspectives cannot be of equal cognitive value, in fact, they are uncomparable, unless they are perspectives upon the same thing or things. Pepper's term "world hypothesis," as well as his requirements of scope and precision, indicate that the four basic types of philosophy are supposed to be concerned with the same thing, namely, with the whole world. But the categories which belong to one world hypothesis cannot be assimilated by another without considerable readjustment in meaning. Therefore the mere fact that philosophers may use the same terminology does not prove that they speak the same philosophical language; and, without a dictionary to enable us to translate the statements of one alternative philosophy into the idiom of another, their concern with the same thing, let us say, with the same world, must be questioned. As the following discussion shows, Pepper himself recognizes that a category, such as a conception of truth, associated with one type of philosophy requires readjustment to be incorporated within another type.

Suppose we begin with the correspondence theory. In terms of this theory the other three theories of truth become subsidiary

criteria of considerable reliability. The nominalistic theory of the causal adjustment of an organism's attitude to the environment becomes an interesting observation of what actually happens when an organism's beliefs correspond with environmental conditions. Consequently, the well-adjusted activity of an organism in its environment is, for a formist, a good sign that the implied beliefs are in correspondence with the environmental objects responded to. But it is only a good sign, and does not guarantee correspondence or truth, and therefore requires more rigorous confirmation. Likewise for the operational theory. The smooth working of a hypothesis becomes for a formist a good sign of its truth, but does not guarantee truth proper or correspondence. As for coherence, this seems to involve for the formist a certain confusion between fact and logical consistency. If this confusion is cleared up and fact is definitely distinguished from description of fact, then we see, says the formist, that the self-consistency of a description of fact is a necessary requirement for a true description, but, of course, it does not guarantee the truth of the description, for many self-consistent descriptions do not correspond with the facts they refer to. (Page 344 f.)

For the sake of simplicity, let us focus our attention on the correspondence theory, and formism, in relation to the coherence theory, and organicism. The term "truth" does not mean the same thing in these two philosophies and the idea of coherence appears in formism transformed into consistency, which is a distortion. The conclusion that the formist and the organicist cannot understand each other because they speak different philosophical languages is in order. Pepper might try to avoid this conclusion by saying that distortion is not sufficiently radical to prevent any mutual understanding. But this way out, through an estimation of the amount of distortion, would not allow Pepper to establish that formism and organicism are equally adequate unless he has already ascertained that the distortion by a formist of the idea of coherence, as well as of other ideas which are characteristic of organicism, is exactly equal to the distortion of formism at the hands of an organicist. For if one alternative philosophy can assimilate the conceptions of another better than would be the other way around, then the former is more adequate than the latter. But I doubt the pos-

sibility of computing the balance of philosophical distortion in alternative world hypotheses; at any rate, I do not think that Pepper would want to undertake any such computation. But then he must take the other position, that alternative world hypotheses are, as it were, different philosophical languages which are not translatable into one another. But if the formist and the organicist cannot understand one another, how can we say that they are concerned with the same things? And if we cannot say that they are trying to give different accounts of the same world, what does the statement that they are equally adequate world hypotheses mean? I see no other way of reconciling the existence of the same objective situation with the mutually untranslatable descriptions except by taking the situation to be determinable in opposition to such alternative specifications or conceptualizations as formism and organicism. But this would mean an acceptance of the philosophy of power which would relegate Pepper's four hypotheses to the position of subordinate, and therefore inadequate, theories.

The foregoing criticism of the conception of equally true alternative philosophies is inconclusive; and the reason is that such criticism needs the support of a branch of philosophy which, except for Pepper's contribution, may be said to be as yet nonexistent. This prospective branch of philosophy or, perhaps, metaphilosophy, is the theory of alternative world-views. We already know much about alternative geometries and logics, and our information has some bearing upon the study of alternative philosophies. We know that the same word is used with different meanings in different systems of geometry and logic; for example, the word "triangle" does not mean the same thing in Euclidean and Riemannian geometries, and the term "proposition" stands for different entities in alternative logics. As explained in the preceding paragraph, alternative philosophies, likewise, may employ the same terms with different meanings. But there is an essential difference. Alternative geometries and logics are constructed in abstraction from any empirical consideration, or from what is technically called interpretation; this implies that

alternative systems of postulates are not intrinsically incompatible with one another but only become so when interpreted in terms of the same empirical data, although lack of precision in the specification of the latter may render the question of the truth of alternative systems practically undecidable. Thus Euclidean and Riemannian geometries are incompatible only if treated as descriptions of the space of physics; and the logic of the same set of empirical statements cannot be both two-valued and many-valued. On the other hand, a postulational construction of philosophies is out of the question. This does not exclude, however, such topics for a special inquiry as precision in a statement of philosophical evidence or the question whether alternative philosophies can be based on the same evidence. And these topics would seem to converge on the major problem of invariance, i.e. on the question of whether there is something invariant through transformation from one world-view to another, and if there is, whether it can be identified with the neutral or objective world. Perhaps the root of Pepper's difficulties, which would not be eradicated even if the relatively adequate world hypotheses were construed as equally adequate, is his assumption of an existence of an objective world which is neither what any of the world hypotheses describes nor the invariant core of their descriptions. There is no way of comparing Pepper's assumed world with the world-views, and therefore no way of telling how adequate they are. On the other hand, to assume the existence of an invariant core for all world-views without identifying it with the objective world is to raise another difficulty. Leibniz' monads are alternative world-views with no other world than their collection; and while the similarity of the world-views constitutes invariance, the denial that there is an objective correlation among them leads to the fancy of a preestablished harmony. An opposite, and no less objectionable, extreme would identify invariance with the objective world but treat an alternative perspective as a distortion or illusion. This extreme is exemplified by Minkovski's famous pronouncement: "From now on space in itself and time in itself dissolve into shadows and only a kind of union

of the two retains an individuality." For my part, I believe that both perspectives and the invariant and neutral things are equally real although the former are actualities, whereas the latter have the reality of powers. But even if my position were generally accepted, it would mean no more than an opening of the theory of alternative world-views. And in opening an inquiry into this theory we can only warn those who may carry out its development that an examination of alternative world-views is not the same thing as the belief that they are equally true or adequate. The philosophy of alternative types of philosophy is an arbiter among them, therefore, in a sense, superior to all of them; and if arbitration requires the assumption of invariant powers, the recognition of the category of power is an exclusive principle.

POWER

THE EMPIRICIST PRINCIPLE

THE concept of power or disposition has been rejected by some writers as meaningless on the premise that it does not pass the test of the empiricist principle; according to the radical empiricists, no data of immediate experience are powers or dispositions. To show that radical empiricists are wrong I shall argue that power is directly observable, but the argument must be preceded by some relevant comments on the empiricist principle itself.

The main difficulty with the empiricist principle is that as yet no one has given it a precise and adequate formulation, so that in dealing with different statements of the principle we cannot be sure whether they really mean to say the same thing. Perhaps Hume's original statement is as good as any. Hume says that all complex ideas, and by ideas he meant meaningful ideas, are combinations of, or constructions out of, simple ideas, and that the latter are either impressions given in sense experience or copies of such impressions, so that ultimately all ideas are derived from experience. In Hume's own words:

> It seems a proposition, which will not admit of much dispute, that all our ideas are nothing but copies of our impressions, or, in other words, that it is impossible for us to *think* of any thing, which we have not antecedently *felt*, either by our external or internal senses. (*Enquiry*, Section v, Part 1.)

Hume's statement of the empiricist principle is not sufficiently definite in at least three respects, and when the appropriate change in terminology is taken into account, the

same kind of indefiniteness beclouds the statements of subsequent empiricists. First, the range of simple impressions, or immediate data, or whatever you call the ultimate elements of experience, is indefinite; second, the relations which are allowed in combining simple into complex ideas are not specified; and, third, the correspondence between impressions and ideas, even if said to be a relation of copying, is far from being a clear conception. To simplify the matter let us confine our attention to the field of visual experience, since extension to other fields of perception as well as to introspective facts would not be, in principle, difficult. To try to define the range of simple visual impressions or data, we might describe them, still following Hume, to be "such as admit of no distinction nor separation." But while there is no doubt that in our experience we come across such data as a uniformly colored surface or a circular shape, we also have experiences that cannot be said, in Hume's sense, either to admit or not to admit distinction or separation. For example, as we watch a flag waving in the wind, we do not see a shape which is complex in the sense of a combination of simpler and static shapes, and yet we do not see an invariable or homogeneous form either. Since such examples are commonplace in a dynamic world, Hume's conception of simple ideas as excluding differentiation is inadequate. As an amendment we can try the following. Simple or, rather, basic visual data are either Hume's simple impressions or else nonuniform impressions that are not combinations of Hume's simple impressions. But even this extension may not be enough. We really don't know where to stop. For instance, we have an idea that two circles are similar, but we may hesitate before we decide whether their similarity is given as an impression, or visual datum, in the perception of the circles. There is even less certainty about relations which are to be used in building complex ideas out of simple elements. Logical and mathematical relations are usually allowed. But when it comes to spatial and temporal correlations we are forced to discriminate. As is well known, to mention one point of discrimination, Einstein's empiricism ruled out as meaningless

the notion of absolute simultaneity at a distance. Still more uncertain is the empirical legitimacy of physical constructions, including theories, which serve to correlate observable data and records. Finally, there are difficult questions about the nature of the correspondence between simple ideas and impressions. When Hume said that ideas are copies of impressions, he meant to exclude distortion in representation. And yet he himself pointed out that ideas are less vivid or intense than the original data, apparently not realizing that in matters of experience difference in degree is also qualitative. But a more serious objection is that copying as the sole relation between an idea and an impression would limit the range of ideas to images in complete disregard of concepts; for whatever theory of concepts one may have, it is generally accepted that the concept of the color blue is not blue itself, and that other concepts, likewise, are not images of their referents. A restatement of the empiricist principle, which takes care of the above uncertainties, may now be attempted (with the restriction to the field of vision still in force). Simple, or rather *basic,* ideas are either images or concepts. If images, basic ideas are either impressions, i.e. sense data, which are not combinations of simpler elements, or else copies that do not differ in quality from the original impressions (except in so far as there is qualitative difference as intensity or vividness decreases). If basic ideas are concepts, they must refer to, or designate, nothing but basic images. The latter are colors and shapes, whether static or in a process of motion or alteration. Perhaps we may add to these the impression of similarity; if this addition is objectionable, we must treat similarity as a logical relation between one determinate and another under the same determinable (in W. E. Johnson's sense). The relations that are allowed in a construction of derivative, or complex, ideas are either logical and mathematical or else those that can be embodied within the field of immediate perception, i.e. such relations as "betweenness" which we perceive while we see the letter "e" between the other two in the word "see." But even these amendments are not enough. An additional difficulty is the customary association of the

principle of empiricism with another which may be called the principle of sensory atomism, according to which simple impressions and ideas are identifiable regardless of their setting or combination with others. The association is objectionable because there is hardly any empirical evidence in favor of the principle of atomism. Class-terms, which function as means of generalized description and classification, are in fact the only evidence; and while the class-term "red" may serve to identify the same shade of red whether we see the latter against a blue or a yellow background, we apprehend in the two settings two different qualities. As a rule, simple impressions and images are conditioned by their context and, because of being so conditioned, give evidence against empirical atomicity. On the other hand, dissociation from the principle of atomism weakens the empiricist principle in the following way. We may prove that experience can be anticipated by the simple expedient of imagining an already familiar quality in an unusual setting, i.e. in a new combination with other familiar qualities. Hume himself grants as much in admitting that we can anticipate the experience of a certain shade of blue by imagining it in the context of a continuous transition from one given shade of blue to another through all shades except the one to be imagined. Let me quote in full:

> There is, however, one contradictory phenomenon, which may prove that it is not absolutely impossible for ideas to go before their correspondent impressions. I believe it will readily be allowed, that the several distinct ideas of colours, which enter by the eyes, or those of sounds, which are conveyed by the hearing, are really different from each other, though, at the same time, resembling. Now, if this be true of different colours, it must be no less so of the different shades of the same colour, that each of them produces a distinct idea independent of the rest. . . . Suppose, therefore, a person to have enjoyed his sight for thirty years, and to have become perfectly well acquainted with colours of all kinds, excepting one particular shade of blue, for instance, which it has never been his fortune to meet with. Let all the different shades of that colour, except this single one, be placed before him, descending gradually from the deepest to the lightest; it is plain that he will perceive a blank, where the shade is wanting, and will be sensible that

there is a greater distance in that place, between the contiguous colours, than in any other. Now I ask, whether it is possible for him, from his own imagination, to supply this deficiency, and to raise up to himself the idea of that particular shade, though it had never been conveyed to him by his senses. I believe there are few but will be of opinion that he can; and this may serve as a proof, that the simple ideas are not always derived from the corresponding impressions; though the instance is so particular and singular, that it is scarce worth our observing, and does not merit that, for it alone, we should alter our general maxim.

Unquestionably Hume's instance is artificial, and I have no idea whether the experiment has ever been tried. But if for the sake of argument the experiment with its negative result, i.e. with the formation of the idea of the missing shade of blue, were taken for granted it would mean a refutation of the empiricist principle. To those who argue that the idea of the missing shade of blue is a fusion of the ideas of the shades in its neighborhood, i.e. of the shades between which the missing shade is to be inserted, and therefore a kind of complex idea whose elements are the antecedently given shades, we must reply that the missing shade of blue is a simple impression (as Hume himself points out in the above quotation) however complex the psychological materials for its imaginative formation may happen to be. Against Hume's own remark that his exceptional instance is insufficient to upset the principle of empiricism we can argue that the instance is no exception. The reason why Hume could think of just one kind of exception to his principle, and an artificial one at that, is his complete disregard for the evidence of art. An artist constantly anticipates new effects of aesthetic experience in working out unusual combinations of colors, sounds, or other elements at his command. I do not mean to call the reader's attention to a great work of art as a unique and original experience, even though I might emphasize the fact that such an experience is dominated by a novel aesthetic quality; what I want to bring out is that the elements themselves are emergent effects of experience within the unique setting of a work of art. Beethoven and Stravinsky use the same notes in composition but the sounds of a Bee-

thoven symphony are not the same in quality as the sounds in a Stravinsky piece. And while even a composer may be surprised at the effects of his music at its first performance, one cannot deny the existence of some anticipation on his part. But while Hume could learn from the more impressive evidence of art, the simplicity of his own experiment is helpful in a study of the dynamics of an imaginative anticipation. As Hume has observed, qualities, while distinct, may yet resemble one another; and the order of different shades of blue in his imaginary experiment is an order of diminishing resemblance to a given shade. This order sets up a definite direction, so that the shades of color themselves are sensed as directed qualities or "vectors": we can immediately perceive whether the shades are set in their proper places, i.e. whether the directions of the elements coincide with the direction of the series as a whole. The vector character of sense data belongs to an objective dynamic situation, in an aesthetic if not physical sense, because the uni-directional order, exemplified in Hume's illustration, is compelling to any percipient's imagination, and a quality inserted in a wrong place would cause psychological disturbance. The compelling dynamics of the situation explains why the reader is ready to agree with Hume that imagination is capable of filling up the gap in his series of shades: the reader would not perceive the gap as a vacuum but as a power or constraint within the field of vision which, to be resolved, would require a definite qualitative appearance. Of course, the elements of an aesthetic experience are always vector appearances; this we recognize when we say that a great poem has the right words in the right order or that not a single note can be altered without destroying a masterpiece of music or, more succinctly, that "the logic of art" is a fact. But Hume's series of shades of blue has the advantage of being imaginatively accessible to the aesthetically least sensitive reader, practically, to anyone. But, whatever way is accessible to us, the important thing is to understand that pressure within the context of a dynamic experience tends to originate novel ideas, or imaginative anticipations, when their incorporation

into the context would remove pressure and restore balance. A radical empiricist will, not doubt, object to the free employment of such terms as "vector quality" and "dynamic situation" because they imply the existence of power, and remind me that the idea of power has not yet passed the test of the principle of empiricism. The answer to this objection is that the identification of vector qualities with powers is beside the point even though it happens that vector qualities are powers; the point is that, whatever their relation to powers, vector qualities are observable either as resemblance in the gradual shading off of one quality into another or as strain and cohesion shown by elements within the complex equilibrium of a work of art. Furthermore, even if the radical empiricist refuses to *observe* vector qualities, I can say that vector qualities are justifiable as logical constructions in terms of which an imaginative anticipation of observable data can be explained with the least deviation from empiricism. And, after all, whether or not the explanation is acceptable, the fact of the imaginative anticipation still remains as the main evidence against the uncompromising empiricist. However, the empiricist had better recognize the existence of observable vector qualities; for, if he does not, his theory is to be rejected as leading straight to solipsism. This is a topic that deserves a separate examination.

Some writers, including Russell (on page 376 of *An Inquiry into Meaning and Truth*), assert that solipsism is not refutable. Perhaps Schopenhauer, who calls solipsism "theoretical egoism," has explained their position as well as anyone else (*The World as Will and Idea*, 2nd Book, §18):

> Theoretical egoism can never be demonstrably refuted, yet in philosophy it has never been used otherwise than as a sceptical sophism, i.e., a pretence. As a serious conviction, on the other hand, it could only be found in a madhouse, and as such it stands in need of a cure rather than a refutation. We do not therefore combat it any further in this regard, but treat it as merely the last stronghold of scepticism, which is always polemical. . . . We therefore . . . will treat this sceptical argument of theoretical egoism which meets us, as an army would treat a small frontier fortress. The fortress cannot indeed be taken, but the garrison can never

sally forth from it, and therefore we pass it by without danger, and are not afraid to have it in our rear.

But if solipsism cannot be a serious conviction, why not take this fact as a refutation of solipsism? If philosophical truth connotes plausibility, adequacy, and precision, then solipsism, which is absurd and "could only be found in a madhouse," is refuted as a philosophy. It would seem, under the circumstances, that when writers contend that solipsism is not refutable, they mean no more than that it is internally consistent. But is solipsism really self-consistent? Much depends on how the notion is stated and understood. A solipsist, if there were one, might say: "The whole world is nothing but my personal experience." The personal pronoun, in this formulation, is essential; but if the use of "I" or "my" is essential, solipsism is inconsistent. For a reference to myself would have absolutely no meaning if I did not understand the difference in meaning between the words "I" and "non-I" or "others"; and the understanding would be impossible without the experience of something which is different from myself. On the other hand, as Russell has once pointed out to me, a statement of solipsism without the aid of personal pronouns is possible. All that the solipsist needs is to give an enumeration of his personal experiences, without calling them personal, in conjunction with the assertion that nothing exists over and above the enumerated experiences. But I think that Russell's defense of solipsism turns a solipsist into a radical empiricist. For even if we could grant to a radical empiricist that meaningful statements must be derived from personal experience, we need not grant to a solipsist that a personal experience is an experience of one's person. The distinction between sensation as a personal act of sensing and sensation as an impersonal sense datum is relevant; but Russell no longer accepts this distinction. However, there is an analogous and also relevant distinction between the proposition as a communicable assertion and the judgment which may be a personal act of reassertion of, i.e. of agreement with, the proposition. For example, I understand the solipsist assertion, but I know that I have never asserted it; hence,

I disown the assertion; therefore, it comes to me from an external source; so, as far as I am concerned, solipsism is refuted. Of course, this refutation would not convince a solipsist or a radical empiricist, who does not disown the notion. Hence a more general refutation is required. The required refutation is the fact that vector qualities are observable and form a basis in experience for the distinction between the percipient and others. We find that all elements in experience, whatever their vector relations to one another, fall into two main classes associated with two opposite directions. Let me call "inward" the direction associated with the elements of one class, and "outward" the direction of the elements of the other class. The names are not arbitrary: the elements experienced with an outward direction form the empirical basis of the idea of oneself, while the inward direction accounts for the idea of an external world. Our experience of the external world is an experience of something bearing upon us, of a dynamic pressure, which may culminate in an impact, from outside; we sense ourselves as resisting the pressure, and if aggressive, as the origin of counter drives. The experience of external constraint and internal resistance is equivalent to a perception of two counteracting or opposite directions, i.e. of a contrast of vector qualities. A simple diagram may illustrate the perceptual situation.

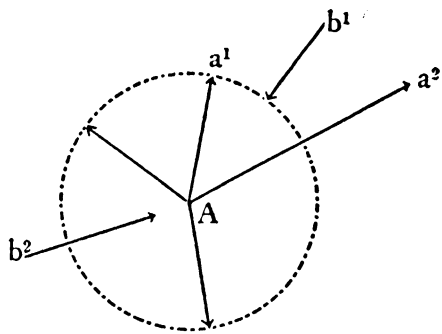


FIG. 3

The point *A* symbolizes the origin of vectors directed outward and therefore represents the percipient. The dotted cir-

cle stands for the field of experience within the percipient's body. The circumference is drawn by a broken line in order to indicate that a body is not isolated from the environment, and that the way for transaction with other things is open. While such vectors as *a1* are sense data located within the body, for example, a taste, vector *a2* is a percept reaching some distant object, say, a sight of a tree. Both *b1* and *b2* are vectors directed inward, and therefore both are perceived as external pressure, even though *b2* penetrates the percipient's body. Thus the direction, and not the location, of a vector determines the distinction between a person and his environment. This is to say that a percipient, who identifies himself with a power to generate outward vectors, must perceive pressure directed toward and against him as something different from himself. Therefore solipsism is refuted. This refutation, to be entirely convincing, can be supplemented by a proof that vector qualities and powers are observable. However, because of the widely spread misinterpretation of the evidence of dreams, hallucinations, and illusions, we may expect many philosophers to refuse to be convinced. Let us then examine the argument from dreams; the argument can be applied, with slight modifications, to hallucinations and illusions. We are told that since images in a dream may be exactly like waking experiences, and since the former are admittedly subjective and not veridical, the same, i.e. subjectivity with no corresponding external objects, may be true of the latter. In particular, to continue the argument, we do experience in a dream the distinction between outward and inward directions, between acting upon others and susceptibility to their action, only to wake up and find that no other people or beings took any actual part in our dream. In a refutation of this argument, and to take a minor point first, let me question the assumption that dreams are indistinguishable from waking experiences on the ground that, if the assumption were true, we could not know that actual people or beings do not participate in our dreams. On page 195 of his *Inquiry into Meaning and Truth,* Russell describes a dream in which he and Whitehead murdered Lloyd George; but

how does he know that the murder was only a dream? Only because he is able to distinguish between a dream and an actual transaction with other people, for example, because a subsequent actual communication with Whitehead, or perhaps with Lloyd George himself, proved that there was no murder. I call the point minor because the argument from dreams can be so reshaped, or amended, as to avoid the force of my objection, although the amended argument can hardly be called persuasive. A solipsist can still argue that both his dreams and what passes under the name of his waking experience consist of mere images with no objective counterpart in an external world. For example, to defend the internal consistency of solipsism Russell might insist on the possibility that his dream was wholly untrue not because Lloyd George is still alive (at the time these lines are being written) but because there are no such people as either Lloyd George or Whitehead. The reader will note that this form of the dream-argument is equivalent to solipsism and therefore has no force that would derive from an independent evidence. But my main objection is against the assumption that dreams and waking experience are intrinsically alike. This assumption is incompatible with Hume's premises, although he himself was not aware of the fact. Hume says that the difference between impressions and ideas "consists in the degrees of force and liveliness with which they strike upon the mind," and he also points out that dreams are ideas and not impressions. The conclusion to be drawn is that dreams are intrinsically different from actuality: the former are "faint images" of the latter. It is no objection to observe that the difference is in degree and not in quality; in matters of experience a difference in degree is always qualitative. Also the difference stands even though we must admit with Hume the existence of borderline cases; for, although some impressions may be "so faint and low, that we cannot distinguish them from our ideas," it would seem that impressions at their best surpass in vividness and intensity any idea that the mind can form. And, I think, that we recognize the difference in intensity between dreams and actuality in our use of cer-

tain hackneyed expressions, for example, when we say that things may acquire a "dream-like quality." Of course I know people who claim that in their experience dreams reach the full vividness of actuality, but I have good reason to suspect that these individuals live mostly in their heads and have only an attenuated sense of actuality; I have yet to come across such a claim from a person who is aesthetically sensitive and alert in discernment. On the basis of my own experience I can say this much: Although in my dreams I often do not know that I am dreaming, this is quite different from knowing that I am not dreaming; also as soon as I begin to question myself, I wake up; and when I examine my dreams retrospectively, I always find them faint, vague, or indefinite, at least in some ways. On the other hand, when fully awake and composed, I know that I am not dreaming. And I think that the quality of the unmistakably actual is, as Hume said, a superior liveliness, freshness, and solidity. Also, I think, this quality of actuality must be identified with the vector qualities of things; for things arrest our attention and impinge upon it by means of their striking intensity, which is another way of saying that their inward direction is a manifestation of their force and liveliness. Let us not misunderstand. To say that a thing holds our attention or has an inward direction is not to say that it is attracted toward us; sometimes, as the "freezing" rabbit knows so well, attempts at getting outside the range of an intruder's vision has the opposite effect of inducing observation. And this brings out a further point: once the observer's attention is concentrated upon a single object as, for example, when a hunter is after his quarry, his perception of the background may be as vague as a dream; yet the superior intensity of the focal point of attention is sufficient to give the whole situation a complexion of actuality. In fact the field of actuality may be spotted with illusions and mirages, yet the quality of the whole suffices to assure the percipient that he is not dreaming. With the argument from dreams rejected, there is hardly anything left in favor of solipsism. And there is one more point to add, which not only strengthens the case against solipsism but

also happens to be an additional consideration against uncompromising adherence to the empiricist principle. A vivid description given by *other* people may provoke in us an imaginative anticipation of a novel experience. The phenomenon of stigmata is one illustration; children of school age exciting one another into an anticipation of sexual experience is another; and, if we are to trust Bergson and his followers, there are many striking instances of intuitive foreknowledge. However, I do not wish to stress this kind of evidence. For one thing, it goes with the assumption of the existence of dispositions, which is yet to be justified. Moreover the complexity of the evidence gives rise to alternative interpretations. In particular, we may suspect that the idea of a novel experience is a *conceptual* construct which is mistaken for an *imaginative* anticipation. We know that similar mistakes actually happen. Thus some students of relativity are so anxious to visualize the conceptual scheme of a fourfold space-time as to end by persuading themselves that they have accomplished that impossible task. But in dealing with examples of this kind we must be ready to inquire whether conceptual constructs themselves form another exception to the empiricist principle.

Admission of concepts proves to be such an embarrassment to empiricism that we can appreciate Hume's attempt at confining ideas to images. For if we assume that concepts are not images, what would a test of concepts by the empiricist principle be? Suppose the empiricist suggests two conditions for such tests: (a) a basic concept, to be meaningful, must refer to a simple impression or experience and to nothing else and (b) a complex concept must be a combination built exclusively out of basic concepts. This suggestion, however, is beset with difficulties. To take condition (a) and to use the idea of the color blue as an example of a basic concept, the concept is identical either with the class "blue" or with the propositional function "x is blue"; in either case it stands for a logical construction and not for a simple datum. To give as an example a determinate concept, or a concept to which the distinction between a determinable

and its determinates is not relevant, would not improve matters. For instance, if we assume that black has no shades, and that the idea of black is not an image, it would seem that this idea refers to nothing but *the color designated by the adjective "black."* But, in thus interpreting an allegedly simple idea, we are identifying it with the definite description "the color designated by the adjective 'black' "; and a definite description not only does not convey a simple concept but, if we follow Russell, is an incomplete symbol which can be said to have meaning only within the context of a proposition. With regard to complex ideas entanglement in class-terms, descriptive phrases, and propositional functions is even more conspicuous; and if this is so, condition (b) is certainly inadequate because incomplete or contextual symbols cannot be construed as mere combinations of basic ideas. At any rate, the consensus of contemporary opinion is to the effect that words are used with meaning, which is another way of saying that words convey ideas, only within the context of a sentence. Assuming this opinion to be correct, we must say that there are no genuine concepts other than propositions or constituents within the context of a proposition. And this leads to an essentially different treatment of the empiricist principle. Instead of asking "How can ideas or concepts mean something?" we must ask "What are the conditions of a meaningful statement?" And the criterion of meaning in taking a statement as a whole may be entirely different from the would-be criterion of meaningful words taken in isolation from the context (if words could be used with meaning in isolation). In keeping with the empiricist's intention we may try the following reformulation of his principle. An empirical statement is meaningful if it has a syntactically correct formation in terms of basic ideas or, at least, if it can be translated into such a formation. But a basic idea must also be redefined. Let us say that a basic idea can function as a predicate within a statement of the form "This is *P*," where "this" is used as a demonstrative symbol to designate some actual presentation. For example, the word "black" conveys a basic idea because the judgment "This

is black" describes the perceptible letters on this page. However, we are not yet at the end of the empiricist's difficulties. For we cannot be satisfied with the privacy of such perceptual judgments as "This is black," and must replace them, for the sake of communication, by such existence propositions as "The color is black." But, as will be explained later, an existence proposition contains the clause "There exists (something such that . . .)" which cannot be understood in terms of basic ideas at all. In order to get around this and similar difficulties the empiricist may prefer an alternative treatment of meaning according to which all words are used with meaning, regardless of their relation to impressions, provided they occur within a statement which is meaningful as a whole. But when is a statement meaningful as a whole? The answer that, to be meaningful, the statement must be verifiable has been thoroughly discredited. For conclusive adverse criticism the reader is referred to Russell's *Inquiry into Meaning and Truth,* but the leading empiricists themselves have finally realized that the condition of verifiability is too stringent; the up-to-date empiricist merely requires, for a statement to be meaningful, that there should be evidence which confirms (or disqualifies) the statement or renders it probable. Those who distinguish confirmation from establishing probability have not yet succeeded in making the distinction clear, and it would seem that the procedure of confirmation commits the logical fallacy of confirming the consequent. But probability as the basis of meaning is no less objectionable. The frequency-notion of probability is not applicable to a single statement; and to say, as Reichenbach does, that we "posit" or attribute to a single statement a certain weight is either to smuggle probability under a new term or else to identify the blind posit with an arbitrary and unjustified fiat. No further explanation of these points is necessary because there is another objection, this time entirely nontechnical, which shows that, if intended to be an empiricist restriction on meaning, probability is too broad. The objection is this. The empiricist criterion of meaning is directed against metaphysical statements; but if a metaphysical statement is non-

contradictory and unambiguous, there is always some evidence which is relevant to it and therefore a contribution to its probability and meaning. To illustrate let me make use of the symposium "Can Speculative Philosophy Be Defended" (*The Philosophical Review,* March, 1941). In this symposium W. T. Stace applies the empiricist test of probability to four statements: "Reality is one," "There is an infinite substance," "There is a timeless evolution of matter toward form," "Bergson's *élan vital* exists," which, he thinks, are fair examples of "illegitimate metaphysical doctrines." R. M. Blake proceeds to show that, by Stace's own test, all four examples prove to be meaningful statements. I think Blake's demonstration is entirely convincing and I want to quote in full his treatment of the first and second examples; of the first because it clearly shows Blake's method, of the second because of its relevance to the concept of power.

(1) The first [example] is the statement that 'reality is one.' As to this Stace says: 'The kind of unity alleged is so far as I can see such that no evidence could ever render it in the least degree either probable or improbable.' But what does he mean by 'the kind of unity alleged'? So far as I can see what is alleged is just 'unity,' not any special kind of unity. And again what is meant by 'reality'? The statement as it stands is so vague and ambiguous that it is not possible to say with any definiteness what it is intended to assert. It might mean merely: 'There is only one totality of all there is.' If so, I think (waiving difficulties about logical 'types') it is an a priori truth. It might mean: 'The world is completely homogeneous throughout.' If so, there would seem to be ample empirical evidence to render it not merely probably but quite certainly false. I can't think of any sense it might have that would make it a statement such that we could know that no conceivable evidence *could* ever render it in the least degree either probable or improbable.

(2) The second is 'Spinoza's doctrine of an infinite substance. From this hypothesis nothing whatever can be predicted which could ever be subjected to empirical test.'

Now when Whitehead's proposition 'stones have feelings' was being defended it was remarked that Whitehead 'does think he can produce evidence of its truth.' For example 'he urges that only by this hypothesis can the emergence of plants and animals from

the aboriginal slime of a so-called dead planet be explained.' And even though we think this evidence of little value it is enough if we weigh the evidence and pronounce it insufficient, to constitute an admission that the proposition is not 'metaphysical.' So too does Spinoza think he can produce empirical evidence of the truth of his doctrine. He says:

'Inability to exist is want of power, and on the other hand ability to exist is power (as is self-evident). If then what now necessarily exists is only finite, then finite things are more powerful than a being absolutely infinite; and this, as is self-evident, is absurd. Therefore, either nothing exists, or a being absolutely infinite necessarily also exists. But we ourselves exist. . . . Therefore a being absolutely infinite, that is God, necessarily exists.

Q. E. D.'

Well then, even though we think this evidence of little value, it is enough if we weigh the evidence and pronounce it insufficient, to constitute an admission that the proposition is not 'metaphysical.'

It is plain that, following Blake's method, we could show that no proposition is "metaphysical," and this means that the empiricist criterion of meaning, in the form under discussion, is a failure. The importance of this conclusion, however, requires a more general demonstration. Let p be any metaphysical proposition, and suppose that there exists no empirical evidence either in favor of or against the truth of p. The radical empiricist would say that p is meaningless. But suppose that there exists a false but meaningful hypothesis h, and that the *truth* of h would serve as relevant evidence with regard to p. On this supposition, p *is* meaningful. Hence the radical empiricist cannot discard p as meaningless unless he can prove that there is no relevant hypothesis h. But, as a rule, he can hardly be expected to prove anything of the kind. The situation can be illustrated by the discussion, in the Appendix, of Russell's theory of perception if we let p stand for "There exist unobserved aspects of a physical object" and h for "A specific shade of color is a particular." Does this all mean that we should reject the empiricist principle altogether? I think I can suggest a correction which would make the principle appear more tenable. The corrected

formulation is as follows. Two (or more) empirical statements have the same informative meaning, i.e. convey the same information if, and only if, the same evidence which raises (or diminishes) the probability of one of them raises (or diminishes) to the same degree the probability of the other; and if one of the statements is given exclusively in terms of existential prefixes, logical and mathematical constants, and basic predicates, while the other involves class-terms and descriptive contextual symbols, these class-terms and contextual symbols convey no more empirical information or meaning than the basic predicates within the first statement. A basic predicate is the predicate in a judgment of the form "This is *P*," when the latter is used to describe some simple impression or datum. There is room for further refinement, but one thing is clear: this formulation is no rule for the discarding of all metaphysical doctrines indiscriminately. But then an uncompromisingly anti-metaphysical rule is neither desirable nor possible for the simple reason that most metaphysical ideas are significant. On the other hand, some ideas, metaphysical as well as others, are disqualified by the corrected empiricist principle, not exactly as meaningless but as dispensable, whenever there is a simpler way of conveying the same information. Consider, for example, the ideas of absolute space, time, and motion. If we disregard certain complications of the relativity theory, we may say that there is no empirical evidence in favor of these ideas and against those of relational space, time, and motion. Both sets of ideas give exactly the same information. We cannot say that the absolute ideas are meaningless since they form the basis of the mechanistic view which admittedly is a meaningful scheme. But we can apply the corrected empiricist principle and discard the absolute ideas as superfluous because the relational ideas do not stipulate the existence of unobservable positions, moments, or changes of position, and therefore are simpler.

If the idea of power can stand the test of radical empiricism, so much the better. In the section to follow we find that powers are observable. Suppose, however, that we are mis-

taken. Even so, as the application of the corrected empiricist principle will show, powers must be admitted in philosophy because they are indispensable: a statement in terms of powers cannot be translated, without a distortion of meaning, into a statement which does not involve the idea of power.

POWER AS AN OBSERVABLE ENTITY

THE concept of power refers to observable entities if, and only if, there are presentations or sense data that can be described by the judgment "This is a power." If presentations are ever in the mode of a tendency, if they are perceived with vector qualities, as attractive or repelling or, more generally, as requirements and therefore impositions, then the dynamic character of such data, their power, would unquestionably be a datum itself. An evidence for such observable tendencies or dynamically unstable presentations is the existence of nonspecific or determinable data. There is a common experience of rendering an original presentation more specific by means of concentrating one's attention upon it. You may have seen a person many times before you noticed the color of his eyes. But even before you noticed the specific color you did not have an experience of colorless eyes; therefore the original color was perceptually determinable. Any experience which can be transformed into a more specific presentation is nonspecific before the transformation. It is not correct to describe the process of perceptual specification as a replacement of the original datum by others which are determinate in a different way but not to a greater degree. As experienced the process is a continuous transition toward specificity within the same datum and not a replacement of one distinct datum by another. Hence, if we are to trust our immediate experience, there are relatively determinable data which tend to become more specific through perceptual concentration. Therefore there are observable tendencies or powers. The evidence for this conclusion must be guarded against misinterpretation. I describe perceptual specification as a

transformation within the same datum but the identity of the datum throughout the process is not essential to the argument. If a critic construes identity in some rigorous technical sense, which excludes alteration altogether, I can restate the point using his terminology. The important thing is to observe the change in specificity and therefore to recognize that a certain datum is not specific, i.e. that a datum of the same kind might be more specific. Even continuity in the process of specification is not indispensable although it allows for direct inspection of an increase in specificity. If we had to rely on a sequence of discrete data, we still could compare them with one another and find that the later data are more specific than their predecessors; but comparison would then be based on memory and involve uncertainty. However, let me consider, for the sake of argument, the hypothesis that perceptual specification consists of a sequence of discrete data. To take advantage of the uncertainty involved in a comparison of successive data a critic must be able to give an alternative explanation of what appears to be an increase in their specificity; but I do not believe that an account which makes no use of the concept of power or tendency can be plausible. According to one opinion all data are equally determinate and the data which I call determinable are simply vague, foggy, or indistinct. In this opinion an indistinct datum is always specifically indistinct. A favorite illustration is a foggy or misty landscape by Turner; the effect of fog, we are told, is produced by a specific composition out of specific colors. But the use of such illustrations betrays a confusion between a work of art as a physical object and a work of art as an aesthetic experience. A physical object, a canvas, can be covered with specific pigments of paint but the perceptual effect of a foggy landscape cannot be identified with them. On the other hand, the effect of a picture and the experience of the original may be of the same degree of specificity, and therefore both determinable. I admit that in a different sense of "specific" every work of art is specific. By coming closer to an actual object in a fog we perceive the object with an increase in specificity; but if we come too

close to a painting the aesthetic object simply vanishes. But specificity, in the sense of incapacity for undergoing further specification, which is characteristic of art, is no objection to the fact that an aesthetic experience is nonspecific, in a relevant sense of the word, if it gives an illusion of determinable objects. So much for "indistinct" in the sense of vague and hazy; let me add that "indistinct" in the sense of inconspicuous or grayed cannot take care of determinable data either. For example, it would be wrong to contend that before you noticed the color of another person's eyes you saw them grayed. Since gray, as a sense datum, is one color among others, the contention would make you experience a change from one color to another: if the eyes are blue, from gray to blue; but your actual experience was not that of a change in color. This is not to say that there was no experience of change at all, and I cannot accept a third interpretation according to which the percipient's need for a subsequent specification of the color means no more than his forgetfulness of a previous awareness. On the assumption that the process, which I describe as an increase in specificity, is a sequence of distinct data this interpretation is not absurd. If we call the original datum *a*, the one to follow *b*, and so on, it is possible that *a*, *b*, etc., exemplify the same shade of blue, but that during the perception of *b* the percipient no longer remembers the color of *a*. But even though possible the hypothesis of a forgetfulness of this kind is not plausible. Let us take another illustration to see how implausible this hypothesis is. Suppose you look at the window of a drug store; one glance is not enough to take in all the articles on display with their specific colors, shapes, and sizes; nor would it be plausible to suppose that a single glance, like a snap-shot, could actually register this variety of data only to have them forgotten the very next moment. The fact that an effort of memory may give knowledge of a datum which was unnoticed at the time of its occurrence does not make the supposition any more plausible. As the clock strikes you need not count the strokes; yet a subsequent effort of memory may tell you the exact number. This I grant, but it is only too

easy to build up a false analogy. You are tempted to say: "Sometimes I take down a telephone number, and later must look up the record in order to make the call; similarly there must be a record of the number of strokes in my mind to enable me to remember the number later; and this suggests that the mind registers everything accessible to the senses, although some of the data are subsequently forgotten." But your analogy does not hold: you can take down any telephone number, but an effort of memory can succeed only if the "forgotten" number is small. If the uncounted number of strokes was twelve, a subsequent effort of memory may tell you that the number was large but you cannot specify how large. Thus, if we want to account for all relevant facts, we are, sooner or later, faced with nonspecific data, for example, with unspecified numbers. We might as well, to begin with, give preference to an interpretation in terms of determinables and dispositions. To limit our discussion to the case of uncounted strokes, a preferable interpretation would be as follows. Let us assume that with each stroke of the clock the percipient's aptitude or disposition of the body is somewhat modified but that the effect is less pronounced with the increase in the number of strokes because his body becomes accustomed, and less sensitive, to a repeated stimulation; we may also suppose that an idea or memory image of a certain number of strokes tends to set up, through habit, association, or conditioned reflex, the same bodily disposition as would be established by the same number of actual strokes. Let the clock strike three; if you failed to notice the event, you may try the numbers one and two in an attempt to imaginatively reconstruct the number of strokes; but the bodily disposition induced by imagination does not harmonize with the physiological set-up conditioned by the original actual event. The resolution of the bodily tension comes only when you try the number three, and you express the resulting feeling of satisfaction by saying that you remember the number. On the other hand, when the number of an unnoticed event is large, the corresponding disposition of the body is not specific enough to fit in with any of the induced

dispositions to the exclusion of others; in fact the induced dispositions are not specific either; and under the circumstances there is no feeling of a definite tension nor of a clear-cut relief. It would seem that in any event we may have a bodily feeling of a determinable number but that imaginative counting gives it an outlet and specification only when the numbers are small. Thus in the course of arguing for determinable colors I have introduced nonspecific numbers. And, of course, it would be no more difficult to show that there are determinable shapes, sounds, and other sensory qualities. But the question of nonspecific numbers has been singled out in recent publications and, since in a measure I am responsible for this, I also shall give a special consideration to the perception of numbers.

Number, in one sense of the word "number," is an observable quality of things, and I am not concerned here with number in any other sense, in particular not with any such mathematical conception as "the class of classes similar to a given class." Observable numbers are given with the pluralities of items since we can perceptually, and without the aid of counting, compare and correlate such pluralities as either numerically equal or unequal. A cat, which is worried when one of her five kittens is taken away, shows perception of the difference between the observable numbers five and four. The audience in an opera house directly perceives the numbers one, three, and four, as it recognizes the difference in the numerical appearance of a soloist, a trio, and a quartet. Counting may help in specifying the number of a plurality and connect an observable number with mathematical concepts, but there is no doubt that small specific numbers make their entry on a purely perceptual level. And now for the perception of determinable numbers. Suppose you have a glimpse of a speckled hen. Just how many speckles do you see in your sense datum before you have a chance to count them? It would seem that, while the speckles are enumerable but not yet enumerated, you see that there are many without knowing how many; in other words, you perceive a determinable and not a specific number. The speckled hen is

H. H. Price's example, and R. Chisholm opens his article "The Problem of the Speckled Hen" (*Mind*, 1942) with these words: "What may be called 'the problem of the speckled hen' was suggested to A. J. Ayer by Gilbert Ryle. Ayer proposed a solution in *The Foundations of Empirical Knowledge*, but his proposal was criticised by H. H. Price and R. B. Braithwaite in their reviews of that book. The problem is significant, since every possible solution appears to involve serious consequences for the theory of empirical knowledge. It may be discussed in terms of Price's example." Since to at least one writer the problem appears significant, let me correct his, and Ayer's, mistake about its origin. I believe I was the first to state the problem in the following passage of *The Philosophy of Relativity* (Allen & Unwin, 1937, p. 90): "An interesting example of perceptual indeterminacy, dealing with the apprehension of numbers, is the situation in which one sees a large crowd and therefore perceives a number of people without being able to specify what this number is." A few years later I discussed this problem, this time using the language of sense data, in a conversation with Ayer himself, who apparently had forgotten the event by the time he had a similar discussion with Ryle. I believe the discussion with Ryle to be subsequent because my impression is that during his conversation with me Ayer was struck by the novelty of the problem. So much for the record, and now for Ayer's position. He differs from me because he denies that specification of number can take place within the same datum. He admits that we often apprehend numerically unspecified pluralities but he contends that subsequent enumeration would give a new datum; in other words, he recognizes indeterminate but not determinable data.

> For a group of sense-data can be said to be enumerable only if it is in fact enumerated. And to say that it might have been enumerated, though actually it was not, is not to say that it had any undetected property, but only that some other group, which would have been enumerable, might have occurred in its place. (*The Foundation of Empirical Knowledge*, The Macmillan Co., 1940, p. 125.)

I have already criticized the notion that what appears to be a continuous increase in specificity within the same datum is in fact a replacement of one distinct datum by another; but whatever our differences Ayer would seem to agree with me, and the point of agreement is crucial, that sense data with nonspecific numbers exist. Ayer's critics make some interesting observations on our crucial point, but their comments cannot be taken as serious objections. Price points out that the uncounted and the counted groups associated with the same speckled hen are exactly alike in visual content. I do not think that he is right. I believe that after the enumeration of the speckles the datum as a whole becomes more distinct. If Price were right, he would have to maintain, in order to conform to the empiricist principle, either that the two statements "*A* is a sense datum with a nonspecific number of elements" and "*A* is a sense datum with a specific number of elements" have the same observable basis and therefore the same meaning or, an equally implausible position, that the second of the two statements is intrinsically incomplete and can be understood only within the context of the following conjunction: "*A* is a sense datum with a specific number of elements and their number was specified by counting." Chisholm has another objection:

> . . . Ayer is not saying that it is neither true nor false to assert the (numerically indeterminate) datum to have forty-eight speckles; he is saying that it is false. The speckles are *many* in number, but it is not true that there are forty-eight, or forty-nine, or any other particular number. But this is very much like saying that victory will come in 1943, but not in January or February or any other particular month up to and including December. If it cannot occur during any of the twelve months which comprise 1943, there is no time left in that year when it *can* occur, and hence it is contradictory to say that it *will* occur in that year. Similarly, if the datum doesn't have ten, eleven, or a thousand, or a million, or any other particular number of speckles, it is contradictory to say that, none the less, it has *many* speckles. (*Op. cit.*, p. 370.)

This argument begs the question. If a determinable were

no more than an exhaustive disjunction of subordinate determinates, and its name only an indefinite description of any one among the latter, there would be no issue because there would be no determinable in the sense of a single observable and nonspecific property which is different from any of its specifications. I should not deny that the proper answer to the question "What is meant by color?" is the disjunction "A color is either red or orange or yellow or green or blue or violet"; but the issue is whether this disjunction is just an enumeration of hues or an enumeration together with a reference to a property specifiable as any one of the hues and yet observable in its own right prior to specification. Let me add that I find Chisholm's analogy faulty. A year is only a collection of days and a month is a part of this collection; hence the day of victory which belongs to the whole collection must also belong to one of its parts. But number is not a collection of particulars. If it were permissible to treat a year as a genuine class whose members are days and species are months, the analogy would be closer but still inexact. For let the year of 1943 mean "the days of 1943"; the latter phrase can be expanded into the finite disjunction "either (the days) of January or February or March or April or May or June or July or August or September or October or November or December." But no analogous disjunction can form our understanding of the idea or property "number" for the simple reason that we cannot enumerate, disjunctively or otherwise, the infinity of particular numbers. We may assume, for the sake of argument, that the number of speckles is always finite. Even so we cannot describe this number by means of a disjunction unless we know the last member of the latter, i.e. unless we count the speckles. To contend that the uncounted number is nevertheless specific in the hen is to take the position of naïve realism and to miss the essential difference between the terms "specifiable" and "specific." The contention may be interpreted as a subjunctive conditional statement, "If the speckles were counted, there would be a particular number," and interpretations of this kind remain to be examined. Meanwhile I am satisfied

that the existence of determinable numbers has been established.

The truth is that determinable data not only exist but make up the bulk of ordinary experience. For the multitude of data discernible within a perceptual background cannot match in distinctness and specificity the few figures in the focus of attention. And even things in the foreground are perceived, except in an aesthetic experience or in learning, in their instrumental capacity and therefore schematically, i.e. with an omission of all specific distinctions which are irrelevant to the percipient's immediate practical purpose. The world of practice is primarily a concern of movement and action, and perceptual indeterminacy is a way of saving the agent's energy. We perceive with a minimum discernment which is sufficient to efficiently handle objects in a semi-automatic action; for example, once we learn how to drive a car we shift the gear and go through other movements without noticing what we are doing. This observation is a commonplace. But with the shift of exposition from determinables to perceptual indeterminacy in its connection with movement we, almost literally, exhibit a motion picture and therefore a most conspicuous and publicly accessible demonstration of the dynamics of the situation. There are three perceptual modes of a dynamic situation: equilibrium, instability, and movement. Equilibrium is observable in the dynamics of art; but not many people are masters of the aesthetic experience or know how to analyze it. Perceptual instability, which appears in a determinable datum ready to undergo specification, is felt as a call upon, or impulse toward, stabilization through an increase in determinacy, therefore as an imposition which unquestionably is an experience of power. But to explain this we need the resources of technical philosophy. Moreover, perceptual instability itself is secondary to indeterminacy since the tendency to undergo specification may not be realized and, if it is not, the same datum is indeterminate while no longer determinable. But the reader may question the existence of a close connection between perceptual indeterminacy and movement. If

so, I should argue as follows. Although a determinable datum is an impulse toward specification, we are not dominated by its power and are ready to divert our attention to other data. For attention is attracted by movement, and we leave the given datum indeterminate as soon as we notice something moving in the background. Thus perception of motion turns a determinable into unalterable indeterminacy. And the moving datum, which is the source of this indeterminacy, is essentially indeterminate itself. A percept of movement is always a blur in the field of vision, the more indefinite in outline and color the faster the movement. The relation between the two is in fact close enough to suggest that perceptual movement *is* perceptual indeterminacy. The usual view is that motion only causes blurred appearances without being identical with the latter; but I believe those who take this view have in mind physical and not perceptual motion. To support my suggestion of identity let us consider perceptual movement which is completely divorced from any physical motion. The diagram of the Maltese cross is a case in point. And, as we have already found, the shift from one definite figure of the diagram to the other is described, indifferently, either as a brief period of perceptual movement or as a transition through perceptual indeterminacy and confusion. This is not to say, however, that motion and indeterminacy in physical process are only causally related. If, as a rule, a percept of movement is a direct presentation of a physical process, perceptual indeterminacy is usually a manifestation of physical motion. And Heisenberg's principle of indeterminacy may be understood as a demonstration that motion and indeterminacy in physics are likewise inalienable.

If power is both observable and common, any attempt to work out a philosophy without dynamics must fail. Even radical empiricists make constant use of the concept of power, although they somewhat disguise their practice by writing about habits, conditioned reflexes, and the like. Hume rejects power only to bring it back, in his account of causality, in the form of mental habit. Thus in Part 2 of Section v

of his *Enquiry* we read: "The appearance of a cause always conveys the mind, by a customary transition, to the idea of the effect." And Carnap, to turn to a leader of contemporary positivists, defines language, in the very first sentence of his *Introduction to Semantics* (Harvard University Press, 1942), as "a system of sounds, or rather of the habits of producing them by the speaking organs." I suppose Carnap would dismiss his reference to habit as a circumlocution which can be reduced to a more direct and literal statement in which there is no mention of habit. This brings us to the subject of disposition-words and reduction sentences. Suppose a physicist tells us that a certain substance is soluble in water. The word "soluble" is a disposition-word and his description, taken at its face value, implies the existence of a power or disposition to undergo dissolution. But, objects the radical empiricist, the statement "*A* is soluble in water" can be translated without any loss of empirical meaning into, and therefore means no more than, the conditional statement "If *A* is put in water, then *A* dissolves." Similarly, he would say, "habit" or any other disposition-word can be dispensed with by means of a suitable translation into an "If-then" statement. But the radical empiricist seems to overlook the fact that the "If-then" statements are of two essentially different kinds. There are indicative conditionals, exemplified by such statements as "If *A* is immersed in water, then *A* dissolves"; and there are subjunctive conditionals such as the statement "If *A* were in water, *A* would dissolve." Let us admit that a disposition-concept could be eliminated if its predication were translatable into the form of an indicative conditional. We may admit this because both the antecedent and consequent clauses of the indicative conditional seem to be verifiable (or refutable) by actual observation and therefore do not refer to a disposition or power. For example, "If *A* is immersed in water, then *A* dissolves" is a truth-function of the component statements "*A* is immersed in water" and "*A* dissolves" which describe each an actual situation. But, as empiricists themselves admit, an indicative conditional, being a truth-function, is true when its antecedent is false;

and when the antecedent happens to be false, the indicative conditional utterly fails as a translation of a statement given in terms of disposition-words. Let us consider Carnap's own treatment of the difficulty.

Let us consider the question whether the so-called disposition-concepts can be defined, i.e. predicates which enunciate the disposition of a point or body for reacting in such a way to such and such conditions, e.g. 'visible,' 'smellable,' 'fragile,' 'tearable,' 'soluble,' 'indissoluble,' etc. We shall see that such disposition-terms cannot be defined by means of the terms by which these conditions and reactions are described, but they can be introduced by sentences of another form. Suppose we wish to introduce the predicate 'Q_3' meaning 'soluble in water.' Suppose further, that 'Q_1' and 'Q_2' are already defined in such a way that '$Q_1\ (x, t)$' means 'the body x is placed into water at the time t,' and '$Q_2\ (x, t)$' means 'the body x dissolves at the time t.' Then one might perhaps think that we could define 'soluble in water' in the following way: 'x is soluble in water' is to mean 'whenever x is put into water, x dissolves,' in symbols:

$$\text{(D:)} \qquad Q_3\ (x) \equiv (t)\ [Q_1\ (x, t) \supset Q_2\ (x, t)].$$

But this definition would not give the intended meaning of 'Q_3.' For suppose that c is a certain match which I completely burnt yesterday. As the match was made of wood, I can rightly assert that it was not soluble in water; hence the sentence '$Q_3\ (c)$' (S_1), which asserts that the match c is soluble in water, is false. But if we assume the definition D, S_1 becomes equipollent with '$(t)\ [Q_1\ (c, t) \supset Q_2\ (c, t)]$ (S_2).' Now the match c has never been placed into water and on the hypothesis made never can be so placed. Thus any sentence of the form '$Q_1\ (c, t)$' is false for any value of t. Hence S_2 is true, and, because of D, S_1 also is true, in contradiction to the intended meaning of S_1. 'Q_3' cannot be defined by D, nor by any definition. But we can introduce it by the following sentence:

$$\text{(R:)} \qquad (x)\ (t)\ [Q_1\ (x, t) \supset (Q_3\ (x) \equiv Q_2\ (x, t))],$$

in words: 'If any thing x is put into water at any time t, then, if x is soluble in water, x dissolves at the time t, and if x is not soluble in water, it does not.' This sentence belongs to the kind of sentences which we shall call reduction sentences. ("Testability and Meaning," *Philosophy of Science*, October 1936, p. 440.)

Carnap admits, on page 445 of the same article, that his reduction sentences are not entirely satisfactory: "The mean-

ing of 'Q_3' is not established completely [by a reduction sentence], but only for the cases in which the test condition is fulfilled. In other cases, e.g. for the match in our previous example, neither the predicate nor its negation can be attributed." To my mind Carnap's admission rather proves that a reduction sentence is entirely unsatisfactory. For to say that when the condition of an antecedent test is not fulfilled the match cannot be described as either soluble or insoluble is to contradict Carnap's previous assertion: "As the match was made of wood, I can rightly assert that it was not soluble in water." More generally, to make the meaning of disposition-predicates dependent on the performance of a test is to disregard their instrumental significance both in science and in ordinary practice. I would not buy sugar if I thought it was not soluble in liquid; nor would I buy it if a test by immersion in water were necessary in order to know that it is soluble. Apparently Carnap is not fully aware of this kind of difficulty, for he proceeds as follows:

> In the case of the predicate 'soluble in water' we may perhaps add the law stating that two bodies of the same substance are either both soluble or both not soluble. This law would help in the instance of the match; it would, in accordance with common usage, lead to the result 'the match c is not soluble,' because other pieces of wood are found to be insoluble on the basis of the first reduction sentence. Nevertheless, a region of indeterminateness remains, though a smaller one. (*Ibid.*, p. 445.)

But most critics agree with one another that the fault with reduction sentences is more serious than indeterminateness. To their numerous objections, which the reader may find elsewhere, let me add two more. Let us use the letter "*d*" as an abbreviation for any such disposition-word as "soluble." Then, according to Carnap, we can say "*c* is *d*" provided *c* exemplifies a substance which was found to be associated with *d* by means of an antecedent test on another exemplification, so that the association in question is expressible by a reduction sentence with a verified condition clause. But the question is whether the association is necessary or contingent. If *d* is constitutive of the substance, then

the law that two bodies of the same substance both have, or lack, *d* does not help because to determine the substance exemplified by *c* we must test the latter for the association with *d*. And if the association between *d* and the substance of *c* is contingent, we should question the law which postulates the invariability of a contingent association. Let me introduce my second objection with the aid of a simple example. Suppose you test a lump of sugar for solubility by immersion in water. How do you know that the lump is immersed in water? The answer is obvious: you assume the medium of immersion, which looks like water, to have the disposition properties of water, i.e. you assume that a test would prove the medium to be water. But even if you are satisfied, because of an earlier actual test, you cannot be sure at the time of immersion that the liquid still has the properties of water. Of course, you may be able to perform the tests for water and solubility simultaneously but simultaneous tests would only remove the difficulty to some further point. For in any test there are not only bodies to be tested but some instruments of test which are *assumed* to have the required disposition properties throughout the period of the experiment. These, and other, difficulties discredit reduction sentences and, if we still expect to account for the predication of disposition properties in terms of "If-then" statements, we must turn to subjunctive, or contrary-to-fact, conditionals. But here again we are faced with two essentially different interpretations. Either a subjunctive conditional can be translated into a composition out of two indicative statements or else the existence of complete constituent statements is denied. The radical empiricist would want an interpretation of the first kind. For example, he would require the subjunctive conditional "If *A* were immersed in water, *A* would dissolve" to be transcribed into a composition on the basis of the indicative, and therefore verifiable, statements "*A* is immersed in water" and "*A* dissolves in water." But the required transcription would have to be an intensional statement, let us call it *I*, "Necessarily, if *A* is immersed in water, it dissolves." And the empiricist

cannot be satisfied with the intensional form, because the modal word "necessarily," he would say, designates nothing observable. He may propose *I'*, " 'If *A* is immersed in water, it dissolves' is an analytic statement," as an adequate transcription of *I* which dispenses with the modal term of the latter. The question now is whether *I* and *I'* are synonymous, i.e. vehicles of exactly the same meaning. As W. V. Quine explains in his "Notes on Existence and Necessity" (*The Journal of Philosophy,* 1943), "all matter within a context of single quotes is isolated, in an important sense, from the broader context," and the names within the isolated context have no designative use, i.e. are not used in order to mention something outside the context. According to Quine, since *"A"* occurs in *I'* within a context of single quotes, its occurrence is not designative. And if he is right, *I'* does not do justice to the original statement which refers the property "soluble" to the object *A* outside the context of words. On the other hand, *I,* unlike *I',* does not contain a component statement in single quotes. Nevertheless Quine has argued that the occurrence of *"A"* in *"I"* is likewise not designative. But we need not follow the argument further. If we accept his conclusion, *I* conveys no more than *I'* and both are equally inadequate transcriptions; if not, and if *I* is adequate, the necessity of the connection between *A*'s immersion in water and its subsequent dissolution is not analytic or logical but resides in some intrinsic physical property of *A,* and an intrinsic property, which is manifested as a dissolution upon immersion in water, is the same thing as a disposition property. But is *I* adequate to the intended meaning? I doubt it. The constituents of the original subjunctive conditional are two incomplete clauses, *"A* were immersed in water" and *"A* would dissolve," neither of which is an indicative sentence. And since the subjunctive form is understood as a statement of a contrary-to-fact condition, the indicative sentence to be associated with the clause *"A* were immersed in water" is *"A* is not immersed in water" rather than *"A* is immersed in water." I am not impressed by the objection that reference to something which is contrary to

actuality is nonsense. Suppose a single shot is fired at a target which consists of a set of concentric colored bands. The statement that "Some of the bands cannot be hit" is true since a single shot can hit only one band. On the other hand, before the hit is scored, we can say with truth that "Any band on the target can be hit." Both statements are true, and yet they appear to contradict each other. To resolve the paradox we observe that each statement employs the word "can" in a different sense: while "Some of the bands cannot be hit" is about possibilities which are excluded by the actual hit, "Any band can be hit" is concerned with an intrinsic susceptibility to a hit which is independent of the actual result of shooting. The difference in the two senses of "can" would not be understood, and the paradox could not be resolved, if the notion of an independent-of-facts susceptibility to a hit were meaningless. We may conclude that the radical empiricist is trapped in the following inconsistent triad: (1) Disposition properties are unobservable and therefore must be rejected; (2) both ordinary and scientific languages are replete with true statements in which disposition properties are predicated of objects; (3) predication of disposition properties cannot be adequately restated in a statement of the indicative conditional form with or without a modal prefix. To extricate himself from his predicament the empiricist must relinquish one of the three statements. I think he will agree that (1) is far more questionable than either (2) or (3), and that therefore he had better reject (1).

I have not yet questioned the adequacy of subjunctive conditionals and, so long as power is understood in terms of disposition properties, subjunctive conditionals are unobjectionable. But the term "disposition property" is misleading. In one sense of "property," in which every descriptive term is a property in distinction from that which is to be described, to say that power is a property is correct because we can always describe a certain power *P* by the statement "*P* is a power." On the other hand, and in another sense, properties are usually opposed to that which has them, to

the bearer of properties. For example, we may contrast our percepts or sense data with a physical object by saying that the former are appearances, manifestations, or observable properties, of the latter. From this point of view our concern with observable power, therefore with percepts, also entitles us to treat a power as a property. But the point of view is provisional and limited. In a subsequent discussion of material things we conclude that in so far as it discloses a power a percept of a physical object is the physical object. The opposition is not between a percept and a physical object but between an actual, specific and explicit, sense datum and an experience of power. The latter opposition is confirmed by an analysis of the aesthetic experience, according to which the observable dynamic substance in art, although objective or public, must be distinguished from the corresponding work of art as a physical object. And this point brings me to what may be called the philosophical use of the term "property." Philosophers identify properties with the attributes of a substance in opposition to the substance itself. In the philosophical sense of "property" a power is not a property but a substance. This is not to say that in identifying power with substance I should endorse any of the traditional philosophical speculations about the nature of substance. A substance, as I understand it, is a substratum wherein its attributes inhere, but I do not agree with Locke that this makes the substance "something we know not what." The substratum is a cohesion of attributes and such a cohesion is a unifying force, or a tendency to remain united, which can be both experienced and described. We experience a cohesion of attributes with the sense of an objective, or inward, compulsion and we describe it in terms of vectors and dynamics. For example, we may describe our perception of a physical object as a compulsion to blend or unify its original determinable appearance with the subsequent specifications. And, in art criticism, we often read about the compelling, or organic, unity of an aesthetic experience. An important difference between a substance and an attribute is that the organic unity of the former does not exclude change

whereas an attribute is strictly unalterable. This fact, together with a confusion between attribute and property as a means of description, may be responsible for the rejection of substance in British empiricism. For if properties are unchangeable attributes, and if things can be described only by means of properties, a failure to differentiate between the two uses of the word "property" would account for the opinion that the dynamic nature of substances is something indescribable and therefore "something, we know not what." Contrary to this opinion there is much to be said about substantival change. For instance, there is the experience of an internal change within a power which becomes exhausted through action, and there is the experience of an extrinsic change, exemplified by a datum in the process of specification, when the power remains invariant through the replacement of its attributes. Extrinsic change proves a measure of independence which certain powers may enjoy: interference from outside which alters its manifestation need not affect the underlying power itself. But this measure of independence is nothing like the absolute autonomy which has been ascribed to substance by some metaphysicians. The vector character of powers means involvement in one another or in actuality, the very opposite of isolation which goes with autonomy. The independence of an elementary power is to be understood as that of a distinct tendency rather than of a separate thing. And even the segregation of a physical object from others means no more than a relative stability of a cluster of tendencies or elementary powers. Perhaps the closest approach to autonomy that we can find is in the dynamic substance of a work of art which has been discussed at great length in some recent writings on aesthetics under the name of "aesthetic quality."

DYNAMICS IN ART

In everyday life powers are observable in the mode of indeterminacy and instability. In art, where experience is at

the highest degree of specificity and equilibrium, there is a dynamics of stress and strain, which contributes, in cooperation with colors, sounds, and other sensory elements, to the aesthetic effect of balance. In accordance with our conclusion that powers are substances, we find powers in spontaneous integration, spontaneous even if conditioned by the artist's ingenuity in sorting and combining sensory elements, to form the substance of a work of art. And by a work of art I understand an aesthetic experience and not a physical object which may be the source of the experience. This understanding, let us note, does not invest art with subjectivity which is incompatible with the substantival status. There is no reason why we should take an aesthetic experience to be subjective. We experience a work of art as an imposition, however pleasant this imposition may be, to which we submit throughout the period of our aesthetic contemplation; therefore the experience has an inward or objective vector quality. A work of art is not a physical object because there is no aesthetic experience without some percipient or other; but this dependence on a percipient makes art no more subjective, i.e. no more dependent on anyone in particular, than the truths of mathematics which must also exist through the thought of some mathematician or other. Many writers question the existence of objective art. Anatole France, to mention a novelist, remarks that there is no such thing as a single novel because each novel is multiplied into as many experiences as it finds readers. And, among recent aestheticians, Dewey has taken a similar position. In order to defend the transsubjectivity of art, to use an ugly term which serves to distinguish the nature of an aesthetic experience from both the subjectivity of personal idiosyncrasies and the objectivity of physical things, I should argue as follows. We can contend without exaggeration that the main postulate of aesthetics is the existence of unique works of art which can be distinguished from, and therefore compared with, one another on purely objective grounds. To illustrate, imagine a number of literary critics to be engaged in a discussion of D. H. Lawrence's *Aaron's Rod* and *Women in Love,* and

suppose the participants to agree that the second novel is better. There would be no point or value to their discussion and agreement if each critic were analyzing, under the same two titles, a different pair of novels. The identity of a work of art, which is a prerequisite for any public discussion, cannot be secured by the convergence of different private aesthetic experiences upon the same physical object. For the physical object may not be the same: readers of a novel own different copies of the book; different sets of waves carry the sounds of a symphony to radio listeners in different cities; and even a great painting, at least in theory, could be duplicated. Admittedly there always are structural similarities among copies or duplicates of the same work of art. But if we identify an object of art with the class of structurally similar things, we must not overlook that their structural similarity is usually inferred from the invariant effect which they have in our aesthetic experience. For example, while all copies of the same book are distinguished by the same sequence of typographical design, no reader is aware of this sequence of print except through its effect which is a unique descriptive narrative. Communicability, i.e. the public nature of the aesthetic experience, does not conflict with the fact that there are differences in art appreciation. Disagreement may come from an inability, which seems to affect musicians more than others, to interpret correctly or describe in words one's own experience; but there may be genuine differences within the experience itself. An inferior product of art may fail to produce the same effect even among qualified percipients; but then we should not call the inferior product a work of art. We must distinguish between entertainment, exemplified by detective stories or motion pictures, and fine art. A work of entertainment provides a mere skeleton, a bare outline in plot and characterization, to be filled up by embellishment and detail through a free play of the percipient's imagination; and of course people both enjoy the exercise of their own faculties and arrive at different experiences, in the course of such exercise, because of the differences in their imaginative power. But an artist can-

not leave his work at the mercy of the inferior imagination of ordinary people without thereby stultifying his creative effort. He must infect others, and his work of art is an instrument of infection, with his own ideas. Accordingly, in order to understand a work of art we must raise our imaginative level and follow the artist; and this requires a far greater effort than indulgence in our private imagination; but the compensation is a thrill which is incommensurable in intensity and significance with the mild pleasures of mere entertainment. The prerequisite of a considerable effort in art appreciation accounts for the fact that even a masterful and imposing work of art, in short a masterpiece, may yet be differentiated into a variety of aesthetic reactions. A percipient may simply be not up to his task and fail to reproduce the artist's design in his own experience. Defective eyesight interferes with the appreciation of painting; emotional infantilism precludes the understanding of a psychological novel; and lack of culture breeds intolerance to artistic conventions. There are all kinds of grounds which are sufficient to disqualify aesthetic judgment. And when unqualified critics of art disagree among themselves, their disagreement does not prove that there is no unique work of art, but only that they missed it. This is not to say that, while the unmistakable aesthetic thrill is sufficient as subjective evidence, there also is a corresponding objective criterion whereby one could tell genuine appreciation from misunderstanding; the point is that there is correct understanding, even if its presence cannot be proved to others, and therefore there is such a thing as *the* work of art. But even when the work of art is a masterpiece and its critics are qualified, a certain amount of variations from one individual to another in their aesthetic experience may be psychologically inevitable. But this only means that the work of art must be identified with the common core of their experiences, while the variations are negligible for the same reason for which we disregard the possibility that no two persons with equally normal eyes can see exactly the same thing in looking at the same colored surface, for example, at the sky: there is no way of directly

comparing the individual sense-experiences that would establish either the presence or the absence of perceptual differences. Of course, each critic may give a verbal account of his experience, and a comparison of such accounts may disclose personal peculiarities of association and memory; but differences of this kind can be discounted as strictly irrelevant to the work of art. Even Dewey, somewhat inadvertently in regard to his own position, recognizes the irrelevance of personal associations and suggestions.

> The city man who lived in the country when he was a boy is given to purchasing pictures of green meadows with grazing cattle or purling brooks—especially if there is also a swimming hole. He obtains from such pictures a revival of certain values of his childhood minus attendant back-breaking experiences, plus, indeed, an added emotional value because of contrast with a present well-to-do estate. In all such cases the picture is not seen. The painting is used as a spring board for arriving at sentiments that are, because of extraneous subject-matter, agreeable. . . . As long as "meaning" is a matter of association and suggestion, it falls apart from the qualities of the sensuous medium and form is disturbed. (*Art as Experience,* N. Y.: Minton, Balch & Co., 1934, pp. 113 and 118.)

But perhaps Dewey is prepared to draw a clear-cut line of demarkation between irrelevant associations and suggestions and appreciable pertinent personal differences in aesthetic response. If so, we may strengthen our position by taking into consideration the theory, to which Dewey himself has so much contributed, of the intrinsic and transsubjective logic of composition within a work of art. Our consideration of this theory will also serve to clarify the concepts of substance and dynamics in art.

The fact that we discern in any work of art a definite number of specific and explicit sensory elements, colors, sounds, etc., combined into a determinate and explicit pattern of space and time does not mean that art gives undiluted actuality. If potentiality were confined to determinable or indeterminate modes of being, then we would have to admit that, by contrast with ordinary life and practice, an aesthetic experience is pure actuality. But powers need not be felt

either as tendencies for determination or as intrinsic indeterminacy; there are also powers which, when matched against, or with, one another in a composition, are experienced as specific forces in equilibrium, as a stabilized pattern of strains or tension. And a specific pattern of tension is the very substance of an intense aesthetic experience; furthermore such a dynamic pattern is not identical with a purely spatial or temporal arrangement of sensory elements. A certain set of colors in a certain spatial arrangement presents a harmonious combination where different colors in the same order would upset the balance. This is a commonplace in aesthetics, but it serves to show that sensory elements themselves are intrinsically disposed to be blended in certain combinations which may or may not correspond to a given arrangement in space or time. We may still emphasize the importance of sensory surface in art and talk of aesthetic immediacy, but then we must insist that the surface is a field of forces and that immediacy is not incompatible with expression or significance. For sensory elements express or bring to the surface a display of powers. This means that aesthetic surface is not flat and rigid, but has depth and is alive.

To understand better the intrinsic dynamics in a work of art, let us begin with isolated sensory elements, such as colors, lines, or sounds, that are discernible within an aesthetic experience. It has been pointed out by many writers that there is no isolation of sensory elements in any strict sense, and with this I fully agree; I am merely concerned with approximate isolation, as when we strike a single note on the piano or draw a line on a clean sheet of paper. The disposition of such an approximately isolated sensory element to enter into specific combinations with other sense data has two explanations. First, there is the doctrine that sensa are qualifications of emotion. To choose from a number of relevant statements, let me quote Whitehead:

> This notion of the sensa as qualifications of affective tone is a paradox to philosophy, though it is fairly obvious to common

sense. A red irritation is prevalent among nerve-racked people and among bulls. The affective tone of perception of a green woodland in spring can only be defined by the delicate shades of the green. It is a strong aesthetic emotion with the qualification of green in spring-time. The intellect fastens on smell as a datum: the animal experiences it as a qualification of his subjective feelings. (*Adventures of Ideas,* N. Y.: The Macmillan Co., 1933, p. 315.)

The emotional basis of sensa explains their internal dynamics of fusion and orderly correlation because introspection demonstrates without any doubt that emotions tend to blend together into complex but specific and unified patterns of composition. Hence we are ready to agree with Whitehead when, on page 321 of the same discussion, he concludes: "We enjoy the green foliage of the spring greenly: we enjoy the sunset with an emotional pattern including among its elements the colours and the contrasts of the vision. It is this that makes Art possible." Yet at the present stage of aesthetic analysis, in dealing with such terms as "aesthetic emotion," "qualification of affective tone," "subjective feelings," we are not completely satisfied, even though we agree with Whitehead, because we feel that his explanation does not penetrate far enough and we do not exactly know what the agreement is about. Shall we go as far as D. W. Prall who simply identifies a sense datum with its affective tone? (Cf. *Aesthetic Analysis,* N. Y.: Crowell Co., 1936, p. 148.) If not, how close or intimate must we allow them to be? Granted that the green foliage is perceived with a specific affective tone, must we conclude that an imaginative reproduction of this specific tone would necessitate an image of the foliage? And, still more puzzling, what is an emotion; in particular, do aesthetic emotions differ from ordinary feelings of joy, sadness, fear, and the like? Substantiated answers to these questions would require a treatise on aesthetics, and therefore I shall leave them for the present unanswered and turn to the second explanation of the disposition of sense data to enter into specific patterns of fusion and correlation. This explanation is a part of D. W. Prall's theory. The theory, which has not

yet received enough attention, can be summed up as follows. Any sensory element is perceived within the setting of a standard scheme of sensory elements of the same kind. While describable in terms of relational concepts the scheme is directly given as a structural background against which all sense data of the appropriate kind must appear. The location of a sensory element within the directly perceived structure determines the original intrinsic relations between this element and any other sense datum within the scheme. These original intrinsic relations condition the possibility of derivative aesthetic structures and patterns. The specific articulation of elements within a work of art depends upon the intrinsic order of their standard schemes. Let me illustrate this statement of Prall's theory by a number of quotations from his *Aesthetic Analysis.*

We have taken as a basis sensory elements systematically related in ordered ranges or manifolds to which they belong by virtue of their own nature. In this sense the elements are *intrinsically* related. They lie in serial orders intrinsic to their defining characteristics, and hence cannot occur except as exhibiting positions or relations in these orders. . . . All musical sounds are in one single pitch series, as all the variations of color are in a single range of hues and in a single ordered series of degrees of brightness. And to hear a note at a particular pitch is to hear a note in its relation to any and every other note, as higher or lower than this other note by a determinate pitch-distance. (p. 135) . . . As we have already suggested, and as any one surveying the field would probably agree, the elements that we are to take as basic should be sensuous elements, and the relations, since they must connect such elements, will be the only sort of relations capable of connecting sensuous elements, namely sensuous relations. (p. 42) . . . A note carries with it its position in the pitch series into any composition, and maintains its determinate distance in pitch from notes of other pitch placed near or far from it in any temporal succession of notes. (p. 58) . . . Any melody is an example of the dependence of structure upon native qualitative order in sensuous materials, a structure felt as having specific and even nameable character, only as the qualitative relation is grasped which is seen to constitute the native order intrinsic to the quality as such. The qualitative order of pitch is not the sole constituent of melodic structure, of course. But that it is one important aspect of it is fairly obvious. Say that we have a series of a dozen notes.

We may decide on the duration of each, the tempo, the loudness, the timbre. But we may still make widely different tunes out of the notes by ordering the pitches variously. If, for example, there is a large pitch difference between the first and second notes, we say that one of them is far from the other in pitch and that the tune begins with a skip. But this would be impossible did not all pitches have each its own fixed place in a pitch order, an order intrinsic to musical sound simply because no musical sound lies outside this order, and because anything that lies in this order is a musical sound. (Page 17.)

Prall's theory explains the transsubjective nature of art but I think that, in order to account for the dynamic substance of aesthetic experience, further explanation is needed. There is an important question which Prall has not even raised. Granted that the sensory order to which an element belongs is directly given along with the latter, can the two be given with the same degree of explicitness? It does not seem possible that they can. For example, while the pitch order is a structure of musical sounds, to explicitly hear one of them is not to explicitly hear the rest, not even in an attenuated way. And while green has a fixed position in the native order of hues in the spectrum, we may see something green without simultaneously perceiving all other colors. I agree with Prall that the native structure which correlates a given sense datum with others must be specific, like our western musical scale, and that, to satisfy the condition of aesthetic immediacy, this specific structure must be given directly or immediately. But I suggest that to be specific and immediate is not the same thing as to be explicit and that, unlike the explicit sensory element, the native structure that goes with it is perceived as a set-up of dispositions. This dynamic set-up may be understood as follows. A native structure has the status of a background against which a single sensory element of the appropriate kind must appear. This background is a field of forces; but there is no dynamic contrast or opposition and the forces are felt with the least amount of tension because their order is serial, i.e. because there is a natural, and for some structures continuous, transition from one force to another. Perceptually such a field of forces is a

like the line connecting the figures of Ariadne and Bacchus a state of dynamic articulation, which is experienced with some intensity of feeling, a derivative pattern of at least two explicit sense data has to be superimposed. The pitch order, for example, is felt as a specific dynamic set-up only when we hear at least two notes with a pitch-distance sufficient to generate an auditory tension. This illustrates the principle, which is not confined to aesthetics, that undifferentiated potentiality is transformed into a determinate structure of power through the superimposition of an explicit configuration of actuality. And the proof that there is such a thing as a specific structure of power is the observation that only juxtaposition of sense data in space or time gives an explicit configuration of actuality whereas we can perceive a specific order which does not coincide with the explicit juxtaposition and may be more impressive than the latter. Let me illustrate this observation by a simple figure.

Compare (a) and (b) in Fig. 4.



(a) (b)

FIG. 4.

We perceive both (a) and (b) as representations of the capital A. But while the outlines of the letter are completed in (b), by a set of juxtaposed segments, some of the corresponding segments are not drawn but left in a state of disposition in (a). Let us call the thin lines in (b) explicit and the corresponding disposition-lines in (a) implicit. The implicit lines, it will be observed, are just as specific as their explicit counterparts, and the whole letter in (a) stands out, I believe, more conspicuously than in (b). An explicit line, or any other explicit sensory element, will be said to be actually seen or perceived, while an implicit datum will be de-

scribed as sensed or felt. To generate a sensed line we need at least two explicit lines. This can be shown by a simple experiment. Erase in (a) all the lines except one; the strain within the area of the figure disappears with the erased lines, and the letter itself may be said to have melted into pure potentiality. Accordingly, you observe a transformation from the mode of specific power into the mode of potentiality. You know that the letter is potentially still there because of your confidence that the erased lines can always be reproduced or restored; and this confidence is based on the fact that the plane of the figure, against which the sole remaining explicit line stands out in black, contains all kinds of lines, in any position, direction, or curvature, among them the lines which would reproduce the letter, but all uniformly white and in a massed juxtaposition with the total effect of an undifferentiated blank. Thus the potentiality of other lines which surround the explicit segment means that none of them is in a favored position, and that additional explicit lines must be drawn in order to effect some tension in their field and thereby put an end to a state where the elements neutralize one another. Suppose, after you have erased all but one line in (a), you draw a second line. The result is a tension in the space between the two lines which is felt as a formation of an angle or, if upon prolongation the lines should not meet, of a pair of parallels. The experiment proves that the existence of implicit lines depends upon an explicit configuration. But the dependence is reciprocal except when the formation of a structure is elementary. We may dispense with the aid of implicit lines in the simple case of two explicit segments and construct the angle by prolonging them until they intersect. But if the lines happen to be parallel, the fact that they will not intersect cannot be actually exhibited; the structure must be felt as a disposition to keep at the same distance from one another upon prolongation in either direction. And when a structure is complex, for example, when it allows for a number of different perspective appearances, the total effect of perceptual integration must be a combination of explicit elements with power. When a stranger turns his

head, you may be startled at the unexpected profile; but as you come to learn in time the complex structure of his face, you no longer identify it with either the full-face or the profile or any other perspective shape but integrate them into a dynamic whole; and you know that the total dynamic effect, which is the face of the man, cannot be an explicit geometrical shape, unless geometry is four dimensional, for the simple reason that explicit shapes are coexclusive and cannot combine to form a new explicit shape within the same area of space. In some of his paintings, the "Woman in Red Bodice," for instance, Picasso has tried to integrate a full-face with a profile into a composite shape. His attempts have the value of reminding us that complex structure is more than an exclusive shape within a single perspective; but constructively Picasso's composite faces are grotesque failures because an unnatural combination of explicit shapes is no substitute for the integral dynamic quality; even within a single perspective view a familiar face is perceived together with a "promise" of its incipient turns and expressions. This is one illustration of the general aesthetic principle of interplay between the orders of power and of specific sensory elements. Consider a more schematic illustration. Imagine a pattern of three colored bands, yellow, blue, green, in this order of juxtaposition. There are two orders involved in the pattern of this image: first, the explicit order in space according to which yellow comes first, blue next, and green after blue, and, second, the implicit, or disposition, order of a hue-distance according to which yellow comes first, blue last, and green is between them. If there were only one explicit order, say, of bands in a monochrome, or if the two orders of "betweenness" were coincident, there would be no definite aesthetic pattern: three bands undifferentiated by color would coalesce into a single longer band and, likewise, so long as their spatial order remains unaltered, yellow would shade off into green, and green into blue. Thus a determinate color-distance gives articulation to spatial juxtaposition, whereas a rearrangement in space may make the bands stand out against one another in a color contrast; and the outcome

of either of these ways of articulation is a definite pattern. Let us say that the explicit order in space and the intrinsic order of colors are two dimensions of visual experience. And let us symbolize the dimension of the explicit sequence by the x-axis and the dimension of power by the y-axis of a rectangular system of coordinates. Then, to use three successive integers, the order of succession of the bands in space may be represented by three points on the x-axis with, respectively, the coordinates (1,0), (2,0), and (3,0); similarly, the order according to which green is between yellow and blue is represented by three points on the y-axis, this time with the coordinates (0,1), (0,2), and (0,3). But to represent our definite pattern of colors we need a higher dimensionality of the first quadrant, and the coordinates of the points that stand for the higher order of integration are (1,1), (2,3), and (3,2), so that the points lie on a curve. The principle, illustrated by the higher order of dimensionality of the integral pattern, is that the total aesthetic effect is structurally above the orders of explicit elements and of power. This principle is important for the analysis of actual works of art. To show its application let me begin with the art of poetry where part of the way I can simply follow the lead of Robert Louis Stevenson. Stevenson writes:

> We have been accustomed to describe the heroic line as five iambic feet, and to be filled with pain and confusion whenever, as by the conscientious schoolboy, we have heard our own description put in practice.
>
> 'All night / the dreàd / less an / gel ùn / pursued,'
>
> goes the schoolboy; but though we close our ears, we cling to our definition, in spite of its proved and naked insufficiency. Mr. Jenkin was not so easily pleased, and readily discovered that the heroic line consists of four groups, or, if you prefer the phrase, contains four pauses:
>
> 'All night / the dreadless / angel / unpursued.'
>
> Four groups, each practically uttered as one word: the first, in this case, an iamb; the second, an amphibrachys; the third, a trochee; and the fourth, an amphimacer; and yet our schoolboy, with no other liberty but that of inflicting pain, had triumphantly scanned

it as five iambs. Perceive, now, this fresh richness of intricacy in the web; this fourth orange, hitherto unremarked, but still kept flying with the others. What seemed to be one thing it now appears is two; and, like some puzzle in arithmetic, the verse is made at the same time to read in fives and to read in fours. . . . Variety is what is sought; but if we destroy the original mould, one of the terms of this variety is lost, and we fall back on sameness. Thus both as to the arithmetical measure of the verse, and the degree of regularity in scansion, we see the laws of prosody to have one common purpose: to keep alive the opposition of two schemes simultaneously followed: to keep them notably apart, though still coincident, and to balance them with such judicial nicety before the reader, that neither shall be unperceived and neither signally prevail. (*Learning to Write,* Scribner's Sons, 1888, pp. 209-213.)

This delightful passage signifies the discovery that a single poem consists of two distinct orders, "What had seemed to be one thing it now appears is two." But Stevenson is puzzled because Milton's verse "is made at the same time to read in fives and to read in fours." We are in a position to resolve his puzzle by differentiating between the explicit order and the order of power. There are four explicit pauses in Milton's line and therefore, explicitly, the line consists of four groups; but a skillful recitation makes us feel, through the subtleties of inflection, accent, and tempo, the standard scheme of five iambic feet in the background of the explicit order. To illustrate the same principle in the art of painting I shall quote from a recent book on aesthetics by R. W. Church. The passage is an appraisal of Titian's "Bacchus and Ariadne."

. . . the line of the shin of Ariadne's right leg carries over into the flow of the drapery of Bacchus. And the expression of this line is strengthened by the contrast in which it stands against the thrust of Adriadne's body, as well as against the lines of the drapery. This felt contrast brings Ariadne into relation with the right hand side of the picture. (*An Essay on Critical Appreciation,* Allen & Unwin, 1938, p. 274.)

I believe we must recognize the truth of Church's comment. But we must also observe that the line which "brings



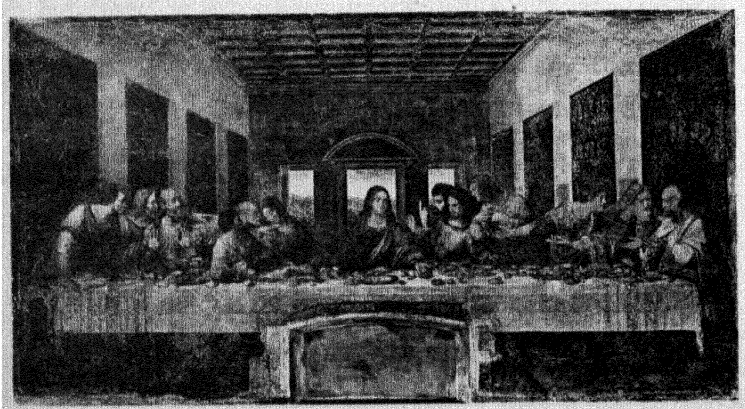
RAPHAEL. The Miraculous Draught of Fishes



TITIAN. Bacchus and Ariadne



PICASSO. Woman in Red Bodice



LEONARDO DA VINCI. The Last Supper

Ariadne into relation with the right hand side of the picture" is not explicitly drawn, but "carries over" in the mode of a tension in a "felt contrast." In the explicit arrangement of space the figures of Ariadne and Bacchus are disconnected, but the power of the implicit line overcomes the separation. The predominance of the order of power is, I believe, a rule rather than an exception. But the point is too important to be left without additional confirmation. Therefore let us consider Wölfflin's relevant remarks on Leonardo's "Last Supper."

> . . . Leonardo's table is far too small. If the covers are counted, we find that the required number could not possibly be seated. Leonardo wished to avoid the dispersal of the disciples down the long table, and the impressiveness thus given to the figures has such force that no one notices the want of room. (*The Art of the Italian Renaissance,* W. Heinemann, London, p. 31.)

The explicit arrangement would be defective, a want of room, if it were not for the counteracting and prevailing effect of power, namely, the impressiveness given the figures through crowding them. Where there is no such dynamic correction, distortion of size would be a defect. For example, in his comments on another painting, Raphael's "Miraculous Draught of Fishes," Wölfflin tells us that the boats are too small in relation to their occupants, and this time he finds a real fault. But, in spite of one fault, Raphael's picture, and Wölfflin's further statement about it, deserve our attention because of the unusual opportunity which they provide for an understanding of the dynamic interplay between the explicit and the felt orders of composition.

> With marvelous skill, the occupants of the boats are all brought into one great line, which rises by the rowers, mounts over the bending forms, finds its culminating point in the upright figure, then suddenly sinks and finally rises once more in the figure of Christ. Everything tends towards Him, He gives the movement its object, and, although insignificant in mass and placed quite at the edge of the picture, His figure dominates all the others. No such composition has ever yet been seen. (*Op. cit.,* p. 112.)

The great line, to which Wölfflin draws our attention, is,

like the line connecting the figures of Ariadne and Bacchus in Titian's painting, implicit; explicitly the figures of the fishermen and Christ are disconnected. Explicitly the center of the picture is, of course, in the middle of the canvas; dynamically it is at the edge, in the figure of Christ. In the explicit order of space the form of Christ occupies a small area; in the order of power "His figure dominates all the others."

Other works of art, or other arts, could be examined only to draw the same conclusion. And I think that the weight of the already quoted evidence is sufficient. Although the quoted writers could not know my theory of power, I consider the theory to be implied by their statements since the latter cease to be incomplete and puzzling the moment we recognize that one of the two orders involved in an aesthetic effect is not explicit, however determinate it may be, and therefore not an order of actuality. The predominance of the dynamic order fits in with the fact that power alone can be the source of organization and integration of sensory elements.

The unity of a work of art, form become content and content form, which is the proof of a complete integration of the explicit with the implicit structures, is itself a mode of power. Contemporary aestheticians, among them Dewey with singular eloquence and emphasis, have called our attention to the dynamic unity in art under the name of "aesthetic quality," and the name is not a misnomer because they employ it to designate the substance of an aesthetic experience, and therefore with no intention of opposing quality to substance. For in asserting the unity of an aesthetic experience and in describing it as equilibrium we may use "static" terms, but we do not mean to overlook the existence of an internal change or "movement" which, while obvious in a piece of music or poetry, is less conspicuous but equally indispensable in keeping alive a painting or sculpture—indispensable because we need time to take in the elements of a complex work of art. And the prerequisite movement, which is a transition from one explicit sensory manifestation to an-

other, would bring about an elimination of the earlier sense data by their successors, and therefore a disruption of unity, if it were not for the common substance or power from which the successive manifestations spring. There still may be an element of mystery in the preservation of substantial identity through qualitative change:

> A miraculous identity may be felt emotionally even when the two descriptions of the identical thing differ in *every* sensible term, as happens in metaphors, in myths, in myself as body and mind, in idolatry, or in the doctrine—which expresses a mystical experience—of transubstantiation. (*Scepticism and Animal Faith,* by G. Santayana, N. Y.: Scribner's Sons, 1923, p. 153.)

But in art the element of mystery is reduced to insignificance by the differentiation between the order of power, the agency of fusion, and the order of explicit and diverse qualities. Inserted in this context, the following citation from Dewey is particularly convincing.

> Consider for example a picture that is a work of art and not just a chromo or other mode of mechanical product. Its quality is not a property which it possesses in addition to its other properties. It is something which externally demarcates it from other paintings, and which internally pervades, colors, tones, and weights every detail and every relation of the work of art. The same thing is true of the "quality" of a person or of historic events. We follow, with apparently complete understanding, a tale in which a certain quality or character is ascribed to a certain man. But something said causes us to interject, "Oh, you are speaking of Thomas Jones, I supposed you meant John Jones." Every detail related, every distinction set forth remains just what it was before. Yet the significance, the color and weight, of every detail is altered. For the quality that runs through them all, that gives meaning to each and binds them together, is transformed. (*Philosophy and Civilization,* N. Y.: Minton, Balch & Co., 1931, p. 96.)

The word "quality" is used in this passage either in quotes or in a sense which is explicitly opposed to the ordinary use; elsewhere, in the same essay, we are told that "the underlying quality that defines the work, that circumscribes it externally and integrates it internally, controls the thinking of

the artist," and this recognition of the integrating and controlling function is only one step distant from a downright identification of the aesthetic quality with power; and in Chapter 9 of his *Art as Experience,* from which many other pertinent passages could be quoted, Dewey explicitly identifies the pervasive aesthetic quality with the substance of a work of art. To complete Dewey's theory we need only apply the rule that two things equal to a third are equal to each other. Since the aesthetic quality has the controlling function of a power and the nature of a substance, we may conclude that the substance of a work of art is power.

There is no need to argue the point, and those who are preoccupied with poetry or music would be the first to concede it, that in art balance and symmetry do not arrest movement: measure and rhythm can be said to be the balance and symmetry of movement. But my previous conclusion that perceptual movement generates indeterminacy may appear to conflict with the principle that sensory elements in art, even though an aesthetic experience must be alive with an internal movement, are always specific. I must admit that movement in art is in a class by itself and therefore my conclusion needs to be qualified; but the qualification is not substantial. For, if the fact that, in a sense, all of art is make-believe keeps us from calling aesthetic specificity an illusion, we can, at least, emphasize that a sensory element of an aesthetic experience is specific not absolutely but only in relation to other elements and their unified structure. This is to say that a sensory element is specific in the negative sense of being incapable of further specification within the context of a work of art without detriment to the total effect of the latter. We may add that the relative or negative nature of aesthetic specificity is far more strongly marked in temporal arts, such as literature, where perceptual movement follows a prescribed explicit sequence of time. Thus we recognize the difference between a *dynamic image* which, in the course of reading a poem, is carried away by another before it can have time to take a definite shape, and a *static image,* in painting, which can be examined at leisure. But let us not

exaggerate the difference, as, I think, I have done in an earlier essay on "Images in Art." (*Philosophy,* 1939.) To illustrate my present position, take a landscape by a pointillist master. You must experiment with distance in order to find the position from which the landscape looks its best; and there is no doubt that, once the right distance is taken, nothing can be done to increase the determinacy of colors and lines. Of course, if you come closer to the canvas, you can discern colored points all over the surface; this further specification, however, is at the expense of the intended aesthetic effect: with the emergence of colored dots the image disintegrates. Nevertheless, the fact remains that even a static image is indeterminate so long as there is a possibility, however undesirable aesthetically, for additional specification within the same area. In literary art, on the other hand, incompleteness or indeterminacy of images is so obvious that the problem is why do we not notice it while absorbed in reading. For dynamic images pass for being specific simply because the reader does not notice that they are not. We know that the writer must describe one scene after another and cannot afford complete description. And we may observe that, even more than the inevitably restricted time, the art of a sustained evolution of characters in a story would not allow for a prematurely complete description. Nor does the end of the story turn a dynamic image into a static picture. This we know because of a disappointment at the illustrated edition of a favorite author. But since we do not pretend to have clear-cut mental pictures of our own preferable to the illustrations in the book, our disappointment proves that within the context of an aesthetic experience incompleteness and indeterminacy of dynamic images do not register. An image, however indefinite it may prove to be if abstracted from its dynamic medium, appears specific if it is sufficiently striking to paralyze the reader's inclination to fill up the gaps with his own fancy. In other words, to appear complete, images must be impressive and "self-sufficient," i.e. in no need for further specification. Yet even a striking image, which needs no aid from the personal resources of a

reader, could not conceal incompleteness without the support from other images and ideas that come and go in the course of an aesthetic experience. This is to say that an image emerges in due course empowered with the momentum of the antecedent images, and that this power is sensed as a specific tension to be resolved by, and therefore leading to, the images to follow. The interdependence of images is a dynamic interpenetration because it means that each and every image pervades the narrative as a whole. There is no definite word or line to introduce an image, surprising and novel as the image may be, with complete abruptness, for its predecessors have prepared the ground in a kind of anticipation; and there is no line, except at the close of the description, at which the image ceases to be, for its reverberations must be felt throughout the subsequent developments and effects. Taken in isolation a line may fall flat or generate false suggestions. Tennyson's line "Or gazing on the new soft fallen mask" might, perhaps, materialize, in a reader's imagination, into an appearance of a silky shiny mask on the floor; but the poet is able to erase any such fancy by the next line of his poem:

> Or gazing on the new soft fallen mask
> Of snow upon the mountains and the moors. . . .

Thus the artist can control the imagination of a sensitive and qualified reader. For the substance of a work of art is a power to eliminate fanciful aberration by directing dynamic images into a prescribed determinate and transsubjective course.

The contribution of aesthetic analysis to the philosophy of power is fundamental. The proof of the existence of observable power is conclusive, except to those who cannot understand art. Moreover, aesthetic experience manifests power in a form which is not observable elsewhere. A determinable datum, in ordinary experience, may be opposed to actuality because the latter is specific. But the opposition is not definitive since the dynamic structure of a work of art,

even though implicit, is specific. We may observe that lack of determinacy is a species of incompleteness, and point out that metaphysical tradition opposes power to actuality as a realizable, and therefore incomplete, agency to a completed realization. But again the evidence of art prompts us to discriminate. An actual entity is either complete intrinsically, i.e. entirely specific and explicit, or else extrinsically, in the sense of a self-contained experience. Power, of course, is not an explicit sensory element. But in a work of art power is exclusively concerned with constituent sense data and integrates them into a total experience of balance or equilibrium. Thus aesthetic analysis corrects a misrepresentation of the metaphysical contrast which would take power and actuality to be incompatible or coexclusive in existence. The truth is that power not only coexists with explicit or actual sensory elements within an aesthetic experience but cooperates with them to an extent that borders on the sublimation of the metaphysical contrast.

THE IDEA OF POWER IN RETROSPECT

THERE are three distinct approaches to the concept of power although they meet on certain common grounds. We can study power as a datum of experience. Caution, which recommends adherence to the empiricist principle and distrust of metaphysics, would favor an exclusive study of this kind; but our own inquiry into the facts of observable dynamics has proved to be in close accord with the perspective theory of truth which assigns to power a dominant metaphysical part in the world outside cognition. For, among other observable states, power may be in the state of a determinable entity, while the perspective theory requires the world outside discourse to be a determinable situation. Thus we are justified in trying a direct exposition of power as a metaphysical principle or category. Such an exposition allows for either of the two remaining independent approaches. One of them, attempted in the next chapter, shows power in rela-

tion to such modes of being as physical thinghood, temporal process, and causality. In contrast with this ontological treatment the other approach may be said to be categorial: a systematic analysis of the category of power in the context of other basic philosophical categories, such as reality, being, actuality, and existence. To partly compensate for the omission of a categorial treatment I shall proceed with a historical sketch of certain philosophies of power, in some of which the concept of power is treated in relation to other metaphysical categories. The review is limited to a few men who have influenced my own position. In each case a statement of the philosopher's main contributions to the idea of power is followed by some adverse criticism. There are a number of shortcomings common to all philosophers under consideration, and an enumeration of these faults at the outset may be of some advantage to the reader. There is the failure to identify the notions of power and of substance, or else the rejection of both as meaningless; when power is analyzed into such distinct modes as potentiality and power proper, the principle of differentiation is left unexplained, and discussion is preoccupied with the mode of indeterminacy at the expense of others; potentiality and actuality are taken to be coexclusive in existence; and there is no understanding that power may be observable and specific.

Aristotle is the first philosopher to introduce the distinction between potentiality and actuality into metaphysics as a basic principle, without which process in relation to the static forms and matter would be unintelligible. He also understood that, with the exception of these static extremes, everything real is, in some sense, a mixture of actuality with potentiality, so that what is form relatively to one standpoint is matter relatively to another. In his treatment of potentiality, in Book 9 of the *Metaphysics*, Aristotle draws a distinction between power as "an originative source of change," which is either active or passive, "either an ability to act or an ability to be acted upon," from potentiality in the sense of indeterminacy, incompleteness, and susceptibility to a mold. Potentiality is further differentiated into the modes of

indefiniteness, pure indeterminacy, and determinability. The infinite exemplifies the mode of indefiniteness because it can never be fully realized: there is always the possibility of continuing the process of realization. Matter is pure indeterminacy because it allows for unlimited alternatives of determination in various aspects and forms. Potentiality as a determinable is susceptibility to a certain form in exclusion of other determinations. "E.g. the seed is not yet potentially a man; for it must be deposited in something other than itself and undergo a change. But when through its own motive principle it has already got such and such attributes, in this state it is already potentially a man; while in the former state it needs another motive principle, just as earth is not yet potentially a statue (for it must first change in order to become brass)." Between the state of pure indeterminacy, or matter, and of a definitely determinable potentiality there are intermediate modes differing according to the number of alternative determinations of which they are capable. Actuality is to an intermediate mode of potentiality "as that which is building is to that which is capable of building, and the waking to the sleeping, and that which is seeing to that which has its eyes shut but has sight, and that which has been shaped out of the matter to the matter, and that which has been wrought up to the unwrought." Aristotle's examples illustrate actuality which is a finished product, an outcome of process or activity. To the question, What is the status of process, i.e. of a transition from potentiality to actuality, the answer is not clear. Aristotle distinguishes between two kinds of process. There is completed action, an attainment of the end of an act in and through the act itself; this kind of process is a species of actuality. "E.g. at the same time we are seeing and have seen, are understanding and have understood, are thinking and have thought. . . . At the same time we are living well and have lived well, and are happy and have been happy." A process which is an actuality is contrasted with incomplete actions, called "movements," which involve progress toward something not yet realized. Although Aristotle does not explicitly identify "movement"

with potentiality, apparently because the distinction between the relation of realization and potentiality as one of the related terms stands in the way, he cannot differentiate between them because, by his own definition, incompleteness is the essence of potentiality. While the status of movement is undefined, Aristotle is not unaware of the part which an actual set-up must play in the progress of a movement or in the transformation of pure indeterminacy into a definite disposition. He points out, in this connection, that potential relationships in space become definite and knowable theorems through the aid of actual construction of figures and diagrams in the process of geometrical proof. No less important than these subtle observations and distinctions is the defense of power against the positivists (of the Megaric school) who deny the existence of potentiality altogether and contend that "a thing 'can' act only when it is acting." Aristotle remarks that the positivist contention stultifies learning and practice because it implies that, during the period of inaction, a man of skill and learning is no better than an unskilled laborer. Then he proceeds with a more general argument. To deny that an event while not yet actual is capable of happening is equivalent to saying that the event is incapable of happening, and if events were incapable of happening, there would be no eventuality, no change, and therefore no time. One must observe, Aristotle concludes, that, since an eventual happening does not exist before it has happened, the understanding of the expression "event capable of happening" proves the existence of power and potentiality: "For of non-existent things some exist potentially; but they do not *exist,* because they do not exist in complete reality."

There is much less to be shown on the debit side of the account. Although Aristotle recognizes different kinds of power, he fails to make out their common character (which we have identified with a vector quality) as if nothing but the same word were common to its different uses. His failure has obstructed the recognition of the substantival status of potentiality. Aristotle does not altogether deny that powers are substances of a kind, but he emphasizes that they are

"less substantial" than a completed action. This position is, of course, a modification of Plato's view that reality is the end or form of a process. "Obviously, therefore, the substance or form is actuality. According to this argument, then, it is obvious that actuality is prior in substantial being to potency." The reluctance to admit that power is substance can also be traced to Plato. On the one hand, Plato felt that, in order to be significant and effective, ideas or forms must be endowed with power. In his *Republic* (Book 6, 509) he says: "The form of goodness is not being, but exceeds being in dignity and power." And in a later dialogue (*Sophist,* 247) he adds: "My notion would be, that anything which possesses any sort of power to affect another, or to be affected by another, if only for a single moment, however trifling the cause and however slight the effect, has real existence; and I hold that the definition of being is simply power." And yet, since the notion of timeless forms leads away from the world of action, Plato cannot be certain and must qualify his own words: "Perhaps we may one day change our minds." Aristotle has an additional reason for hesitation: the nature of his argument for the incomplete reality of power excludes the recognition of observable power, and unobservable entities are, in a sense, unsubstantial.

The influence of Plato and Aristotle may, perhaps, explain why Locke, who virtually identifies substance with power in the passage to follow, stops short at an explicit identification.

> The mind being every day informed, by the senses, of the alteration of those simple ideas it observes in things without; and taking notice how one comes to an end, and ceases to be, and another begins to exist which was not before; reflecting also on what passes within itself, and observing a constant change of its ideas, sometimes by the impression of outward objects on the senses, and sometimes by the determination of its own choice; and concluding from what it has so constantly observed to have been, that the like changes will for the future be made in the same things, by like agents, and by the like ways—considers in one thing the possibility of having any of its simple ideas changed, and in another the possibility of making that change; and so comes by that idea

which we call *power*. Thus we say, fire has a power to melt gold, . . . and gold has a power to be melted . . . in which, and the like cases, the power we consider is in reference to the change of perceivable ideas. . . . Power thus considered is two-fold, viz., as able to make, or able to receive any change. . . . I confess power includes in it some kind of relation (a relation to action or change). . . . This, at least, I think evident—That we find in ourselves a power to begin or forbear, continue or end several actions of our minds, and motions of our bodies, barely by a thought or preference of the mind ordering, or as it were commanding, the doing or not doing such and such a particular action. This power . . . is that which we call the *Will*. . . . (*Essay Concerning Human Understanding*, II, XXI, I.) The idea then we have, to which we give the general name substance, being nothing but the supposed, but unknown, support of those qualities we find existing, which we imagine cannot subsist *sine re substante*, without something to support them, we call that support *substantia*. . . . Whatever therefore be the secret abstract nature of substance in general, all the ideas we have of particular distinct sorts of substances are nothing but several combinations of simple ideas, co-existing in such, though unknown, cause of their union, as makes the whole subsist of itself. . . . For he has the perfectest idea of any of the particular sorts of substances, who has gathered, and put together, most of those simple ideas which do exist in it; among which are to be reckoned its active powers, and passive capacities, which, though not simple ideas, yet in this respect, for brevity's sake, may conveniently enough be reckoned amongst them. Thus the power of drawing iron is one of the ideas of the complex one of that substance we call loadstone; and a power to be so drawn is a part of the complex one we call iron: which powers pass for the inherent qualities in those subjects. . . . Nor are we to wonder that powers make a great part of our complex ideas of substances; since the secondary qualities are those which in most of them serve principally to distinguish substances one from another . . . : all which secondary qualities . . . are nothing but bare powers. For the colour and taste of opium are, as well as its soporific or anodyne virtues, mere powers, depending on its primary qualities, whereby it is fitted to produce different operations on different parts of our bodies. . . . He that will examine his complex idea of gold, will find several of its ideas that make it up to be only powers; as the power of being melted, but of not spending itself in the fire; of being dissolved in *aqua regia*, are ideas as necessary to make up our complex idea of gold, as its colour and weight: which, if duly considered, are also nothing but different powers. . . . (*Ibid.*, II, XXIII.)

Such expressions as "powers make a great part of our complex ideas of substance," or the even stronger characterization of power as "a principal ingredient in our complex ideas of substances," together with Locke's assertion that powers are inherent properties of a thing that cause sensory representations, colors, sounds, and other (ideas of) secondary qualities, in a percipient, lead to the conclusion that a substance is a determinable situation, or a complex of powers, whereas its specification in terms of explicit sensory qualities is conditioned by the percipient's sense-organs. Locke is on the point of drawing this conclusion:

> Had we senses acute enough to discern the minute particles of bodies, and the real constitution on which their sensible qualities depend, I doubt not but they would produce quite different ideas in us: and that which is now the yellow colour of gold, would then disappear, and instead of it we should see an admirable texture of parts, of a certain size and figure. This microscopes plainly discover to us; . . . Blood, to the naked eye, appears all red; but by a good microscope, wherein its lesser parts appear, shows only some few globules of red, swimming in a pellucid liquor; and how these red globules would appear, if glasses could be found that could yet magnify them a thousand or ten thousand times more, is uncertain. (*Ibid.*, II, XXIII.)

Yet Locke prefers an alternative conception. His alternative to the conclusion that a substance is a complex of power which makes us perceive sensory qualities is expressed by the phrase "an admirable texture of parts, of a certain size and figure," and is based on the distinction between primary and secondary qualities. According to Locke, a physical substance, a piece of gold, say, consists of invisible parts characterized by the primary qualities of size and shape, while their joint effect on the senses is a percept of a yellow glittering bulk or some other combination of secondary qualities. But he does not seem to be sure whether there really are physical powers associated with the inherent primary qualities, or whether to say that there are is simply a way of saying that the invisible parts can produce in us the effect of

perceptual qualities. I think the source of Locke's uncertainty is a purely static conception of powers and of their associated qualities, with the consequent inability to understand their cohesion in a single substance. If powers are endowed with observable vector qualities, their cohesion into the unity of a complex power is no mystery, and the unifying complex power is a substance in the sense of something which holds the components together. On the other hand, powers deprived of their vector character would require the existence of an unknowable second-order power to hold together the first-order powers and qualities that make up a piece of substance. And of course, on the premises of Locke's empiricism, the existence of an unobservable hierarchy of powers cannot be admitted. There is no doubt that Locke is not satisfied with his own alternative. His admission that, strictly speaking, the idea of power is not simple because of an implied reference to action or change is a concession to a dynamic conception; but he neither explains the nature of this reference nor recognizes its observable dynamic source. Let us grant to Locke that the word "power," to be meaningful, requires the context of some such phrase as "a power to affect, or be affected by, x in the direction of y"; it would seem that if the word "power," within the context of the phrase, did not designate a kind of entity, we would be unable to assign fixed values to the variables x and y, and that, conversely, given a concrete situation described by the phrase upon an assignment of fixed values, we should expect an observable power to be a component of the situation. Perhaps, as some commentators think, Locke recognizes observable power in the form of the will within a purely psychical situation given to introspection. But even this is uncertain. We can only say that Locke has left the way toward the ultimacy of power open by his own admission that what appears to be a dependence of secondary upon primary qualities may yet turn out to be dependence "upon something yet more remote from our comprehension." (Cf. *ibid.*, IV, III, 11.)

Locke's indecision has been inherited by C. D. Broad in his discussion of power in *An Examination of McTaggart's*

Philosophy (Cambridge University Press, 1933, vol. I, Chapter 14, §3). The exposition of "The Popular-Scientific View" (§3. 1), which I may be wrong in identifying with Broad's own view, begins with a virtual identification of power with substance, summed up in the statement "Thus a Thing is conceived as a store of powers or dispositions," and proceeds by establishing several useful distinctions which I find acceptable except for the distinctions of order. Let me use one of Broad's own illustrations of the hierarchy of orders which opposes the first order disposition of an adult, his ability to talk, to the second order disposition of a child, the child's power to acquire the ability to talk. I do not object to the distinction between "power to do things" and "power to acquire power to do things," but to the metaphysical interpretation of these expressions which stipulates the existence of a hierarchy of orders of disposition. I have admitted that the unity of an aesthetic experience is of a higher dimension than the dimension of the component series of powers and sensory elements, but the analytic differentiation between these orders of dimensionality is not a metaphysical distinction among orders of being: the components and their integral unity are equally observable within the same work of art. And, in any event, Broad's illustration is of a different kind, which can be interpreted without the aid of the hypothesis of a diversity of orders. We may say, for example, that the child's "power to acquire a power to talk" is, in effect, a power to do things, namely, a power to utter certain vocal sounds, while the practice of such utterances brings about new bodily habits and mental complexes, so that the subsequent power to talk is not a function of the infantile organism at all but of a developed body and mind. Broad's other illustrations can be similarly reinterpreted. The possibility of an alternative interpretation is important because the employment of his metaphysical hierarchy in a critical discussion of the popular-scientific view (§3. 2) has led Broad to an entirely static conception of substance which counteracts his original intention to identify substance with power. Let me explain this. Broad

points out that the popular-scientific conception of disposition finds a partial expression in the following statement: "A material thing, or substance, might have been in different circumstances from which it in fact was, and it would then have had an assignably dissimilar history from that which it in fact had." As Broad remarks, such a statement is indispensable in science: the physicist assumes it "when he talks of 'the most probable initial state of gas,' or when, in applying the Principle of Least Action, he compares the various 'possible paths' (all but one of which are physically *impossible*) by which a system 'might' pass from one actual state to another." Yet, Broad continues, the statement in question is incompatible with the doctrine of universal causal determination. Let me quote:

> Now is it possible for anyone who accepts the laws of mechanics to say literally that the very same thing which was in contact at a certain moment with certain other things might instead have stood in different spatial relations to the very same things at that moment? The position of anything at any moment is supposed to be completely determined by its previous position and velocity, and its previous spatial relations to other things, and the natures and previous states of itself and other things. No doubt we can say consistently that this thing would have been now in such and such different spatial position if it had previously stood in such and such different spatial relations to other things. But this merely pushes the question of the legitimacy of this kind of supposition further and further back in time. And, in the end, we seem unable to give any clear meaning to the supposition that this very thing might now have been differently related to the same things, unless we think of this thing as being created and suddenly put into the pre-existing system of nature at a certain time and place. . . . We may sum up the position as follows. The popular-scientific view of the world ostensibly combines the following four propositions. (i) That any substance might have been in different circumstances at a given moment from the circumstances in which it in fact then was. (ii) That the circumstances of any substance at any moment are completely determined by its nature, the natures of the other substances in the universe, and the previous internal states and external circumstances of it and of them. (iii) That the natures of substances cannot change, and that it is nonsensical to suppose

that a substance which in fact has one nature might instead have a dissimilar nature. (iv) That the "coming to be" and the "passing away" of simple substances is unintelligible and can play no part in science, whilst the "coming to be" and the "passing away" of compound substances is completely determined as to time, place, and the nature of the substance concerned, by previous events. My criticism is that, even if there were no logical objection to the first supposition by itself, when taken literally, it cannot be taken literally and combined with the other three.

This passage is puzzling. Does Broad's criticism mean that he repudiates the popular-scientific view together with the distinctions that he himself has so painstakingly drawn in §3. 1? Whatever the answer, let me point out that the four propositions of Broad's summation are not incompatible if the word "substance" is taken to mean the same thing in all of them. But I think that the wording of the four sentences indicates a shift of meaning in the author's mind. Proposition (i) describes any substance as a power which exists independently of this or that actual manifestation. Proposition (ii), on the other hand, is concerned, as the distinction between substance and its nature indicates, with substances which are actualized in definite circumstances; the circumstances of an actualized substance could not be other than they happen to be precisely because actualization at a given moment excludes the power to be actualized at the same moment in a different way. The shift to actualized substance, which prevents the identification of substance with power, is promoted by proposition (iii) which must be understood in terms of Broad's hierarchy of power. The hierarchy assigns to each power an exclusive function and thereby dispenses with the possibility of alternative manifestations. Thus the nature of a substance does not allow for any change once its nature is identified with a single function of Broad's "supreme" order of disposition. We must also reject proposition (iv). For, if substance is power, we may observe that, in the mode of a strain or tendency conditioned by an actual situation, a power "comes to be" or else "passes away." Let me add a remark about the relation

between proposition (i) and the doctrine of universal causal determination. Far from being incompatible, the latter would seem to imply the former. This is so because the doctrine of causal determination is based on the concept of causal laws, and a causal law takes the form of a subjunctive conditional, viz. "If a certain condition were observed, then another condition, or other conditions, functionally related to the first, would also be observed," a form which is almost a paraphrase of Broad's proposition (i). But, in order to learn more about dynamics in philosophy, we had better leave the static conceptions of the analytic school alone and turn to romanticism.

I should like the remarks of this paragraph to contribute to a rehabilitation of Bergson. I believe that the rise of Einstein's relativity is, more than anything else, responsible for the decline of Bergson's reputation. For the philosophies of Einstein and Bergson are utterly opposed to one another as only an extreme static conception, a view *sub specie aeternitatis,* can be to a radical romanticism. No sooner had Bergson developed his central idea, that the spatializing schemes of the intellect distort our intuition of the absolute creative time, than Einstein demonstrated that time itself can be incorporated into a geometrical scheme of a four-dimensional world, and that alternative differentiations between time and space within the world are incompatible with the notion of an absolute time. Bergson's rejoinder at the time, in his *Durée et Simultanéitée,* which did not question the importance of relativity as a scientific theory but argued that the theory is an operational scheme and not a description of the creative process of nature, could not help the matter when philosophers and physicists were equally anxious to give a realist interpretation of Einstein's revolutionary ideas. And, although the operationalism of Bridgman and many other present-day physicists is in complete accord with Bergson's position, the stigma, no longer justified, has not yet been removed. And, even if we should prefer a realist interpretation of physics, we must not overlook the current shift of scientific interest and attention, from rela-

tivity to the quantum theory, which, in its philosophical implications, is favorable to a dynamic conception of nature. We are tempted to say that, in his denial that motion is a sequence of definite positions occupied by a moving body, Bergson has anticipated the quantum principle that specification of a dynamic property, of the momentum of an electron, excludes the assignment of a definite simultaneous position. And, when Bergson adds that the abstract measurable time t is not fit to describe the progress of creative evolution, the quantum physicist seconds him by pointing out that this abstract measurable time is inadequate for the understanding of electronic phenomena. So much for Bergson's philosophy of science. But this is not enough for reinstating Bergson in his position of importance in the history of philosophy. We must also call attention to his contribution to the philosophy of power which has not been sufficiently appreciated because of a widely spread misunderstanding. The usual interpretation, which I consider a misunderstanding, identifies Bergson's temporal process, or creative evolution, with actuality, and therefore would leave to power only a minor metaphysical part. The basis for this interpretation is Bergson's intention to dispense with things or substances in favor of actions and actual movements, an anticipation, let it be noted, of Whitehead's attempt to "explain away" substances in terms of actual occasions. Bergson's own statement is as follows:

> Everything is obscure in the idea of creation if we think of *things* which are created and a *thing* which creates, as we habitually do, as the understanding cannot help doing. . . . It is natural to our intellect, whose function is essentially practical, to present to us things and states rather than changes and acts. But things and states are only views, taken by our mind, of becoming. There are no things, there are only actions. More particularly, if I consider the world in which we live, I find that the automatic and strictly determined evolution of the well-knit whole is action which is unmaking itself, and that the unforeseen forms which life cuts out in it, forms capable of being themselves prolonged into unforeseen movements, represent action that is making itself. . . . (*Creative Evolution,* Modern Library, p. 271.)

But this passage does not mean that there is nothing but action in creative evolution; Bergson may mean no more than (what Whitehead has expressed with greater clarity) the fact of entanglement of power with actuality. To the extent to which we can distinguish, at least, in an abstraction of the understanding, between a creative source and an actual creature within the same process, there is no doubt that the creative source, according to Bergson, is potentiality or power. So he says himself:

> While, in its contact with matter, life is comparable to an impulsion or an impetus, regarded in itself it is an immensity of potentiality, a mutual encroachment of thousands and thousands of tendencies which nevertheless are "thousands and thousands" only when once regarded as outside of each other, that is, when spatialised. Contact with matter is what determines this dissociation. Matter divides actually what was but potentially manifold; and, in this sense, individuation is in part the work of matter, in part the result of life's own inclination. Thus a poetic sentiment, which bursts into distinct verses, lines, and words, may be said to have already contained this multiplicity of individuated elements, and yet, in fact, it is the materiality of language that creates it. (*Ibid.*, p. 218 f.)

Bergson proceeds to explain that the creative impetus of life, a state of tension with its interpenetrating tendencies not yet differentiated from one another, is of a psychical order and, more specifically, as the romantic tradition from Schopenhauer through Nietzsche would have it, of the nature of the will (cf. *ibid.*, pp. 259, 261, 267, 280). But, on the other hand, if "action which is unmaking itself," the tendency to differentiation and actuality, the effect of relaxation of the creative tension, leads to extension and, ultimately, to extinction, if, in short, Bergson's matter is an illusion, then creative power is the sole reality, and to call it power or potentiality, i.e. to oppose it to a different kind of reality in the form of actual entities, is no longer correct. This is to say that, in order to recognize Bergson's contribution to the philosophy of power, we must reject, as another misinterpretation, the notion that Bergson's matter is a "state of unreality" or incomplete reality. The material tendency, regarded

in itself, has the complete physical reality of an interruption of the creative effort, of a state of relaxation. This physical tendency is the objective basis upon which human perception and science build a world of external objects in space; a construction which, although an idealization, is a perspective of the understanding which is neither arbitrary nor a fiction. This approach to the perspective theory of truth is, as illustrated by the following quotations, explicit and unambiguous:

A priori and apart from any hypothesis on the nature of the matter, it is evident that the materiality of a body does not stop at the point at which we touch it: a body is present wherever its influence is felt; its attractive force, to speak only of that, is exerted on the sun, on the planets, perhaps on the entire universe. The more physics advances, the more it effaces the individuality of bodies and even of the particles into which the scientific imagination began by decomposing them: bodies and corpuscles tend to dissolve into a universal interaction. Our perception gives us the plan of our eventual action on things much more than that of things themselves. The outlines we find in objects simply mark what we can attain and modify in them. The lines we see traced in matter are just the paths on which we are called to move. Outlines and paths have declared themselves in the measure and proportion that consciousness has prepared for action on unorganised matter—that is to say, in the measure and proportion that intelligence has been formed. It is doubtful whether animals built on a different plan—a mollusk or an insect, for instance—cut matter up along the same articulations. It is not indeed necessary that they should separate it into bodies at all. . . . If on one side matter lends itself to a division into active and passive bodies, or more simply into coexistent and distinct fragments, it is from this side that intelligence will regard it; and the more it busies itself with dividing, the more it will spread out in space, in the form of extension adjoining extension, a matter that undoubtedly itself has a tendency to spatiality, but whose parts are yet in a state of reciprocal implication and interpenetration. . . . (*Ibid.*, p. 206 f.) . . . Now, in the continuity of sensible qualities we mark off the boundaries of bodies. Each of these bodies really changes at every moment. In the first place, it resolves itself into a group of qualities, and every quality . . . consists of a succession of elementary movements. But, even if we regard the quality as a stable state, the body is still unstable in that it changes qualities without ceasing. . . . What is real is the continual *change* of form: *form is only a snapshot view of a transition.* Therefore, here again, our percep-

tion manages to solidify into discontinuous images the fluid continuity of the real. When the successive images do not differ from each other too much, we consider them all as the waxing and waning of a single *mean* image, or as the deformation of this image in different directions. And to this mean we really allude when we speak of the *essence* of a thing, or of the thing itself. (*Ibid.*, p. 328.)

There is no doubt that Bergson has left much unanalyzed in these ideas, nor is it necessary to enlarge upon the commonplace that he is not at his best in analysis. Let me mention this much: sometimes he characterizes potentiality as indeterminacy (cf. *ibid.*, p. 274), sometimes as interpenetration of tendencies (cf. *ibid.*, p. 280), sometimes in terms of definite tendencies, but he has made no sustained effort at, and certainly never succeeded in, explaining how these different characterizations are to be correlated with one another. Instead of an explanation there is a dialectic of reality which is said to be one and yet dual through the opposition between the creative and the reactionary tendencies; a dialectic which has an unmistakable family resemblance to Schopenhauer's performance with the idea of the will-at-variance-with-itself, and is no more enlightening than the latter. We may say that Bergson's dialectic pulls the rabbit out of the hat in deriving extension, or spatial externalization of items, as an outcome of relaxation whereby the interpenetrating items within the intense creative effort are supposed to fall apart. The dialectical trick is exposed if we follow Whitehead and note that, in fact, extension has a double function of allowing for the externality of standpoints while, at the same time, bringing them together by means of geometrical and chronological correlations. "Extension, apart from its spatialization and temporalization, is that general scheme of relationships providing the capacity that many objects can be welded into the real unity of one experience." (*Process and Reality,* Cambridge University Press, 1929, p. 93.) Whitehead's correction, if we accept it as such, has a far-reaching significance. Spatialization, as he sees it, is no longer an intellectual distortion of creativity but a real factor in the

physical process. (Cf. *op. cit.*, p. 45.) And with the recognition of the factor of spatialization as real, the science of physics must be restored to its original place as the best available account of physical reality. There remains the problem of combining the static conceptions of the relativity physics with a dynamic philosophy of process, but Whitehead himself has shown the way toward a solution.

Briefly stated, Whitehead's solution is that actuality and potentiality are two aspects of the same creative process, and that the space-time of physics has the status of potentiality. But this statement needs expansion. Creative process is to be understood as the origination of new ways of looking at the world. The act of viewing the world in a unique perspective is called an actual entity. Relatively to the standpoint of any actual entity, there are other already settled or complete actual entities; and actuality, or the actual world, is defined, always relatively to a certain standpoint, as the totality of the already settled actual entities. The same actual entities, however, can be regarded in their capacity to undergo objectifications, i.e. as data, or material, utilized by a new actual entity in the process of self-formation. This is to say that the old world must be capable of undergoing transformation for the creative process to go on. This capacity of the world to be unsettled in order to enter into the constitution of, and be assimilated by, an actual entity in the making is called real potentiality. Real potentiality is a restricted or conditioned potentiality. Any thing could be implicated in any imaginable way in the constitution of some other thing; therefore unrestricted potentiality is simply indetermination. But elimination of incompatible action reduces the amount of indeterminacy in the actual world. To give one illustration, there is at this moment, October 30, 1944, a general potentiality for the world war to abruptly end tomorrow, but this potentiality is not "real" because the forces already in existence require a longer period of pacification. Restrictions upon potentiality may be more or less general; the most general scheme of restrictions, exemplified in any age or actual situation, is extension, and this ac-

counts for the importance of the extensive continuum of space-time. "Thus in itself, the extensive continuum is a scheme of real potentiality which is exhibited in all mutual objectifications by which actual entities prehend each other." (*Ibid.*, p. 106.) Is Whitehead's incorporation of extension into creative process a satisfactory solution? A critic may doubt whether this incorporation marks an appreciable advance over Bergson's conception; actuality and potentiality as two aspects of the same process may appear to be replicas, except for the difference in terminology, of intension and extension as the dual tendencies of reality. But the similarity between Whitehead and Bergson, in their treatment of extension, is only surface deep. According to Bergson, the tendency toward extension is a real obstacle and opposition to the creative effort, whereas in Whitehead's conception the extensive continuum is a real factor of creativity. Hence Whitehead, unlike Bergson, admits the evidence of physical science into philosophy. The two philosophies have some similarity on other points, relevant to the concept of power, usually with a touch of sophistication to the advantage of Whitehead. For example, compare Bergson's doctrine of tendencies with Whitehead's conception of "vector-characters." Both the creative tendencies and vector-feelings have the same office of bringing different items of reality into contact with one another. But Bergson's creative tendency is on a cosmic scale and therefore unobservable, although it is supposed to be understood by analogy with the immediate experience of personal development. Whitehead, on the other hand, intends to remove the opposition between the cosmic and the personal, and describes vector-feelings as observable links between the percipient occasion and other actual entities which together form the external world:

> Thus the primitive experience is emotional feeling, felt in its relevance to a world beyond. . . . In the phraseology of physics, this primitive experience is 'vector feeling,' that is to say, feeling from a beyond which is determinate and pointing to a beyond which is to be determined. But the feeling is subjectively rooted

in the immediacy of the present occasion: it is what the occasion feels for itself, as derived from the past and as merging into the future. (*Op. cit.*, p. 228.)

To mention only one advantage of Whitehead's conception of observable vectors, the conception is a weapon against Hume's skepticism. In a refutation of Hume's premise, that causal efficacy is never observable, Whitehead can say: "The vector character of the datum is this causal efficacy." (*Ibid.*, p. 169.) But, this and other improvements notwithstanding, I doubt whether, with regard to their total contributions to the philosophy of power, Whitehead is superior to Bergson. Whitehead, but not Bergson, has the weakness of what may be called a "feminine outlook." There are two important, and converging, considerations which account for Whitehead's weakness but do not erase it. In order to uphold the possibility of a vector contact among contemporary actual entities, despite the conclusion of the relativity physics that distant contemporaries are physically independent of one another, Whitehead draws a distinction between physical contact and contact in the sense of space-time correlation, and contends, on the basis of this distinction, that spatio-temporal correlations of an actual entity with its contemporaries are observable feelings of "strain." But the weakness of his contention is that, if geometry is the only thing to tie them together, the world of contemporary events has no body to it; and the identification of these ties with feelings of "strain" cannot provide the undoubtedly intended substantiality because the doctrine of geometrical "strains" is not sufficiently clear and conclusive. The second consideration, which in Whitehead's treatment has the same effect of reducing the world to insubstantiality, is the rejection of substances in transaction with one another. Bergson's repudiation of substances and things does not lead to insubstantiality because he makes, in effect although not in terminology, an exception in the case of the vital impetus itself which turns out to be a power to originate change and remain the same throughout the process, i.e. a substance. Whitehead, of course, has much to say about potentiality

but he takes it to be a passive susceptibility to absorption into the system of a subsequent occasion and not an active power to affect others. He sometimes uses the term "power," but even then he means passive potentiality. The outcome is clear. With no power to contact a contemporary, and with inheritance from antecedent events as the only accessible way of transaction with the external world, there is nothing left to an agent but the act of perception. Thus, according to Whitehead, perception is the sole activity of actual entities and the world of actual entities is a system of "narcissist" self-contemplation. I know, of course, that Whitehead does not accept the usual opposition between perception and action; I even am prepared to declare that the identification of action with perception is the key to his philosophy. But this knowledge only strengthens my conviction that Whitehead's ideas would be more attractive if they were integrated with the concept of an active and substantival power.

EVENTS

THINGS

ACTUALITY and potentiality or power are correlative philosophical categories. Therefore the primary dictionary definition, which identifies actuality with reality, is not appropriate in philosophy. Power, of course, is just as real, and in many cases just as observable, as anything actual. There is an opposition, or contrast, between power and actuality. But, again, the usual view is that actuality and potentiality are coexclusive, whereas I should hold that power is implicated in every actual concern. My position is that in contrast with actuality as a relatively settled situation power is an incomplete entity, or a "vector," because it must have a bearing upon something beyond itself. There are at least three different forms of dynamic incompleteness corresponding to three ways of what may be called "vector-bearing." There is the experience of power as a determinable entity which is associated with the inward bearing in our perception of the external world. A lack of satisfaction, which is felt as a want or a desire, is the form of incompleteness of an outward vector. And the bearing of material things upon one another is expressed by the incompleteness of a cause which is about to produce its effect. The simple device of completing the incomplete should enable us to establish the existence of three corresponding modes of actuality. And I think that both the aesthetic experience of specific sense data and the common feeling of satisfaction at the fulfillment of a desire would be readily classified with actuality. On the other hand, a cause in conjunction with its effect does not seem to

constitute an actual situation. A law of science, which correlates a cause with an effect, is only an abstraction from actuality; in their concrete setting causal correlations would seem to require the presence of material things in physical transaction with one another. The position of common sense is that a cause, even in conjunction with its effect, is incomplete because it is no more than a contingent state of a thing, whereas a thing is a complete entity because it would be the same even if it were in a different state of causal transaction. According to this position, actuality consists of material things. But what does common sense mean by things, i.e. by material things? The answer, if I am to speak for common sense, is as follows:

A chair, a tree, a pen, and the list may be continued indefinitely, are familiar examples of things. A thing is a three-dimensional solid object bounded by a definite surface which isolates it from the environment so as to make it recognizable, or at least identifiable, through the change of the latter. The sky, although easily recognizable, is not a thing because it has no perceptible boundaries. A cloud is too quick to change its shape to be a definite thing. A shade of green in the setting of a rainbow is not a thing because it shades off into the neighboring hues. A process, such as the ringing of a bell or the freezing of water, is not a thing because it has no shape at all. The enclosure of a thing within a definite surface boundary allows for a change of manifestations which does not interfere with the basic completeness. For, first of all, enclosure within a surface is a means of isolation. So long as a thing retains a recognizable shape alteration and displacement may go a long way before its identity is lost. In fact, a thing may be defined as an entity which persists through the change of its properties. You say that you own the same car after the replacement of a blown tire; and the continuity in the history of the thing, in conjunction with the recognizable shape, prompts you to say the same thing even if the original body, engine, and wheels have been successively replaced. A sudden deformation, in an automobile crash, may still allow for identification provided the oc-

currence of the change is observable; however, an explosion of a bomb, which completely destroys the original surface boundary, would be said to be the end of the thing. Second, enclosure within a definite boundary is an objective fact which is independent of the perceptual properties of the thing. Only one side of a thing, i.e. only a part of the surface, can be shown to a single observer at a time; and this observable part hides the inside and the back of the thing. This means that a thing may be in part unobservable without the unobserved parts being any less definite or specific. As you look at the back of your own calling card, you show common sense in assuming that the print of your name is still on the other side. The existence of unobserved parts explains the relative independence of a thing from its perceptual manifestations; the change of the latter is a change from one "side-show" to another which does not interfere with the intrinsic invariance of the thing. Thus a thing is an actual entity because it preserves an invariant core through the change of extrinsic and perceptual properties.

This account is incomplete, but it goes far enough to enable us to see the incoherence of the common sense conception of material things. There is no doubt that common people can make significant and true statements, such as "There is a desk in my room," which involve a reference to a material thing. But the correct use of such thing words as "desk" does not justify the philosophy of things which may go with it. For if you tell me "There is a desk in my room," the information may be true; but if you associate with this information a metaphysical belief that the desk remains the same actual entity even when unobserved, i.e. retains some of the properties that you may see when you enter the room, the metaphysics is questionable. Hume was the first to bring out the point.

> Thus the controversy concerning identity is not merely a dispute of words. For when we attribute identity, in an improper sense, to variable or interrupted objects our mistake is not confin'd to the expression, but is commonly attended with a fiction either of something invariable and uninterrupted, or of something

mysterious and inexplicable, or at least with a propensity to such fictions. . . . (*Treatise,* Part 4, Section 6.)

And, in a similar vein, Russell writes to a critic:

> Mr. Nagel asserts with passion that he has seen tables, but he adds that he means this in the sense in which we ordinarily use the words "see" and "table." I might agree if he would take the phrase "see a table" as a whole. Like Mr. Nagel, I have often had the experience called "seeing the table." My objection is that the phrase, as commonly understood, involves false metaphysics. . . . (*The Library of Living Philosophers,* vol. v, p. 704.)

The fault with the metaphysics of common sense, as I see it, is the contention that material things are actual entities. How can a thing be both in part unobserved and yet wholly actual? Granted that an observable entity may be a power, there can be no doubt that an actual entity must be, at least in principle, observable. Perhaps common sense means that the parts which are unobserved by a single observer could be observed by others. But to take this position is to assert that a thing is a collection of actual aspects, an assertion which does not prove that a thing is an actual entity unless a collection of actual aspects can be shown to be actual itself. Suppose someone suggests, in order to defend common sense, that the surface boundary of a thing is the actual agency that collects all actual aspects together. The suggestion is unsatisfactory because the collection of all actual aspects of a thing does not change, whereas the surface is subject to alteration through the history of the thing. The surface of a thing may enclose all its present aspects but not its future and past. The fact that a thing has a past and a future excludes the possibility that it should be given wholly and actually within a present act of observation. And if a thing cannot be completely actualized at any present time, how can it be actual; or, if it were actual, how could such a statement as "I see a table at this moment" ever be true? The answer that the thing is complete and actual only at the end of its history does not meet the point that at the moment when a table crumbles to pieces it is no longer true to say "I see a

table." Of course, one may argue that at the end of its history the whole past of the table is preserved within the space-time of relativity, but the table as a four-dimensional entity is neither actual nor the table of common sense. Even if these objections were not unanswerable, the assumption of a unique surface boundary between a thing and its environment, which must be the basis of any forthcoming answer, has no empirical justification. The physicist, who ought to know, rejects the notion. According to the relativity theory, a material thing has no definite surface because the shape and size of a surface vary with reference to different systems in relative motion. Moreover, as we learn from quantum physics, there is a perpetual, although invisible, interchange of matter between a thing and its neighborhood; this means that there is no basis for the differentiation between the thing and the surroundings other than greater density of matter within a region which is approximately coextensive with what is taken to be the volume of the thing. We can disregard the negative findings of modern physics only at the price of getting entangled, with G. E. Moore, in the hopeless problem of the relation between the surface of a physical thing and the "corresponding" percepts or sense data. In order to make the common sense conception more precise Moore draws a distinction between "seeing" a physical object, and therefore a part of its surface, and "directly seeing" a "corresponding" sense datum; but, once the distinction is drawn, he is at a loss to know whether the "correspondence" is identity. Sometimes, for example, in double vision, there are *two* "directly seen" images which therefore must be distinct from the "corresponding" single physical surface. But the same kind of problem puzzles Moore even in the case of normal vision.

> I am now seeing part of the surface of my hand; and I do now not only feel sure but know, with regard to this object I am seeing which *is* part of the surface of my hand, *that* it is part of the surface of my hand. And also I do *now,* at the very same time, feel some doubt as to whether a certain object, which I am *directly seeing,* is identical with the object which I am seeing which is part

of the surface of my hand. But to say that I feel doubt as to this, is to say that it is *possible* that it *is* identical. . . . (Page 636 f.) There is . . . reason for thinking that the sense of "hear" in which we hear physical sounds is *not* the same as the sense of "hear" in which "directly hear" is synonymous with "hear." And the argument seems to me to be exactly analogous to one argument for thinking that the sense of "see" in which I am now seeing a certain part of the surface of my right hand is *not* the same as the sense of "see" which is such that "directly see" is a synonym for "see" when used in that sense. I know perfectly well that, if my present situation had been different from what it is only in the respect that I had been wearing blue spectacles instead of spectacles of plain glass, then the part of the surface of my hand which I am now seeing would have *looked to me* of a somewhat different colour from that which it now looks to me. But there are good (though not conclusive) reasons for thinking that if it had looked of a different colour, then the *directly seen* object, which would then have "corresponded" to this part of the surface of my hand, would have been of a different colour from the directly seen object which now "corresponds" to this part of the surface of my hand. But, if so, the directly seen object, which would then have "corresponded" to that piece of surface cannot possibly be identical with the piece of surface in question. And if *it* is not, then certainly nothing else which I am directly seeing is identical with that piece of physical surface. And hence there is a good (though not conclusive) reason for thinking that the sense of "see" in which I am seeing part of the surface of my right hand cannot be identical with that sense of "see" which is such that "directly see" is a synonym for "see" when used in that sense. (*The Library of Living Philosophers*, vol. IV, p. 642.)

Suppose we grant to Moore that the sense datum which is directly seen through the colored glasses is not identical with the "corresponding" piece of physical surface; could we not argue that there are privileged sense data, for example, those that are directly seen by a normal naked eye, which are identical with that surface? And if no sense datum which I can directly see is identical with a piece of physical surface, then I must say that I see two things when I am looking at my right hand: I see a part of the surface of the hand and I also see (directly) the "corresponding" sense datum. But I am sure that a common sense person would say that he sees, in an analogous situation, only one visual object; at any rate,

no straining of the eyes would help him to discern the sense datum from the surface. And if no one can discern the surface as distinct from the sense datum and therefore observe what the surface looks like, can he really insist that he *sees* this indiscernible object? It would seem to me that, since there is no discernible evidence for the existence of a surface which is distinct from any sense datum, Moore can do no more than infer the possibility of such distinct existence. But infer from what? Not from the findings of the physicist who, as we know, denies the existence of definite physical surfaces of things. The inference must be, in part, from the common sense notion of things which postulates physical surfaces as means of isolation. I say "in part" because it is quite obvious that common sense postulates surfaces on the basis of, and with no intention to distinguish them from, what can be directly seen. The additional premise for the inference is a correction of the common sense notion, to the effect that variability and subjectivity of sense data make it improbable that any of them should be identical with the physical surface of a thing. But if common sense needs correction on this point, why not give preference to the physicist's position altogether? If we do, we still may speak of surfaces of things although we cannot say that a thing has just one objective surface; we should hold that there are as many surfaces to a thing as there are "corresponding" sense data, that this "correspondence" is identity, and that the surfaces are relative to the percipient's standpoints. Moore would not go that far: while he sees through the common sense notion, he reasserts its assumption of the existence of a unique and objective surface of a thing. But then he must raise a problem that cannot be solved. There is no directly observable evidence, since such evidence consists, according to Moore, of sense data alone, for thinking that, when we see a piece of a physical surface, the physical surface, if there be such an object, is to be distinguished from any of our sense data, or, on the contrary, identified with at least one of them. Again, let us note that even though the statement "We see a part of the physical surface" may be true as

a whole, there need not be such an object as "the physical surface," unless we arbitrarily decide to so call one (or one set) of our sense data. And of course, an arbitrary identification would not serve the original purpose of construing the physical surface as a means of isolation of a thing from its surroundings, including the percipients. For a sense datum which a percipient may choose to identify with a piece of physical surface must be one of *his* sense data; and to argue that the sense datum may continue to exist while unobserved is to make a thing out of it, because only a part, i.e. a part of the total duration, of such a datum would be sensed or directly perceived.

The understanding that material things are not actual entities has led some philosophers to the theory of logical constructions. Unfortunately there is no general agreement as to the status of a logical construction. Some writers tell us that logical constructions are fictions, or artifacts, or, at any rate, purely conceptual schemes, whereas others would say that even though things are logical constructions, they may be more than logical constructions and exist in their own right. However, all discussions about logical constructions would seem to have this much in common. To say that a thing is a logical construction is to assert that any statement involving thing-words can be translated without loss of truth or meaning into a statement given exclusively in terms of directly observable entities or else of actual events. A directly observable entity, it will be remembered, can be described by a true statement of the form "This is *P*," such that its truth requires, to be established, no more than one act of observation, or, to use an alternative formulation, such that it employs the predicate "*P*" to designate a basic idea. Now philosophers under consideration generally agree, with the notable exception of G. E. Moore, that while the statement "This is a tennis ball" may be true, its truth cannot be established by a single percept but requires additional evidence. On the other hand, all of them, including Moore, agree that the truth of "This is white" can be established by a direct observation of a single sense datum. Accordingly, the theory of

logical constructions would be, at least, plausible, if we could show that such a statement as "This is a tennis ball" is translatable into a combination of such statements about sense data as "This is white." As a first approximation to a translation consider the statement "This is white and fuzzy in texture and resilient to touch and spherical with a diameter of about two inches." Some critics would point out that this translation, as well as any other, fails to enumerate the apparently endless number of properties of a tennis ball. But their objection may appear unduly academic: why should we enumerate more properties than would be sufficient in practice to recognize an object as a tennis ball? Because, the critics would answer, there is always the possibility of a mistake: the white, fuzzy, resilent, and spherical complex may turn out to be a mirror image, or a dream, or an illusion, and not a tennis ball at all. This answer involves what Ayer has called the argument from illusion (cf. *The Foundations of Empirical Knowledge,* Chapter 1). I have already dealt with this argument in my treatment of dreams and of solipsism (cf. chapter on Power: "The Empiricist Principle") but in order to discuss the matter with the proponents of the theory of logical constructions let me add another consideration. Once you are practically convinced that you are handling a real tennis ball, you must specify, in order to uphold the theoretical possibility of an illusion, the kind of happenings that would establish the illusion; but, regardless of how you specify them in detail, you must, at least, recognize them as real evidence for the illusion of a tennis ball, and not as, in their turn, illusions or dreams; this is to say, you must be able to recognize some of the happenings as manifestations of material things. Let me illustrate. Suppose you were sure a moment ago that you held a tennis ball, but to your great surprise you now find your hands empty. Would this prove that you just woke up; or that you had an illusion a moment ago? Not unless you are sure you are not dreaming or having an illusion now. In fact there are alternative explanations of the disappearance of the ball. Your hands are empty because you threw away the ball with-

out having noticed it. The whole thing is a conjurer's trick or, what amounts to much the same thing, some undetected physical cause is responsible for the sudden disintegration of the ball. You have been holding the ball all the time and are only dreaming about its disappearance now. And so on. If there is any way of deciding among such alternative explanations, we must be able to tell, at some crucial point, a material thing from an illusion or dream; for example, to eliminate the third explanation, you must know that your empty hand is not a dream. The argument from illusion would then seem to amount to this. There are alternative explanations, on the one hand, in terms of actual events, on the other, in terms of illusions, dreams, or hallucinations, of any such phenomenon as a sudden disappearance of a thing; but there is nothing in the world that is in favor of one of these explanations rather than another. But then, in accordance with the empiricist principle, the explanations turn out to have the same empirical meaning, or to give the same information, and therefore are neither alternative nor distinct; and if so, the argument from illusion must no longer oppose these explanations to one another or say that what appears to be a thing may be only an illusion, but rather that it may be only a complex of sense data. And when thus corrected, the argument would be not only compatible but directly in support of the contention that statements about things are translatable into statements about complexes of sense data. But the moment we see the close connection between the corrected argument from illusion and the contention of the theory of logical constructions, we must reexamine the latter by going into a further critical analysis of the former. For we cannot but suspect that something is wrong with an argument that winds up in a denial that obviously distinct explanations are distinct. I believe the fault with the argument is in the premise that such phenomena as a sudden and unaccountable disappearance of a material thing are imaginable. At first this premise seems to be unobjectionable. Can't you imagine, for example, that you hold a tennis ball in your hand, then you close your eyes for a moment, then you open them, and

there is no ball in sight? Of course you can: you have just done so if you understood the question. But the word "imagine" is not used here in the sense intended by the argument from illusion. You can imagine an *image* to suddenly and unaccountably disappear. That kind of thing often happens in a dream. But the sense of "imagine" intended by the argument from illusion is not merely entertainment of images, but entertainment of images together with a conceptual reference of such images to an objective event or thing. In the latter sense of "imagine" you cannot imagine, to use a simpler illustration, that your right hand should presently and without any assignable cause disappear, although you need only close your eyes to bring about a sudden disappearance of its image. I suppose you cannot imagine the uncaused disappearance of your hand, as contrasted with the mere image of the hand, because conceptual reference to the hand which is a physical object requires the latter to conform to causal laws, and that this conformity excludes miracles. In other words, "the uncaused disappearance of the hand" is unimaginable for the simple reason that it is conceptually meaningless. Therefore the argument from illusion is based on a meaningless premise. And, if this conclusion is correct, we not only can reject the translation of statements in terms of things into statements in terms of sense data as inadequate but show exactly where it fails. A statement about a thing is about an entity that conforms to the laws of physics and, in particular, perseveres in existence or resists physical destruction. Thus when we say "This is a tennis ball," we refer to something which will rebound when hit by rackets in a game of tennis. On the other hand, we should never expect to hit with a racket a mere complex of sense data, although as a sight the event of hitting a ball with a racket can be described exclusively in terms of visual sense data. Therefore, while we interpret statements describing sense data, such as "This is white," literally, we must treat a statement in terms of thing-words as an idiom which does not make explicit the intended disposition properties. The statement "This is a tennis ball" should be treated as an idiom because it does not mention explicitly the prop-

erty of being usable in a game of tennis. To do justice to the intended disposition property and yet insist on the possibility of translating a thing-statement into a sense data statement, there is no choice but to maintain that the enumeration of sensory properties must be given in conjunction with an "If-then" statement whose antecedent and consequent are formulated exclusively in terms of eventual sense data. Accordingly, to translate "This is a tennis ball" we should say something like this, "This is white, round, fuzzy, and if hit, it will rebound." But, in a discussion of Carnap's reduction sentences, we have already found that recourse to "If-then" statements is insufficient. Furthermore, there are additional difficulties with an "If-then" statement which refers to the future or is about eventual sense data. The empirical status of propositions about the future is a problem; and an "If-then" statement about the future can at best tell us that something *will be* a physical object, say a tennis ball, whereas the statement to be translated is to the effect that something *is* a physical object at the present moment. So much for the interpretation of things in terms of sense data. But we have yet to consider the alternative form of the theory of logical constructions, for example, Whitehead's philosophy of things, according to which things are strings of events, i.e. statements about things are translatable into statements in terms of events. The theory has an unquestionable initial plausibility. An account of a thing, like a biography of a man, can be given only by describing a sequence of events; and those who look for something behind such a sequence are immediately accused of a Kantian belief in the "ding an sich." But initial plausibility, in this instance as in many others, is in part an effect of novelty and therefore of insufficient analysis. Let us try to clarify some of the points involved. First, the relation between sense data and events. Not all writers take sense data to be events: to Whitehead they are "eternal objects," i.e. universals; in Russell's recent effort to do away with substance they turn out to be both properties and particulars. But let us side with the majority who think that sense data are perceptual events or processes. A sharp clap

of hands as contrasted with a continuous ringing of a bell may illustrate the distinction between an event and a process. But while all sense data are perceptual events or processes, to be called percepts, it is generally understood that not all events are sense data. There are world points of the theory of relativity which are said to be four-dimensional and therefore unperceivable events. And even in the ordinary world with its three dimensions of space severed from time there are three-dimensional events, like a collision of two cars which, as the conflicting reports of even trustworthy witnesses show, cannot be perceived in their entirety and in all detail by a single observer. The fact that events, which are not sense data, transcend the experience of an outsider, and therefore have an independent existence, explains why they are preferable to sense data in a logical construction of material things; but the same fact shows that transsubjective events are, at least in part, not observable. Since an event is capable of showing incompatible qualities, for example, of appearing red and green, in relation to variously situated observers, however normal their eyesight may be, it is not essentially different from a thing which shows incompatible qualities to the same or a different observer at various dates; the only difference is that in one case reference is to situations of observation changeable in space and in the other in time. And if an event, like a thing, is not directly observable in its entirety, it cannot be, any more than a thing, called either complete or actual. Whitehead meets the point by drawing a distinction between events which are actual entities, because of being organisms, and events which are artificially and mechanically unified, i.e. which are collections of actual entities without being actual themselves. Consider an event in the history of an animal, for example, a movement of a cat. The movement has an organic unity; hence it is an organism, in Whitehead's sense of the word, and an actual entity. Although the feline movement cannot be perceived at once from all possible angles of vision by a single observer, the cat itself feels it as a complete and unified act; or, rather, since the agent is to be treated as a string of such acts, the

feline act feels itself as complete and unified. Compare this act with an event in the history of a material thing, for instance, with the fall of a chair. Again, no outsider can directly perceive the complete event, but there is no internal feeling within the happening in this case. Hence the fall of a chair is not an actual entity, although each vibration, coincident with the fall, of the innumerable constituent electrons is, according to Whitehead, a primitive organism or unit of physical actuality. Accordingly, an actual entity can be contrasted with other events precisely because it is felt or observed directly, even if internally. Whitehead's conception of actual entities is usually said to be anthropomorphic. But this is hardly a damaging criticism; if we accept the transformal function of cognition, we must understand that, since conceptual transformation is inevitably human, all knowledge is in some sense anthropomorphic; and, to check the claim that one can escape anthropomorphism by thinking in purely abstract terms, we must remember that abstract thought distinguishes man from other animals. But there are other criticisms of Whitehead, for example, the observation that he uses such terms as "feeling" or "organism" in an unusually broad sense and therefore fails in his attempt to specify the nature of concrete actuality. Although such criticisms are obviously not unanswerable, the fact remains that the conception of events as feelers or organisms is a stumbling block in philosophy; and, in order to avoid unnecessary opposition, I shall, for the present, adapt only the less radical elements in Whitehead's doctrine. I agree that some events are actual and all actual entities are events; I think that actual events consist of specific sense data and of internal experiences of animals. But I do not know whether such physical manifestations as electronic waves are waves of feeling; I doubt whether it is true that nothing is real unless it is directly implicated in the formation of an actual feeling; and, to come back finally to the theory of logical constructions, I hold that statements about things are not translatable into statements given exclusively in terms of actual events. A thing is understood to remain the same through, and in spite of, the changes which

it may undergo; in Whitehead's treatment this substantival identity is reduced to the close similarity of perspectives inherited by one actual occasion from another within a single string of events. Common experience of personal identity, however, is not amenable to such a treatment; for example, while my perspective upon the world has considerably changed since last year, I feel that I am substantially the same person. The point is that, however dissimilar the events in the history of a thing, the thing participates as a whole in each of them, while, on the other hand, even if all constituent events are alike, each of them can be only a part of the whole history. This is not the only difficulty with the notion of a string of events. There is the further problem of the connection of an event with its successors. The difficulty is a modification of an old puzzle about causality: the cause or the antecedent event is already out of existence when the effect or the successor event emerges, and the latter had not yet come into being when the former existed, so that there seems to be no time when the two could possibly come in touch with, or affect, one another. Let us consider more specifically the form which this difficulty takes in Whitehead's philosophy. An actual entity is said to conform to the nature of its antecedents in a string of events through perception in the mode of causal efficacy. But this is not to say that the predecessor and the successor share in the actual being of each other; as an actual entity each is concerned exclusively with itself or with its own "subjective aim." Only after an event is completed, i.e. as a dead event (although Whitehead prefers to call its death "objective immortality"), can it serve as a pattern for the successors to conform to; this is the reason why the identity of a pattern, which is a complex of universals or "eternal objects," with the correlative similarity in the perspectives of events which conform to the pattern, turns out to be the only basis for the identification of a thing. This is not a caricature on Whitehead's ideas; textual quotations would have led, but in a longer and roundabout way, to the same point, which I take to be a weak spot in his philosophy, to the notion that actual entities can be linked to-

gether by a nonactual tie. Thus I conclude that the theory of things as logical constructions has yet to find a satisfactory form.

The conclusion that events and not things are actual entities, and that the theory of logical constructions is inadequate, has cleared the ground in favor of the thesis that things are powers. Since the thesis is concerned with physical things, its elaboration can, and must, profit from the findings of the relativity and the quantum theories. This statement, strangely enough, will be challenged by many contemporary philosophers of science, and therefore needs a word of defense. Great philosophers of the past were always inspired by the development of science. The influence of Newton on Locke, Hume, and Kant, of Leibniz the mathematician on Leibniz the philosopher, of Darwin on Nietzsche and Bergson, to mention only a few men, illustrates the contribution of science to philosophy. Why should the twentieth century be different? Of course, it is not entirely different; Whitehead's metaphysics, for example, grows out of his familiarity with recent science. But I am ready to admit that Whitehead represents the minority. The reason is not so much the empirical temper of the age, or even the unprecedented technical difficulty of modern science, as the fact that physics, if interpreted realistically, may be said to have taken a turn toward paradoxical development or, at any rate, toward developments that are beyond the comprehension of common sense. The atomistic view of nineteenth century physics was not contrary to common sense; in fact, such common sense thinkers as Democritus or Lucretius have anticipated it by many centuries. But the relativity of simultaneity, the principle of indeterminacy, and many other ideas of our physics simply could not be anticipated, except, perhaps, by a madman. And while philosophers have often indulged in speculations shocking to common sense, they do not approve of scientific paradox except when it happens to fit in with their philosophies. Whitehead himself makes full use of the special theory of relativity, but does not follow Einstein beyond it. Other writers reject the philosophical significance of relativity al-

together, but incorporate into metaphysics certain ideas of the quantum theory. The scientist shows the same kind of favoritism. A physicist is apt to take the operationalist position and characterize quantum physics as a convenient theoretical construction for the correlation of experimental data, but when some of his pet ideas, such as the principle of complementarity, are in question, he argues that they embody the ways of nature herself. The more consistent attitude, a denial that any development of physical theory is descriptive of the nature of things, is seldom taken in principle and hardly ever adhered to in practice. Nor is there anything, except consistency, to recommend this attitude. We must admit, of course, that certain conceptions in recent physics, for instance, the non-Euclidean space-time of relativity, cannot be illustrated by a percept or image, and that therefore they are ways of or, if one likes the expression better, rules for, correlating experimental data. But when we call a certain way of correlating data a rule we need not mean that it is only a rule. To say that a rule is only a rule is another way of saying that it is nothing but a convention, such as a rule of chess; but a rule may also be an expression of a fact. One way of telling whether a rule is a convention or a fact is by establishing whether it allows for an alternative. The game of chess, for example, has evolved through its history, and this means that it used to be played according to alternative sets of rules; hence the rules of chess are conventions. On the other hand, there is no alternative to Einstein's theory of relativity that would be equally successful in dealing with the same data; hence we accept the theory not by convention but as a statement of fact. A reservation to the effect that a better theory may sometime be worked out is idle unless one has some idea of how this could be done. But a request for an explanation of the status of a fact, in the sense in which the word "fact" has been used in the context of this paragraph, is legitimate and must be satisfied. I do not here use "fact" as a synonym for "event," but to designate a complex objective situation which cannot take place as a single event or be directly observed in a single percept. To illus-

trate this use, let us take the following two statements: (1) It is a fact that the façade of a house obstructs an observation of its back; (2) It is a fact that the death of Caesar happened several centuries before the death of Napoleon. To establish a fact, as it is stated in (1), we must correlate our percepts of the façade with our percepts of the back of a house, but the correlation itself cannot be given as a percept. Again, contemporaries of Caesar could witness his death, and contemporaries of Napoleon Napoleon's death, but no one could perceive the fact that Caesar died before Napoleon. And if the reader objects that the limitation of human perception is an accident, and that a being who lived long enough to witness both deaths is conceivable; or, which amounts to the same thing, that both events are links within the chain of the same historical process, he must admit the fact, if it were a fact, of the possibility of inhuman longevity, or the fact, if it were a fact, of an unceasing historical process, to be beyond the range of direct observation. But, my critic may continue, statements (1) and (2) exemplify facts in the derivative sense of true propositions, and it would be a relapse into a naïve correspondence theory of truth to try to duplicate them as an objective reality independent of cognition. I agree; but the conclusion, which the critic is after, that (1) and (2) must be "true" by convention, would follow only if the world outside statements consisted exclusively of actual events and processes. I should deny both the duplication of reality in discourse and the conventionalist alternative by referring statements (1) and (2), in accordance with the conformal transformation theory of truth, to facts in the basic sense of objective but determinable situations. And this brings me back to the doctrine that things are powers, because the constituents of a complex determinable situation are things as powers or capacities for undergoing determination.

Gross material objects, such as tables or stones, are collections of molecules, atoms, and, in the last analysis, of such things as electrons and protons. We may begin then with such an elementary thing as a single electron. To a first

approximation, the electron as a particle may be represented by a single world-line in the space-time of relativity; a gross object would then be identifiable with a bunch of such world-lines. A point on a world-line is called a world-point, and the physicist also calls it an event because he specifies it by both the coordinates of space and time, just as we single out an ordinary event by giving both its location and date. A world-point would be an event literally if a single vibration of an electron took place instantaneously at a geometrical point; since, however, even the shortest physical happening has some duration and extension, events are finite regions in space-time and, accordingly, an electron is, to a second approximation, a series of space-time regions, and a stone a series of collections of such regions. Now, unless a thing is an organism capable of feeling itself, neither a space-time region nor a string of regions can be directly observed. A partial aspect of a region, however, may be a datum within the perspective of an outsider; and since within a perspective time is separated from space, this perspective datum, if it happens to be specific, is what we have already recognized as an actual event. Thus, if we disregard organisms, we must distinguish between two senses of the word "event": (1) an event as a space-time region, and (2) an event as a percept. As a space-time region an event is not actual and must be associated with a power. For one cannot directly observe in its entirety a four-dimensional entity. Furthermore, any region has the same status as its predecessors and successors along a string of regions in space-time, and therefore cannot be treated as the only actually present event to be contrasted with the no longer actual past or the not yet actual future. In the technical language of the theory of relativity this consideration is known under the heading of the relativity of simultaneity: there are alternative ways of sorting events into present, past, and future. But the understanding that the regions of space-time are not actual entities is only half of the story; it remains to show that they are phases of things or powers, and this last conclusion will be resisted by all those who have convinced themselves that

the theory of relativity has no use for things because world-lines are nothing but linear sequences of world-points. But if a world-point, or a world-region which is a collection of such points, is neither actual nor associated with a power, what other status could it have? There is, of course, the status of potentiality, but potentiality is related to power as indeterminacy to a definite tendency, and while space-time may be identified with a field of indeterminacy, the network of world-lines transforms this field into a definite chrono-geometrical structure. Association of space-time regions with power has an additional advantage of helping our understanding of the fact that world-points along a world-line are bound together in a timeless unit, although the end-points of the unit have different coordinates of time. We understand this fact better because we are perfectly at home with the statement that if things are powers they have a beginning and an end but remain the same through the series of changes which they undergo while in existence. Complications, however, are inevitable as soon as the quantum theory is also taken into consideration. For an electron can be represented, to a first approximation, by a single world-line and interpreted as a definite power provided it is an identifiable particle. But, the subatomic physicists tell us, an electron leads a double life: its existence in the shape of a particle is intermittent with a behavior which can only be associated with a train of waves. Hence the representation of an electron by an uninterrupted world-line is inexact; but if the diagram consists of a number of segments, there is the question of how to interpret the gaps between the segments as well as how to justify their identification with the same electron. The difficulty increases when we learn that an electron emerges as a particle only in the process of such experiments as an observation of its position. Thus we may say that an electron is transformed into a particle after a position observation has been made; before its localization the electron is diffused, like a cloud, over a certain region of space-time which is associated with at least one wave-train. This way of presenting the matter, it must be noted,

does not differ, at least not in words, from the physicist's own description. For example, A. D'Abro reports the position of Heisenberg and Bohr as follows.

> The diffused picture endures only so long as the electron is unobserved. If an experiment is performed for the purpose of locating the electron (e.g. by means of a fluorescent screen), and if the position of the electron is thereby observed, the extended waves immediately condense into a small wave packet, and the electron condenses with the waves, so that it is now diffused only through the small volume of the packet. The more precise our observation of the electron's position, the smaller the wave packet, and hence the more does the corpuscular aspect of the electron manifest itself. We may therefore say that the corpuscular aspect of the electron is brought into existence by our observation of the electron's position. . . . Before the observation, the electron is represented by a cloud extending over a certain region of space-time, and hence cannot be credited with any precise position. . . . The intensity of the wave at a space-time point is proportional to the probability that the electron will be found at this point immediately *after a position observation has been made;* before the observation, the position of the electron is meaningless and hence is not represented by the original wave picture. (*The Decline of Mechanism,* N. Y.: Van Nostrand Co., pp. 648 and 652.)

The physicist, however, does not know whether to take such words literally or rather as portraying a symbolic picture. On the one hand, the waves, associated with an electron, are usually described as "waves of probability," and understood to be computational devices and not actual entities; the particle mode, too, being correlative, or complementary, to the wave mode, should then be treated as a symbolic representation. On the other hand, duality, of which the particle-wave opposition is one manifestation, is, according to Bohr's principle of complementarity, objective; nature herself, Janus-like, is two-faced, and she is not represented adequately by either one of the complementary aspects taken singly. Thus the physicist may describe the situation in D'Abro's words: "But a satisfactory fusion of the wave and the particle aspects of matter and of radiation has yet to be performed; hundreds of years may elapse be-

fore the human mind will be able to comprehend the dualism of waves and particles." (*Ibid.*, p. 653.)

I do not claim that the philosophy of power would by one stroke perform the required fusion; but certainly no fusion is possible so long as an electron is taken to be an actual entity: for completeness of realization, as a criterion of actuality, rules out complementary aspects since they cannot be jointly realized. On the other hand, if an electron is associated with a power or potentiality, its dual nature is far more intelligible. Transformation from the mode of undifferentiated potentiality into the mode of a definite power may be the key to the mystery of an electron's transformation from a diffused into a localized state. The diffused state would then be interpreted as a space-time region of potentiality for the electron's localization; through a position observation potentiality is transformed into a definite power whose manifestations are particle-shaped events; and the transformation is brought about by the actual measurement and observation. The already familiar instance of an undifferentiated plane, which is transformed into a structure of definite but implicit lines of tension by the simple device of drawing two or more actual lines, may serve as an analogue. Take a clean sheet of paper. You may say that there are so many white lines collected together on its surface that they neutralize one another and cannot appear as distinct entities; in fact, if you draw a line in white it will be lost, too, against the white background; but the whole undifferentiated plane has a potentiality for showing all kinds of lines in some such contrasting color as, for instance, black. Let two segments of straight lines, which would intersect in the given plane if prolonged, be actually drawn in black; this is a set-up of actuality with the aid of which the angle that the lines, initiated by the two segments, tend to form is now definitely felt; and with additional drawings the implicit structure thus felt gains in articulation and complexity. And if we are justified in identifying the formerly undifferentiated area of the plane with the locus of tension that is subsequently felt there, we must allow the quantum physicist his identifica-

tion of an electron with both a diffused state and a definite localization in the shape of a particle.

EVENTS

THE distinction between an event as a region of space-time, to be called physical event, and an event as a percept within a perspective raises the question of the relation between them. We might say that the percept is a perspective view, in which the properties of space and time appear dissociated, upon a physical region, but this statement allows for two essentially different interpretations. I have already committed myself to the interpretation which identifies a physical event with a power as a source of actual manifestations, and therefore I should take any specific percept of an object in the external world to be such a manifestation. This is to say that, in my philosophy, a percept of a physical event is an aspect of a power, i.e. a perspective actualization of the latter. The alternative interpretation is to the effect that a physical event is not an entity but a correlation of simultaneous percepts, each of which belongs to a different perspective, and therefore a correlation of the corresponding perspectives. Such a correlation of the percepts or perspectives, whether understood to be an objective fact of nature or only a logical construction, is supposed to be operationally effectual: given a percept, the scheme of correlation must enable the percipient to describe the appearance of any other simultaneous percept of the correlated set within an alternative perspective. According to Russell's version of this interpretation (cf. Lecture 3 of *Our Knowledge of the External World*), given a perspective view upon a physical event (in Russell's terminology, upon a momentary cross-section of a common sense "thing"), other simultaneous perspective views can be determined, provided we correct for distortion caused by the intervening medium, by arranging them about a center, in the space of percipients, according to the laws of ordinary geometrical perspective. His version leads to the

paradoxical conclusion that the center around which the percepts are arranged, "the place where the thing is," is empty, i.e. not occupied by any percept of the correlated group. Russell denies that the conclusion is a paradox: he remarks that, as a purely empirical observation, we find that when we come sufficiently near to the center of a group of percepts there is no member of the group to be seen. I disagree with him; my observation is that even in the immediate neighborhood there is a blurred or determinable datum. However, to avoid such criticism of detail, let me make a point which is in favor of my interpretation and against any version of the correlation theory of physical events. To be correlated with the same "event," i.e. into a single group, percepts of the same kind are supposed to be simultaneous. But, since the order of simultaneity is relative to the frame of reference, percipients in relative motion would not choose the same percepts as members of the same "event." And even if we disregard this complication, the relativity of simultaneity would still interfere with the proposed correlation in another way, unless the percepts to form one group can be traced back to the same physical source, i.e. unless there is a physical event which is an entity. I mean that an observer, in relative motion to another, would agree with the latter concerning the identification of physical events only because both reject simultaneity of percepts as the basis for the identification. To explain my point, let me use Einstein's illustration of the disagreement between two passengers in relative motion. Two trains, $T1$ and $T2$, pass each other on parallel tracks when two strokes of lightning, A and B, hit the embankment at the opposite ends of the trains. Two passengers, $O1$ and $O2$, are seated, the first in the middle of $T1$ and the second in the middle of $T2$. $O1$ perceives both flashes simultaneously, i.e. he has two simultaneous percepts $A1$ and $B1$, and, since he assumes that his train is standing still, he concludes that the physical events A and B are objectively simultaneous. He would account for the fact that the passenger $O2$ in $T2$ saw the flashes in two successive percepts $A2$ and $B2$ by pointing out that the train $T2$ was mov-

ing toward A and away from B. If, on the other hand, O_2 assumes that his train is at rest while T_1 is moving, he will disagree with O_1 and argue that A happened before B and that the simultaneity of A_1 and B_1 is an effect of the motion of T_1. Suppose the passengers cannot settle the question which train is moving, and therefore must disagree about simultaneity; why do they agree to correlate A_1 and A_2 with the same physical event and B_1 and B_2 with another? There are only three alternatives: A_1 and A_2, but not B_1 and B_2, are simultaneous; or it is the other way around; or else neither pair consists of simultaneous percepts. Whichever alternative is taken, it does not satisfy the requirement that only simultaneous percepts can be used in identifying a physical "event," i.e. a single group of percepts. Take, for example, the first alternative. Both observers correlate their percepts B_1 and B_2 with the same physical event B, even though these percepts, by hypothesis, are not simultaneous; therefore the requirement of the correlation theory of physical events is violated. And there is a further question. Why should the passengers O_1 and O_2 not settle their disagreement by the simple expedient of correlating their percepts with *three* physical "events"? They could easily decide that O_1 perceived, through the mediation of his percepts A_1 and B_1, two simultaneous strokes of lightning A and B', and that O_2 perceived, by means of his percepts, two successive strokes of lightning A and B''. There is only one plausible answer. The passengers would not resort to an easy convention of correlation because they believe that physical events are not arbitrary correlations of percepts; they know that, while trains do not move toward, or away from, a scheme of correlation, the motion of *one* of the trains and the occurrence of *two* strokes of lightning suffice to account for the difference in the temporal order of their percepts. If both passengers were relativists, they would give a different explanation of the situation. According to the theory of relativity, neither of the trains can be said to be at rest; and since the speed of light messages is the same for all systems in relative unaccelerated motion, the existence of an objec-

tive invariant temporal relation between A and B would imply that both passengers, being equidistant from A and B, should perceive the flashes in the same temporal order. But O_1 observes two simultaneous, and O_2 two successive, flashes. Hence, the relativist concludes, there is no objective or invariant temporal order between A and B: the two physical events are simultaneous relatively to one passenger, and in succession relatively to the other. The relativist solution of the problem shows, even more clearly than the explanation given by the pre-relativity passengers, that identification of events is not a matter of correlation of simultaneous percepts. Let us grant that simultaneity of percepts accounts for the fact that the passenger in T_1 arranges them in two groups, the lightning strokes L_1 and L_2; likewise, that the passenger in T_2 correlates his percepts with two lightning strokes L_3 and L_4. But the second order correlation, viz. the identification of L_1 with L_3 and of L_2 with L_4, i.e. the agreement to the effect that both passengers are concerned with the same pair of physical events A and B, has nothing to do with the simultaneity of percepts because it has nothing to do with simultaneity at all. While classical physics could hold that the simultaneity of percepts represents an objective physical order provided we correct for the motion of the moving train, this correction is senseless once we recognize that motion is relative. We may still characterize A and B as conventional constructions (of a second order of correlation of percepts) but, since the convention is no longer based on an objective physical order, it appears to be entirely arbitrary. For the claim that the second order correlation in question is justified by its predictive value has no foundation. Einstein's illustration is purely academic, since there is no check-up by experiment. We may interpret Michelson and Morley's experiment as a check-up but only if we already assume the existence of unobserved (i.e. identifiable without the aid of simultaneous percepts) physical events and processes, for example, the movement of the earth relatively to the source of a light signal. With this matter settled, let us proceed on the premise that physical

events are not merely groups of simultaneous percepts but genuine entities to be associated with objective powers. The next step, toward further clarification of the relation between physical events and percepts, and therefore between power and actuality, raises the problem of the present in opposition to the past and future. For a percept, to be actual, must occur within the span of a present.

I assume that the present must be understood in the sense of a present event, and that a present event is a specific, complete, and therefore actual percept. And my general position is that no satisfactory account of a present event can be given without assuming the existence of the past and future as a background. This is by no means a universally accepted position. On the contrary, a personal loss, for example, the loss of youth, is intensely felt as an unconditional obliteration of the past. Some philosophers, notably C. D. Broad, admit the existence of the past but not of the future. Still others deny the existence of both the past and the future; I have even heard certain professional philosophers make the irresponsible statement, irresponsible because of a disregard for the familiar fact that history is engaged in a description of past events, that, since only present events exist, such an expression as "the past event" is either self-contradictory or nonsensical. But, while discounting its excessive forms, we cannot expect a widely spread belief to be wholly false; we must compromise: in the mode of existence which belongs to a present event the past and future do not exist, but in some sense the past and future certainly exist. Let me now examine alternative conceptions of a present event and, in the course of the examination, establish that all but one of them, which happens to be the least plausible, must assume, in some mode of existence, the reality of the past and the future.

Alternative conceptions of a present event may be classified as follows. The present may be said to be momentary or else protensive. If events are just moments, they may form a discrete series, or again they may form a continuum. If an event is protensive, it may occur as an indivisible quantum

of time; on the other hand, an enduring event may be said to have phases which are distinguishable, in relation to one another, as earlier or later. If an event is an indivisible unit of time it may yet be commensurable with other such units; or, on the contrary, it may be incommensurable with any other event. Further division will be introduced as we go on with an examination of these alternatives. The view that the present is instantaneous and that time, or change, is a discrete sequence of moments replacing one another out of existence is the least plausible. It clashes with the personal experience of a continuous passage and endurance of things. And since the world exists in time or, to put it differently, change is the changing world, to conform to the scheme of a sequence of discrete moments the world would have to be perpetually annihilated and recreated. Furthermore, unless we assume with Descartes God to be in charge of the recreation and annihilation, the worlds separated by nonexistence would not form the universe, but would be utterly disconnected and independent entities; hence there would be no moment in existence when anyone could have any evidence for the belief that his life is not strictly momentary. Finally, there could be no perception in such momentary worlds. For a quality requires extension, both in space and time, to be perceived; for example, to see a color, we must see it spread over a finite area and not at a point. But if we conclude, as we must, that there is no adequate description of the world in terms of complete discontinuity, we may also doubt whether the concept of the mathematical continuum is what we need. For a mathematical continuum is built out of distinct elements, such as points or numbers, whereas continuity, as perceived or experienced, for example, in looking at a rainbow, would seem to be presented as a gradual shading off of one quality into another. Points on a line are taken to be separate from one another, but red and orange, orange and yellow, and so on for other hues, are actually fused in the rainbow. Do such doubts carry much weight? I believe they do, but Russell, after having carefully examined the matter, does not think so, and we must turn to his argument.

It is . . . a tenable hypothesis, if desirable on other grounds, to maintain that all physical processes are staccato, and continuity in percepts is merely a case of vagueness, in the sense of a many-one relation between stimulus and percept. . . . *A fortiori,* the mathematical continuum, if it existed in the stimulus process, would produce the percept we call continuous. . . . The argument advanced by those who lay stress upon the perceived character of perceptual continuity is, however, not as to the nature of the physical stimulus, but as to the nature of the percept. The continuity of the percept, they maintain, is quite obviously not that of the mathematical continuum, nor yet the deceptive appearance of continuity which would exist if the percept were a rapid staccato process. In saying this, they seem to me to go beyond what the evidence warrants. Consider a case which is analogous in some respects, but not in others—namely, the case of slightly different shades of colour. Suppose we have a series of colours, *A, B, C, D,* . . . such that each is sensibly indistinguishable from its neighbour, but not from the rest. That is to say, we can see no difference betweeen *A* and *B* or between *B* and *C,* but we can see a difference between *A* and *C.* We are then compelled to infer a difference between *A* and *B* and between *B* and *C,* although we cannot perceive any difference. There is no theoretical difficulty in such an inference, for, although *A* and *B* and *C* are percepts, and the difference between *A* and *C* is a percept, there is no reason why the differences between *A* and *B* and between *B* and *C* should be percepts: the relations between percepts are sometimes percepts and sometimes not. Now, instead of different static shades of colour, let us suppose that we are watching a chameleon gradually changing. We may be quite unable to "see" a process of change, and yet able to know that, after a time, a change has taken place. This will occur if, supposing *A* and *B* to be the shades at the beginning and end of a specious present, *A* and *B* are indistinguishable, while *A* recollected is distinguishable from *C* when *C* occurs. The supposition we have to make about a perceived motion is not quite analogous to this, but has certain points in common with it. Suppose that we are perceiving a motion in a case where we know the physical stimulus to consist of a discrete series, as in the cinema. Let us suppose that *n* of these stimuli can be comprised within one specious present, and that each produces an element in the percept. Then the percept at one instant consists of *n* elements, $x_1, x_2, \ldots x_n$, which are arranged in an order by the degree of fading. Let us suppose that we cannot distinguish x_1 from x_2, nor x_2 from x_3, but that we can distinguish x_1 from x_3. In that case our present percept will be indistinguishable from the percept of continuous motion. The percept will in fact contain parts that

are not processes, but these parts are imperceptible. The analogy with the case of the colours arises through the existence, in each case, of a series in which differences of neighbouring terms are imperceptible while those of distant terms are perceptible. And it elicits the important principle that a percept may have parts which are not percepts, so that the structure of a percept may be only discoverable by inference. . . . (*The Analysis of Matter*, N. Y.: Harcourt, Brace, & Co., 1927, p. 280 f.)

This argument, it seems to me, undermines the basic distinction between the external stimulus (including both the objects of physics and such things as reversible figures) and the corresponding percept, or alternative percepts, because the distinction is an opposition between the imperceptible and the perceived which implies that the percept, contrary to Russell's supposition, cannot be similarly analyzed into perceptible and imperceptible parts. The difference between perceptible and imperceptible parts is questionable unless referred to the external world. If Russell were right, the existential status of the imperceptible parts of a percept would be a mystery. As distinct from the stimuli, they are not in the external world; and since they are not data of perception, where are they or to whom are they given? But even if such obscure entities were admissible they could not be the data which we actually compare when we find that the colors *A* and *B* or *B* and *C* are indistinguishable while there is a difference between *A* and *C*. For, in the first place, we cannot perceptually compare imperceptible things and, secondly, a specific shade of color is a simple quality and therefore has no parts whether perceptible or imperceptible. With Russell's statement that, while perceptually indistinguishable, *A* and *B* or *B* and *C* are not identical, I agree but not for the same reason. I should say that *A* and *B* or *B* and *C* are indistinguishable not because they are perceptually identical but because there is no specific perception of their difference; in other words, the percepts are not sufficiently specific or determinate. And it would seem that not only do we have here an additional evidence for the existence of relatively indeterminate sense data, but we also find that even such static

percepts as the shades *A*, *B*, and *C* may not be fully specifiable when set side by side in a certain order. However this may be, the mathematical continuum with its numerically specifiable elements is not adjustable to the experience of a temporal process as a sequence of momentary events, even if it could fit in with the perceptual continuity from A through *B* to *C*. The additional difficulty with time is that in a series of moments only one, the present moment, can be actually given; therefore, one of the postulates of the mathematical continuum, that there exists a third element between any two given, is inapplicable. If we do not want to give up the mathematical continuum as a description of temporal continuity, we must admit that more than one moment is given within the present; but if we allow for at least two moments, our adherence to the mathematical continuum would require the possibility of inserting a third between them, and then a fourth, and so on indefinitely. Thus, in order to identify moments with the elements of the mathematical continuum, we are forced to deny that a present in our experience of time is a single moment. And this leads to a theory of protensive events. Theories of protensive events start from the common assumption that an actual event is not momentary but has a finite duration. A survey of these theories may be given with reference to Fig. 5.

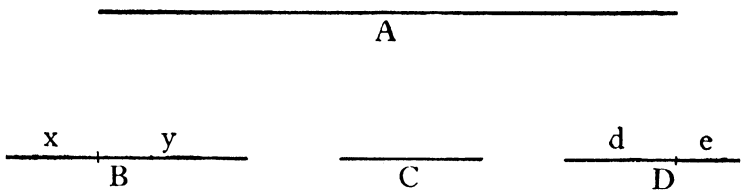


FIG. 5

Each segment in Fig. 5 represents a different event; the length of a segment symbolizes the extent of the duration of the event; the parallelism between *A* and the shorter segments symbolizes the possibility that an event may be simultaneous with several events which are not simultaneous with

one another; the gaps between the shorter segments may be interpreted as uneventful regions of time; and the contiguity of *d* and *e* illustrate the theory that events in immediate succession are contiguous. The diagram would be entirely unobjectionable if we were concerned with events in the sense of space-time region, because the dimension of time has the same structure in space-time as the dimensions of space. But since we are discussing perceptual events, we must be on guard against the misleading features of a spatial representation. The figure is best suited to represent the view that a single protensive event consists of phases which are earlier or later in relation to one another. Thus we see that the part of the segment *A* which is coextensive with *B* precedes the part coextensive with *C*, and we can interpret this in terms of events by saying that the phase of an event *A* which is simultaneous with *B* is earlier than the phase simultaneous with *C*. The interpretation is plain common sense; if, for example, *A* is such an event as the French Revolution, *B* designates Marat's assassination by Charlotte Corday, *C* the execution of Louis XVI, we do not hesitate to say that the first event extends over the second and the third. But it does not take much thinking to realize the instability of such a notion of events: if you ask a common sense person whether the French Revolution should be called a process or a sequence of shorter events (so that *A* would not be "parallel" to *B*, *C*, etc., but resolvable into them) rather than a single event, he would immediately be inclined to agree with you. But a shorter event in a sequence is, in its turn, resolvable into a sequence of still shorter events. And the instability of the whole conception is shown by the fact that, in order to arrest the progress of resolution into shorter and shorter events, we must either fall back on the equally unsatisfactory conception of momentary events or else try the alternative of events as protensive units, or indivisible quanta, of time. The evolution of Whitehead's philosophy of events is a case in point: he started with events of unlimited duration, but his later works are built on the concept of actual occasions which are ultimate and indivisible unit-

events. The theory of events as quanta of duration, however, has complications of its own. There is the question of the length of a unit-duration. If this were a matter of physical events, we could assign a minimum duration to any of the shortest physical phenomena, for example, to a single electronic vibration. But since we are concerned with percepts, we are inevitably led to the psychological theory of the specious present with the well known attendant difficulties. And then there still is a dose of instability: the concept of a quantum-event may easily degenerate into that of a momentary present or else into the notion of a duration with earlier and later phases. For the question, whether the extension of a quantum-event is commensurable or, at least, comparable with the duration of other events, must be answered one way or the other. If the answer is "No," then the unit-event is, in effect, a moment. For if an event occurs in a single act, and cannot be said to be either longer or shorter than any other occurrence, the event is not distinguishable, except for the verbal difference in designation, from a moment. On the other hand, if durations are comparable, a comparison would require a longer event to extend over a number of shorter events, as illustrated by Fig. 5, and this entails a differentiation between earlier and later phases within the longer event. At first, we may think the differentiation is not necessary, not if all unit-events prove to be of an equal duration. But the notion of equal or congruent quanta-events, although there is a temptation to take it as a distinct alternative, would again seem to many philosophers to be indistinguishable from the conception of momentary events. Thus Russell argues that "duration" would be a meaningless word if there were no event simultaneous with a number of successive events. But if he is right, would not a present event fall apart into a sequence of earlier and later phases? Russell has his own way of dealing with this matter. He draws a distinction between the relations "wholly preceding" and "partially preceding." Fig. 5, he would say, shows that *B* wholly precedes *C*, while *A*, which overlaps *D*, precedes the latter only partially. He then defines an event to be in the

past if, and only if, it wholly precedes the present. Accordingly, while a later phase of an event is being perceived, the earlier phases are not yet past; hence *A* partially precedes itself without thereby falling apart into a sequence of shorter events. The unity of an event then appears to be compatible with the identification, which the following passage from *An Inquiry into Meaning and Truth* suggests, of an earlier phase of an event with the immediate past of a later phase.

> I think, to begin with, that we must exclude from the category of memories what we know about the *immediate* past. For instance, when we see a quick movement, we know that the object concerned was in one place and is in another; but this is all to be included in perception, and cannot be counted as a case of memory. This is shown by the fact that seeing a movement is different from seeing a thing first in one place and then in another. (P. 192.)

If this statement means that the present percept contains both the immediate past and the final phase of a movement, Russell can uphold the unity of the present by merely saying that the immediate past is not wholly in the past. This is not to say, however, that there is no need for a further explanation of the fact that an event can preserve its unity through transition from the immediate past to the final phase. In Russell's philosophy the need for an explanation is particularly urgent for at least two reasons. First, Russell's relational theory of duration (the theory that an event has duration if, and only if, it is simultaneous with two, or more, events which are in succession) requires the existence of overlapping events, and this requirement makes it doubtful, in so far as the differentiation between earlier and later phases of an event is a matter of duration, whether the status of the immediate past can be distinguished from the status of the past. Thus, in Fig. 5, the events *A* and *B* overlap, and *x*, the earlier phase of *B*, wholly precedes *A;* but then, since *y*, the later phase of *B*, is wholly simultaneous with, i.e. occupies the same duration as, the earliest phase of *A*, it would seem that *x* wholly precedes and therefore is in the past, and not merely in the immediate past, of *y*. Second, Russell does not distinguish, as Whitehead does, between the sensory

and the nonsensory elements within a percept or, to use my terminology, between the dynamic and the explicit sensory elements; but without an interplay between elements of some such different kinds the distinction between the percept as a whole and a phase within it would be a mystery. Let me explain by making use of a quotation from Whitehead.

In human experience, the most compelling example of non-sensuous perception is our knowledge of our own immediate past. I am not referring to our memories of a day past, or of an hour past, or of a minute past. Such memories are blurred and confused by the intervening occasions of our personal existence. But our immediate past is constituted by that occasion, or by that group of fused occasions, which enters into experience devoid of any perceptible medium intervening between it and the present immediate fact. Roughly speaking, it is that portion of our past lying between a tenth of a second and half a second ago. It is gone, and yet it is here. . . . Consider a reasonably rapid speaker enunciating the proper name 'United States.' There are four syllables here. When the third syllable is reached, probably the first is in the immediate past; and certainly during the word 'States' the first syllable of the phrase lies beyond the immediacy of the present. Consider the speaker's own occasions of existence. Each occasion achieves for him the immediate sense-presentation of sounds, the earlier syllables in the earlier occasions, the word 'States' in the final occasion. As mere sensuous perception, Hume is right in saying that the sound 'United' as a mere sensum has nothing in its nature referent to the sound 'States,' yet the speaker is carried from 'United' to 'States,' and the two conjointly live in the present, by the energizing of the past occasion as it claims its self-identical existence as a living issue in the present. The immediate past as surviving to be again lived through in the present is the palmary instance of non-sensuous perception. . . . The Humian explanation, involving the 'association of ideas,' has its importance for this topic. But it is not to the point for this example. The speaker, a citizen of the United States and therefore dominated by an immense familiarity with the phrase, may in fact have been enunciating the phrase 'United Fruit Company'—a corporation which, for all its importance, he may not have heard of till half a minute earlier. In his experience the relation of the later to the earlier parts of this phrase is the same as that described above for the phrase 'United States.' . . . Also, in so far as there was consciousness, there was direct observation of the past with its intention finding its completion in the present fact. This is

an instance of direct intuitive observation which is incapable of reduction to the sensationalist formula. Such observations have not the clear sharp-cut precision of sense-perception. But surely there can be no doubt about them. For instance, if the speaker had been interrupted after the words 'United Fruit,' he might have resumed his speech with the words 'I meant to add the word Company.' Thus during the interruption, the past was energizing in his experience as carrying in itself an unfulfilled intention. (*Adventures of Ideas,* pp. 232 ff.)

Whitehead, it will be noted, distinguishes between the earlier and the final presentations in the speaker's experience, and he says that the earlier presentations are in the immediate past, but he does not identify the immediate past, or the earlier presentations, with the earlier phases within a present event. The difference between Whitehead's position and mine may be partly verbal since he does emphasize the essential dynamic fusion between the immediate past and the present. While the immediate past is gone, "yet it is here." The important point I want to illustrate is clearly there: the dynamic fusion, whether we choose to call it "the present" or not, perceived throughout the utterance of the phrase "United States" incorporates nonsensuous elements and therefore can be contrasted with a purely sensory datum, such as may occur at the enunciation of the word "States." However, we may increase our understanding of the unity of a present event if we inquire into Whitehead's reasons for keeping the immediate past and the present apart; the reasons, to his mind, are strong enough to justify the paradoxical statements that the immediate past is both gone and here, and while preserving self-identity is not the same but duplicated, or lived again, within the present. One of his reasons must be the observation that the dynamic unity between the immediate past and the present is not unbreakable, that the speaker may be interrupted and the word "United" uttered without the intended completion of the phrase "United States." But, I think, we must discriminate. The speech may be loose and unenlivened; if so, the dynamic correlation between the immediate past and the

present would not reach the state of fusion which prevents severance. On the other hand, if the speaker intends to have his say, there will be no interruption: he would shout the word "States," as happens so often in political meetings, to drown the interrupting voice. The fact is that the word "United" in isolation from the context of other words is an auditory presentation which is different from the first word within the phrase "United States." It would seem that Whitehead does not appreciate enough the dynamic transforming function of a context. But, he might say, this function is never strong enough to prevent some unusual interruption: for example, the speaker may be shot to death at the very moment he was going to utter the word "States." This answer, I think, would bring out the importance of the fact that Whitehead is concerned with organic occasions rather than with percepts. Notice that throughout the quoted discussion he describes the experience of the speaker and not, which would be more natural in a concern with percepts, of the hearer; and the experience of a speaker may be in fact articulated into a sequence of occasions because of being associated with, or conditioned by, the sequence of physiological acts involved in speech. At any rate, it would seem that Whitehead identifies the present of the speaker with his act of uttering a single syllable; thus he breaks the phrase "United States" into the sequence "U-ni-ted-States," where each syllable represents a distinct actual occasion, because the enunciation of the whole phrase requires four distinct vocal acts; and, of course, the bodily process of speech can be interrupted after any of the vocal acts. On the other hand, the duration of a hearer's percept need not be closely correlated with the speaker's vocal act; and, outside of such a correlation, the word "States" has no more exclusive rights for the status of a present than the whole phrase "United States." No doubt, as we hear the whole phrase, we can contrast the sounds "United" and "States" as, respectively, an earlier and a later phase within the auditory percept; but then we can also perceive the sounds "sta" and "tes" as earlier and later within the word "States." Is there any part

within the duration of a percept which cannot be further subdivided into shorter phases, and may therefore monopolize the present? A single sound, perhaps? The answer is that temporal protensity requires the existence of earlier and later parts. Even a single sound has protensity; this is shown by its variations from a nearly instantaneous utterance to a prolonged drawl or, if the sound comes from a musical instrument, by the length of the notes according to the score. If you strike a disconnected note on the piano, or if someone exclaims "Ah!" the single sound can be perceived as a present, not because it has no earlier and later phases but because the qualitative similarity of the phases is a basis for collecting them together into a segregated unit. When, however, a note is struck in the context of a musical phrase, the whole phrase, rather than the single note, is perceived as the present; in this case the basis of contextual organization takes precedence, as a unifying factor, over the basis of qualitative homogeneity. Contextual organization may even force us to hear a single note of the score as two distinct sounds. This is illustrated by an example on page 434 of Koffka's *Principles of Gestalt Psychology*. (N. Y.: Harcourt, Brace & Co., 1935.) A sequence of notes in an ascending scale meets another in a descending scale, and the place where they meet, although a single long note in the score, is actually heard as two short notes. But Koffka's way of describing the situation, to the effect that "one note gives rise to two presents," is misleading; nothing short of the musical phrase as a whole is a present, and the single notes of the score, whether or not they are heard as single sounds, represent the earlier or later phases within the more extensive present. We are inclined to say, with Koffka, that a single heard sound is a present, because we feel that the sound could be transformed into an actual present if we had focused our attention upon it and turned a deaf ear to the other sounds of the phrase. But, strictly speaking, a sound heard in an organized sequence of sounds is not a fully actualized or complete entity. In fact, when a sound is not meant to be a part of the organized system, as it happens with coughing

and other extraneous noises in a concert hall during the performance of a symphony, the sound is usually not heard at all. Again, within the symphony as a whole a single phrase is no longer heard as an actual present; the composer, however unconsciously, knows this, and to save a favorite phrase from drowning in the whole he resorts to numerous repetitions. Whitehead's example, the phrase "United States," if taken as a percept of the hearer, is analogous to a musical phrase: contextual organization determines whether the words "United States" or the word "States," or neither, should be unified as a perceptual present, and the span of immediacy may be extended from a phrase to a sentence, or even to a whole piece of writing. The only question is whether perceptual organization is ever powerful enough to have all the elements integrated into the unity of an actual present. Whitehead's position, which accounts for his disregard of the experience of a hearer, is that nothing short of an organism is powerful enough to form an actual entity. And his position enables him to work out an original treatment of the problem of the unity of a protensive event. The principle of Whitehead's treatment is the opposition between the internal self-experience and the objective appearances to outsiders of the same actual entity. The actual entity feels itself in a single act and this indivisible act is its actuality; but once the act is performed it can be shown to other percipients only in the static from of an infinitely divisible region of space-time. Thus by one stroke Whitehead draws a clear-cut distinction between actuality and the divisible continuum of potentiality, and explains that subjectively an elementary organism is actual and a unit, while as an object of perception it is a quantum comparable and commensurable with the extension of other entities. If I do not accept Whitehead's undeniably effective idea, this is because I feel that the distinction between actuality and power is clear cut only as an ideal which can be closely approached in fact but hardly ever reached. Let us grant that an elementary organism is the closest approximation to pure actuality; however, since even organisms fall short of the ideal auton-

omy and completeness, I see no reason why we should not recognize percepts as actual when they reach (as for example, in an intense aesthetic experience) a dynamic coherence and unity which is so obviously similar to that of an organism that aestheticians have always called it "organic." The fact that the unity of an actual entity is in any case dynamic means, I believe, that power is an essential factor of this unity and that there is no such thing as undiluted actuality. Our percepts are certainly quanta in space and time but, contrary to Whitehead and in agreement with Bergson, I must say that I experience my own actual self as an *extended* duration rhythmically articulated by a sequence of acts and events. If, in a defense of Whitehead's idea, someone points out that actuality is a standpoint of a unique perspective (and a standpoint, treated as a point, is plainly not divisible) the answer is that the standpoint of an actual entity is a point in a metaphorical sense and, even if it were nothing but a point in space-time, Whitehead would be the first to agree that there is no such thing in the physical world as a dimensionless point.

I have reviewed the alternative conceptions of the present event in the order of increasing adequacy, and the reader may have noticed that the more plausible theories have a firmer grasp of the idea that the past and future exist as a background against which the present stands out as a figure of actuality; and, more generally, that power is an indispensable factor in the formation of an actual entity. Yet even the comparatively adequate conception of events as quanta of duration was found to be unstable, so that alternative theories are liable to join one another in a vicious circle, unless reinforced by some such development of ideas as in Russell or Whitehead. But we must go still further. For the assertion that a present is an outcome of organization is misleading: we are tempted to imagine a situation in which an actual replacement of one phase by another is superseded, while the last phase comes into being, by their revival or, at least, by an integration of their cumulative effects, together with the final phase, within the emergent present. The image is a

pure fiction; there is no basis in experience for attributing superior actuality to the final phase of a percept, and an explanation of duration in terms of revival or duplication of the already experienced succession of phases merely removes the problem to the treatment of succession. But this fiction helps our understanding of the difficulty. The data to be organized as *successive* phases within the same present must be, in some way, already given *together* as the material for an organization; but if they are, the outcome of the organization would seem to be a puzzling mirage of a succession of phases where there is togetherness only. Let us try to deal with this puzzle as follows. Originally the successive phases within a percept exist together in the mode of potentiality, i.e. they are so many subregions within a region of space-time arranged along the dimension of time in a serial order which is similar in nature to, but not identical with, the order of segments along a line in space. Actualization is an integration of such a set of subregions by means of a manifestation of a single sensory quality, or a pattern of such qualities, or some other unified character, such as a unique aesthetic quality. The unity of a present is the qualitative unity of a manifestation; but the extension of the manifestation over a set of subregions appears, within a perceptual perspective, as passage or succession from earlier to later phases. Perceptual succession is no more illusory than the order from left to right of the parts of a linear segment; both are perspective properties and each is a unique and ultimate mode of appearance. The only element of illusion is the feeling that the final phase within the present replaces the earlier phases out of actuality; this feeling comes from our preoccupation with the perceptual mode in which the present itself appears as a figure against a background of potentiality and therefore as an actual entity which has relegated its predecessor into the background. The fact is that, in contrast with this perceptual mode, the final phase within the feeling of a present cannot replace the earlier phases out of actuality for the simple reason that no phase is actual in the sense of a complete, specific, and distinct entity. A phase of

a percept may be compared to a part of a linear segment. A part of a segment is not an actual segment, although it would become a segment, and therefore is in a semi-actual state, if it were separated, by intersection, from the other parts. A phase of a percept may be even less actual than a part of a segment because of the peculiar indeterminacy and blurredness, which we have already noted apropos of perceptual motion. The point is that the unity of a present is sometimes loose, and when it is the percept does not distinctly stand out against the background, and its phases are at the minimum of differentiation. For example, the unity of a single note is loose, its span is short and, while it vanishes almost imperceptibly, its phases may be barely discernible. But the same note acquires a certain distinctness and stability, and therefore a higher degree of actuality, within the context of a definite musical phrase.

Whatever the intrinsic clarity of the conception of the present outlined in the preceding paragraph, it resolves certain difficulties. We now may understand better the fact that the span of immediacy in experience may vary from a fleeting click of the camera to the sustained feeling of an aesthetic quality throughout the length of a poem, and that process shows a diversity of rhythms and measures. We need not be surprised to discern within the immediate present phases of unequal degree of actuality, nor to find within the complex organization of an aesthetic experience elements of a high degree of actuality to be accompanied by others receding in perspective toward the obscurity of the background. The accent, the beat, repetitions, pauses, and prolongation are the artist's main resources in a perspective distribution of actuality. And once we appreciate the effect of artistic organization in rendering the elements of experience distinct, we can also see that, during an "anaesthetic" or uneventful period of time, the present may be practically absorbed into the physical medium of space-time, so that at the extreme of a stagnant existence, which is, perhaps, exemplified in the life of plants, the data of perception disintegrate into an undifferentiated, unsettled, and unbound

continuum. We are also in a position to settle the associated questions of the boundary of a present and of the way of separation between two successive events. Since an actual event may imperceptibly shade off into the background of space-time, it need not be bounded; on the other hand, there are clear-cut events such as an aesthetic experience. And when two events in immediate succession both stand out as actual percepts, their separation, brought about by an infiltration of potentiality, may take three forms: either one percept is continuously transformed into the other, so that the region of their separation is an attenuated, or blurred, actuality; or each percept fades off into the background between them; or, if both percepts are bounded, a region of space-time plays the part of a gap between them. To illustrate: A blue spot on the screen gradually becomes violet in a so-called "symphony of colors"; images materialize at intervals out of the indifferent perceptual field of drowsiness; the hammering of a nail is a sequence of discrete knocks. The excluded alternative is that of contiguous events, i.e. of events with a common boundary. For since a bounded percept is an actual entity, or nearly so, it comes complete, together with its boundaries; and if such a percept, let us call it *a,* had a common boundary with its equally actual successor *b,* then all three, the common boundary and the percepts *a* and *b,* should exist, contrary to the hypothesis of a succession, together or simultaneously. This is to say that contiguity would, in effect, obliterate the distinction between the present and the past.

My conception of a present requires a differentiation between physical process and the two modes of the experience of temporal change. Physical change is a sequence of world-points along a world-line in space-time. Perceptual change is either a replacement out of actuality of one percept by another or else a succession of phases within the span of an immediate present. The differentiation, however, does not obliterate the common basis of any temporal change, the presence of an operative power. Accordingly, temporal change must be characterized as a substantival affair. The point is important and needs to be argued. The fact that events in

succession are segregated from one another through the manifestation of different qualities may be misinterpreted to the effect that temporal change is qualitative or adjectival, i.e. a correlation of different dates with different complexes of qualities. And, of course, an adjectival theory of time can be advanced on other and independent grounds. For example, Russell develops such a theory, in connection with a sophisticated treatment of proper names, primarily because he wants to eliminate from philosophy the notion of a substance. A consideration of Russell's difficulties will make the subsequent argument in favor of a substantival theory of temporal change the more plausible.

It should be understood that Russell's rejection of substances is not equivalent to a rejection of the distinction between a particular and a universal, and, therefore, contrary to many of his critics, to a rejection of the subject-predicate form of statements; only, where a usual exemplification of the subject-predicate form is some such statement as "This (patch) is navy-blue," Russell's illustration would be "Navy-blue is a color," or something of the kind. As the illustration shows, Russell takes a particular to be a specific quality, such as navy-blue, or a complex of specific qualities, and not a substance; a universal, on the other hand, is to be identified with a generic property or relation. This position raises the problem of time in the following way. What would usually be described as a recurrence of some specific quality now and here and then and there is, according to Russell, the presence of literally the same particular in association with different dates or places. The inevitable question is whether Russell does not, in effect, transfer the substantival status from the particular to the associated places and dates. In his answer to this question Russell explains that public space can be constructed out of positional qualities, i.e. out of such qualitative aspects of the visual space as are designated by the expressions "up-and-down" and "right-and-left." But he has difficulty with time. He explicitly denies the experience of temporal qualities and therefore, in order to account for public time with its irreversible sequence of events, recom-

mends the employment of such schemes and devices as the second law of thermodynamics or "a clock which, in addition to showing hours and minutes, will every day exhibit a number greater by one than that exhibited on the previous day." But the statistical nature of the second law of thermodynamics allows for an occasional reversibility in the direction of process. And Russell's clock, or any similar mechanical contrivance, would afford a means of dating events only if we already know how to interpret the exhibited sequence of numbers in terms of a temporal succession. For example, to use the clock today we must remember that yesterday the number was smaller by one and interpret this memory by reference to past events and not, say, to a remote locality. But the possibility of interpreting a sequence in terms of time would seem to require an independent experience of temporal qualities. Russell himself, in spite of his explicit rejection of temporal qualities as independent data of experience, recognizes the insufficiency of a mechanical device and the ultimate status of perceptual simultaneity when, on page 418 of his *Inquiry,* he concludes: "We must admit that we can perceive several events as simultaneous." He also recognizes that his clock may fail in yet another way. A theory which identifies particulars with bundles of specific qualities allows for the possibility of recurrent history. And if the present state of the world will ever recur, the clock's exhibition of today's number must also recur together with a breakdown in the construction of an irreversible public time. Russell dismisses the eventuality on the grounds of probability; in fact he claims that one advantage of his theory is that it allows for the possibility of total recurrence without making this possibility in the least probable. Let us consider his claim. If the number of simple qualities is finite and that of dates infinite, why should we not expect recurrence, however complex the combination of specific qualities may be? Furthermore, if the ultimate specificity of a simple quality is conditioned by its place in the context of other qualities, the admitted recurrence of single specific qualities entails the recurrence of their qualitative contexts and therefore, pro-

ceeding from contexts of simple qualities to contexts of contexts, of the whole present state of the world. So much for the probability; but what about the possibility of total recurrence? Does Russell mean that his predecessors' statement of the hypothesis that history is cyclic is meaningless because they admit the existence of substantival instances or events; and if so, why? The difference between their statement and his own may be illustrated by the anecdote about an English sailor in China who witnessed fifty Chinese pass by his gunboat only to report that a single Chinaman passed by fifty times. Assuming that to a western eye the Chinese are indistinguishable, a philosopher of recurrence could translate the sailor's report in terms of substantival occurrences by saying that the same bundle of Chinese qualities was recorded in fifty instances, while Russell would not admit even the sailor's single instance and describe the situation as the same bundle of qualities which precedes itself forty-nine times. The point, which the anecdote serves to bring out, is that the issue of recurrence is bound up with the problem of the identity of indiscernibles. And it would seem that Russell argues that to admit the existence of substantival instances is to reject the principle of indiscernibles and that a rejection of the principle makes the hypothesis of total recurrence meaningless. This will be clear if the reader interprets *B* and *C* in the passage to follow as two recurring or indistinguishable states of the world.

> The identity of indiscernibles, which follows analytically from our theory, is rejected by Wittgenstein and others on the ground that, even if *a* and *b* agree in all their properties, they may still be two. This assumes that identity is indefinable. Suppose you wish to count a collection of five objects *A, B, C, D, E,* and suppose that *B* and *C* are indistinguishable. It follows that, in the moment of counting *B,* you will also count *C,* and therefore you will conclude that there are four objects to be counted. To say that *B* and *C* are "really" two, although they seem one, is to say something which, if *B* and *C* are totally indistinguishable, seems wholly devoid of meaning. . . . (*An Inquiry into Meaning and Truth,* p. 117.)

The reader is likely to object that the argument about counting is begging the question: when Wittgenstein and others assert the possibility of a purely numerical diversity they mean that *B* and *C* are countable as two even if their non-numerical properties are the same. However, the possibility of a purely numerical diversity requires the counting person to be externally situated in relation to the counted objects; and this requirement means that the objects *B* and *C* are dissimilar in their positions within the field of perception. If, on the other hand, *B* and *C* represent two indistinguishable states of the whole world, there can be no outsider to count them, and therefore no empirical evidence in favor of or against the statement *"B* is a unique occurrence" which is not equally in favor of or against the statement *"B* recurs as *C."* A further objection that *B* must be distinguishable from *C* by the number of the antecedent states of the world is also invalid. For since *B* and *C* are, by hypothesis, exactly alike, an observer within *B* must establish the same number of antecedent states as the corresponding observer within *C*. And neither of them would be wrong. If a state of the world can recur once, it must recur an infinite number of times. For example, the state *C* has the property of being preceded by the exactly similar state *B;* hence, the latter must have the same property, and so on ad infinitum. And while the number of *B*'s antecedent states is aleph-sub-zero, the number of *C*'s antecedent states is aleph-sub-zero plus one, which is equal to aleph-sub-zero. Thus, I think, we may agree with Russell that the usual statement of the hypothesis of total recurrence is meaningless. But is Russell's own statement any better? Let us consider the text.

We are supposing that there are only qualities, not also instances of qualities. Since a given shade of colour can exist at two different dates, it can precede itself; therefore "preceding" is not in general asymmetrical, but will be so, at best, in regard to some special kind of qualities or bundles of qualities. . . . Many writers have imagined that history is cyclic, that the present state of the world, exactly as it is now, will sooner or later recur. How

shall we state this hypothesis on our view? We shall have to say that the later state is numerically identical with the earlier state, and we cannot say that the state occurs twice, since that would imply a system of dating which the hypothesis makes impossible. The situation would be analogous to that of a man who travels round the world: he does not say that his starting point and his point of arrival are two different but precisely similar places; he says they are the same place. The hypothesis that history is cyclic can be expressed as follows: Form the group of all qualities contemporaneous with a given quality; in certain cases the whole of the group precedes itself. Or: In these cases, every group of simultaneous qualities, however large, precedes itself. Such a hypothesis cannot be regarded as logically impossible so long as we say that only qualities occur. To make it impossible, we should have to suppose a momentary subject of qualities, and to hold that this subject owes its identity, not to its character, but to its space-time position. (*Ibid.*, p. 126.)

My objection to Russell's statement of the hypothesis is that the form "*A* precedes *A*," to be intelligible, requires some kind of duplication since without it "*A* precedes *A*" and "*A* does not precede *A*" would seem to describe exactly the same empirical situation. Since Russell rejects duplication in the sense of numerical diversity, he has a choice between differentiation by means of the qualitative heterogeneity of the perceptual field and contextual differentiation. He chooses the first to account for duplication in space. He explains, on page 136 of his *Inquiry*, that if we see simultaneously two patches of the same shade of color we can count them as two because of their difference in positional quality within the field of vision. But since Russell does not admit an analogous perception of temporal qualities, he must distinguish between the earlier and later *A* in the situation which he describes by "*A* precedes *A*" with the aid of some difference of context; accordingly, "*A* precedes *A*" is, in effect, "*A*, within the context *B*, precedes *A*, within the context *C*." But contextual differentiation is no longer available when, as is the case of total recurrence, there is no context to a recurring state of the world except the series of the recurrent states which is the same for all of them. The tentative conclusion

is that Russell is no more successful than his predecessors, and that the hypothesis of total recurrence is meaningless. And if this conclusion is correct, there is no advantage to his adjectival theory of temporal change. For the only other important advantage that Russell claims is the elimination of the notion of substance which, of course, is no advantage once we recognize that substance is not an actual entity but a power.

We are in a position now to appreciate the superiority of a substantival theory of temporal change. One advantage is the possibility of explaining duration without reference to other (simultaneous or overlapping) events: we may say that the duration of a percept derives from the extension of the space-time region which is the physical source of the percept. A nonrelational explanation of duration fits in with the common experience of protensity which we have even when we are preoccupied with a single train of events. For instance, the conductor of an orchestra may be so absorbed in the performance that nothing except the measured flow of the symphony reaches his perception; nevertheless he is able to keep time, which means that he can appraise the duration of a beat correctly without the aid of parallel or concurrent percepts. Even more important, only a substantival theory can account for the differentiation between temporal and spatial change. Consider a continuous qualitative change, for example, a gradual transformation of red into orange, yellow, green, and so on for the other colors in the order of the spectrum. Such a continuous transformation can be perceived in two different ways: either as a presentation in space, for instance, as a picture of the solar spectrum in a textbook of physics, in which the qualitative variety of colors appears at once, or else as an exhibition at the same spot occupied by only one shade of color at a time and by all of them in turn. Qualitatively the change may be the same in both cases. Therefore transformation in quality does not distinguish temporal change. Therefore temporal change is not qualitative but substantival.

PERCEPTION AND CAUSALITY

THE understanding that percepts are actualizations of physical powers enables us to arbitrate between the presentative and the representative theories of perception, or between direct and critical realisms. To begin with, the usual formulation of the issue, whether the percept is located at the physical source or at the percipient's station, i.e. where the object is or where the observer stands, is too ambiguous to lead to any satisfactory solution. This is so because of the ambiguity in the notion of the physical source or object: as a first approximation there is the common sense notion of a material thing which occupies a definite volume in space, i.e. space separated from time, and then the question is whether the percept is located within or outside the volume of the thing; but if we are precise we identify the physical counterpart of the percept with a space-time region in the four-dimensional continuum, and then we should ask whether or not the percept is within that region. Usually the controversy moves on a common sense level and therefore inability to reach a decision is no surprise. Certainly there are percepts, for instance, in the case of double vision or mirror-images, which, even if traced to a single physical source, cannot be located within a single physical volume. On the other hand, if and when percepts are admittedly veridical, dislocation from the physical object would require the latter to have an imperceptible boundary surface, a requirement which we have already rejected in a discussion of G. E. Moore's problem. In fact, we may define a veridical visual percept as a part of the surface of a material thing in space. The immediate objection, that percepts cannot be identified with the surface of a thing because they vary in shape and size with the change in the percipient's position, may and must be answered, in agreement with a form of direct realism which is sometimes called "objective relativism," by pointing out that shape and size are relative or perspective properties. A further objection, that the perspective relativity of size

and shape does away with the physical surface as a uniquely determined and exclusive boundary of a material thing, and therefore renders the common sense notion of things indefinite, is unanswerable; but it means no more than a realization that the common sense treatment is at best an approximation. To be precise we must consider the location of a percept in relation to a space-time region. But a visual percept appears within a perspective in space; whether or not we should also say that it is in space-time would seem to be a matter of linguistic convention, and not at all a philosophical problem. But the philosophical issue may be restated without involvement in the ambiguities of "location." According to the representative theory, there is no direct perception of the physical source or region; a percept, or, in the simplest case, a sense datum, is always a representation or image by means of which, or through which, we refer to the original, if there is an original; there is good indirect evidence for taking the image to be a distortion, but even if the image were similar to the original, they would be two distinct entities. The presentative theory denies all these assertions. Thus the question is simply: Is perception direct or indirect? But when the issue is put so simply we find ourselves unable to answer by an unqualified agreement with either alternative. A four-dimensional region of a curved space-time cannot be given to perception either directly as an original figure or as an image, while an actual percept takes place in space and not in space-time. Accordingly, there is a dualism between the dispositional nature of the physical source and the actual character of its manifestation, but, and here we disagree with the representative theory, this dualism is essentially different from that of representation. Let us analyze the difference.

Representation is a relation between two definite terms, the original O and the representative R. Unless this relation is established by an arbitrary convention, R represents O either because they resemble each other or because they take a similar part in similar schemes or contexts. Within the limitations of pictorial perspective, an old-fashioned

portrait represents a certain person through resemblance; a congressman represents the people of his constituency because he shares with them the life and activities of the same state; integers in the order of increasing magnitude symbolize by representation a dynasty because both the sequence of integers and the succession of kings exemplify the same serial order. On the contrary, powers and their actualizations belong to entirely different orders of being. Perhaps the contrast between pure potentiality and full actuality is the most radical difference that can be found in reality; at any rate, their dissimilarity is proved by the observation that since different percepts or actualizations of the same thing do not resemble one another (for example, the side view on a cone, which is triangle-like, does not resemble the appearance of the base, which is a circle) they cannot resemble the thing itself, at least not all of them. And yet the relation between a power and its actualizations is far closer or intimate than representation; in fact, except for the extreme opposition between pure potentiality and full actuality, which may be an idealization never to be exactly reproduced in reality, transformation of power into actual percepts is a relation in an unusually broad sense of the word. For we never come across a clear-cut power, on the one hand, and a clear-cut actual entity, on the other, to be related as two distinct terms which could be, respectively, designated as "this" and "that." There is always a mixture of power with actuality. The percept may be blurred and indeterminate, for instance, when an object is rapidly moving past us at close range; or the datum is determinable and therefore felt as a power to acquire further specification; or an image which is specific in its central parts shades off imperceptibly at its fringes into the background of an extensive continuum; or, when the percept is specific and bounded, there is the unifying power of an aesthetic quality. However undesirable this may be from a purely logical point of view, we are forced to recognize in our experience of power through actuality a peculiar unity in difference. Actualization is never a discontinuous transformation; a power is felt as aiming at a manifestation

in a percept; and the percept is experienced with an ultimate sense of satisfaction or finality in the attainment of the aim. These are the factors in our unerring recognition of a percept as an actualization of a certain power in spite of the fact that there can be no resemblance between a power and an actual percept. The danger of presenting the situation in these terms is in the subjectivist or, at least, psychological twist of the description. A critic may say: "Granted that power always permeates our actual percepts, why not give both a subjective standing and say that there are psychical powers or capacities to generate images?" The critic cannot deny that percepts appear against the background of an extensive continuum but, instead of taking this to establish their physical roots, he identifies the extensive continuum with the visual or, more generally, sensory, field which is just as mental as the percepts themselves. Yet the subjectivist interpretation is certainly not plausible and we should not even mention it if it were not for our want of another witness, particularly important because his point of view is so unlike our own, to the intimate relation, if it can be called a relation, between power and percepts. However, since we take advantage of our critic, let us close the matter by explaining to him where his position is unplausible. The fact is that we are all familiar with the experience of spontaneous imagination, we know that we have a psychical power or capacity to originate images and how it feels to exercise this power; but we also know how different this experience is from an experience of percepts which are derived from an external source. A percept, as contrasted with a mere image, comes to us along an inward direction which originates from the continuum in the background; and, as we already know, the inward direction is the distinguishing mark of an external physical source. In veridical perception we certainly know how to look in the direction of the physical source, and the more distant the object of vision the more we have to strain our eyes in order to discern details of shape or color. I am not confusing here the physiological condition of perception with an order within the visual field, and I admit that con-

vergence of the eyes on a distant object may be a physiological condition for a percept to appear right where I am, although this possibility does not impress me as a likelihood; but I cannot understand why the act of straining the eyes in looking at a distance should help one in the process of making an internal or mental image more specific. And, incidentally, I find no evidence for the identification of the space of imagination with the visual field; on the contrary, there is some basis for their differentiation. While looking at real objects around you, you also can, although it requires a mental effort, watch a fanciful or memory image; both the veridical percepts and the imaginary figures appear at a distance from you, but the distance of a mere image is not a recognizable definite distance of a percept; you cannot place the image among the percepts; the space of imagination is, as it were, superimposed on, without getting mixed up with, the space of perception.

The idea of integration of power with percepts indicates an orientation toward the presentative theory of perception. In fact I could classify my position as a version of objective relativism, if it were not for the observation that objective relativists carry out their principle, that properties of a physical thing are relative to the percipient's standpoint and change with the change in his perspective, in one direction not far enough and in another to an undesirable extreme. While emphasizing the relativity of shape, size, color, and other spatial properties, objective relativists do not recognize the existence of alternative and relative dates. This restriction is particularly surprising, since Einstein's theory, with the corollary of alternative datings of the same event by observers in relative motion, was an inspiring influence in the formation of objective relativism. Perhaps, in developing a theory of human perception, we do not need to consider any frame of reference except that of the earth. Let us then disregard alternative frames of reference; even so, it is difficult to understand why temporal properties should be any less relative than spatial properties. Objective relativists can hardly be expected to treat the dating of events as a purely

operational procedure which does not express objective temporal properties; at any rate, no theory of perception can disregard the fact that perceptual simultaneity is a primitive basis for assigning the same date to a number of events. Whatever the reason for their limitation, an inevitable consequence is the objective relativists' failure to give a satisfactory account of perception when the physical source is a distant event such as the explosion of a star. The astronomer who records such an explosion knows that the light ray from the region of the explosion may have taken years to reach him, and he is apt to say, in agreement with the representative theory of perception, that his percept is only a message from, or representation of, the already past event. But an objective relativist cannot admit representation and, since he does not make provision for alternative dates either, he must conclude, to acknowledge the fact that the date of the distant explosion is earlier than the date of its recording in the observatory, that the astronomer perceived the already past original event. But this conclusion is absurd. In what sense can we call an event past if we can have it, through perception, in the present? Note that objective relativists are not concerned with an event in the sense of a space-time region, which is intrinsically neither past nor present nor future, but with an actual happening. And an actual happening, once superseded by another, cannot recur. To say that it can recur perceptually is to assert that an actual event disappears only to remain in a capacity to be picked out and revived at a later date by a distant percipient. But "an event which is gone and yet remains to be picked out in perception" is a self-contradictory expression, unless interpreted along the lines of my theory, i.e. unless to disappear from actuality and to remain in a capacity to undergo another actualization are literally distinct modes of being. But then another actualization is a new percept with a new date and not the already past original manifestation. According to my theory the same physical source has alternative dates associated with alternative manifestations, and a distant observer can pick out only one manifestation, the one

that has the same date as the corresponding act of perception. Thus an observer always perceives a present datum, although the physical source actualized in his present percept may have had earlier and already past manifestations. Imagine three astronomers, *E, V,* and *M,* located, respectively, on the earth, Venus, and Mercury. Let all three of them be engaged in recording the emergence of a sunspot by means of synchronized clocks. Suppose the magnifying power of their telescopes to be the same, and their lines of vision to virtually coincide. Under these circumstances their percepts are similar in shape, let us take them to be three circles *e, v,* and *m;* but of course the size of these circles is not the same; since Venus is closer to the sun than the earth, and Mercury closer than Venus, *e,* the percept of *E,* is smaller than *V*'s percept *v,* and the latter is smaller than *M*'s percept *m.* Can we say that the astronomers perceive the same actual manifestation of the sunspot? Of course not, since they perceive manifestations unequal in size. Suppose next a clock on the sun, synchronized with the other three clocks, to show the emergence of the sunspot exactly at noon. Then, since it takes a light-ray eight minutes to reach the earth from the sun, *E* will register his percept at 12:08, *V* at an earlier date *tv,* and *M,* still earlier, at the time *tm.* Thus there is a set of alternative dates assigned to percepts of diminishing sizes by increasingly distant observers: 12, *tm, tv,* and 12:08. Let me now contrast the interpretations of this situation by the representative theory and objective relativism with my own treatment. Both the representationalist and the objective relativist agree that the emergence of the sunspot took place at noon, but while the former treats *e, v,* and *m* as representative images, the latter asserts that they are three perspective presentations of the original event. Where they disagree, I must side with the objective relativist; but I differ from both by pointing out that the original event is a timeless region of space-time and therefore is not to be exclusively associated with any of the four dates. The first date, 12:00, is associated with a manifestation of the sunspot to a would-be solar inhabitant; as the earliest possible date of

any manifestation it may be assigned, but only by convention, to the space-time region itself. But the earliest manifestation is not identical with any percept of the more distant astronomers. Contrary to the objective relativist I believe that no one except a solar inhabitant can perceive the earliest possible manifestation of the sunspot, and once the manifestation is past, no one can perceive it. The percepts *e, v,* and *m* are not to be identified with the earliest manifestation which is in the past for the simple reason that all of them are smaller than it, and therefore must be different manifestations. Objective relativism does not identify the largest view on the sunspot with the size of the latter in exclusion of other perceptual sizes; in the same spirit I do not want to recognize the earliest date associated with an event as its only date. Alternative dates, I may add, are paired with alternative sizes; for example, 12:08 goes with *e, tv* with *v,* and *tm* with *m.* To deny to the original physical event all later dates on the ground that at noon they are no more than eventualities is to forget that at that time *e, v,* and *m* exist only in a state of disposition; and at 12:08, while *E* perceives *e,* the earliest manifestation is already not actual. Of course, the statement "*E* perceives an explosion which is already past" is unobjectionable and may be true provided we know it to be an idiom which really means that *E* perceives a present manifestation of an explosion which could have, at a closer range, an earlier manifestation. This point, which may be another way of saying that perceptual properties in the immediate neighborhood of a physical source are assigned to the latter as its exclusive properties only by convention, however practically justifiable this convention may be, enables the theory of alternative dates to do justice to certain important elements of truth in G. E. Mead's pragmatic philosophy of history without sharing his exaggerations. The reader may remember that Mead takes the past to be a function of the present; his idea is that the present originates a novel cosmic point of view which establishes a unique historical perspective incompatible with the preceding views on the past, and the idea is substantiated by the perpetual re-

writing of history as one generation succeeds another. Mead's error is his belief that the actual events of history are modified through the percepts of subsequent historians; the error of his critics is their belief that nothing but the historians' account is modified. Mead is right when he says that the changing accounts express different perspective views on the same thing, only this thing cannot itself be another perspective manifestation, but is an event in space-time. Also, and this remark is relevant to Whitehead even more than to Mead, since theoretically there is no limit to percepts with later dates, we may speak of "objective or perceptual immortality," only we must attribute it to the space-time source and not to an actual event which is a strictly dated manifestation. In justice to Whitehead, however, I must make a qualification: if an actual event is taken in the sense of an organic, internal experience, then we may say that it reflects the "objective immortality" of the associated space-time region in so far as it is unbounded, because no act of self-experience can survive itself and therefore be an experience of its own end.

The theory of alternative dates does not depend on relativity physics even though it is based on a conception of space-time. This may be explained in connection with my second criticism of objective relativism. With the thesis that spatial properties, although relative to definite standpoints, are objective, I agree (and would treat temporal properties likewise) but I think objective relativists go too far when they conclude that all properties of an object are relative. For if all properties of A were relative to B, and all properties of B to C (where C may be identical with A, and all three may be percipient bodies), and so on for other objects, then all objects would disintegrate in a system of unending cross-references. Suppose, to take a simple illustration, a driver stops his car at the intersection of two streets because of a red light. His passenger, who is color-blind, protests on the ground that the light is green. Granted that the light is both red in relation to the driver and green in relation to the passenger, should we conclude that these two observers do

not even refer to the same light or, worse still, that there is no such thing as the same light? Of course not; but objective relativism is unable plausibly to explain the fact of identification. Some scientists would refer to the wave-length of the red light; but length, as well as any other spatial or temporal property, is found to be just as relative as the so-called secondary qualities. And if neither space nor time are sufficient as means of objective identification, there must be an intrinsic property which is invariant through various spatial and temporal determinations by different observers and yet is the sole ground for the derivation of these determinations. This means that the intrinsic distinguishing characteristic of an object is neither spatial nor temporal, although within any of the alternative perspectives it must be equivalent to the corresponding determinations of place and time since the latter are the only practical means of objective identification. Although neutral among perspective appearances, the intrinsic property of an object must be their generative source. This argument, the reader will note, is purely philosophical; the fact that the space-time of physics happens to fulfill the philosophical requirements is a piece of good luck. Physics, perhaps, may be said to strengthen the philosophical argument by using an invariant space-time basis to show that differences in space measurements arrived at by observers in relative motion are compensated by differences in their time measurements; but further developments, for example, the theories that space-time is semi-Euclidean or curved, are purely scientific. We may note in this connection that space-time is not experienced through actual percepts with a definite structure, but only as an extensive background of such percepts; therefore structural properties of space-time, other than the general property of extension, are irrelevant to a philosophical concern with perception.

A theory of direct perception, in the present version as well as in any other form, is confronted with two points of purely philosophical criticism. If visual percepts are outside the body of the percipient, then perception is an act of self-transcendence, i.e. an act of reaching a place where he is not.

This point is undeniable but, since the only choice is between perceptual self-transcendence and complete isolation, self-transcendence would seem to be preferable. But if, for the sake of argument, we should call admission of self-transcendence a weakness, let us point out that a representative theory which locates percepts in the body of the percipient must suffer from the same weakness. Suppose, as many representationalists would, that a visual percept is an image on the retina. This means that a distribution of colors takes place among various parts of the affected area of the retina; but a mere distribution of colors is not enough to form an image; the colored regions must be correlated from a certain point of view as parts within a whole. The integrating point of vision must be either one of the points on the area of the image or a station outside that area; in either case there is self-transcendence: the point of vision must "take in" together, in the act of forming a unified image, all the points on the area of the image where it is not. Again, there is a form of self-transcendence in the causal theories of representative perception because complete isolation of entities from one another and causality are incompatible. This remark brings me to the second point of criticism which is to the effect that a presentative theory of perception is incapable of being a causal theory. The critics point out that since a cause and its effect are two distinct events, a percept which is an aspect, or manifestation, of a physical source cannot also be an effect of the latter. The answer to this objection is that the presentative theory has a better explanation of the undeniable association between causality and perception than a downright identification of percepts with causal effects. To say that percepts are effects of physical causes is to introduce into causation an undesirable duality. For if a percept is a terminal member in a sequence of causes and effects, its immediate cause must have a double effect: as a purely physiological disturbance, in the brain, say, the immediate cause must have some subsequent physiological, or physical, effect and, at the same time, in producing a percept, it also has a psychological effect. The advantage of a

presentative theory is that it does not need even to raise this psycho-physical problem. On the other hand, the presentative theory brings causation and perception together in a plausible account of the biological function of percepts in the process of adjustment of a percipient organism to its environment. A visual percept plays the part of a warning, or promise, to a percipient with regard to a possible encounter with the physical source; hence the percept must be given in time to enable the organism to avoid untoward effects from, or to further an advantageous encounter with, the corresponding source. Thus the function of a percept is anticipatory of causal effects; therefore it would not be plausible to suppose that the percept itself is an effect even with the qualification that it must take place earlier than other effects. Let the physical source be called *S*, and its effects on a percipient *a, b, c, . . . , n,* in the chronological nature of their occurrence. If the effect *a* were also a percept, it would be at least as different and independent of *b, c, . . . , n* as the latter are independent of one another; and then the percipient's ability to anticipate later effects on the basis of *a* would be a complete mystery. On the contrary, if a percept, as the presentative theory would have it, is a participation in the dynamic nature of a physical source, it is an insight into the dynamic efficacy of the latter, and therefore an anticipation of the ensuing effects is no longer a problem. Suppose you are on a railroad track facing an oncoming train. Just in time to avoid destruction you are literally forced to step aside. There is a direct experience of the momentum of the train, of its overpowering onrush, in short, of a destructive physical power. Percepts, as this illustration shows, are associated with causality not because they are effects in a causal transaction but because a percept may be, in the form of an experience of compulsion, an apprehension of a causal connection.

Whitehead has repeatedly called our attention to the experience, or feeling, of compulsion, and his contention is that this experience provides a refutation of Hume's skepticism.

. . . In the dark, the electric light is suddenly turned on and the man's eyes blink. The man will explain his experience by saying, 'The flash made me blink'; and if his statement be doubted, he will reply, 'I know it, because I felt it.' . . . The philosophy of organism accepts the man's statement, that the flash *made* him blink. But Hume intervenes with another explanation. He first points out that in the mode of presentational immediacy there is no percept of the flash making the man blink. . . . Hume refuses to admit the man's protestation, that the compulsion to blink is just what he did feel. The refusal is based on the dogma that all percepts are in the mode of presentational immediacy—a dogma not to be upset by a mere appeal to direct experience. (*Process and Reality*, p. 245 ff.)

We need not accept every word in this passage. The fact that Hume overlooked the dynamic properties of percepts does not mean that he overlooked a distinct mode of perception; and since we are asked to make our decision by an appeal to direct experience, I, for one, must say that I do not find in my experience two distinct modes of perception; as I have already shown, even actual percepts, in what Whitehead would call the mode of presentational immediacy, inevitably appear against the background of, and permeated with, power. Furthermore, the experience of compulsion is not incompatible with Hume's criticism of the principle of causality popularly associated with the slogan "Same cause, same effect." A particular experience cannot validate a general proposition such as the principle of causality. To substantiate these remarks I can do no better than quote another argument for the perception of causality, but this time by the outstanding Humean of our days, Bertrand Russell, who does not endorse Whitehead's interpretation.

If I say: "I said 'cat' because I saw a cat," I am saying more than is warranted. One should say: "I willed to say 'cat' because there was a visual occurrence which I classified as feline." This statement, at any rate, isolates the "because" as much as possible. What I am maintaining is that we can know this statement in the same way in which we know that there was the feline appearance and that if we could not, there would be no verbal empirical knowledge. I think that the word "because" in this sentence must be understood as expressing a more or less causal relation, and

that this relation must be *perceived,* not merely inferred from frequent concomitance. "Cause," accordingly, must mean something other than "invariable antecedent," and the relation of causation, or some relation intimately connected with it, must be one which can sometimes be perceived. . . . Problems connected with language are absent in some instances in which the same relation can be perceived, e.g. if I am hurt and cry out. We seem here, to perceive indubitably a connection between the pain and the cry. (*Proceedings of the Aristotelian Society,* N. S., vol. 36, "The Limits of Empiricism," p. 137.)

The reader will note that Russell, unlike Whitehead, believes that the relation of causation is perceivable "in the same way" in which we perceive a sense-datum such as a feline appearance, i.e., to use Whitehead's terminology, in the mode of presentational immediacy. And Russell's explicit opposition of perceivable causation to invariable correlation makes it clear why the experience of compulsion is not yet a refutation of Hume. On the other hand, when Russell says that to see a feline appearance is not to see a cat, we may disagree with him without thereby damaging the main contention of the quoted passage. The main point, that the relation of causation can be perceived, is the point of agreement between Russell and Whitehead. Let us join them, but at the same time indicate the minor readjustments which the quoted passages must undergo to be assimilated within our own version of the presentative theory. To begin with Whitehead's illustration, we must take the man's claim, that the flash made him blink, literally, i.e. in the sense that the flash came with a power which perceivably caused the blink. And all three, the flash, the power, and the blink, are parts of the same experience which is not to be differentiated into two perceptual modes. Russell's illustration may be reinterpreted thus. If I say: "I said, or willed to say, 'cat' because I saw a cat," what I am saying is warranted provided there was a visual appearance, which I classified as feline, and which was a manifestation of an animal power that perceivably causes people to utter the word "cat." Thus reinterpreted both illustrations serve to emphasize the point that a direct perception of the relation of causality is an experience

of compulsion, and therefore may be, when compulsion comes from an external source, a participation in a physical power. This point is not a refutation of Hume, but it is an indispensable step toward a refutation. For Hume's contention that the phrase "an external cause is a physical power" is empirically meaningless can no longer be defended once direct experience of compulsion has been pointed out. We may conclude that the presentative theory definitely contributes to the justification of the principle of causality.

CONCEPTS

THE CONCEPT

A concept, as the term is used here, is either a proposition or an element within the proposition, for example, a propositional function, a class, or a relation. A situation, whether an event, a thing, a process, or a power, which is known through a proposition, i.e. either explicitly referred to or described by a proposition, will be said to be conceptualized. Conceptualization has the stabilizing function of objectifying the situation concerned, and objectification, except in the case of a pure power, is a step, usually the final step, in a process of actualization. This is the point to begin with.

Actualization of powers, which takes place within a perceptual perspective, can not be complete and definite, unless the perceptual field is itemized and the items are recognized as definite objects. Perception itself may lead to these effects, but in the end there must be conceptual cultivation of perceptual grounds. To illustrate, let us take a perspective of the basic kind, a visual perspective in ordinary space. Under favorable conditions of lighting and sharp eyesight, figures within a scenery stand out with a remarkable distinctness of outline. Thus the figure-background contrast, which is the first indispensable requirement of itemization, is a perceptual datum; but, and these are the limitations of any visual perspective, figures can perceptually stand out only at the expense of others which are pushed into, and are drowned in, the background, and even the items which are focused in the foreground are seldom completely detached from the surroundings by a boundary. Conceptualization re-

moves the first limitation by means of a generalization which transforms the contrast between the figure and the background into the opposition between the term and the context. For instance, a proposition may call our attention to a distant mountain, which therefore acquires the prominence of a conceptual term, even though it must remain in the perceptual background, unless we should walk toward the mountain and change the original perspective. Within an ordinary proposition, which is a minimum conceptual context, every element is an equally distinct term and the context is a definite set of such terms. The defect of incomplete isolation is also conceptually corrected: a percept can be supplied with a conceptual boundary where it happens to be unbounded. Calculus gives an interesting example. Anyone can perceptually distinguish a valley from the surrounding hills. But perception does not determine where exactly a hill ends and the valley begins; we might say that the boundary is at the point where the convex curve, which is the contour of the hill, is transformed into the concave outline of the valley, but again perceptually we are unable to find the point of transformation. This point, however, can be unambiguously fixed as a point of inflection. The concept of a point of inflection on the curve $y = f(x)$, which represents the sinuous contour of the hill and the valley, is defined as a point a at which $f''(a) = 0$, while $f'''(a) \neq 0$. There is also perceptual instability, which must be conceptually counteracted to prevent the breakdown of a visual perspective. Even if it were possible to keep the same spot focused in the perceptual foreground, movement and qualitative change within a perspective would generate, if unaided by the stabilizing influence of concepts, spontaneous confusion and indefiniteness. You saw a sparrow dart past you; but when pressed to describe the exact color and configuration of the occurrence, you can only report a quick splash of indefinite gray across the field of vision. It is obvious that without an antecedent conception of sparrows in flight you would not know how to classify the glimpse. So much for the stability of a lasting perspective. The real difficulty with perception is that visual

perspectives do not last long. We usually shift our eyes; and with each shift there is a new perspective or, at any rate, a different figure-background set-up. To be able to identify an item which is no longer in the perceptual foreground, we may again need the aid of concepts. We could get along without them if objects were always qualitatively different. But when, for example, we count the number of three-cent stamps in a row, we must identify each by correlating its positions in a series of successive percepts; and this requires the concept of a serial, if not geometrical, order. Conceptual correlation of perspectives usually takes more than positional relationships; but however elaborate the scheme may be, we need it because no perspective is stable and definite unless correlated with others, and we can always work out the scheme if we use a conceptual identification of referents in order to discount the inevitable perceptual difference. There is one more point to note. The establishment of a definite perspective may be obstructed by conflicting tendencies or powers which cannot be actualized together. Under conceptual guidance, however, such powers can be arranged into a number of alternative sets, each being capable of manifestation at a different time. A simple illustration of such conceptual guidance, which may be described as the selective function of concepts in the organization of a perspective, was given in the section "Perceptual Judgments and Truth" in connection with the discussion of Fig. 2. But while conceptual construction of alternative schemes of actualization is associated with the selective function, and is an outgrowth and extension of the principle of objectification, it may be turned in a direction which is opposite to the direction of actualization. This consideration introduces an entirely different conceptual function, which enters into the formation of the concept of possibility, and which we must exercise whenever we conceive, and therefore in a sense objectify, powers in opposition to, and therefore without bringing about, their actualization.

Different or alternative perceptual perspectives exhibit either the same contents in a different foreground-back-

ground distribution or else different contents. Conceptual analysis, underlying such differences of content or content-distribution, remains the same. This is to say that the same basic terms and the same principles of contextual formation are used to itemize and stabilize any perspective that human perception can originate. The basic terms, correlative to human perception, are: material thing, number, property or class, space, time, movement, and causality; the associated principles of formation are the theorems of the two-valued formal logic. The understanding that this conceptual analysis is adapted to the needs of perception is the first step in the process of transcending perceptual limitation and developing a human perspective in a wider sense of the word. The second step requires the introduction of an alternative conceptual analysis correlative to a different mode of observation. In quantum physics, for example, the methods of observation cause a disturbance in the phenomena to be observed; hence identification of individual items is no longer practical, and analysis in terms of material things must give way to analysis on an entirely different basis. The terms of the quantum physicist are probabilities and wave-equations, which he interprets as "waves of probability"; he finds the conceptions of space and time, or even of space-time, inadequate; and if he happens to be a logician, he may avoid certain paradoxical statements by adopting the principles of formation of a multivalued, or non-Aristotelian, logic. Construction of alternative systems of logic, of non-Euclidean geometry, and of as yet uninterpreted branches of pure mathematics, signifies a further step in the direction of emancipation of conceptual analysis from any particular mode of observation or perception. But formation of uninterpreted systems would degenerate into an invention of meaningless and dull games if it were not for the fact that they are designed with an eye on a possible or eventual interpretation. Thus the progress of mathematics has been directed by the concrete problems which, at one time or another, physicists posed to mathematicians; and even a prohibitive calculus or language of symbolic logic is usually

put forth with a hope that it may prove to be more adequate as a working logic, at least for certain practical purposes, than any of its numerous predecessors. This means that there also is an inclusive language, which for the English speaking people can hardly be anything but English, in which the alternative abstract systems or languages can be brought together for comparison or correlation. And if one alternative system, or, perhaps, the common structure of some, or all, of them, turns out to form an adequate basis of conceptual analysis for the inclusive language itself, we should be in possession of the form of a most comprehensive perspective, the study of which would be most appropriately called formal logic since it would be a study of the form invariant through the change from one alternative system, or perspective, to another.

The preceding paragraph is not meant to be an introduction to the subject of formal logic, but a preliminary explanation of the fact that conceptual objectification, instead of an engrossment in actual experience, may lead to an a priori and formal scheme. A comparison with Kant may serve to clarify my position. I think his identification of conceptual, or categorial, organization of elements within a proposition with objectification is correct. I also agree with Kant that objectification involves objective reference, but my interpretation of the latter is entirely different. Objective reference, as I understand it, is nothing more than concern with basic terms of a certain kind in any statement of conceptual analysis. This is to say that objective reference is associated with the fact that there are terms—we may construe them as particulars capable of being referred to—which must occur within any correct conceptual formation of a given system or language. On the other hand, Kant mistakes objective reference for a constitutive condition of empirical truth. Kant's mistake is partly explained by his failure to see that the a priori is synonymous with "formal" or "uninterpreted," and that it need not always be an a priori truth. Since, unlike Kant, we have access to non-Euclidean geometry and non-Aristotelian logic, we are in a

position to correct him by pointing out that such alternative systems are a priori, i.e. formal and constructible without recourse to any forthcoming interpretation, and yet, because of being coexclusive if applied to exactly the same empirical data, they cannot all be empirically true. For example, non-Euclidean geometries were built up a priori but, if we accept the evidence of relativity physics, only Riemann's geometry describes the structure of the physical world; therefore all other geometries, as well as the familiar Euclidean system, while internally consistent, are not empirically true. I can show now that Kant was wrong in saying that objective reference constitutes empirical truth: all that I have to do is to demonstrate that an a priori system which is not empirically true involves conceptual reference in exactly the same sense and way as the alternative system which is true. The alternative geometries of Euclid and Riemann may illustrate the point; which of the systems is taken to be true is immaterial and, to agree with the theory of relativity, we may give the prerogative to Riemann. Let us consider the following two statements: (1) A straight line is infinite, and (2) A straight line is not infinite but closed. (1) belongs to Euclid and is, by hypothesis, empirically false; (2) is a true statement of Riemann's geometry. Both statements involve the proposition "There are straight lines," where "straight" is to be taken in its quantitative sense, as "shortest distance between any two points." According to modern logic, this proposition is based on, or contains as a constituent, the propositional function "x is a straight line," and, to make the employment of the function explicit, the proposition is formulated as follows: "There exists an x such that x is linear and straight." The variable x is free in the isolated propositional function; it is a bound, or apparent, variable when the function is incorporated within the context of the complete proposition. The distinction between a free and a bound variable is associated with two modes of objective reference. Conceptual reference within a propositional function, let us call it "substantival reference," is a concern with the term "x" which does not involve an asser-

tion of existence. Thus "x is a straight line" refers to, or is about, x in the sense of being a request for a particular, represented by the variable, to be described as linear and straight. The second mode of reference is "existential reference": a proposition, built on a propositional function, not only requires a particular to be described by a certain property but asserts that the requirement is satisfied, i.e. that there is a particular which exemplifies the property. We find that the false (1), just as much as the true (2), involves both modes of reference. We may also safely assume that objective reference meant to Kant no more than either substantival reference or existential reference. He himself says: "It is easily seen that this object [the ultimate conceptual referent] must be thought of only as something in general $= x$, since outside our knowledge we have nothing which we could set over against this knowledge as corresponding to it." (*Critique of Pure Reason,* abbreviated translation by Norman Kemp Smith, 1934, The Macmillan Co., p. 85.) At any rate, there is no reason why Kant, or anyone else, should mean anything different from substantival or existential reference so long as objective reference is to be kept distinct from description. And if this point is granted, we must conclude that since objective reference takes place in true and false systems of thought alike, it cannot constitute empirical truth. Kant's error inevitably leads to the doctrine of an arbitrary imposition of concepts in the formation of empirical knowledge and, since there is no reason to expect things as they really are, things in themselves, to fit in with arbitrary ideas, this doctrine means a separation between the phenomenal field of empirical knowledge and the unknowable realm of things in themselves. My position, on the other hand, is that, in order to be empirically true, a statement must give conceptual expression to tendencies and powers which are already there, at the physical roots of perceptual experience. I reject the arbitrary element, although, in accordance with the perspective theory of truth, I admit that conceptualization has, as a rule, some transformal function to perform and, in this sense, is an a priori truth: the

antecedent tendencies, to be conceptually recognized, are selected, isolated, and made explicit in a procedure which may require generalization, analysis, or some other kind of idealization. There is the inescapable fact that concepts are ideas or ideals. But, again, we need only to extend the principle of objective relativism from perception to conception to understand that idealization does not spell subjectivism. Actual properties are objective, even though actualization is relative to a standpoint within a perspective, and this remains true when actualization acquires the special form and completeness of a conceptualization. The objective basis of conceptualization can be best illustrated by the analysis of a perceptual gestalt in terms of the corresponding perceptual judgment. For example, you perceive the letter "H" as a single pattern or configuration, but you must admit that there is nothing subjective in the perceptual judgment "This is a set of three short lines, two vertical and one horizontal which connects the other two at their mid-points," although the analysis involved is relative to the distinct concepts of number, isolable item, and geometrical element. The presence of transformal conceptualization may be denied by those who refuse to see the difference between the antecedent percept and the derivative perceptual judgment, but it becomes unmistakable with the transformation of the perceptual judgment into a communicable proposition which introduces objective reference and generalization. The transformation, to be illustrated by the same example, takes place in two steps. First, we derive from the perceptual judgment the corresponding propositional function "x is a set of three short lines, two vertical and one horizontal which connects the other two at their mid-points." Second, we turn the free variable into an apparent variable, and obtain the existence proposition "There exists an x such that x is a set of three short lines, two vertical and one horizontal which connects the other two at their mid-points." As far as sentences are concerned, the result comes about through the replacement of the original "this" by the complex symbol "There exists an x such that x"; but the contribution to meaning, which the

verbal change conveys, is pure conceptualization that cannot be illustrated by anything in perceptual experience. There is nothing subjective in this pure conceptualization; on the contrary, it has abstracted the original meaning from entanglement in a private experience designated by the word "this." But it would be wrong to conclude that the derivative existence proposition is objective and communicable because of being an impoverishment of the meaning of the original perceptual judgment. An existence proposition *originates* existential reference, and this, as already mentioned and subject to further explanation, is a positive contribution to meaning. An equally superficial criticism would ridicule the alleged objectification of real tendencies in a priori or pure concepts as a miraculous harmony between ideas and reality. The criticism overlooks the fact that there are conflicting tendencies in nature and alternative schemes of conceptual analysis. If concepts happen to objectify a certain set of tendencies, the harmony is struck at the expense of conflicting powers which must remain undifferentiated in the perceptual background. However, even if there were no alternative conceptualization, there would be no miracle, except in so far as any ultimate fact may be so called, in the fact that concepts are the means of an objectification which, in its turn, promotes the actualization of a power.

An analysis of an existence proposition shows the presence of substantival as well as existential reference. Substantival reference is there because the existence proposition involves, as a constituent, a propositional function. But since the same propositional function may be embodied elsewhere, for example, in a perceptual judgment, substantival reference is not an original contribution of the existence proposition. Let me illustrate. The reader may use the letter "*a*" to name or designate this page; then he can say (1) "*a* is rectangular." (1) is a true perceptual judgment which can be transformed into (2) "There exists an x such that x is rectangular," an existence proposition which can be understood not only by a reader of this book but by anyone who speaks English. Both (1) and (2) involve, as a constituent, the same proposi-

tional function (3) "*x* is rectangular," where "*x*" is a free variable. Substantival reference is common to (1), (2), and (3), and the question is whether it is further analyzable. One thing is certain: the property "rectangular" is not meant to be attributed to the letter "*x*." In the first place, (1) does not contain any variable at all; secondly, the letter "*x*" is not rectangular, and yet (2) is a true statement; and, finally, which letter to use is immaterial, so that (3) can be read "*y* is rectangular." Clearly, the variable is employed to symbolize the fact that a property, such as "rectangular," does not stand by itself but belongs to something. In (1) the thing which has the property is perceptually given and designated by the name "*a*," and therefore does not require a symbolic representation. Thus we may say that substantival reference is to a thing, in the most general sense of an entity or a something. A thing in this sense, i.e. as a bearer of properties or an objective for reference, will be called a referent. In order not to be misled by the term "substantival reference," let us note that the referent need not be a material thing or substance: thus, if "thing" is used in the sense of a referent, "This thing is a material thing" is not a tautology; "The thing is a sense datum" may be a true statement; and "The thing is a property" is meaningful. We may further note that any object word contains an implicit referent: for example, we mean by a sphere "a thing which is spherical," and by the moon "the thing which is lunar." We can contrast the referent as a nondescriptive constituent with the other constituents of an object word, or within a propositional function, which are connotative or descriptive; but in this contrast "nondescriptive" must be understood as "not enriching, or adding to, the description already given by other constituents," and not in any absolute sense. Accordingly, only the context will determine whether the referent is to be taken as just an entity or as an object of a particular kind. Thus the referent in "The thing occurred a moment ago" is an event, since translation into "The thing is an event which occurred a moment ago" does not change the import of the original description. However, even when

reference is to an object of a special kind, we can always single out as an ultimate referent the part which the object plays in the capacity of an objective for reference. For instance, since "The thing lasted only a moment" entails "The thing is an event," where "thing" and "event" no longer stand for the same concept, we may say that the premise implicitly refers to a thing of an unspecified kind. This observation helps to establish a further point. The presence of a percept, designated by "*a*" in (1) does not take the place of a conceptual referent in the way in which it dispenses with the variable. At any rate, since we can infer from (1) that something is rectangular, in our understanding of the perceptual judgment we must conceive *a* as a thing. The point is not trivial. If conceptual referents are embedded in perceptual judgments, there is contact between discourse and extralinguistic experience. For if a perceptually present object appears within a judgment in a conceptual frame of thinghood, subsequent reference to it as to a thing, by means of communicable propositions and in the absence of the object itself, can never be a source of falsehood. However, and this is just as important to note, although necessary the concept of a referent is not sufficient to account for the possibility of reference within discourse to things outside discourse. There must be, in addition, existential reference. This is so because substantival reference alone does not set up the required differentiation between possibility and realization, and there are referents in a fanciful scheme no less than in a pursuit of empirical knowledge. For example, in thinking of a unicorn we think of an existing thing without asserting its existence. The failure to understand that substantival reference does not commit the thinker to existential reference, that the concept "existent" is not an assertion of existence, is responsible, of course, for the fallacy of the ontological argument. On the other hand, differentiation between substantival and existential reference may explain the conviction, which so many writers share without being able to explicitly state their reasons, that words are meaningful only within the context of a perceptual judgment or a communicable propo-

sition. Words are primarily designed to refer to objects of the world outside discourse, and therefore in one sense of "meaning" words are not used with their proper meaning when they lack external reference. This point leads to the topic of existence propositions.

To appreciate the conceptual contribution of an existence proposition let us, first, reject the opinion that the existence proposition is no more than a part of the meaning of a perceptual judgment from which it is derivable. We shall again make use, for the purpose of illustration, of statements (1) and (2) of the preceding paragraph. The opinion, which I reject, is based on the following argument: (1) is the premise from which (2) is derivable as a conclusion; hence the meaning of (2) is contained in, and can be only a part of, the meaning of (1). If "meaning" were restricted to "empirical meaning," I should agree; but the point is that the conceptual, or logical form, of (2) contains a pure concept which cannot be exemplified in perceptual experience and is not a part of any perceptual judgment. The fact is that once (2) is detached from (1), its truth no longer depends on the truth of (1), and to the extent to which the conditions of the truth of a statement determine its meaning, the emancipation of the meaning of (2) brings about an original contribution. So long as there are other rectangular things, (2) remains true even if the reader tears the page, which was designated by the letter "*a*," and thereby deprives himself of the possibility of asserting (1). This is to say that (2), unlike (1), refers to rectangular objects other than *a* just as much as it refers to *a;* the reference is to some rectangular object or other without being a reference to any particular one. Another way of saying this is that (2) could be derived from perceptual judgments other than (1). The existence proposition differs from each of the corresponding judgments because it alone has an external reference, i.e. external to the statement. There is no external reference in (1), and a similar consideration applies to any other perceptual judgment, because (1) is about *a*, or about the percept designated by "*a*," and *a* is a constituent within the perceptual judgment. On the other

hand, (2), unlike (1), contains neither *a* nor any other particular presentation to which the property "rectangular" could be ascribed; therefore (2) must refer the property to something outside itself. Thus external reference, i.e. reference (of a description) within a proposition to something outside it, is an original conceptual contribution of the existence proposition. Hence "(2) is a part of (1)" is true only with a qualification: (2) minus its external reference is a part of (1). For since predication cannot be at once external reference and reference to an internal constituent, and since (1) does not mean "*a* or some other thing is rectangular," the presence of *a* must alter the meaning of (2) so long as the latter remains incorporated into the perceptual judgment. But abstraction of (2) from (1) spontaneously restores, with the removal of *a*, external reference. The spontaneous emergence of existential reference, in the process of abstraction from an empirical datum, is a demonstration of a pure, or a priori, conceptualization. But to demonstrate this is not to solve the problem which, at first, may take the form of a paradox. How can a proposition transcend itself? How can a proposition, which would seem to be a self-contained meaning, reach to something which is absent or outside the meaning? To resolve the paradox of transcendent reference we must show that the question is ambiguous and needs rewording.

There is a tendency among philosophers to disregard the paradox, or even deny the underlying problem. W. T. Stace, commenting on my presentation of the paradox in *The Problems of Logic* (Allen & Unwin, 1941, Chapter 4), writes to me as follows:

> Has not the supposition of there being a paradox in objective reference arisen in the following way? Owing to the pre-occupation of man (evolving out of the animal) with food, weather, physical danger, etc., we are all ingrained materialists. Hence we always think of thought, mind, etc., as if they were physical things. We then ask: how can the mind transcend itself, be outside itself, be here and yet also there where the object is? How can it (in memory) jump backwards in time, and do so without traversing the intervening time? We ask these questions because material things could not be in two places at once, could not jump back in

time, could not go from here to there without traversing the interval; and so we think it mysterious that thought can do these things. But this is absurd and all these questions are childish. It just *is* the nature of thought to do these things (just as it just *is* the nature of matter not to do them) and that is an end of the matter. We might just as well say that it is a paradox that a stone *can't* jump backwards in time or be in two places at once.

My critic does not deny the fact of transcendent reference in thought, but he takes it to be an ultimate fact, and therefore no problem, still less a paradox. But to take his position is to invite ruling out, on the same grounds of ultimacy, any other problem of philosophy, and therefore to write *finis* to philosophy. Nor is the specific criticism in the quoted passage to the point. Our concern is not with transcendence in relation to physical restrictions, but with the possibility of reaching beyond discourse within the context of discourse. If an absent thing were no more than distant, in space or time or both, there would be no miracle for thought to have the effect of, or even to outdo, radio and television in getting hold of the distant thing. But what if there is nothing to get hold of, if the thing is absent in the sense of being out of existence? Observe that if a thing is destroyed within the period of the assertion of an existence proposition about the thing, there may be a change in the truth-value but not in the meaning, or existential reference, of the proposition. In asserting that "The Empire State Building is tall" I may be unaware of the fact, if it were a fact, that at this very moment the building is being blown up by German conspirators, and if the destruction of the building can turn the truth of the assertion into falsehood, this is because the proposition continues to be what it is, and, as it were, in disregard of the new fact of destruction, to persist in its reference to the, no longer existing, thing. The paradox is this: the proposition would refer to the thing, even if there were no thing to be referred to. One might suggest that the ultimate referent of a proposition is the four-dimensional physical source of percepts which, unlike the percepts themselves, can never be erased from the place which it occupies in space-time; but

this suggestion would endow the proposition with a knowledge of the theory of relativity which is not there. To fully understand that "The Empire State Building is tall" the reader need not know anything about space-time. Furthermore, an existence proposition may be about something which has never existed and is unlikely ever to exist. Compare the proposition "The unicorn feeds on grass" with "The lion is carnivorous." Both refer exactly in the same way to animals outside discourse, and that is why, since there are no such animals as unicorns, the first proposition is false while, since lions exist and are carnivorous, the second proposition is true. Both will continue to refer exactly in the same way to animals outside discourse if it ever should happen that lions become extinct and unicorns appear in the course of biological evolution. Consideration of existence, however, serves only to illustrate the difficulty of referring to something which cannot possibly be a referent within the proposition. Strictly speaking, an object within the field of vision is just as absent in relation to an existence proposition as if it did not exist at all. I may say in front of a lion cage "There is a lion," but the statement does not catch the lion as a constituent even though he is within my perspective. Thus the point of the paradox is that the existence proposition with nothing but internal resources manages to be about something external to it. This, I think, is also an answer to another critic, E. Nagel, who makes the following comment: "It is not clear what the point of the paradox is. If Mr. Ushenko's use of the term 'discourse' signifies a language, or even the more inclusive operations of reflective thought, then I fail to see that what the language is *about* exists *within* language, except in those relatively rare cases when we happen to be talking about some part of language." (*The Journal of Philosophy*, 1942, p. 180.) I am not concerned with the relatively rare cases. But when it comes to external reference, I think that Nagel reasserts the paradox in the very act of questioning its existence. There is no denying that language can have only what is within it, therefore if it has a referent, this referent must be within it; and yet, as Nagel himself ad-

mits, the language is not about what exists within it, therefore the referent must be outside it. I do not deny that the paradox is a result of an ambiguous and inexact formulation; but the resolution of the paradox requires a specification of the fault in its statement; merely to close our eyes to the apparent difficulty is not enough.

In an attempt to resolve the paradox of objective reference I may begin with a comment on the ambiguity of the word "about." In one use of the word "about" we can say that a proposition is about a certain thing if, and only if, the thing exists as an entity in its own right, and the proposition enables us, at least in principle, to single out the thing by pointing to it and saying "This is it," where "this" is a demonstrative symbol, or "*a* is the thing in question," where "*a*" is a proper name. In this sense of "about," "Red is between orange and purple in the solar spectrum" is about the color red, since an understanding of the statement would enable us to locate the color, and assert "This is red," upon a subsequent presentation of the spectrum. On the other hand, we also use "about" when we say that a proposition is about its topic or subject-matter. The second or nondemonstrative use does not imply the first or demonstrable "about," and a confusion in this respect often leads to the fallacy of hypostatizing a subject-matter into an independently existing entity. Suppose that in looking for a three-cent stamp, which I believe to be in some drawer of my desk, I make the statement: (1) The stamp is in one of the drawers. What is (1) about? The answer is: (2) Statement (1) is about a stamp. But notice that the answer does not further our understanding of what (1) is about: it does not, any more than (1), help me to locate the stamp and thus enable me to say: (3) This is the stamp, and therefore this is what (1) was about. Neither (1) nor (2) is about the stamp in the demonstrative sense of "about." This is clear if we consider the possibility that I was wrong in my belief that there was a stamp in the desk. Russell's theory of definite descriptions gives a logical account of the matter. As is well known, he has explained that, by means of logical analysis, the meaning of a singular state-

ment, such as (1), can be made explicit, and in the explicit formulation no trace of a definite description, i.e. of the original phrase of the form "the so-and-so," is left. For example, by means of logical analysis (1) is translated into the more explicit form (4) "There exists one, and only one, x such that x is stamp-like and is in one of the drawers," where the definite description "the stamp" does not occur. And since (4) does not contain "the stamp" as a constituent, it is not about a stamp in the demonstrative sense of "about"; and neither is (1), since (1) and (4) mean the same thing. With the aid of Russell's analysis we thus prove conclusively that no such proposition as (1) and, more generally, no existence proposition is about a demonstrable thing. But, I think, we must complete his theory by pointing out, first, that in the nondemonstrative sense of "about," which requires further discussion, statement (1) is about a stamp and, second, in certain uses a definite description may stand for a single constituent in the meaning of a statement. For unless so completed, Russell's treatment cannot be applied to such a perceptual judgment as (3). For clearly, if I found the stamp, the judgment "This is the stamp" employs the definite description "the stamp" to stand for the same constituent which the demonstrative symbol "this" designates, and therefore is not to be interpreted as "This is something or other such that it is unique and stamp-like." In line with my previous point, to the effect that incorporation of an existence proposition into a perceptual judgment modifies the former because the internally present percept does away with external reference, we may say that the presentation of the stamp, as a constituent within "This is the stamp," cancels the reference to something or other which the description "the stamp" contributes to (1) in the form of the phrase "There exists an x such that x . . .". Furthermore, if the demonstrative use of "about" were its only sense, (3) would have to be false; whereas the following interpretation of (3) allows for the fact that it may be true. Let (3) mean "This is the stamp, and this judgment is demonstratively about what (1) was nondemonstratively

about." However this may be, Russell's analysis helps to make the first step in a resolution of the paradox of external reference. The referent of an existence proposition is not an entity which exists outside the context of the proposition; the proposition is not about any external thing in the demonstrative sense of "about." To take the next step we must answer the question: What is the referent within the existence proposition? By means of the same examples we can see that (1) and (4) must have the same referent, and that the only constituent in (4) which can take the part of a referent is the apparent variable. Hence, according to Russell and myself, the answer to the question is that an existence proposition is about an apparent variable. My answer to that effect appears on page 163 of *The Philosophy of Relativity* (Allen & Unwin, 1937):

> The logical analysis of a proposition, in which a descriptive phrase of the form "the so and so" . . . is involved, makes use of variables such as the symbol *x*. And the outcome of the analysis is the replacement of the original sentence by a new one where no trace of the expression "the so and so" is left, but where, instead, a set of adjectives is given together with their "substantival reference," i.e. together with the symbol *x*. This outcome suggests that the proposition is about the symbol *x*. . . .

Russell's statement is found on page 278 of *An Inquiry into Meaning and Truth:*

> We may say, generally: when I am in a state of believing, that aspect of the believing which *seems* to refer to something else does not really do so, but operates by means of apparent variables. To take the simplest case: if I am expecting an explosion, the verbal expression of my belief is "there will be a noise." Here "a noise" is an apparent variable. Similarly if I am recollecting an occurrence by means of a memory-image, the verbal expression of my memory-belief is "there was something like this," where "this" is the memory-image and "something" is an apparent variable.

Both statements are misleading. Whatever Russell may mean by his statement, I did not intend to say that an existence proposition is about a letter, such as "*x*," or about a word such as "noise." A reviewer, C. G. Hempel, misunderstands

me when, commenting on my assertion that "the concept 'thing' serves as an objective for reference, [and] represents or is a substitute for the absent stamp," he writes: "But this formulation appears to offer a merely verbal solution of the problem (if there be a problem). For the word 'thing' in the illustration clearly is not a substitute for the stamp in the sense that the symbol 'stamp' now refers to (i.e. designates) the word 'thing.'" (*The Journal of Symbolic Logic*, vol. VII, No. 2, 1942.) According to my theory, the referent in (1) is not the *word* "thing" but the *concept* "thing" or thinghood. When I say that an existence proposition is about an apparent variable, I mean by "apparent variable" not the letter or word which we happen to employ but the significance or logical function of the apparent variable symbolized by the letter or the word, viz. the conceptual function of serving as an objective for reference and description. A sentence which contains the words "a noise" can be translated into a sentence of the form "There exists an x such that x is noisy and . . . ," and in this sense "a noise" is, or rather conceals, the apparent variable "x," but only if the apparent variable is construed as a symbol for the thing, or process, which is describable as noisy. If this is understood the only thing which remains, to complete the resolution of the paradox, is to explain the sense in which existential reference is external, i.e. the nondemonstrative use of the word "about." There are two points to examine. First, reference within an existence proposition is external in relation to its descriptive constituents. This we already know as the contribution of substantival reference. What I want to stress here is that without substantival reference, insufficient as it is to take care of external reference, the paradox would stand unresolved. So long as concepts are taken to be purely descriptive, in disregard of the office of serving as an objective for description, their reference to things must perforce be understood as a feat of self-transcendence, utterly unintelligible when the things referred to are out of existence. Reference is a conceptual relation and if one of its terms is to be removed, because of its physical status, outside the conceptual con-

text, the relation itself must collapse. In an earlier publication I said: "But a referent such as a dog is a physical entity which must be physically or bodily present in order to be used as a relatum in a relation, regardless of the nature of the latter." C. G. Hempel, in the already mentioned review, questions this statement. I cannot understand how it can be questioned. Conceptual reference does not carry implication with it, since there is always a possibility of error. My reference to a dog does not alter if it happens to be an error, for example, if the dog is dead; but if the dog is dead, it certainly cannot be used as a relatum in a relation, for there is nothing there to be so used. As far as I can see the only way to avoid the requirement of a physical, or at least perceptual, presence of the dog as a relatum, which yet does not lead to my position of rejecting self-transcendent reference, is to deny that reference is a relation. Meinong and Husserl take this drastic course: they postulate a mysterious "intention" toward an external referent which does not establish a relation between the word or symbol and the referent. But if the referent is neither present nor represented by a constituent within a proposition, the intention is not directed to anything, i.e. it intends nothing. To my mind, such an intention means no more than a technical camouflage for the already rejected opinion that objective reference is an ultimate fact which does not require, or allow for, explanation or analysis. A more recent and better treatment of reference as being nonrelational is attempted by A. J. Ayer as follows:

> . . . We cannot define the meaning of a symbol in terms of any relation that is supposed to hold between it and the fact which it symbolises, for in cases where it expresses a falsehood there is no such fact, and consequently no such relation, and yet the symbol is still meaningful. . . . The answer to the question, How is it possible for "red" to mean red? is simply that this happens to be the symbol that we have chosen to use to refer to this colour. (*Op. cit.*, p. 105 ff.)

Let us try to give as generous an interpretation as possible to the "simple" solution given in the last sentence of the

quoted passage. Suppose you observe a red patch and choose the word "red" to be used in order to refer to the observed color. This means that you establish a rule for the use of the word "red." Assuming that the rule is understood, you can on subsequent observations of red things describe them as red in accordance with the rule. But this solution simply removes the difficulty into the assumption that the rule can be understood. The question is, what does the rule mean? At the time of the original observation of a red patch you may formulate the rule as follows: "The word 'red' is to be applied to any shade of the same color as this," where "this" is used as a demonstrative symbol to designate the color of the presentation. But this rule ceases to be intelligible on any subsequent occasion, when the original presentation is already out of existence and the word "this" is deprived of its original meaning, and must be replaced then by another rule which carries with it external reference. The new rule, in its simplest form, can be stated thus: "The word 'red' is to be applied to any shade of red." But this rule does not help our understanding, or regulate the use, of the word "red," since in its very formulation a correct understanding and use of the word is already presupposed. We may attempt to avoid circularity by a restatement of the rule: "The word 'red' is to be applied to any shade of the color which was designated by the word on the occasion of the original presentation." But in this statement external reference to the original color is no less evident. No communicable rule for the use of a symbol or word can be stated without referring within this rule to the referent. My conclusion is that Ayer does not solve the problem but simply avoids it. Let me observe, while I am making the point that there is no alternative to substantival reference, that images could not take the place of conception, even if they were indispensable as a psychological accompaniment or, perhaps, an aid to the latter. To recognize a certain color, for example, a memory-image of a previous presentation of the same color may be indispensable, but only because the image can be interpreted as a representation of an antecedent event, and this

interpretation is external reference all over again. Let me quote Russell in support of this:

> Suppose some one says to me "I saw a fox in the street," and suppose I believe him. What does this involve as to my state of mind? I may have an image of a fox, more or less vague, and think "he saw that." This assumes that the image occurs as representative, since I do not think that he saw my image. Images, in fact, act as symbols, just as words do. Images are usually sufficiently vague to be capable of "meaning" any member of a rather ill-defined class of possible or actual percepts. Such an image of a fox as I personally can form would fit any ordinary fox. It serves, therefore, almost exactly the same purpose as is served by the word "fox." (*An Inquiry into Meaning and Truth,* p. 301 f.)

Thus, so far as the performance of reference is concerned, images can do no more than words. But, let me repeat, although indispensable and not replaceable by a display of images or by anything else, substantival reference is only a part of the story. This brings me to the second point. In external reference the referent which is actually external only in relation to the descriptive constituents within a proposition must be taken, or interpreted, as if it also were outside the proposition altogether. Such an interpretation is feasible only if the referent is capable of playing the part, or being a representative, of an external object. Some of my critics point out that representation is a relation between the representing thing *a* and the represented thing *b,* which therefore involves external reference from the former to the latter. This objection is a mistake. Representation is not a dyadic but a triadic relation: from *a* to *b* with respect to *c;* and in so far as representation with respect to something does not fail, there is no distinction between *a* and *b* and therefore no external reference from one to another. For example, a deputy representing his constituents in a legislative body is identified with them in so far as the exercise of making laws is concerned. This example may be criticized as a legal fiction and the critics may stress the fact that, in spite of a would-be identification, the delegates and the constituents are distinct agents. My answer is that the repre-

senting *a* and the represented *b* need not be distinct things. Even in the example of a legislature we may consider the case of an electorate with one member only so that the duly elected delegate happens to be the same person as the voter. We may call a representation, when the representing *a* is not a distinct thing from the represented *b*, representation-presentation. A representation-presentation takes place when *a* is a part, or a function, of *b*, or associated with *b* in some other essential way, but in any case is not separable from *b* as a thing which exists in its own right. For example, we may say that the grin of the Cheshire cat both represents and presents the cat, and there is no greater wonder in Wonderland than the appearance of the grin without the cat. The concept "thing," the referent of an existence proposition, is, like a grin, a function rather than a thing which could exist in its own right. The function of serving as an object of description to which we refer the descriptive constituents of a proposition is the same function through which we must articulate perceptual experience when we itemize it by means of a perceptual judgment. Even before it is possible to discern the nature of an item, we can say "There is something there"; then we may add "This thing looks like a bird"; and, after the visual experience is over, we conclude by some such statement as "The thing which we took for a bird was a plane." The same concept "thing" is employed in these three statements; hence the representation-presentation in the third statement of what the first two judgments are demonstratively about. External reference is possible because the referent is both within the proposition and outside it. But to say that this is possible is not yet to specify the way it actually takes place. The way is through assertion. For since the referent belongs both to discourse and to the extra-linguistic world, to assert that the concern is not with discourse, i.e. that the descriptive constituents within the assertion are realized, is to place the referent outside discourse. We have here an additional confirmation of the fact that the assertive element, "the claim to truth," as I have called it elsewhere, constitutes the very nature of a proposition, for without it the primary purpose of

discourse to describe things in the world could not be fulfilled. Of course, any item is conceivable as a thing, but this does not force a proposition to be about each and every thing; the field of reference is restricted by the descriptive constituents: a proposition asserts the realization of a certain characteristic or character, and is not concerned with things which are incapable of being so characterized. As to the nature of the assertive element within a proposition I have nothing further to say, and suspect it to be ultimate; in this limited sense I may agree with my critics that there is something unanalyzable in objective reference. Let me then sum up my treatment of the problem, and the resolution of the paradox. An existence proposition is, in the direct and demonstrative sense of "about," about a referent which is a constituent within the proposition. The referent, which is understood to be a thing in the sense of a substratum, happens to be the same conceptual agency through which experience is itemized in a perceptual judgment. Hence in being directly about a constituent referent the proposition is indirectly about an item outside discourse. In conjunction with the assertive function, which is a repudiation of an internal concern, indirect reference is transformed into an external reference, which is explicit and central and yet does not require the presence of an external thing. Thus, in a nondemonstrative sense of "about," propositions can be about things of the external world.

The understanding of conceptual reference has been obstructed by the otherwise useful distinction which, following W. V. Quine, can be presented as "use versus mention." Let me quote Quine to introduce the opposition:

> As an illustration of the essential distinction, consider these three statements
>
> (1) Boston is populous,
> (2) Boston is disyllabic,
> (3) 'Boston' is disyllabic.

The first two are incompatible, and indeed (1) is true and (2) false. Boston is a city rather than a word, and whereas a city may be populous, only a word is disyllabic. To say that the place-name

in question is disyllabic we must use, not that name itself, but a name of it. The name of a name or other expression is commonly formed by putting the named expression in single quotation marks; the whole, called a *quotation,* denotes its interior. This device is used in (3), which, like (1), is true. (3) contains a name of the disyllabic word in question, just as (1) contains a name of the populous city in question. (3) is *about* a word which (1) *contains;* and (1) is about no word at all, but a city. In (1) the place-name is *used,* and in this way the city is *mentioned;* in (3) a quotation is used, and the place-name is mentioned. We mention x by using a name of x; and a statement about x contains a name of x. (*Mathematical Logic,* N. Y.: W. W. Norton & Co., 1940, p. 23.)

The distinction between use and mention does not, contrary to some of my critics, dispense with the problem of external reference. Granted that a thing is being referred to when its name is used, we must not overlook the fact that such names as "Boston" are not demonstrative symbols, but can be used in the absence of the things named and therefore present the same problem as descriptive phrases. Furthermore, the referent of an existence proposition is a concept and not a word; and I do not think that the distinction between use and mention, which is relevant to words, is equally relevant in dealing with concepts. Accordingly, when I am asserting that an existence proposition is about an apparent variable, I do not confuse use with mention because I do not mean by "apparent variable" a symbol, which could be "x" or "y" or any other letter agreed upon, but the conceptual function which the symbol symbolizes. The symbol of an apparent variable is used within the expression "There exists an x such that x . . ."; but I do not think that the symbol "x," as it occurs within this expression in an existence proposition, can be said to be used in order to mention a thing outside discourse: there may be no such thing outside discourse; nor is it correct to say that the symbol "x" is used in order to mention the apparent variable, in the sense of the concept "thing." The symbol "x" symbolizes, i.e. it must be interpreted as, a certain conceptual agency. The truth is that the distinction between use and mention cannot

be entirely clear without an antecedent explanation of the relation between the semantic function of mentioning things and the conceptual function of external reference. Let me illustrate the point. A class-term is associated with the class-extension, to be called the denotatum of the term and, if the class is not null, with the collection of existing things to which the term applies, and which may be called the designatum of the latter. In using a class-term conceptual reference is to the denotatum of the term. But the question is whether the class-term mentions the denotatum or the designatum. I do not think that many semanticists realize that there is a question here, but I suppose they would be inclined to say that the class-term is used in order to mention the designatum. If so, and unless they accept conceptual reference as distinct from mention, the semanticists would be at a loss in dealing with class-terms, such as "unicorn," which have no designata, or with such sentences as "All men are mortal," when the latter are interpreted as propositions with no existential import. Another illustration is the semantic conception of truth. Consider again Tarski's equivalence exemplified by the statement: " 'The moon is round' is true if, and only if, the moon is round." The right hand side of the equivalence is meant to be used in order to mention the moon. Apparently the semanticist assumes that one can mention the moon by virtue of an extra-linguistic reference, as if the possibility of referring beyond discourse, and yet in terms of discourse, were no problem at all.

The referent must be correlated with other conceptual forms within the complex structure of a proposition. Thus we make use of the concept "property" when we describe the referent. Furthermore, conceptual assertion takes place in order to construe the description as realized and not merely a possibility. Accordingly, the opposition between realization and possibility is an ultimate and a priori conception. For, while the existence of alternative tendencies of a power is the empirical basis of the concept of possibility, only one tendency at a time can be actualized, and therefore to envisage alternative actualities is to conceptually idealize the

situation. A property may be one-term, or monadic, or else many-term, or poliadic; in the latter case the property is called a relation, and the corresponding propositional function, such as "$x = y$," requires the employment of at least two referent variables. Although properties are always descriptive, the concept "property" is no more descriptive than its conceptual correlate "thing," since both serve propositional articulation regardless of the contents. And, of course, a property may, in its turn, be a referent; for example, at this moment I am concerned with the nature of, and therefore referring to, properties. Hence the list of basic concepts includes properties of properties, i.e. properties of a higher logical type than a property of a particular. Thus an absolute but restricted hierarchy of logical types is derived from the conceptual articulation of experience by means of a proposition. A referent of the lowest type is a particular: only the concept of a power, an event, or a process, can function as a particular; next in the hierarchy comes a property of a particular and, finally, a property of a property. We may artificially extend the hierarchy by conceiving "a property of a property . . . of a property of a particular," but in ordinary discourse there is no need for such an extension. Even in the theory of logic, or metalogic, and of mathematics, except, perhaps, in some special context as this one, a postulational treatment of numbers as particulars or elements of the system would let us *use* a property of properties of properties of particulars and *mention* a property of properties of particulars as, respectively, the highest types of properties required. Thus, as I have tried to show in the third chapter of *The Problems of Logic,* a structural difference between properties of particulars and properties of properties of particulars is sufficient for a resolution of Russell's paradox of classes that are not members of themselves. And, some adverse criticism notwithstanding, I do not think that my restrictions, imposed upon the hierarchy of types, are inadequate for mathematics. Of course, if integers are defined as classes of classes, i.e. in terms of properties of properties of individuals, construction of other mathematical entities requires the

existence of higher types; but, unlike Russell, recent mathematical logicians prefer to treat integers as entities of the lowest type. As to Russell himself, he was primarily concerned with the difficulty of a logical construction of real numbers, but his difficulty was a question of distinct logical orders rather than types. However this may be, let me propose the following tentative list of pure, or nondescriptive, concepts, in which the first three form an absolute but restricted hierarchy of logical types: thing, property (or relation), property of a property, assertion (with the distinction between possibility and realization), proposition (as the context of the preceding entities), class (if classes are to be distinguished from properties), and, finally, number and other mathematical constructs.

Pure concepts are commonly contrasted with such empirical terms as "brown," "chair," "man," and the like, because of a descriptive or connotative import of the latter. I do not deny that empirical terms are ideas or thoughts of some kind and that concepts enter into their formation. The presence of conceptualization is shown by the fact that such a statement as "The chair is brown" is understood to the effect that "There exists one, and only one, thing under consideration such that it has the properties of being chair-like and brown (or, alternately, such that it is a member of the class 'chair and brown object')." But whatever the nature or status of empirical terms, I should not call them concepts, if concepts are definite and communicable entities which serve to stabilize and articulate discourse. And, furthermore, I shall argue that concepts which take part in the formation of empirical terms are pure concepts. In short, my argument is that there are no other but pure concepts.

To begin with, even writers who identify empirical terms with concepts generally agree that an empirical concept does not share in the sensory, or empirical, nature of the data or objects to which the concept applies, or which it denotes. For instance, these writers would say, the concept "brown" is itself not brown, and the concept "round" is itself not round. I suppose if asked for a proof, they would point out

that neither "brown" nor "round" is a name of anything that takes place in perceptual experience. Thus, to use "brown" for an illustration, there are perceptually coexclusive shades of brown, i.e. a surface which appears to a percipient to be of a certain shade of brown cannot also show to him another shade of brown, and the term "brown" cannot name one of them, in exclusion of others, since it is associated with each and all of them indifferently. My own view of the existence of determinable properties would make no difference here, for an additional association of the term "brown" with the determinable color does not require dissociation with the relatively specific shades, and, of course, a surface can be no more simultaneously determinable and determinate than it can have at once different shades of color. Thus to insist that the term "brown" shares in the empirical nature of brown data is to postulate, over and above the determinable color and its relatively determinate shades, a mysterious universal essence of "brownness." To reject universal essences I must undertake a brief digression on the legitimacy of universals.

If we define universals as entities capable of recurrence or, briefly, as recurrents, then it is quite easy to demonstrate the existence of universals. For example, the existence of a uniformly colored surface is a required demonstration because it means that the same color recurs at different parts of the surface. To deny the existence of uniformly colored surfaces is to assert that there must be a change in color, however slight, from point to point on any surface. But aside from the fact that a point, or even an area which is small to the point of being hardly discernible, does not provide the minimum extension for an appearance of a color, we find that uniformly colored patches unquestionably exist as data in our perceptual experience. Nor is recurrence an exclusive property of sense data; concepts are, likewise, recurrents. For instance, consider the reiteration: "Today is Friday, today is Friday." This reiteration exemplifies a recurrence of the same proposition in an immediate succession of two sentences; but of course, recurrents may be separated

by any interval of space or time. There is no reason, however, to assume that during an interval between recurrences the universal entity continues to exist or subsist. Those who assume the continuous being of a universal essence point out that to identify recurrents as manifestations of the same universal we require an uninterrupted existence, or subsistence, of the latter. But, let me answer, there are different uses of the expression "the same." Although we should not call a particular the same on different occasions of observation if it were not for its uninterrupted existence, a similar requirement is not appropriate with regard to a universal. A Platonic recess for thoughts which no one happens to entertain is no more credible than any other myth.

But some thinkers believe in universal essences without construing them as Platonic or subsistent entities. To claim that there is a universal essence "brownness," they would say, is merely to state the fact that we recognize a certain similarity among all brown data, however different in shade or specificity they may be, which allows us to conceive their properties of color together as a unique family. When empirical terms are identified with universal essences so understood, they are called classes. For objects are classified according to their similarity in satisfying a definite condition. The question is: Are there empirical class-concepts? Of course there are empirical class-terms, but that does not prove that they are definite and communicable concepts. To answer the question we must, as a matter of clarification, compare empirical classes with purely logical and mathematical classes. The comparison will be undertaken with respect to two points: (1) the existence of a definite condition which determines class-membership, and (2) the possibility of differentiating between a class and a property. There is no doubt that logical and mathematical classes are definite because they are built according to specific rules, or conditions, which leave no doubt as to the membership of any given element. Take the class of prime numbers; to be a member of this class an integer must be greater than one, and have no factors other than itself and one. This condition

unambiguously and immediately determines whether any given integer is prime. For example, the numbers 2, 3, 5, and 7 are prime, while 6, whose factors are 2 and 3, is not. On the other hand, in classifying empirical objects we are invariably confronted with doubtful cases. If a man is a rational being, how shall we classify a feeble-minded person? And if a man is a featherless biped, how shall we classify a soldier whose legs have been amputated? We have to qualify, but each qualification brings with it similar difficulties. The best we can do is to define a class in terms of simple sensory qualities; for example, an orange is "round and orange and . . ." But this would be no more than shifting the difficulty: we would have now to define such simple classes as the class of orange things and, again, we should be unable to decide on certain occasions whether a given color is orange or red. The difficulty is well known in the field of linguistics and semantics. We are often told that words are ambiguous and vague or ill-defined in their application. I merely connect this recognized imperfection of words with the problem of empirical concepts; I suggest that to say that words are ill-defined in their application is to admit that there are no definite class-concepts corresponding to empirical class-terms or words. The difficulty in question, let us observe, converges upon the possibility of singling out invariance among the variations which are displayed by a sensory property. We fail to define the color orange, or any other color, because each shade of a color is a simple quality, and we manage to discern a similarity of shades in spite of the absence of an invariant or common element. Nevertheless with the aid of the group concept we can sometimes succeed where sensory discernment and the usual procedure of classification fail. A group is a logical, or mathematical, class of transformations which are performed in accordance with certain definite and precise rules; whatever remains unchanged through these transformations emerges as an invariant property. A reader, who is not familiar with the theory of groups, will find in C. J. Keyser's readable account a demonstration of the use of group-invariance in a definition

of the empirical term "shape" or "figure." Thus, by means of group theory, empirical class-terms may be correlated with class-concepts; but if we say that thereby empirical class-concepts can be built, we must not forget that the conceptual bases of such constructions are purely logical, or mathematical, classes. And now a word about point (2), the differentiation between a class and its defining property. Recent work in mathematical logic has shown that logical and mathematical classes are to be determined by their extension, and this in conjunction with the principle of extensionality, to the effect that properties or propositional functions which are materially equivalent are equal, makes, for all purposes of inference and computation, a class to be indistinguishable from a property or propositional function. There is one possible qualification. Russell's paradox of "the class of classes which are not members of themselves" may, perhaps, not be given in terms of properties. I shall not enter into a detailed discussion, but I can briefly indicate the grounds of my doubt. Carnap attempts to formulate Russell's paradox, and I followed him in my *Problems of Logic;* in terms of the monadic property, or quality, "impredicable." But I now doubt whether "impredicable" is a quality. If "impredicable" is a two-term relation, then, to express in symbols that a property is not predicable of itself, we should use the relational form *"F Impr F,"* where *F* is a quality and not a relation, and not Carnap's form *"Impr (F)."* And the employment of the relational form prevents the occurrence of the paradox. On the other hand, I have no doubt that an empirical class is distinguishable from the corresponding property, unless the stipulation that extension identifies a class is withdrawn. Take the class "man," for example. Every moment people are born and die, and therefore if a class is to be identified by its membership or extension, there is not a single class "man," but as many as the number of moments in the history of mankind; yet the property "human" connotes the same thing throughout history. Some logicians propose to meet the difficulty by a convention according to which not only existing people but the dead and the unborn

are to be counted as members of the class "man." This convention has the embarrassing consequence of removing empirical classes from the list of empirical entities. The alternative of withdrawing the convention of identifying classes by their extension is no better: it would sever the connection between the calculus of classes and the field of empirical class-terms. The truth is that there is no satisfactory solution because empirical class-terms are not definite, unambiguous, and communicable class-concepts.

Scientific concepts, such as "velocity," "force," and the like, are different from both the pure concepts of logic and mathematics and the empirical terms of ordinary discourse. The undeniable precision of a scientific concept has a drawback: we must raise the question of a justification of the concept in terms of perceptual experience. Consider the concept of velocity. We may say that the basis which this concept has in experience is the observable speed of bodies in motion; but velocity is distinguished by precision because it refers speed to a single point and moment, and, it has been argued, neither points nor moments are data of experience. Whitehead's method of extensive abstraction gives one well known way toward a solution of the problem. This method confirms my assertion that conceptual precision is a contribution of purely logical and mathematical concepts. For the point of Whitehead's program is a replacement of such nonempirical entities as points or moments by constructs which are built out of perceptual data exclusively by means of logic and mathematics, and are equivalent, for all purposes of deduction, to the replaced entities. But in carrying out his program Whitehead makes use of the already conceptualized sets of data; for example, in defining a point he makes use of the precise geometrical properties of such sets as the set of concentric circles. On the grounds of the perspective theory of truth the existence of approximations to a set of concentric circles in perceptual experience fully justifies the concept; but if idealization is admitted into the procedure at all, there would seem to be no good reason why points and moments, to begin with, could not be treated as

idealizations of perceptual approximations to points and moments. For such approximations certainly exist. When I look at a corner of this page, I am observing an excellent illustration of a geometrical point; at any rate I cannot discern any extension at the intersection of the edges. I must admit that the datum is not sufficiently determinate to enable me to positively assert either that it *is* a geometrical point or that it is not; but it provides a sufficient empirical basis, at least as a definite tendency, to the formation of the geometrical concept. Thus my admission serves to reassert a major point of this section, that concepts have a footing in perception even if, in order to stabilize and organize the preanalytic dynamics of experience, they themselves must be a priori or pure.

FORMAL LOGIC

FORMAL logic is the science of pure concepts. If my contention that there are no definite and communicable empirical concepts is correct, the definition can be simplified: logic is the theory of concepts, of significant conceptual formation and valid transformation. This definition is in line with one traditional doctrine, according to which logic is concerned with formal properties of propositions, but has the advantage of rendering precise the term "form" by identifying form with concept. Since concepts, as I understand them, are pure or a priori, correct form can be recognized without the aid of empirical considerations. The basis for telling whether the form is correct is either antecedent convention or conceptual intuition. I reject the conventionalist alternative in favor of logical intuition. The argument leads to the most exacting test of intuition, the subject of semantic paradoxes. But the success of logical intuition is relative to, or conditioned by, linguistic precision. This means restriction of the field of application. To go beyond the restricted field, we need a logic of relevance which, unlike formal logic, would be a concern with interrelated empirical contents.

We may agree with the conventionalist that no account of logical form has been satisfactory. The best that I can find is Russell's statement:

> In every proposition and in every inference there is, besides the particular subject-matter concerned, a certain *form,* a way in which the constituents of the proposition or inference are put together. If I say, "Socrates is mortal," "Jones is angry," "The sun is hot," there is something in common in these three cases, something indicated by the word "is." What is in common is the *form* of the proposition, not an actual constituent. If I say a number of things about Socrates—that he was an Athenian, that he married Xantippe, that he drank the hemlock—there is a common constituent, namely Socrates, in all the propositions I enunciate, but they have diverse forms. If, on the other hand, I take any one of these propositions and replace its constituents, one at a time, by other constituents, the form remains constant, but no constituent remains. Take (say) the series of propositions, "Socrates drank the hemlock," "Coleridge drank opium," "Coleridge ate opium." The form remains unchanged throughout this series, but all the constituents are altered. Thus form is not another constituent, but is the way the constituents are put together. It is forms, in this sense, that are the proper object of philosophical logic. (*Our Knowledge of the External World,* N. Y.: W. W. Norton & Co., 1929, p. 45.)

Although clear as far as it goes, the statement requires further elaboration. First, although Russell uses the term "proposition," his illustrations do not show that he would draw a distinction between proposition and sentence; and if logical form is the way the constituents of a *sentence* are put together, then it is indistinguishable from syntactical form. But syntactical form is a linguistic construction which may have nothing in common with objective, or ontological, structures. And a divorce between syntax and objective structure naturally leads to the notion of an arbitrary form in logic, and therefore to the conventionalist position. Second, Russell differentiates between the form and the constituents of a proposition on the basis of invariance, i.e. on the assumption that the form remains the same while one constituent is replaced by another. But by his own admission, illustrated by the sentences "Socrates was an Athenian," "Socrates married Xantippe," and "Socrates drank the hemlock," we

can keep the same constituent while we change the elements of form. Again, in order to complete Russell's account, we must distinguish between linguistic and conceptual invariance. Whereas linguistic invariance is insufficient to enable us to differentiate between form and content, conceptual invariance means the existence of the same basic organization of elements within the context of discourse, regardless of either the elements or the context, i.e. regardless of the subject matter, therefore of the same form. Let us say that logical form is contextual: an abstract pattern of predication and of correlating a referent or a predicate with other referents or predicates; and that, on the other hand, constituents of content must be placed within this framework of context in order to perform their function of describing the world outside discourse. Let me illustrate. Take the statement "Africa is larger than Australia." The conceptual framework, common to this and other contexts, is "One thing has a certain relation to another"; the constituents of the statement describe the related things as two geographical continents of unequal magnitude; the contribution of the constituents is to geography and not to articulation of discourse. We may say that form is significant but not meaningful except in conjunction, and cooperation, with the constituents of content. Consider the familiar verse:

'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe. . . .

Alice's reaction, "Somehow it seems to fill my head with ideas—only I don't exactly know what they are," is correct. The verse is significant because it has the same logical framework as the meaningful lines:

'Twas chilly, and the slender does
Did leap and circle in the glade. . . .

But while both verses are significant, the piece from *Alice in Wonderland* gives no more than elusive suggestions of possible meaning.

The fact that logical forms are incomplete with respect to

meaning, and therefore do not make up an independent language, is not appreciated by the conventionalist who treats logical formulas as if they were formations of meaningless marks set up in accordance with the conventional rules of an abstract language or calculus. To contrast the conventionalist treatment with my position of conceptualism, compare the valid logical formula:

$$(a) \sim (p. \sim p),$$

with the principle of contradiction:

(b) It is false that the same proposition is both true and false.

I take (a) and (b) to have the same significance: both are intended to exclude as false any such conjunction of empirical statements as "The moon is round and it is false that the moon is round." The difference between (a) and (b) is, primarily, this: (a) is a schema, i.e. an exhibition by means of conventional symbols of the falsehood of a self-contradictory formation, whereas (b) describes, and rules out, the falsehood of a self-contradictory formation in technical English, i.e. by means of such technical terms as "proposition," "true," and "false." Both (a) and (b) are about an invalid formation and, in this respect, both differ from the empirical statement "The moon is round and it is false that the moon is round" which *uses* the invalid formation in order to *mention* the moon and roundness. The conventionalist, on the other hand, takes (a) to be an uninterpreted formula within an independent object-logic or calculus, and opposes the object-formula to (b) which is construed as a metalogical rule, or convention, for the use of (a) and other object-formulas, whereby the consistency of the calculus is prescribed. I have two main objections against the conventionalist. First, his treatment of logical form does not do justice to the function of logical analysis. Second, he disregards coercion which goes with a principle of logic such as (b). On both scores conceptualism proves to be a superior alternative.

Logical analysis, in the technical sense of the expression,

defines the meaning of a statement by specifying its logical form. We recognize the importance of logical analysis when we observe that sentences are often inadequate expressions of the intended meaning, that they may be idioms, that even if different they sometimes convey the same proposition, and that statements of the same linguistic form may yet have different conceptual formations. The nature of logical analysis requires a procedure in the course of which the original (imperfect or idiomatic) sentence is replaced by a literal, or more explicit, or, at any rate, more adequate formulation. Since overtly only sentences are employed in the procedure of replacement, the view that logic needs no propositions may appear to have an empirical basis, but only if one overlooks the point that replacement of one sentence by another would be stultified unless we could compare them with respect to the same meaning and perceive that the sentence which completes the analysis gives a better expression of the meaning by carrying further the specification of form. The function of logical analysis is correction of an originally unsatisfactory formulation; and this function cannot even be understood without the aid of the antecedent distinction between proposition and sentence. Analysis, logical as well as any other kind, requires a complete list of basic, or undefined, elements of the field under analysis. This is to say that a complex situation is fully analyzed if, and only if, it is given as a combination of basic elements. In logic the basic forms of analysis (with the addition of symbols to be introduced at a more advanced stage) may be listed as follows: the conjunctive "and" (symbolized by a dot), the operator of negation "It is false that . . ." (symbolized by the curl), the sign of equality, the existential prefix "There exists an x such that . . . ," and the predication-form "$f(x)$." Let me illustrate logical analysis by means of this list. The listed symbols represent logical forms only within the conceptual framework of a complete proposition. It would seem that the simplest conceptual framework is symbolized by "There exists an x such that $f(x)$." This is the form of such statements as "Something is blue" or "Men exist." Thus logical

analysis shows that the sentence "Men exist" expresses the elementary existence proposition "There exists an x such that x is human." "I saw a lion" is analyzed into "There exists an x such that x is leonine and x was seen by me." "All men are mortal" becomes "It is false that there is an x such that x is human and not mortal," or, if you use the original sentence colloquially, with the implication that men exist, the complete analysis gives a conjunction, "There exists an x such that x is human and it is false that there exists an x such that x is human and not mortal." The singular proposition "The moon is bright" is translated into "There exists an x such that x is lunar, and it is false that there exists a y which is lunar and distinct from x, and it is false that there is an x which is lunar and not bright." Any compound form can be transformed into a conjunction or a negation or a combination of both. For example, "If winter comes, spring can't be far behind" is transformed into "It is false that winter comes and yet spring is far behind." An examination of these and other examples shows that logical analysis is complete if, and only if, the sentence arrived at cannot be transformed into another sentence with a greater number of existential prefixes without a change in the intended meaning. We also observe that the operation of prefixing an expression with an existential prefix establishes one of the truth-conditions of the statement under analysis. Thus the analysis of the singular proposition, given above, arrives at a conjunction of three truth-conditions which correspond to three applications of the existential prefix. Accordingly, we may conclude that logical analysis can be carried on so long as not all truth-conditions of the proposition under analysis have been explicitly stated. The conclusion is that logical analysis of meaning is a statement of truth-conditions. This conclusion must not be confused with the wrong notion that the meaning of a statement is identical with its truth-conditions. We must not forget that when all truth-conditions which can be given in terms of elementary logical forms are made explicit, logical analysis is completed, but each component statement of a single truth-condition

must be understood, and therefore is meaningful even though it itself is not resolvable into a set of further truth-conditions. In other words, logical analysis must perforce leave unanalyzed, and therefore without a further statement of truth-conditions, those components of the analyzed proposition which have the form of an elementary existence proposition. This is not to say that an elementary existence proposition cannot be further analyzed, but only that it puts an end to the technical logical analysis; further analysis depends on consideration of descriptive meaning. We do not need to continue. This introduction to the theory of logical analysis is given in order to convince the reader that the conventionalist is unable to take care of an important branch of logic on his terms. His closest approach to logical analysis is a doctrine of interpretation whereby an independent formal language or calculus is correlated with a set of empirical statements. This doctrine involves two things. First, a model language is constructed; it contains only uninterpreted formulas, i.e. sets of meaningless marks on paper combined according to the conventions of a metalanguage. Second, each uninterpreted formula is correlated with an empirical sentence of some definite field, such as biology; this procedure assigns a logical form to each empirical sentence. The conventionalist difficulty is the question of correlation. Either the empirical statement, to be correlated with a formula of an uninterpreted language, has an antecedent logical form of its own or not. The negative alternative would mean that correlation, contrary to the actual practice of interpretation, is arbitrary. In practice, even a conventionalist would correlate the form "There exists an x such that $f(x)$" with "Something is blue" rather than with "All men are mortal." An arbitrary correlation seems to be excluded when we are told that the construction of an uninterpreted calculus must be "guided implicitly by the interpretation we eventually intend to give it." The advice comes close to saying "Don't let your left hand know what your right hand is doing," and would seem to imply an antecedent knowledge, in the intended interpretation, of the logical form of empiri-

cal statements. But if we admit the alternative of antecedent logical forms, logical analysis, as I have explained it, is the way to establish and study them. Let us note that a study of the syntax of an ordinary language such as English would not be sufficient. For example, the three sentences, "All men are mortal," "No men are immortal," and "Only mortal beings are men" have different syntactical structures, and we need logical analysis to learn that their conceptual form is the same.

Conceptualism allows for, and explains, logical necessity: the contradiction of a necessary conceptual formation is inconceivable, i.e. conceptual understanding, or intuition, would not accept it as a definite concept. On the other hand, to the conventionalist, a theorem of logic has only the necessity of a move which is made in accordance with the rules of a game. The principles of logic, declares the conventionalist, are rules by convention. But to explain himself, and to convince others, he must argue his point. And if the logical basis of his argument is only convention, the opponent may refuse to be convinced by the simple expedient of using different conventions of his own. Even if both use the same logic, for example, the common sense logic embedded in an ordinary language such as English, the conventionalist's conclusion cannot be conclusive on his own terms, because the conclusion declares that the apparent coercion of its joint premises rests on arbitrary stipulations. As a matter of fact, the evidence, which is supposed to be in favor of the conventionalist position, is far from being conclusive, regardless of the interpretation of the nature of logical coercion. There is the fact of the existence of alternative postulational systems of object-logic, and the associated fact that certain formulas, for instance, the formula of the two-valued system which is interpretable as the classical principle of the excluded middle, are not theorems in some of the alternative systems. But these facts have not much bearing on the issue whether the principle of the excluded middle, taken as an *interpreted* formula, is a dispensable convention. To prove that the principle is dispensable, the conventionalist must

argue that alternative logics are equally applicable to actual discourse, i.e. that the same set of statements can be employed to interpret the formulas of the two-valued calculus as well as the formulas of a multivalued object-logic. But in so arguing he cannot expect conviction because he is forced to tread on highly controversial grounds. Suppose, for example, he argues that the statement "It will rain tomorrow" exemplifies the use of a two-valued logic provided we agree that the statement is "either true or false, although we do not know which," and that the same statement exemplifies the use of a three-valued logic if we agree that the statement is "neither true nor false." A classical logician may counter, following C. D. Broad, that "It will rain tomorrow," or any such reference to the "nonexistent future," is not a genuine, or meaningful statement. The controversial issue turns upon the criterion, or convention, of meaning. But even if the conventionalist could prove that the principle of the excluded middle is a dispensable rule, he would demonstrate that *some* rules of logic are conventions and not that all are. As far as I know any alternative object-logic contains an equivalent of "$\sim (p. \sim p)$," i.e. a theorem interpretable as the principle of contradiction, and I shall argue, in the next paragraph, that the principle of contradiction is valid on intuitive grounds. For the moment, let me point out that if every logical principle were valid by convention only, deductive demonstration would carry with it no more certainty than induction. Let us grant, for the sake of argument, that logical necessity is nothing but successful convention, that to play a winning game we must only conform to its rules. With the best intention to act in accordance with the rules, for example, in writing a formula of the object-logic in accordance with the metalogical conventions of formation, we can never be sure that we have carried our intention into practice. We may have misunderstood the directions, or misapplied them, or simply made a slip in writing down the formula. The conventionalist might reply that the success of our past experience shows that, if we are careful enough, there need be no inadvertent infringement of the rules. But

that is just the point: to justify logical demonstration by the empirical evidence of the past is to rely on the principle of induction. Let me put the matter thus: although logical necessity can *also* be stipulated, it is not there *only* by convention.

To convince the conventionalist that the principle of contradiction is intuitively certain, let me follow him, for the duration of the argument, in drawing the distinction between the principle as a metalogical rule, the principle as a theorem of an object-logic, and the exemplification of the theorem in an empirical statement of ordinary discourse. As a metalogical (syntactical or semantic) rule of formation, the principle of contradiction is *indispensable*. For if, in an attempt to violate the principle, we should first assert a formula, i.e. write down a theorem, of the object-logic only to retract our assertion, or to erase the theorem, the moment to follow, we could proceed no further than we would in a game of chess against an opponent who takes back any move he pleases. And if the conventionalist concedes that, as a rule of procedure, the principle of contradiction is indispensable, then he must admit that it can have no alternative, and therefore is not a convention. Furthermore, if a rule is indispensable, it is more than a rule, we call it a principle: for it also is a *description* of the falsehood of any formation which would violate the rule. Accordingly, the principle of contradiction guarantees that any statement which exemplifies the form "$p. \sim p$" is false (if "p" represents a proposition and "curl" the expression "It is false that . . ."). Perhaps the conventionalist might try the following dodge. Let us, first, he would say, write down the meaningless formula "$p. \sim p$" and *stipulate* that it is a theorem of our object-logic and, second, let us interpret the formula as a contradiction with no regard for either the internal consistency of the calculus or the possibility of an interpretation in terms of empirical statements. Thus, the postulationist would conclude, we at once dispense with the use of the metalogical rule of noncontradiction and establish a violation of the rule as a theorem. The answer to this imaginary argument is that in an attempt to be con-

cerned with a single formula in disregard of consistency with other formulas we can dispense with the use of the metalogical principle of contradiction, in the sense of suspending its application, only at the price of adherence to another metalogical principle, the principle of identity, according to which a symbol must have the same significance in all its occurrences within a given context. If we do not adhere to the principle of identity, nothing keeps us from treating the symbol "p" as having a different significance in its two occurrences within "$p. \sim p$," so that the formula itself becomes another way of writing "$p. \sim q$" and is no longer interpretable as a contradiction. This technical consideration brings us to the problem of logical principles in relation to one another, a problem which is important in a discussion of an exemplification of the formula of noncontradiction by an empirical statement. Take, as an exemplification of "$\sim (p. \sim p)$" the statement "It is false that A (the same area) is both red and not red (in relation to the same act of perception)." The statement is intuitively true, but the validating intuition is relative to the principle of the excluded middle or to certain linguistic conventions. Suppose we are asked to describe a band of color in the spectrum just where red shades off into orange. We may say: "The band is not violet, nor blue, nor green, nor yellow, nor orange; in short, it is false that the band is not red." But, if pressed, we may also admit: "It is false that the band is red." The joint assertion "It is false that the band is red and that the band is not red" would be a contradiction, and yet an empirical truth, but only if we insist that the language we use is precise and that we must apply the principle of the excluded middle, "Either the band is red or it is not red." As a matter of fact, the words "red" and "not-red" are vague, and therefore we can uphold the principle of contradiction by suspending the application of the principle of the excluded middle: our joint assertion is not sufficiently definite to be a contradiction. The principle of the excluded middle, taken as a principle of conceptual precision, "Either a concept describes a thing or not," is just as intuitively certain

as the principle of contradiction. But when words fail to convey precise concepts, the principle of the excluded middle does not apply to sentences. The situation is simply this. Any principle of logic requires precision of terms in the field of application, and therefore no principle, not even the principle of contradiction, can apply without qualification to an inexact language or indefinite discourse. When a logician sets up a formal calculus, he uses as his medium, or metalanguage, technical English which is nearly precise; therefore his metalanguage conforms to the principles of logic sanctioned by intuition. On the other hand, colloquial language, exemplified by the use of the adjective "red," is vague or inexact. Yet, because of its paramount importance in formal logic, and in order to assure contact between formal logic and actual discourse, the principle of contradiction must have unrestricted application. Unrestricted application can be secured by different means, of which the suspension of the principle of the excluded middle is one. Using the method of suspension, we proceed to deal with inexact words, such as "red," as follows. We divide colors into three coexclusive and jointly exhaustive classes: (1) those to which the word "red" definitely applies, (2) those which are definitely not red, and (3) indeterminate shades of color. This is to say we replace the principle of the excluded middle by the principle of the excluded third. At the same time, we conform to the principle of contradiction because we take the indefinite sentence "It is false that the band is red and that it is not red" to mean the practically definite, and noncontradictory statement, "It is false that the band is *definitely* red and that it is *definitely* not red." But there is an alternative method. We may have unrestricted application of both the principle of contradiction and the principle of the excluded middle provided we specify, or make precise, the inexactitude of our words. This is Russell's alternative procedure, which he introduces on page 131 of *An Inquiry into Meaning and Truth:*

If "metre" is intended to be a precise concept, we shall have to divide lengths into three classes: (1) those certainly less than a

metre (2) those certainly greater than a metre (3) those belonging to neither of the first two classes. We may, however, think it preferable to make "metre" an inexact concept; it will then mean "any length which, by existing scientific methods, is not distinguishable from that of the standard metre." In that case, we can sometimes say "the length of this rod is one metre." But the truth of what we say is now relative to existing technique; an improvement in the apparatus of measurement may make it false.

There is a disadvantage in Russell's procedure, the reinstatement of the principle of the law of the excluded middle, because his alternative would seem to involve, besides a sanction of linguistic instability, abandonment of the principle of identity, in the form of the assertion that a proposition, if once true, is always true; as he himself admits, the truth-value of "the length of this rod is one metre" may vary with the change in the methods of observation and measurement. On the other hand, the admission of objective indeterminacy, by the first alternative, is unobjectionable on the premises of the philosophy of power.

The conventionalist contends that conceptual intuition allows for such linguistic formations as the "Epimenides" only to find itself caught in a semantic paradox. I disagree. The paradox takes place only if the objectionable formation is not, to begin with, recognized as a downright contradiction, i.e. a conjunction of two contradictory statements, but leads to a contradiction by transformation in accordance with the accepted rules of inference. There would be no paradox if we could show that the original formation is, as it were, an idiom, and that a translation into a literal and explicit expression brings out a downright contradiction. Consider the following version of the paradox. Let us draw a rectangle, to be called R, and write in it the sentence: (A) All statements within the rectangle R are false. If (A) is false, then, since there are no other statements in R, what (A) asserts agrees with the hypothesis, and therefore (A) is true. But if (A) is true, it is true that whatever is written within R is false, and therefore (A), which is written there, is false. Hence the paradox. However, conceptual intuition

gives a simple resolution. Since every sentence which expresses a proposition is construed as a claim to truth, so is sentence (A). But (A) describes itself as a falsehood, and this description contradicts its claim to truth. Therefore (A) is not a paradox but a contradiction. The contradiction, let me emphasize, is elicited by making explicit the conceptual significance, the claim to truth, of (A), and not by drawing inferences in accordance with the usual rules. I am entirely satisfied with this resolution of the paradox. Unfortunately logicians who deny the existence of propositions, or even those who admit propositions but not as assertions, will not accept it. In order to convince them, as well as others, that epistemological paradoxes arise through no fault of conceptual intuition, let me try an alternative treatment. In a previous paper on "Undecidable Statements and Metalanguage" (*Mind,* vol. LIII, N. S., No. 211) I argued the following point:

> Let me try now a treatment of epistemological paradoxes without recourse to a metalanguage. Consider Epimenides' statement in the form:
>
> (E) This statement is false.
>
> Observe that the paradox takes place only if the designation "This statement" is used as a name of E. But in English such a use of the designation is incorrect; a correct use requires a context within which the designation refers to *another* statement, usually immediately preceding the statement which contains the designation. The correct use may be illustrated by the following context:
>
> The earth is flat. This statement is false. . . .
>
> Suppose you try to state E in isolation from any such context. As soon as you utter the words "This statement . . . ," I have a perfect right to interrupt: "What statement? You use a designation of a statement, but you did not mention any. So the designation cannot be a name of a statement, at best it designates the statement-form 'The statement X,' where 'X' is a variable." To this you reply: "Let me finish. I meant to say: This statement is false." But I cannot accept your explanation: "The property of being false must be attributed to a complete statement; it is false or perhaps meaningless to attach 'false' to a mere statement-form such as 'The statement X'." . . . This imaginary dialogue is intended to show why E, in isolation from a context of other state-

ments, is bad English; we are forced to construe *E* as a falsehood or absurdity, to the effect that a statement-form is false and is, therefore, a complete statement.

In a letter of comment on this passage C. I. Lewis wrote to me as follows:

> I feel sure that your point . . . is correct and of fundamental importance, but think that I should want to put it a bit differently lest it should appear that the point depends upon any consideration of the temporal. It seems to me correct to say that the locution "This statement is true" (where "this" refers to the statement being made) is in fact not a statement at all, because in the nature of the case there can be no criterion of its truth or falsity. . . . In general terms, I think we might say that a locution in the assertive form is not in fact a statement unless there be some criterion of its truth which is theoretically applicable, and that no locution can have such a criterion unless it has some (thinkable) referent other than itself.

I believe that I am substantially in agreement with Lewis, and on the basis of his quoted words, as well as of other points which he makes in his letter, I can formulate a theory which I should like to consider as an expression of our common views. Statements about statements are of two kinds. First, there are specifications of the nature or constitution of statements, in particular, specifications of the formal or modal properties of statements. These specifications may also be described as rules to which all statements are subject or, if the rules are for particular classes of statements, with which all statements of a certain class must be in agreement. Let me illustrate the first kind of statements about statements. (a) Any statement is either true or false; (b) A necessary statement is possible; (c) Any statement can be expressed in words or symbols. Observe that since (a) is a statement, the truth of (a) is applicable to (a): (a) is either true or false. Again, since (b) is necessarily true, it is possible, i.e. the truth of (b) applies to (b). Likewise (c) applies to (c). Thus statements about the constitution of statements may be "about" themselves, but only indiscretely, i.e. only in the sense that if they happen to be

uttered or written, their truth applies to them. But the important point is that no such statement is about itself discretely: no such statement mentions itself as a distinct existent referent. Consequently, a truth of this kind does not depend on the existence of any particular statement. For example, (a) does not refer to (a), and the truth of (a) could be expressed, even if (a) did not exist, by the sentence "Any statement has one of the two truth-values: truth and falsehood," or by some other formulation to the same effect. We may say that such a statement as (a) is intended to be internally true, and does not involve external reference. Second, there are statements about statements in a literal sense of "about," in its nondemonstrative use. These statements have an external reference to other statements or, at least, their contradictories have such a reference. And since external reference is a constituent of such statements, the basis of their truth is the existence of external referents. Hence a statement of this kind must not be interpreted as referring to itself: this interpretation would be inconsistent with the constituent of external reference within the statement, and remove the ground for a possible determination of its truth-value. Epimenides' assertion, (*E*) "All Cretan statements are lies," in its nonparadoxical interpretation, i.e. intended to refer to all Cretan statements other than (*E*), is an illustration. An examination of the truth-values of statements by Epimenides' compatriots would determine whether (*E*) is true. We may conclude that no statement, whether of the first or the second kind, is about itself discretely, i.e. has itself for a referent. This conclusion effectively eliminates paradox in the interpretation of any version of the "Epimenides." For example, statement (*e*) within the rectangle *A* of Fig. 6 would be a paradox, leading to a contradiction, only if it could be interpreted as a statement about itself. But, in accordance with our conclusion, we find such an interpretation to clash with correct English. Consider the following statement: (*e*1) *The statement within the rectangle B of Fig. 6 is false.* Statement (*e*1) is not about itself and is meaningful: it means that there is only one

statement within the rectangle *B* and that this statement is false. Therefore since the rectangle *B* happens to be empty, (*e1*) is significant and false; therefore it is not a paradox. Suppose you cut out the italicized words of (*e1*) and place them, in the same order, within the rectangle *B*. This operation of displacement should not change the meaning of the statement. Even after (*e1*) is placed within the rectangle *B* it continues to mean: There is only one statement, other than (*e1*), within the rectangle *B* and it is false. And since there is no other statement within *B*, (*e1*) continues to be false and, therefore, is not a paradox. But statement (*e*) is an exact analogue to statement (*e1*) when the latter is placed within the rectangle *B*. Hence (*e*) must not be interpreted as a statement about itself and is not a paradox. The fact that there is no paradox is obscured by a natural tendency to treat a set of words as a statement unconditionally when only one of the alternative interpretations would make a meaningful sentence out of them. With regard to our illustration we can counteract this tendency by making use of Peirce's distinction between type and token. In the sense in which there is only one word "the" in the English language, the word is a *type*-word; in the sense in which there are about twenty *the*'s on a page, each *the* is a *token*-word; and these tokens are all instances of the same type. The type-token distinction is to be extended from single words to sets of words or sentences. For example, (*e*) within

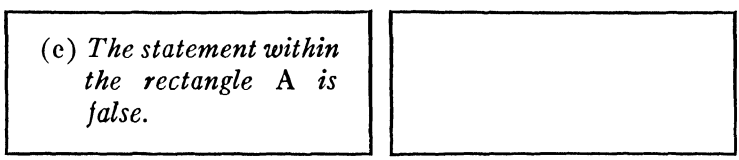


FIG. 6

the rectangle *A* of Fig. 6 is a token-sentence. Another token-sentence of the same type is: (*f*) The statement within the rectangle *A* is false. Since both (*e*) and (*f*) are tokens of the same type, they mean the same thing. And since (*f*) is out-

side the rectangle *A*, it must refer to something other than itself. Therefore (*e*) also refers to some other statement than itself. Both (*e*) and (*f*) are false but meaningful statements, and there is no paradox. There are other versions of the "Epimenides" but, with the possible exception of the paradox correlated with Goedel's undecidable formula *G*, they are all amenable to the same treatment. Let us consider Goedel's version of the "Epimenides." His undecidable formula *G* is about itself, it expresses within an object-logic the metalogical statement "*G* has the property *P*"; *G* is shown to be nondemonstrable (and nonrefutable) within the object-logic if we let *P* mean "nondemonstrable within the object-logic." If, on the other hand, we interpret *P* as the property of falsehood, we transform *G* into a paradox of attributing falsehood to itself. To resolve the paradox we must explain why one interpretation of *P* is legitimate and the other is not. I think an explanation can be given by calling attention to the fact that Goedel's object-logic is a formal and postulational system. This fact means, in the first place, that *G* is concerned with a logical structure or form, and therefore is about itself indiscretely, i.e. *G* is about itself only because it happens to exemplify the structure with which it is concerned. Secondly, since *P* is a predicate of a formula it must be interpreted as a structural property. While "nondemonstrable" is obviously an appropriate description of a formula within a postulational context, the paradox-generating interpretation introduces semantic considerations of falsehood, i.e. reference to matters of fact, which are foreign to the syntax of the object-logic. Of course, the force of these observations depends on the assumption that no analogue of Goedel's undecidable formula can be found among ordinary English sentences. Although J. Findlay has apparently succeeded in translating *G* into English, actually his translation is given exclusively in terms of technical logic, viz. "statement," "statement-form," "variable," "name," "proof," and "substitution." This means that Findlay's undecidable formulation is no more empirical than Goedel's formula, and therefore an attempt to derive a version of the "Epimenides"

by changing Findlay's expression "we cannot prove" into "it is false" is equally objectionable. Such an objectionable attempt would lead to the following locution:

> The statement is false which is arrived at by substituting for the variable in the statement-form 'The statement is false which is arrived at by substituting for the variable in the statement-form *Y* the name of the statement-form in question' the name of the statement-form in question. (Cf. J. Findlay, "Goedelian Sentences," *Mind,* vol. LI, N. S., No. 203, p. 262.)

If the predicate "false" were used here in accordance with ordinary English, the locution should involve external reference; but Findlay's procedure of construction shows that his undecidable sentence refers to nothing but itself "in a purely formal manner." And when there is no external referent, an expression is not to be characterized as either true or false. Accordingly, the locution derived from Findlay's formulation is not a statement. This, I think, shows that conceptual discernment can take care of logical difficulties even in their most sophisticated modern form. At any rate, so long as the resourcefulness of English, or any other inclusive language, has not been fully explored, the semanticist paradox of an infinite hierarchy of metalanguages is more embarrassing than any of the paradoxes, such as "Epimenides," that it is designed to resolve. We may grant to the semanticist that ordinary English is often ambiguous and vague, but not that it is inherently inconsistent. Accordingly, we may admit the artificiality of formal logic, to the extent, that is, to which it requires unambiguous precision, and therefore, given a word or linguistic expression, eliminates all its alternative senses and uses but one. But this is not the extent of artificiality which would justify a divorce between a symbolic calculus of formal logic and the syntax of an ordinary inclusive language.

The success of formal logic is also a limitation. The existence of objective tendencies toward differentiation, isolation, and stability justifies conceptual analysis and thought in the sense of a definite outcome of thinking. But thinking

which is an advance of thought aims at the interconnection of things and is more than conceptual regrouping according to the definite rules of logic. Clear-cut formation and transformation of concepts may be indispensable in communicable exposition, proof, and criticism. Hence concepts and their logic are applied in ordinary discourse and argument whenever the participants are concerned with successful communication or general agreement. Science, in the sense of the already acquired body of knowledge, is another major field of application. But, however important such fields may be, concepts are in a sense dead thoughts, and they must be supplemented by growing ideas if the boundaries of knowledge are to be pushed further and the objective aspect of interpenetration is not to be lost sight of. The contrast between concepts as tools of exposition and live ideas in creative thinking is sufficiently familiar to require further elaboration. And I am not prepared to make a decision on the question whether live ideas are not mental constructions but words in association with dynamic aptitudes or dispositions of the body. But I must complete my account with a comment on the possibility of a nonformal logic of interconnected ideas in progressive thought. The minimum requirements for such a logic, if we are to keep the traditional connotation of the term, are three. (1) The existence of rules. We need not expect that we can acquire the skill of combining ideas or words in discourse, but we must admit the existence of an art of combination which some people may command. And, given a certain combination in discourse, an appeal to theoretical standards or principles must enable us to appraise it correctly. (2) Communicability. This requirement is very difficult to define. But one thing is certain: there is no logic to a combination of ideas if no one but the author can appreciate it. (3) The dynamic necessity in certain combinations of ideas within the given context. The deductive necessity of formal logic is analytic; but the logic of live ideas needs synthetic necessity in order to allow for the growth and development of thought. Some professional logicians believe that the so-called intensional

logic satisfies the above requirements, although their illustrations have been reinterpreted, with some measure of success, in terms of analytic necessity and, in any event, are not sufficiently impressive. Of course, there is the excuse that intensional logic is only at an incipient stage, but I am skeptical about its future because this logic shares with formal logic the assumption that words have definite meanings independent of and controlling their use and context, an assumption which is legitimate in dealing with the objective aspect of stability but not in a concern with dynamic thought. A more promising approach to a nonformal logic is rhetoric, in the sense of I. A. Richards, provided we take its field to include not only literary art but philosophical speculation and to be, in fact, coextensive with what Dewey calls qualitative thought. Dewey's account of qualitative thought is summed up as follows:

> Different ideas have their different "feels," their immediate qualitative aspects, just as much as anything else. One who is thinking his way through a complicated problem finds direction on his way by means of this property of ideas. Their qualities stop him when he enters the wrong path and send him ahead when he hits the right one. They are signs of an intellectual "Stop and go." If a thinker had to work out the meaning of such ideas discursively, he would be lost in a labyrinth that had no end and no center. Whenever an idea loses its immediate felt quality it ceases to be an idea and becomes, like an algebraic symbol, a mere stimulus to execute an operation without the need of thinking. For this reason certain trains of ideas leading to their appropriate consummation (or conclusion) are beautiful or elegant. They have esthetic character. In reflection it is often necessary to make a distinction between matters of sense and matters of thought. But the distinction does not exist in all modes of experience. When there is genuine artistry in scientific inquiry and philosophic speculation a thinker proceeds neither by rule nor yet blindly, but by means of meanings that exist immediately as feelings having qualitative color. (*Op. cit.*, p. 120.)

The restriction, with which I must qualify my agreement with this passage, is primarily a matter of emphasis. Dewey's attention is concentrated on the creative thought of an artist, a scientist, or a philosopher. But, with the requirement of

communicability in mind, we are concerned with the receptive experience of an aesthete or a reader. The point is not that this receptive experience is passive—on the contrary, to follow a creative writer we must be able to recreate his ideas—but that communicable thought is free from all psychological idiosyncrasies that stimulate original thinking. This point is important if we want to understand the relation between formal logic and communicable qualitative thought. For original thought in the making is often illogical. I do not mean the common fact that a thinker may begin with certain assumptions which he rejects at the conclusion of his inquiry, but the existence of actual inconsistency in his mind. Incompatible ideas may be at work simultaneously without any awareness of the fact on the part of the thinker; or else he fails to realize that in the course of a gradual transformation an idea has acquired a form which is no longer consistent with its original meaning. One may expect communicable qualitative thought also to be illogical. In fact one may argue that the internal development of an idea, associated with its dependence upon the context and use of words, engenders ambiguity with a consequent violation of formal logic. The argument is incorrect. Even a purely formal postulational system allows for contextual dependence and a certain development in the significance of its terms. Consider, for example, the game of chess. We find that the word "Knight," as we use it in describing the rules of the game, is definite and unambiguous: the meaning is given by specifying the moves of a knight on the chessboard. And the meaning of the word remains definite even though at the beginning of the game the knight is equivalent to three pawns while toward the end it is exchangeable for two pawns. Contextual change is compatible with a definite meaning, and therefore there need be no violation of formal logic, so long as the change is an addition, or accretion upon, an invariant core which can be specified by a definition. The development of ideas in communicable qualitative thought is a contextual change of this kind. For example, the communicable minimum meaning of the proposition "Beauty is truth" is inher-

ent in Keats' poem although it has been enriched through the development of ideas in its setting in a way which nothing else could duplicate. Thus nonformal logic goes with formal logic. Only the part which formal logic plays in communicable qualitative thought is trivial; our interest is always in the progress and the invariant core is simply taken for granted. Furthermore a detachable invariant proposition is not the same thing as a detached one. Accordingly, formal logic goes with nonformal logic but only implicitly; to make it explicit we "translate" the organic unity of live ideas into an analytic correlation of separate propositions, and this is like "translating" poetry into prose. These remarks may be commonplace, but they serve to emphasize the fact that necessity in a nonformal logic is different in kind from the analytic necessity of deduction. To perceive the validity of a deductive transformation we need only to understand that the premise and the conclusion are alternative analytic articulations of the same contents. On the other hand, necessity in qualitative thought, exemplified by the coherence of ideas in a great and living system of philosophy or by the organic unity in a work of art, is felt through the relevance which different contents have to one another within a perspective of the mind. The logic of qualitative thought is a logic of relevance. And a logic of relevance requires a dynamics of ideas. For ideas are relevant to one another to the extent to which they cannot be separated without distortion, to the extent, that is, to which they are terms of an intrinsic relation; but there would be no intrinsic relation except for the fact that the entertainment of one idea exerts a power in the direction of its correlate. Compulsion exerted by ideas in discourse is a counterpart of their controlling function in inquiry, as the latter is described by Dewey. This becomes evident if we observe that corresponding to the major idea which shapes an inquiry along systematic lines, or enables the thinker to find direction through a complicated problem, there is the central idea in a piece of coherent discourse which organizes the subordinate ideas according to the degree to which it permeates them, i.e. according to their rela-

tive prominence. The situation, in either case, is complicated by the fact that subordinate ideas attract or repel one another with different degrees of force and, in reacting to the dominant idea, modify the power of domination. Thus, in a sense, the differentiation of ideas in qualitative thought may be characterized as a ramification of a single idea. And an idea which remains the same through its ramifications, like a thing which preserves identity through the change that it undergoes, must have the nature of a definite power. Accordingly, an experience of compulsion, which is derivative from the combined powers of the constituent ideas in discourse, is the ultimate basis of a nonformal logic. The protest that reason cannot have irrational grounds comes from an unwarranted identification of correct reasoning with formal logic. We may repeat, in rejecting this protest, that even formal logic would be an empty game without objective application if it were not for the existence of a dynamic tendency toward fragmentation. Let me add that when, in qualitative thought, ideas themselves are powers, their compulsion is neither contrary to reason nor a pressure from external forces, and therefore is not irrational in the ordinary sense of the word. Power and reason are not incompatible.

To relate power to reason consider again the dynamic field of experience, represented by Fig. 3, on p. 88, in which the opposition between the self and the external world appears as a fact of vector distribution. A momentary visual perspective would have the structure under consideration: forces within such a field, both the inward and the outward vectors, are distributed according to their accessibility to the percipient, i.e. according to their distance from him. This is to say that the experience of outward vectors, the original feeling of oneself, is the sense of one's power to reach and grasp objects. When distances are too great to permit the eventuality of contact, there is no tension in the distant background; hence the sense of supreme calm at the sight of the starry sky. Clearly, the reason for this kind of vector distribution is practical: things are evaluated not for their own sake, but instrumentally, with regard to the accident of

being within the range of personal power. The fault with the egocentric perspective, or practical reason, is not that it is practical but that it proves to be a "short-sighted" view, and, in the long run, does not serve the best interests of the self. The fact is that a momentary field of vision is an abstraction which, like a snapshot, leaves out the representation of movement, and therefore gives a false estimation of accessibility. For things may not wait where they are to be grasped, and their spontaneous movement cancels distance, and, with it, the sense of personal security conditioned by separation in space. Hence it pays to study independent movements together with the intrinsic, or objective, significance of things. This means that practical reason must give way to what may be called "higher," or objective, reason. The progress corresponds to a transformation of pattern within the dynamic field; the clear-cut radial arrangement of forces around a single center is blurred at the "blind spots" of perceptual movement, and, as the moving object draws the percipient's attention, the focus of attention originates a second center within the total field. To the extent to which interest focused upon an object may prevail over the interest in oneself the double-centered matrix invites conceptual preoccupation with purely objective contents. But, instead of taking the way of scientific abstraction from the dynamics of experience, we can reach objectivity by means of another change in the vector field. This further transformation is correlated with the logic of relevance, as embodied in an aesthetic experience. The mechanism of the transformation is simple, although it takes all the resources of great art to create the intended effect. To begin with, through empathy, the original center of experience is displaced from the self to another agency, or agencies, within the field: in this manner the percipient learns how to take the part of another, how to identify himself with the latter. But there would be no advantage in simply shifting the egocentric pattern from one region of the field to another unless the percipient can coordinate the agencies of interest, with which he has succeeded in identifying himself, within the unity of a major controlling

power. The dynamic effect is this. The original inward direction of vectors set along straight lines fades into the insignificance of a background; on the other hand, the lines of forces, which form the foreground, are bent in closing upon one another through subjection to the dominant power. The experience is a lesson in the appreciation of objective values, and therefore of "higher" reason. But a work of art, an integrated aesthetic experience, must perforce remain an objective oasis in the total field of subjective experience: the closed structure of art is dislocated from the basic matrix of the background, a fact of dynamics which aestheticians have known, without much success at an explanation, under the name of "psychical distance." We may speculate on the possibility of an experience, a correlate to the "supreme" reason, in which objective integration has spread over the whole field. We may be inclined to accept the mystic's claim to such an experience of total integration. But if we do, we must reject his protest that the experience is utterly ineffable; on the contrary, we can describe his experience as a dynamic field in which the egocentric pattern is no longer displaced from the objective center of the whole. The conclusion is that reason, in any mode, has a correlate in a structure of power. And with this glimpse into the problems of value the development of the philosophy of power may take a new course.

APPENDIX

THE THEORY OF PERSPECTIVES IN PHILOSOPHY

THE philosophy of power has been outlined within the framework of a theory of perspectives. The opposition between power and actuality is the distinction between an objective situation and the corresponding percepts in alternative perspectives. The associated theory of perception is a version of objective relativism, according to which percepts are perspective manifestations through which the perceptible situation can be actualized. Even truth turns out to be a perspective property because true propositions specify a determinable cognitive situation within the perspective of conceptualization. But in order to appraise these statements, and their elaboration in the text of the book, the reader must be familiar with the elements of the theory of perspectives in philosophy. Let me introduce the subject by means of the diagrams of Fig. 7.

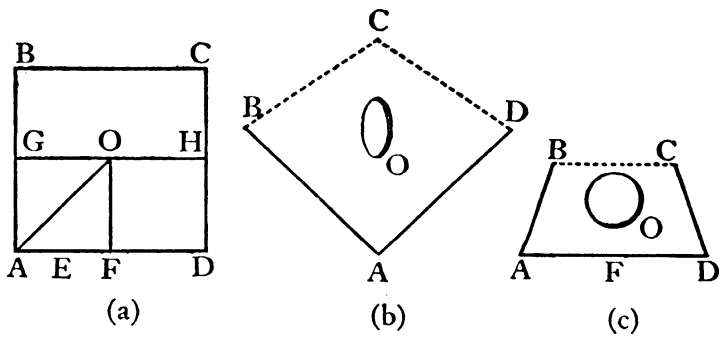


FIG. 7

Suppose *ABCD* represents an illuminated area which is surrounded by complete darkness. Let us imagine that the area is the world of observers endowed with monocular vision (which, in other respects, is like human vision). Also let this world be colorless. Each observer is immobilized at the boundary of the area, with the center of the lens of his eye fixed virtually at the upper edge of the boundary. The fixed point, from which an observer looks at his world, will be called, indifferently, the standpoint, the point of view, or the station. The view on the area from each standpoint is a unique percept or *perspective*. For example, from the standpoint *A* the area looks like the rhomboid (*b*); from the standpoint *F* like the trapezoid (*c*); and so forth for other points of view. When the standpoints are, like *E* and *F*, in close proximity to one another, the corresponding views are very similar. And, of course, all perspectives, however dissimilar, have something in common, namely, certain properties which remain unchanged, or invariant, under projective transformations, such as the transformation from (*a*) to (*b*) or from (*b*) to (*c*). We may assume our observers to know just enough Euclidean and projective geometries to enable each to communicate to others a description of his own perspective and determine the existence of invariant properties. Under these circumstances, the philosophical problems of the theory of perspectives are as follows. Can the inhabitant *A*, i.e. the inhabitant with the standpoint at *A*, or any other observer of the area (*a*), know, or infer, the existence of the common external world? If so, can he know that the common world is a square? And how would he explain the relation between his perspective and the common world? Since all inhabitants of the area agree with one another in regard to invariant properties, they must accept the same mathematical formulae which serve to correlate one perspective with another. But the question whether the correlation is purely mathematical or exemplified by a region of public space remains open. And the answer to the question depends on the inhabitant's philosophy. In a Liebniz-like frame of mind he might claim that (*b*), (*c*), and other per-

spectives, are independent private worlds of experience, or monads, and that the explanation of invariant properties is preestablished harmony. A Platonist would hypostatize or reify the formulae of correlation. But most of the observers, endowed with plain common sense, would believe in the existence of an external world of space. However, since there is no perspective identical with (*a*), the inhabitants cannot imagine or picture their common world as a square. Nor can we, under the circumstances, pretend to know better. Of course, we know that (*b*), (*c*), and so forth, are perspectives from the standpoints on the boundary enclosing the area (*a*), but we have no right to identify the "instrinsic shape" of the area, even if there were such a thing, with the way the shape looks to us. Our eye perceives the region (*a*) from above: this is a mode of perception which, by hypothesis, is inaccessible to the observers themselves. And even if a standpoint above the plane of the figure were admissible, it would be the standpoint of just another perspective which is no more entitled to pass for *the* right view than (*b*) or (*c*) or any other perspective. The restriction of immobility, imposed upon the observers, prevents the use of the measuring rod in an attempt to establish the exclusive shape of the area. And, again, even if this restriction were removed, conventions of measurement set up conditions of a unique perspective, in a wider sense of the word "perspective," of course. Thus, if we want to be impartial and side with all the inhabitants of (*a*), we should conclude that *shape is a perspective property* and treat the common area as a determinable situation or, in terms of a dynamic philosophy, a *power* to acquire alternative shapes in relation to different points of view. So long as one adheres to the dogma of an exclusive objective shape, one favors the representative theory of perception: alternative shapes, such as (*b*) or (*c*), are taken to be perceptual representations which distort, except for the exhibition of invariant projective properties, the original shape of the world. But as soon as we understand the public region to be a power to assume different shapes under different conditions of perception, we can at-

tribute each and all these shapes to the same object as its original, even though relative, aspects. Accordingly, let us accept a version of objective relativism which does not locate perspectives at the corresponding standpoints but at the object of perception. This version of objective relativism is to some extent similar to the so-called selective theory of perception because both theories place perceivable qualities, such as shape, at—or in—the object. But selective realism would have perceivable qualities in the object absolutely, i.e. independently of the conditions of perception, so that all that a percipient does is select among the antecedently existing qualities his percept. On the other hand, objective relativism asserts that perceivable qualities are in the object not absolutely but in perspective, i.e. in relation to such conditions of perception as the occupation of a unique standpoint: a perceptible quality is *in* the object of perception but only *from* the corresponding standpoint. But, the reader may ask, if the object of perception is a power to acquire different perspective shapes and has no intrinsic exclusive shape, what does it mean to say that this power is an objective region of space? The answer is that the public world, represented by the region (a), not only accounts for the existence of invariant properties of space, but also performs the three functions which we associate with space. First, in so far as the region allows for the occupation of distinct standpoints, such as A, F, and so forth, it is subject to differentiation into points. This separative function is idealized in geometry by the postulate that space is divisible into smaller and smaller volumes and, ultimately, into dimensionless points. On the other hand, the region has the unifying function of space since it can hold all the standpoints together. Geometrically the unifying function is acknowledged by postulating the existence of lines, because any two points can be related by a line. Third, the perspective function: the same region allows for alternative shapes in perspective. Since shape is a perspective property, geometry recognizes the third function of space through a concern with diagrams of different figures. Also a line is associated with two opposite direc-

tions; for example, the line between A and B, in Fig. 7, can be described either as a relation from A to B or from B to A. This duality of direction determines a dual order of proximity among the points along the same line, and therefore a duality of linear perspectives. A directed line is a vector. And since vectors are terms of dynamics, the perspective function of space signifies the possibility of cooperation between geometry and physics; for example, the possibility of associating with a point any directed quantity such as velocity. But, within the context of the theory of perspectives, the more interesting fact is that the existence of geometrical vectors provides some definite meaning to the statement that each standpoint in space is correlated with a perspective, even if no percipient occupies the standpoint and the perspective is unobserved.

At this stage of our account we may take advantage of a comparison with Whitehead's well known treatment of perspectives in Chapter 4 of his *Science and the Modern World.* Our three functions of space closely correspond to what Whitehead calls the separative, the prehensive, and the modal characters. His "fallacy of simple location" is the fallacy of assigning a single position to an object of perception in disregard of the modal character of space. Let the object be a definite shade of green. Then, according to Whitehead, "green is not simply at A where it is being perceived, nor is it simply at B where it is perceived as located; but it is present at A with the mode of location in B." Whitehead's statement involves a differentiation between the percept of location and the percept of a sense quality to be located, between geometrical and material qualities, which forms the basis of his elaborate theory of perception in the two modes of presentational immediacy and of causal efficacy. For the present I am concerned with location only. Whitehead points out that, although the object is perceived *there,* at B, from *here,* from the standpoint A, the percipient does not perceive his own standpoint but perceives the object simply at B. Accordingly, "the modal character taken by itself gives rise to the idea of simple location," even

though the existence of a modal character rules out the possibility of unqualified simple location. To illustrate Whitehead's point, we must observe that the actual view from the standpoint *A* is not exactly reproduced by the rhomboid (*b*) of Fig. 7: the diagram must be corrected by erasing the corner at *A*. On the other hand, the operation of erasing something which we know to exist as an element of the public world must not mislead us to the conclusion that the idea of simple location is altogether fictitious. The separative character of space, which is just as real as the modal character, provides the objective counterpart to the idea. For, if there is meaning to the concept of distinct perspectives, space requires the existence of separate and mutually independent standpoints. And, of course, as the meaning of the word makes it clear, a standpoint has a simple location: there could be no definite standpoint, if the specification of each should involve reference to the others. If Whitehead gives the impression that the idea of simple location is false, the reason is that he has a real difficulty in an attempt to explain the existential status of perspective standpoints in terms of his metaphysics. The fact that a geometrical standpoint cannot be perceived by the occupant, but only appears to an outsider through his perspective, makes it clear to Whitehead that the standpoint is not an *actual* entity. Yet he understands that the scheme of standpoints, "the scheme of extension," which he describes as "the general scheme of interlocked relations of perspectives," cannot be just a Platonic idea or "eternal object." And he comes close to what I should call the correct solution when, in making a further effort to explain the nature of space and time, he replaces the characterization "general scheme of potentiality" by the phrase "potential scheme." For the solution is that points by themselves are only potential standpoints, and that extension, of which space is one mode, is the objective disposition in nature to undergo itemizing through an emergence of actual standpoints together with the correlated perspectives. And while the percipient does not perceive his own standpoint, he feels, or experiences, it as the origin of per-

spective tension, as the center, that is, upon which the inward tendencies from the external world of space converge.

Let me interrupt the digression on Whitehead to make use of what we have already learned about his ideas for an extension of the theory of perspectives. The situation, in which a percipient looks at a distant green object, extends the perspective set-up from the world of two-dimensional areas, illustrated by Fig. 7, to an instantaneous space of three dimensions, and from perception of pure geometrical configurations to perception of figures endowed with material qualities. With regard to dimensional extension we may follow the usual procedure of incorporating time, as the fourth dimension, with space into a four-dimensional public world. In accordance with the theory of relativity, a perspective is established as perceptible separation between space and time in relation to the percipient's standpoint of rest. This extension, although technically difficult, has no difficulty in principle, but it brings out more clearly the important point that the public medium, being a four-dimensional continuum, is not subject to human perception. The extension of perspective treatment to material qualities means that, in addition to the occupation of a standpoint in space, there are other, physical and psychological, conditions of a perspective. For example, the color presented by an object is conditioned both by the physical properties in the medium which separates the object from the eye and by the physiological structure of the eye. To an objective relativist this means complication. But the complication, which is connected with the differentiation between regional and material qualities, can be dealt with more effectively if we introduce another geometrical extension of the idea of perspectives, by means of additional rules of transformation. Different perspectives, represented in Fig. 7, depend entirely upon occupation of different standpoints; they do not involve physical transaction with the public region; in short, looking at the region is enough to obtain a unique view. Accordingly, such perspectives can be presented to different observers simultaneously. On the other hand, topological transforma-

tion, directed by the rules for stretching, bending, twisting, or any other distortion short of tearing the region to pieces, cannot be carried out in practice except through some duration and with the aid of physical operations. This fact is a basis for dividing perceptual qualities into geometrical or regional and material or physical. We may agree to call "geometrical" any perceivable property of an object which can be modified by the occupation of a different standpoint alone; any other property is material. Accordingly, such a property as size is regional only within a definite range: after reaching the maximum regional size by approaching the object we can still enlarge its size physically by stretching. We now can deal with our complication as follows. Anything which conditions either a regional or a material property, whether it is the occupation of a standpoint or a physical, physiological, or psychological complex, forms the percipient's station, in a wider sense of the term. But the properties thus conditioned are not subjective representations; they are relative but original properties of the object itself. Let us observe that the present use of the term "physical," in connection with perspective qualities, is not the same as in the text, where physical properties are opposed to perceptual qualities.

Our distinction between the terms "regional" and "material" may help the reader to understand Whitehead's doctrine of multiple location. Consider his account of mirror images. Suppose you look into a mirror and see the image of a green leaf. The perceived region is in front of you and behind the surface of the mirror. But the dissociation between geometrical and material properties is evident because no physical operation either behind the mirror or where you are would change the image. Accordingly, the green of the leaf does not belong to the perceived region behind the mirror; as Whitehead puts it, you only project the green upon that region. But in order to be able to project the green elsewhere, you must, first, have it where you are. Whitehead's proof that the green is at the percipient's station is the fact that if you turn around to face the actual leaf, you

perceive a different region, in front of the mirror, but the same shade of green. The green is a physical property of the leaf, or of the region in front of the mirror, because in order to change the color at any place of its appearance some such physical operation as dyeing must take place within the region of the actual leaf. Let us take another illustration. An astronomer, looking through a telescope, observes the explosion of a distant star. He reports that the actual explosion happened some hundred years ago, since it takes that much time for the light message from the exploding star to reach the earth. Whitehead would point out that the astronomer's account confirms the dissociation between the regional and the material properties of the explosion. The regional datum, toward which the telescope is directed and which is the scene of the original explosion, is uneventful at the time of observation from the earth. The image of the explosion, which is a physical effect from the past event, is the astronomer's percept projected from his station upon the uneventful distant region. We must admit that both illustrations fit in with Whitehead's theory. But, as I have explained in the text, the objective relativist has his own interpretation, in terms of the conception of multiple dates, of the astronomer's account. And, even though mirror images, like double images, form an exception to the principle of objective relativism, an ambiguity in Whitehead's account of the mirror image keeps us from deciding in favor of his account. When Whitehead asserts that the green of the leaf is the same as the green of the mirror image and therefore must not be located at either place, he may mean either that the green is the same universal shade of color or that it is the same particular sense datum. If the perceived green is a universal, it cannot be associated with any exclusive location and therefore must not be tied up to the percipient's station. On the other hand, if the green is a particular sense datum, then it must be located just where it is perceived to be, either behind the mirror, at the image of the leaf, or where the actual leaf appears to be, and not at the standpoint which the observer does not perceive at all.

The fact is that the difference between Whitehead and objective relativism is a matter of general theoretical plausibility which cannot be decided on the score of a singular type of perceptual evidence. The issue is essentially a question of veridical perception. To an objective relativist every quality, which appears in veridical perception, belongs to the present datum, whereas, according to Whitehead, material properties only appear to belong to the presented region and are, in reality, remnants of a past event. In my opinion, the notion of the past which actually intrudes into the present and, therefore, is present signifies a confusion of thought.

Russell's theory of perceptual perspectives, which is another alternative to objective relativism, requires special consideration because of its intrinsic interest and in order to counteract an unusually large amount of misinterpretation. To begin with what I believe to be the reason for so much misunderstanding. A physical process may have the twofold nature of an object of perception and of an agency in transaction with the environment. The function of the agency cannot be completely disregarded even in a concern with perception. Hence Russell's hypothesis of the physical *cause* of a veridical percept and of perceptual distortion through the *interference* of the physical medium between the object and the percipient. Nevertheless, we may expect a theory of perception to be, in the main, preoccupied with the object of perception in abstraction from the associated physical agency. Accordingly, we must approach Russell's *neutral monism* within the limits of this legitimate abstraction. And the fault with his critics is that they treat neutral monism as if it were an attempt to give an exhaustive account of physical (and mental) nature. The truth is that Russell does not deny the existence of purely material events which, if perceivable, may have no more than structural similarity to the corresponding percepts. Nor does he deny the existence of purely mental events that are only remotely connected, if at all, with a physical source. The contention of neutral monism is that, in veridical perception of the public world, a percept belongs to two distinct groups, to the group of aspects which

constitute the physical object of perception and to the group of sensory elements within the percipient's perspective. This is to say that some events are at once material and mental. Let me proceed with an outline of the theory, restricting the exposition to momentary visual perception, by making use, again, of Fig. 7. Suppose the square (*a*) represents the surface of a card table, which is at the moment the public physical world of four players and one adviser. All the participants are looking at the prize of the game, a silver dollar which is set on its edge in the middle of the table, at *O*, with the plane of its surface perpendicular to the surface of the table and intersecting it along the line *GOH*. The momentary view of the player seated at *F* is represented by the circular image within the trapezoid (*c*); his assistant, with the standpoint at *A*, sees an ellipse, as in the rhomboid (*b*); each other player has his own unique perspective image of the dollar. Besides these actual views, we assume the existence of unobserved perspectives corresponding to other possible standpoints. For example, if the player at *F* could move closer to the dollar along the line *FO*, his circular image would grow larger until, at the point where the eye touches the object, it would disappear. Accordingly, we postulate a series of circles, in the order of increasing size, all along from *F* to *O*, except at *O* and at the points in close proximity to *O*, where no images can be seen. Similarly, we associate unobserved perspective aspects of the dollar along any line radiating from *O* to a possible or actual standpoint, with the exception, in each case, of a short segment in the neighborhood of *O*. The silver dollar, the momentary physical object of visual perception, is defined as the totality of all perspective aspects, whether percepts or unobserved, which are symmetrically arranged, with regard to their differences in shape and size, and according to the usual laws of perspective, around the center at *O*. We may identify the collection of points which can be turned into standpoints with the public, or physical, space. The empty region in the neighborhood of *O*, i.e. the region where no percept of the physical object is possible, may be defined, in deference to common sense,

as the place (in physical space) where the object is. Each percept, together with its perceptual background, is extended within the percipient's private or mental space. A private space, together with its contents, is located at the corresponding standpoint. Therefore a private space may be treated as a single point or, if the standpoint is identified with the volume of the percipient's body, as a single element of the physical space. Since every percept is an aspect of the physical object in physical space and also a region of the mental field, it is both material and mental. To make neutral monism plausible, this point must be supplemented by two considerations. First, purely mental events, memory-images, dreams, hallucinations, are similar to neutral data, i.e. to actual percepts, to the extent of being capable of inducing deception or confusion with the latter. Second, if we accept the scientist's hypothesis that veridical percepts are caused by physical stimuli, we have reason to assume, with reservations, that purely material events, i.e. unobserved aspects of a physical object, are, at least, structurally similar to percepts. This is to say that we may assume that, as a rule, perceptible differences within the momentary field of vision are caused by, and therefore correspond to, objective differences within the physical stimulus. For example, there is a topological similarity of structure between perceptual space and the space of physical objects: both are three-dimensional fields with a biunique and continuous correspondence of points. The similarity between a percept and the corresponding unobserved aspects is unlikely to be confined to the invariant topological structure. But let me refer the reader for the developments of Russell's theory of perception to his own treatment in Chapters 20, 21, 24, and 25 of *The Analysis of Matter*. For my purpose, which is to clear out current misunderstandings of his theory for a subsequent comparison with objective relativism, I need go no further. Current misunderstandings are embodied in three points of adverse criticism. (1) Russell's statement, that "when a physiologist looks at another man's brain, what he sees is in his own brain and not in the other man's," is absurd be-

cause no one can see the contents of his own brain. (2) Russell's statement, that there is nothing but a "hollow center" at the place where the physical object is, is absurd because physical transaction, such as the handling of an object, takes place just where the object is supposed to be. (3) Russell's stipulation of unobservable aspects is a meaningless attempt to describe how a thing would look in the absence of an onlooker. I may admit that Russell's statement in (1) is paradoxical, but the paradox disappears the moment the statement is reformulated in terms of his theory of perspectives. Suppose one of the players, who is seated at the point *F* of the card table, to be the physiologist and let the brain under his inspection replace the silver dollar at the point *O*. Then, in accordance with Russell's theory, to say that, while looking at the other man's brain, the physiologist sees something in his own brain is to say that the physiologist observes his own percept (which also happens to be an aspect of the other man's brain) at *F*, i.e. at the region of physical space where his brain is. The physiologist sees something in his brain without seeing any part of his brain because the latter is a group of aspects which can be observed only where they are, viz. at points in physical space which are other than the physiologist's standpoint. The assertion that the physiologist cannot see anything in the brain under inspection simply means that no percept is possible in the neighborhood of *O*, where the other man's brain is. This remark brings us to the second criticism, which can be disposed of even more easily. The description of the place where the object is, the phrase "hollow center," expresses the fact that there is no perceivable aspect of the object there. Russell does not mean to say that the place is absolutely empty: the physical agency which is the cause of percepts or aspects symmetrically arranged around *O* is presumably at *O*. Criticism (3), on the other hand, is partly a misunderstanding, but partly a disclosure of a real difficulty. There is misunderstanding because there is a definite sense in the idea of the "looks" of the object in the absence of an onlooker. Nevertheless, the notion of unobserved aspects is questionable. Let me try to

explain myself with the aid of another simple illustration. I perceive two leaves, one still green, the other already turned red. For the sake of simplicity, let us say that my percept contains two spots of color, one green, the other red, against the uniform background of the blue sky. The question is: What does Russell mean when he assumes that the two spots appear within an unobserved aspect of the leaves? A part of his answer is that a color photograph, taken under appropriate conditions from a standpoint unoccupied by any observer, would show the two spots. But does this prove that the spots were present where and when the photograph was taken? A skeptic might object that if the standpoint were occupied by a color-blind observer, or by an ordinary camera, the differently colored spots would not be registered, and ask why the testimony of normal people, or of color photographs, should be more reliable. To this question Russell has a good answer. While perceptible difference implies the existence of a corresponding difference within the physical cause, so that any unobserved aspect, which is a link in the causal connection between the leaves and the percept, may be expected to contain two differently colored spots, the absence of perceptible difference does not imply that there is no unobserved difference in the external world. This means that a normal eye or a color photograph registers the structure of a physical object better than a monochrome image. But there is another difficulty. We assume that an unobserved aspect may show two colored spots because a photograph may show them while we are looking at the photograph; but how do we know that the picture would show color if we were not looking? It would seem that, on the grounds of a causal theory of perception, Russell can only say that there is a structural, physical and chemical, difference between a color photograph and a monochrome which accounts for the difference in their perceptual effects. And, in a letter of November 7, 1945, Russell writes that he does not think "that anything qualitatively analogous to what we see can exist where there is no eye, any more than a wireless emitting station can cause (physical) sounds except where

there is a radio set." Yet structural similarity alone is hardly sufficient. Let us ask a physicist: What difference of physical structure corresponds to a perceptual difference of color? The physicist may tell us about electromagnetic waves in the medium between the leaves and the percipient, and point out the difference in wave-length. But a philosopher cannot be satisfied with the physicist's wave-equations: he wants to know the nature of physical processes associated with the equations. Can the equations be *literal* descriptions? If so, an unobserved region of physical space may contain actual waves bounded by sinuous curves. But a sinuous curve is a perceptible shape, and to assume the existence of unobserved shapes is no better than to assume the existence of unobserved color. Accordingly, Russell warns us that the equations of physics are no more than logical constructions. And, if so, we may argue that the unobserved aspects of physical process are intrinsically not unlike the corresponding percepts. This solution, if meaningful, would be in line with neutral monism. And the solution is entirely meaningful provided Russell's theory of particulars and proper names, which he has proposed in *An Inquiry into Meaning and Truth,* is meaningful. For, according to the proposed theory, to say that the red and green of my percept are like the red and green of an unobserved material aspect is not to assert that there are two distinct but similar *instances* of red and green; the assertion is that the percept and the unobserved aspect contain the same color-particulars. Hence the spots within an unobserved aspect must look red and green, even though there is no onlooker, for the simple reason that the spots within the percept are the same spots and do look red and green. Admittedly, Russell's theory of particulars is tentative and may not be true. But the issue is a question of meaning and not of truth. And Russell's theory of particulars does not appear to be meaningless, at least not without further investigation. But, even though apparently meaningful, the conception of unobserved aspects, to be acceptable, must be argued for. Let me mention, in order to tip the scale in favor of objective relativism, one more difficulty. To say

that a material aspect is similar, at least structurally, to a visual percept is to rely upon the nature and scale of normal vision. We may agree with Russell that normal sight is better than a monochrome representation or, more generally, than abnormal vision; the question remains whether normal sight is adequate, except from the point of view of biological transaction, to the complexity of the external world. A microscope, a colored glass, a different lens of the eye, would bring out images which, structurally and qualitatively, are unlike any ordinary human percept. And while ordinary percepts are superior for certain purposes, the aid of optical instruments is required for others. Under these circumstances there would seem to be no reason for giving preference to any set of alternative percepts or images in exclusion of another. We should rather say, in accordance with objective relativism, that there are alternative perspective representations of the external world, each adequate, in its unique way, but none exhaustive. This means a further extension of the idea of perspectives. The station, i.e. the conditions of a perspective, may include, among other things, mechanical contrivances. And this also means that the "unobserved material aspects" of the external world are not, contrary to Russell's suggestion, actual events, but powers to assume different manifestations in different perspectives.

The dependence of realizable powers upon the actual set-up of a perspective is a basis of the perspective theory of truth. For, in accordance with the theory, two statements, which appear to contradict one another, may be both true within their respective contexts or perspectives. The statements "There is music in the living room" and "There is no music in the living room" do not contradict each other provided the first statement is used elliptically for "There is music in the living room if the radio is turned on" and the second for "There is no music in the living room if the radio is off." The invention and use of an instrument, like the radio, changes our sensory perspective by lifting potentialities to the level of realizable power. But the range of the perspective theory is extended beyond sensory perception to

the fields of imaginative composition and conceptualization, to art, science, and philosophy. Extension to art does not raise a new difficulty because the full import of an artistic truth is a function of its total context: we understand without difficulty that "Beauty is truth," in the perspective of Keats' ode, does not contradict Pushkin's statement, "The elevating falsehood (of beauty) is more precious than the countless base truths (of fact)," in Pushkin's perspective. On the other hand, in science, different theoretical perspectives may involve incompatible conceptions of power in the form of conflicting predictions. For example, let us treat the conceptual framework of Newton's physics, the idea of material bodies moving in absolute space while time flows at the same rate, and the special theory of relativity, with its variable rates of time and the constant velocity of light, as different theoretical perspectives. The treatment must take care of the fact of extrapolation of the results of actual experiments, which fit in within the framework of one perspective, to another perspective provided the experiment is conceivable, even if not capable of actual performance, within the latter. Thus we extrapolate the truth of the statement "If an experiment of a Michelson-Morley kind were performed, the result would be negative," as a description of physical power, to Newton's age when the technical resources were insufficient for an actual performance of the experiment. But the result of the experiment, which has a definite place in Einstein's theory does not fit in within the original perspective of classical physics: Newton would have expected a positive result. This is to say that Newton's perspective provides the grounds for a false expectation, i.e. for a false conception of physical power. And the question is whether a perspective which is misleading with regard to scientific expectation is to be discarded not only because it is obsolete but because it is a false theory. If the answer is "Yes," the theory of perspective truth in science fails. The defense of perspective truth has the choice between two arguments. We may give up the attempt to treat classical physics and Einstein's theory as different perspectives, and argue that New-

ton's formulae are approximations to Einstein's in the evolution within what is basically the same perspective of physics. On the other hand, we may argue that the perspective of pre-relativity physics,in conjunction with some such hypothesis as Lorentz has proposed, can account for the negative result of the Michelson-Morley experiment. We may add that prior to the actual performance of the experiment perspective transformation was not called for, and that Einstein's perspective is preferable now because, with the negative result of the experiment a part of our actual world, our understanding and employment of the principle of simplicity, which is a principle of perspective construction, is different. Our defense is not completely clear and explicit because the theory of perspective truth has not yet been fully analyzed. To mention one point of obscurity, the admission that the perspective theory of empirical truth requires the conformal truth of the meta-theoretical statement "Empirical truth is perspective" raises the further question of the relation between conformal and absolute truth. My own tentative position is that the meta-theoretical statement concerned is conformally but not absolutely true. If there were no perspectives upon the world, the statement would be no longer true. I reject absolute conformal truth because I find that we judge the theories of the past by present standards, that we cannot identify our present standards with absolute truth since they may be replaced, in their turn, by new standards, perhaps by a return to a standpoint of the past, and that the belief in the progressive and irreversible evolution of ideas is no more than a perspective view itself. Nevertheless, so long as we have no evidence for a prospective change in our present standards, we are entitled to identify them with perspective truth, because it would be just as unscientific and implausible to expect change on the grounds of mere possibility as it would be, for a biologist, to list unicorns among animals on the grounds that the possibility of finding one in some unexplored territory is not excluded.

Perspective truth is a problem because the idea of theoretical perspectives lacks the clarity of the idea of per-

ceptual perspectives. We understand what we mean by a "point of view," in a literal sense of a position in space and time, but our meaning of the term "conceptual standpoint," of a set of basic concepts which determine a unique theoretical perspective, is in part a question of the philosophy of concepts and also a linguistic proposal. I expect agreement only with the following general considerations. Whereas points of view, and the corresponding perceptual perspectives, change from one individual to another, a conceptual standpoint represents the mentality of a culture. As far as the culture of science is concerned, we may distinguish between conceptual standpoints which conform to human perception and those which are perceptually inhuman. The perspective of classical physics conforms to perceptual differentiation between space and time. The perspective of relativity, on the other hand, requires the concept of a four-dimensional space-time which cannot be perceptually exemplified. The perspective of quantum physics is even more "inhuman." In philosophy, a perspective comes with a unique synthesis, or integration, of philosophical categories. But philosophers differ in their choice of categories; and while some would accept a philosophy as an integral system, others would call it eclectic. Thus differentiation among philosophical perspectives is determined by the critic's own philosophical perspective.

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