SUBSTANCE, CHANGE AND EVENT*

by

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INTRODUCTION

Civilization is moving through a period of widespread revolutionary change. In all walks of life traditional values are being challenged from every side, and men are becoming aware of new possibilities, and of decisions to be made. If this paper were a discussion of social problems, or of trends in religious thought, all who glanced at it would find at least the value of timeliness or relevance. Unfortunately, academic philosophy is regarded by most as a study almost completely divorced from the struggles of every day life. It is felt to be something alien and 'above the battle.' However, while it is indeed true that in a sense philosophical analysis and construction are removed from practical human activity, there nevertheless exists an important and intimate connection between the two. Thus we may note the familiar saying that 'each has his own philosophy of life.' There is an important truth in this statement which is often overlooked. Not only does each of us have a more or less consciously formulated outlook on life as a whole, but of far more importance is the fact that to a large extent these intimate beliefs determine our reactions to the situations we encounter, and contribute to shape our behavior. These implied assumptions, as we may call

them, are almost never examined with a critical eye, and as a result most human behavior can only by courtesy be termed rational. This is not to suggest that completely logical conduct is anything more than an unattainable limit or ideal. Its aim is merely to point out that here, as everywhere, the more adequate our beliefs, the more appropriate our activity, and that each of us should willingly undertake a careful and logical analysis of the basic assumptions that are implied in his approach to the various problems of human life. To do this is to philosophize.

Philosophy thus works within the distinctions and meanings of experience, and attempts to form "a coherent, logical, and necessary system of general ideas in terms of which every element of our experience can be interpreted." {1} Or, to phrase it somewhat more realistically, the task of the philosopher is to criticize and formulate in a coherent manner, the fundamental meanings involved in our knowledge of the natural world. Philosophy thus walks hand in hand with the specialized scientific disciplines, both learning from them their insights into the structure of the world, and analyzing from the point of view of knowledge as a whole those concepts such as space, time, and causality which the scientist merely formulates in such a manner as to fulfill the methodological requirements.

Once this has been done to a more or less adequate extent, the philosopher is in a position to undertake the study of the nature and status of value, and to determine the fundamental attitudes rationally to be taken with respect to reality, in view of man's place in the cosmos. That this is the logical mode of procedure would seem to be indicated by the fact that all our value judgments and appraisals are founded upon cognitive judgments and knowledge claims, and by the additional fact that the more adequate our knowledge, the more satisfactory our evaluation of the objects of that knowledge. That this should also be the case with the appraisal of nature as a whole is clearly in need of no added explanation.

One of the more embracing questions to be dealt with in this paper is that of the status of change in the universe. Our proposed solution is incompatible with the existence of a block universe,{2} and involves in its broader aspects the rejection of the theory of mechanistic determinism. Thus what at first sight appears to be merely an abstract study of abstract aspects of the natural world, turns out to have such a consequence for human attitudes and behavior as the rejection of that fatalism, optimistic as well as pessimistic, which so often has blocked the course of the struggle for social justice. It is thus my hope that in the opinion of the reader, this thesis will have a value at least to some extent similar to that of the so-called more concrete activities leading to the betterment of the social conditions of human existence.

I. THE EMPIRICAL BACKGROUND OF THE PROBLEM.

In sense perception we are not only aware of 'a number of things' with different structures, and in a variety of relationships to one another and to ourselves, we also grasp as an indisputable fact that "something is going on."{3} To those who have raised no searching questions as to the nature of existence, or are ignorant of the history of philosophical disputes, this togetherness of endurance and of change is most certainly not a puzzling situation. There is here no 'felt difficulty' that drives them on to seek a

harmonious reconciliation. How, then, did the problem of change originate, and why has it appeared to many thinkers to be one of the most difficult questions for a metaphysics to resolve? These questions are clearly pertinent to our inquiry, and their answer, which is not difficult to find, will serve as an excellent means of orientation for the discussion which is to follow.

This problem arose, as did all the other problems with which philosophy has dealt, when the human mind attempted to pass beyond that naive level for which nature is merely the realm of objects which are useful or harmful for specific practical purposes. They have their ultimate source in the efforts made by certain men in opportune positions{4} to understand the nature of the world, and to account, in a rational manner, for the enormous variety of natural phenomena . Their tools were inadequate, their empirical knowledge limited, and as a result their theories were inevitably crude and unsuccessful. However, from these attempts, examples of which are to be found in pre-socratic Greek philosophy, there developed in a slow and halting fashion the science of philosophy as we know it today. Now among the many faulty and inadequate analyses made by those early thinkers in their attempt to formulate a conceptual structure expressive of the generic aspects of reality, were their theories of time and of space. Here the abstractions of contemporary mathematical thought were read back into reality, and soon the general problem arose of how to derive extension from the extensionless. Thus the attempt to bind these theories with the actual facts of motion and change resulted in contradiction. The theories, however, resisted all attempts to prove them fallacious. Thus the paradoxes{5} of motion arose and men were constrained either to relegate empirical facts to the realm of 'mere appearance' (a fiction of philosophers who have failed to solve problems) which merely transferred the problems to another sphere, or else to leave philosophy as a hopeless endeavor, and seek refuge in the business and beliefs of every day life.

Our task in this present study is to join hands with recent philosophy in its attempt to begin anew, and thus, to examine the problem of change in the light of the technique and knowledge that is now at hand. In doing so we shall use the method of procedure, common to all those who develop theories to explain or interpret fact. In other words, we shall begin with a description of our experience at that naive level in which the meaning of persistence and change are merely felt as harmonious aspects of the natural realm, and thus, bearing these data in mind, we shall attempt an adequate and critical conceptualization of these two facts about the objects of our natural knowledge. Our problem is by no means an isolated one. The concepts we shall use raise questions which lead to several of the most basic problems of philosophy. Where necessary we shall give a brief account of the position which seems to be most satisfactory, for we cannot avoid this conceptual interpenetration. However, since this paper makes not the slightest pretense of presenting an entire philosophical structure, we must clearly limit our interpolations, and this in a rational manner. At first sight this would seem to be impossible, for, since the test of a system of philosophy is its adequacy to experience as a whole, each of its component propositions is in jeopardy until the structure as a whole has been accepted as fulfilling this requirement. However, we are fortunately spared the impossible task of justifying our particular conclusions by such an endless process of completion, for we remember that it's an ultimate fact about the subject matter of human thought that some propositions are much more relevant to

one another than are others, and indeed we shall find trains of thought which may, with justice to our argument be omitted. Thus we shall proceed to our subject, using the criterion of relevance, though keeping in mind the wider task of a complete interpretation of nature.

In speaking of nature, we have placed our trust in what may roughly be called common sense. We have, as yet, made no attempt at definition, but have assumed on the part of the reader a sufficient understanding of the terms which have been used. The questions as to the nature of thing, and its relation to what we may call the given are clearly essential and must be answered in the course of our inquiry. However, for our purposes, it will be well to postpone these considerations until somewhat later when we shall have completed our examination of the relevant features of experience.

Mr. Bertrand Russell, who continues in modern philosophy the tradition of David Hume, claims in one of his early writings that what we *mean* when we say that things change "is that, given any sensible appearance, there will usually be, *if we watch*, a continuous series of appearances connected with the given one, leading on by imperceptible gradations to the new appearances which common sense regards as those of the same things." "Thus," he continues, "a thing may be defined as a certain series of appearances, connected with each other by continuity and by certain causal laws."{6} Mr. Russell is not, of course, asserting that any such meaning is actually present to the consciousness of those who entertain the proposition with which he is concerned. In fact he criticizes common sense for overlooking his 'empirical' theory of change, and for making the naive assumption of permanent substance in the face of the fact that all that is 'given' is "a world of helter-skelter sense data."{7} He also claims in another interesting passage that "we cannot speak legitimately of changes in the intervening medium (he is discussing the causal theory of perception) until we have constructed some world more stable than that of momentary sensation."{8} The theory of change advanced by Mr. Russell in these and other sections of the work from which we have quoted, certainly merits our careful consideration and this we shall attempt to give to it in a later section of our work. Our present task, however, is to examine in a critical fashion the description of experience involved in this portion of Mr. Russell's philosophical position.

We are certainly not conscious of constructing our experience out of a helter-skelter collection of sense data. On the contrary, the primary fact about experience is that we *find* ourselves in a world of enduring, independent, and co-real objects in which, as 'embodied selves,' we are each of us one among many others. These realistic meanings of objectivity, thinghood, independence, etc., are as brute facts about our experience as the most annoying of colors or sounds. The analysis of the 'given' as involving sense data is an explanatory activity carried on *within this situation*, and in its scientific aspects is but one phase of the wider attempt to understand the world. Thus psychology is just as obligated as any other scientific discipline to do justice to the richness and unity of the domain of its inquiry. In this respect it is interesting to note that psychology today is rapidly leaving behind the atomistic approach and the attempt to construct experience out of simples, that gave to Russell's argument whatever plausibility it seemed to possess. It is true, indeed, that we do not spring into existence with a full blown experience of nature. However, it is clear that such a statement is no

basis for a *proof* of the proposition that the realistic meanings of thinghood, endurance, and activity are merely subjective elaborations or beliefs, and that reality actually consists of causally connected series of appearances. For as we have seen, these appearances are scientific abstractions from concrete situations in which these realistic meanings are also to be found. While, on the other hand, as an explanatory hypothesis, the thesis that "a thing may be defined as a certain series of appearances connected with each other by continuity, and by certain causal laws," receives no empirical justification, is a construction from abstractions, and does violence to our actual meanings of endurance and of change. As we have already pointed out it is based upon a false and outmoded psychology. Mr. Russell's theory of change also meets with other difficulties, as we shall later discover. It not only fails to have the advantage of simplicity over the realistic naturalism which we shall be concerned to maintain, but it breaks down at several crucial points, and shows itself to be an inadequate interpretation of nature.

Child psychology tells us that the baby, *as one physical object among others*, starting with such objective reactions as turning towards its mother's breast, gradually develops that complex behavior which we recognize as similar to our own. This is quite in harmony with the view which we have been developing, for we are quite prepared to admit that the categorial meanings of our experience are to some extent at least the outgrowth of a fairly long period of interaction with the natural world. Such an admission of development in no way conflicts with the assertion of validity. Thus the hypothesis of the existence of an independent realm of enduring centers of activity is a self-consistent one (as far as we have examined it) and, a fact of equal importance, it does justice to the concrete nature of human experience.

It is true, indeed, that we have excellent reasons for believing that natural objects, in perception, are not literally existentially present to consciousness. This brings up the question of the mechanism of perception, for a detailed account of which, along the lines presented in this paper, I must refer the reader elsewhere.{9} The following quotation will serve our present purpose: "The external thing selected and referred to as an object is never *existentially given* in experience, but is *cognitively given* in the sense that it is interpreted and revealed."{10} Sense data are merely tools used by the mind in its perceptual activity and the concepts founded upon them are able to reveal the pattern and structure of the world of nature, because these data are the result of the organism's commerce with the external realm and bear its imprint. If the assertion of such a 'peculiar transcendence' should bother the reader, let him remember that the theory of perception we have so hastily presented is a hypothesis to explain and account for human experience in view of the meanings, distinctions and references contained within it, in view of the facts of error and illusion, and in view of the relevant teachings of the special sciences. This theory is known as *Critical Realism*, and as it will form the basis of the positive thesis of this paper, the above synopsis, and the suggested references should be carefully examined. Further questions in this connection will be answered as they arise.

So far in this section, we have been concerned to remind the reader of the richness and complexity of the concrete situation in which the experience of change occurs. We are now in a position to discuss this latter more fully and to attempt to discover what we mean when we say that a thing changes. If questioned to this effect, common sense would answer that what is meant is

that through the *same* thing as before, it is different in such and such respects. Now we may define a thing as a portion of physical nature which is such that it can be meant or referred to as a unit. Such reference involves the selection of certain characteristics of a spatial sort as boundaries. Such constituents of physical nature may vary widely in complexity, and in unity of function and behavior. Thus the following may be given as examples: a mountain, the world, a chair, a dog . . .. The question arises in the light of these considerations as to how a thing may be both the same, and yet different. It is, of course, no solution to say that an 'identity in difference' is involved since the problem is exactly to determine in what sense it is the same, and in what sense it is different.

In the first place it is important to note that empirically we have no right to treat change as somehow external to things. To all appearances they are in their own right dynamic, and until we are forced to another conclusion, we shall proceed on this basis. Let us now proceed to examine the significance of the word same, and the question uppermost in our minds will be, are the concepts of sameness and change mutually exclusive. In the first place the term is clearly ambiguous. Thus it may refer to sameness of sort or kind as when we say of a work of art that has been slashed with a knife that it is no longer the same. Here we are concerned with classification. Such a meaning of sameness clearly depends upon the fact that human knowers can achieve conceptual standards. Thus, to use the above example, we note that after it has been slashed the structure and properties of the picture no longer live up to the standards which were fulfilled by the picture in its original state. Not only is a judgment of this type consistent with the fact of change, but indeed it would be absurd if nature were a static realm. There is another meaning of sameness, namely the sense in which it is equivalent to the endurance of being through change. Thus we speak of subjects of change. It is important to note in these connections that we consider many things to be more of a unity than they really are. Thus we read back into nature the unity of our reference. For example, a rock, or a stocking, is really a congeries of smaller units of being. However they have definite spatial boundaries, and we refer to them as wholes. If we ask whether there is any conflict between this latter meaning of sameness and the concept of change, our answer can only be in the negative. For, as we have seen, things are dynamic or active, and this situation is bound up with existential endurance. Basic to this discussion is the fact that historical continuity of a spatio-temporal sort is essential to all sameness that is commonly said to hold between a thing and itself. Let us apply these considerations to a familiar paradox. A stocking is darned until none of the original material remains. Is it the same stocking? Our answer, in view of the distinctions drawn above, will run as follows. In the first place, there is historical continuity, thus, if we are concerned with its formal or structural aspects we shall call it the same. Such sameness as we have seen above appeals to no dogmatic metaphysical conceptions, but ratter expresses the satisfaction of a human standard. If, on the other hand, we are concerned with the material identity of its component parts, we shall deny that is the same. In a later section of our work we shall clarify and systematize these more or less empirical considerations.

II. SOME THEORIES OF SUBSTANCE

In this and the following sections of our paper we shall be concerned to examine several proposed conceptualizations of the world of our experience.

Fundamentally, for our purposes at least, these philosophies are of two types of which the one is based upon the category of substance, and the other upon the concept of event. We shall be required in the course of our inquiry to make some criticism of the contention of certain idealists that change and time are mere appearances, or finite perspectives of a non-temporal Absolute. Insofar as spiritualistic theories of reality, in general, are concerned, we shall make no comment other than to point out that there is no evidence for such a position once an understanding of the nature and reach of human knowledge has been achieved. Thus certain idealists have attempted to do justice to empirical facts of growth and change, and in keeping with this have developed dynamic theories of substance as the subject of change. Others of more recent periods have developed a philosophy of events. Fortunately, this aspect of these metaphysical positions can be discussed apart from reference to the question as to the intrinsic quality of being. It is the contention of the point of view represented in this paper that idealism is inconsistent with the actual facts of experience, and derives its plausibility from the failure of early realistic theories of knowledge to do justice to the nature and claims of the cognitive process, and from the failure of early naturalism to do justice to the human and social level of being.

The positive thesis of this paper will be a defense of the category of substance, and will be, it is hoped, a logical outgrowth of the considerations presented in the section just completed. However, the concept of substance has had an extremely interesting history, and has received several different treatments in the course of its development. We shall by no means attempt a complete delineation of the various historical meanings the term at one period or another has acquired. However we shall discuss the most important aspects of these theories, and not in any historical order, but rather as the questions arise in the course of our discussion. The historical theories we shall discuss have been the target of criticism for those realists who have found in their inadequacy a sufficient ground for the rejection of the category of substance. Needless to say, our conclusion will be a different one.

An excellent point of departure will be the definition and discussion of substance to be found in Locke's *Essay Concerning Human Understanding*.

> **. . . if anyone will examine himself concerning his notion of pure substance in general, he will find he has no other idea of it at all, but only a supposition of he knows not what support of such qualities which are capable of producing simple ideas in us; which qualities are commonly called accidents. If anyone should be asked, 'What is the subject wherein color or weight inheres?' he would have nothing to say but, 'the solid extended parts.' and if he were demanded, 'What is it that solidity and extension inhere in?' he would not be in a much better position than the Indian before mentioned, who, saying that the world was supported by a great elephant, was asked, what the elephant rested on, to which his answer was, 'A great tortoise;' but being again pressed to know what gave support to the broad-backed tortoise, replied--something, he knew not what.{11}**

The important thing to note in the above quoted passage is Locke's conception of the primary qualities as accidents *inhering* in substance. Granted such an analysis, then substance indeed becomes an unknowable, and is on its way to complete rejection. The essential similarity of such a position to the earlier dualism of form and *prima materia* is obvious, and with it the ground for the plausibility such a conception possessed for Locke. It is also important to note the use of the term subject to express that "wherein color or weight inheres." This usage presents us with a fruitful clue as to the specific grounds underlying such an analysis.

Not only is such a substance unknowable, but it also, according to its very definition can have no characteristics or attributes, for it is that in which all objective qualities inhere. If we push the point far enough, it becomes obvious that the conception refutes itself for it cannot even have the 'relational adjective' corresponding to inherence. While if accident and substance are purely external to one another then the latter conception ceases to perform any useful function and must clearly be dispensed with. Without inquiring further into the absurdities of Locke's theory, let us attempt to discover the grounds which he regarded as sufficient to establish it. We have noted so far that Locke conceived substance to be a simple existent, and the ontological subject of some predicative propositions. Now let us consider the following propositions, "This is square," "This is brown," etc., where the object referred to is the same in each case. Let us further suppose that all these propositions are of the subject-predicate type, and thus that each of them attributes a quality to the object. Now let us form the compound proposition, "This is square and brown, etc.," There is apparent a certain simplicity about the subject of this proposition. To it stand opposed a collection of predicates brought together in one complex whole. How easy it is to assume that just as 'square' stands for squareness, and 'brown' for the quality known by that name, the 'this' stands for a simple being in which the predicated qualities inhere. Thus the copula would express this relation of inherence. Do we not use the expression '*having* a color' or '*having* a shape'? Such an argument from predicative propositions would also have weight for Locke in view of the Aristotelian dualism of matter and form. Our very language is extremely misleading in all these respects.

The judgment 'this is square' may be interpreted in a different manner, one that accords with a more adequate view of substance, and one that reflects the active character of the knowing-process. Our judgments arise in the matrix of experience and it is in this latter that the clue is to be found. Critical Realism has stressed the important role played in perception of the objective reference to a thing selected as an object. At the social level of language and explicit judgment, such words as *this* and *that* are used. These are known as denotative terms. Thus we see that these latter terms *mean or signify concrete external things*, when used, of course in connection with some socially significant selective activity. To complete the explicit judgment certain concepts are asserted to reveal the nature of the object referred to. Thus the verbal expression 'this is square' accompanied, say, by such an activity as pointing, is an attempt to 'get across' to others an actual perceptual experience in which a selected thing is perceived as being square. We shall later develop from such an analysis the conception of a substance as a concrete thing. The position may be more fully expressed as follows: "Substances are, then, continuants which can be made the objects of

cognition and which are self-existent, though not necessarily out of relations with other self-existents."{12}

The last proposition in the above quotation, namely that concerning the relation of substance to substance, raises a question which is fundamental to our inquiry. It has been asserted that doctrines of substance logically involve either monism or monadism. Our present task is to evaluate the argument upon which such an uncongenial proposition rests. Fortunately we shall find them to be completely unsatisfactory. The following quotation from Russell's admirable study of the philosophy of Leibniz will serve as an excellent point of departure:

> **Les différents attributs qu'a une substance à différents moments sont tous des préedicats de la substance, et, quoique un de ces attributs n'existe qu'à un certain moment, le fait qu'il est attribut a un certain moment est éternellement un prédicat de la substance en question. Car la substance est le même sujet en tous les temps, et par suite a toujours les mêmes prédicats, puisque la notion du prédicat, selon Leibniz, est toujours contenue dans la notion du sujet. Tous mes états et leurs connexions ont toujours été dans la notion de ce sujet qui est 'moi'. Alors dire que tous mes états sont enveloppés dans 'ma' notion, c'est simplement dire que le prédicat est dans le sujet (J. I, 528; G II 43). De cette proposition, continue Leibniz, it suit que toute ême est un monde è part, indépendent de toute autre chose hors de Dieu.{13}**

We are clearly concerned with the question as to the ontological situation underlying judgments about the future. Let us consider the two judgments "This apple is 'green'," and "This (same) apple will be ripe next Thursday." Let us further assume that both of these judgments are true. Now of these two, the first one tells us that the substance with which we are concerned besides being similar to those objects which we call apples, also has a specific nature, at the present time, of such a sort as to be expressed by the complex concept 'green.' Leibniz, of course, interprets this to mean that the characteristics of being a green apple actually 'inhere' in the substratum or substance of the apple. So far there is nothing unusual. However the second judgment relates to the same ample and also makes a predication of it. Thus the characteristics involved in being a ripe apple must also inhere in this substratum. Common sense would of course maintain that all that is required is that these qualities should inhere in the substance next Thursday. However Leibniz goes on to ask what is required for the apple next Thursday to be the same apple as it is today. In answer to this question he asserts that the necessary condition is that the object at both times should have the same (i.e., identical) complex of characteristics. . . . "la substance est le mê&me sujet en tous les temps, *et par suite a toujours les mêmes prédicats*."{14} Thus the *notion* or form of the apple is, as it were, a complete and specific diagram of all its past, present, and future states arranged in a continuous series{15} with an intrinsic sense. Leibniz concludes that the behavior of the apple has its ground in its individual nature alone (omitting all reference to the Creator) and thus that each object is a world apart, a windowless monad.' To put it somewhat differently, we may say on this basis that events occur *as if* and *only* as if there were actual dynamic interaction between the monads. It is easy to see that an alternative cosmology relative to the same base would be an absolutistic monism similar to that of Spinoza.

As was to be expected, our analysis proceeds in a different manner. Thus while we agree with Leibniz that it is a fact about the apple that it will be ripe next Thursday, we deny that there exists intrinsic to the apple a complex universal composed of all universals truly to be predicated of it. It is indeed true that next Thursday the apple may be said to 'have' ripeness. {16} This assertion, as such, however, does not prejudice in any fashion the question as to the *locus* of the ground of this ripeness. As we have seen, Leibniz has tacitly assumed that sameness means in this case complete identity of characteristics. We have already pointed out that there is no empirical justification for such an assumption, while without it Leibniz cannot but fail to prove his point, at least in so far as the argument we have been discussing is concerned. Thus, to repeat, without this latter, the predicate would be 'contained in' the ontological subject only at the selected moment of time. More than this we could only assert that each fact about the object is contained in the 'totality' of facts about the object, a tautological statement to which no one would object.

As we have already suggested, the position which we shall defend is that of a cosmological pluralism of a nonmonadistic type. This is to say that we shall affirm a world of self-existent continuants in constant dynamic interaction with one another. This position would seem to have a firm foundation in experience, for empirically we have every reason to believe that when a thing changes, the grounds of its coming state lie not only in the internal tension of the object, but also in the nature of the environment in which it is immersed. Before we develop these considerations let us note an ambiguity in the expression 'self-existent.' Used correctly this phrase means that an object described by it exists in its own right. That is to any that it does not depend for its existence on something else. However, it has been argued that there can only be only one self-existent, because if there were two, each would 'depend' on the other, an assertion apparently incompatible with the premise. However, the specific structure or form of an object may 'depend' on, or be an expression of its togetherness with other objects, without its being existentially dependent on them, or ontologically derivative. Thus, for example, the specific behavior of an electron is what it is because of the participation of the electron in a concrete existential situation. In other words it is quite conceivable that ultimately all existents 'contribute their bit' to the behavior of a given object, or, to paraphrase a saying of Professor Whitehead, that each particle of being takes account of all the others. Let us apply these considerations to the case of the apple we have discussed so much. Here, empirical and scientific knowledge combine to tell us that a host of environmental factors are necessarily involved in the ripening of the apple. For science, the locus of the grounds of this change are those factors which are selected by inductive technique as being its 'cause.' Ontologically, on the other hand, the apple is ultimately dynamically together with all the remaining existents in the universe. However, no matter how tremendous the number of external factors involved in bringing this change about, the fact remains that on next Thursday the apple will 'have' a behavior and a structure expressible by the concept ripe, and thus the second judgment can be true without involving monadism.

We have another consideration to examine before we can consider ourselves to have established a pluralistic point of view. It comes from the sphere of logic, and is suggested by the following statement of Bertrand Russell's . . . . . "traditional logic holds that every proposition ascribes a predicate to a

subject, and from this it follows that there can only be one subject, the Absolute, for if there were two, the proposition that there were two would not ascribe a predicate to either."{17} Now, it may have been assumed on the part of the reader that since we have concerned ourselves to some extent with the import of certain subject propositions, that we are prepared to defend the traditional point of view. On the contrary, we join with Mr. Russell in rejecting it as inadequate. However, our reason for rejecting it is not so much that it is false, as that it is incomplete, and requires supplementation in the form of a logic of relations. Thus, for example, we are in complete agreement with Mr. Russell when he shows quite conclusively that the traditional mode of analysis fails to cope with asymmetrical relations. However, we also believe that there are certain propositions, such as 'this is square' which do not express a relation between entities. However this may be, it is clear that in accepting the contributions of modern logical theory, we are in a position to construct a pluralistic cosmology on a substantislistic basis.

III. EVENT AS THE BASIC CATEGORY OF EXISTENCE

Historically it is not difficult to understand why many thinkers have abandoned the category of substance. Several apparently unsolvable problems had arisen in connection with this latter concept, and an attempt to dispense with it, and to approach reality with a new hypothesis, was in order. Thus the question as to the relation of property to substance was to be avoided by undermining its significance. The theory of 'events' which thus took its place was a natural outgrowth from British empiricism, and the ontological skepticism into which it had developed. We have already attempted to show the inadequacy of this latter point of view, and it might be felt that if we were able to develop a consistent position on the basis we have suggested, that the theory of events would be placed on the defensive, and that we should thus have no reason to take it into consideration. However, this theory is too firmly entrenched to hope that any merely positive construction would, except in the long run, drive it to cover. Furthermore, we shall find it to be a task of great intellectual pleasure to discuss it, and to attempt to find difficulties in its interpretation of nature. For clearly either it has such difficulties, or it is equivalent to the theory we shall develop, or else our position is in turn untenable.{18} In any of these cases a discussion of the theory will prove both interesting and valuable. We shall presuppose on the part of the reader a knowledge of the background of the theories to be discussed, and an acquaintance with the structures to which they belong. However, it should be kept in mind that we are not concerned to give a complete account or criticism of any particular standpoint or position, but rather, by the use of examples, to demonstrate the weakness of the theory of events in general.

An excellent point of departure will be a quotation from Bertrand Russell which we have already given, but which, for the sake of convenience, we shall repeat . . . "a thing may be defined as a certain series of appearances connected with each other by continuity, and by certain causal laws."{19} For the time being, at least, we shall take the term appearance, as used in this sentence, as synonymous with 'event', and thus we shall turn at once to an examination of the implications of the above assertion. As we have already suggested, however, we shall concern ourselves more with the various alternatives presented by the statement, than with the actual

relevant theories of Mr. Russell. To begin with, let us note the use of the term series. Clearly an attempt is being made to avoid the concept of continuant, or 'subject of change,' and to supplant this latter with a continuous series of appearances such as would ordinarily be said to be in time. Now, in the first place, either past and future events do not exist, or else present events have some specific character or relations which determine them as such. The first of these alternative presents us with the following possibilities. Either the present event has a temporal span (or duration), or else it is equivalent in this respect to an instant, that is, it has no duration.{20} It should be understood in this connection, that we are not concerned with the question, does the event endure?, but rather with the question, does the event, so to speak, contain within itself *as a unit of becoming*, temporal distinctions. Now the first of these possibilities clearly demands that we deny that any portion of the event in question came into being before the rest, for if we did not do this we should be logically forced to the assertion of durationless events. Now it is my contention that the concept of a unit of becoming containing within itself temporal distinctions, is a self contradictory one. Let us consider, for example, an event *e* that has become as a whole, and that has a duration in the sense above defined. Now clearly there is no change within this event. However, we must be able to distinguish within it an earlier and a later, a past, a present, and a future. Now it is agreed that change is essential to time, that is to say that a static universe would have no temporal dimension. But we have already seen that what we may call physical change is excluded from the event. The only remaining possibility is that there is change within the event with respect to the characteristics of pastness, presentness, and futurity, since 'earlier than', and 'later than' are unchanging relations. For a conclusion of this argument we shall refer the reader to the discussion immediately following as an exactly similar situation will be discussed though, as it were, in 'letters writ large'. There the issues will be clearer, and freer from preconception.

Before we go on to discuss the thesis that present events are merely a special class included within the 'totality' of existent events, let us note that all *event-theories* which deny the existence of the future must choose between asserting that what becomes has within it temporal distinctions, or maintaining that what becomes is instantaneous.{21} The latter of these assumptions will be discussed at a later time in the paper. Let us now examine the thesis presented at the beginning of this paragraph. Dr. C. D. Broad gives the following analogy:

> **We are naturally tempted to regard the history of the world as consisting in a certain order of events. Along this, and in a fixed direction, we imagine the characteristic of presentness as moving, somewhat like the spot of light from a policeman's bull's-eye traversing the fronts of houses in a street . . . on this view the series of events has an intrinsic order, but no intrinsic sense.{22}**

Thus, in this position, the only change occuring to an event in the series is with respect to the characteristics of pastness, presentness, and futurity. However, "past, present and future are incompatible determinations. Every event must be one or the other, but no event can be more than one . . . and this exclusiveness is essential to change and therefore to time. For the only change we can get is from future to present, and from present to past."{23}

"But every event has them all. If M is past, it has been present and future . . . Thus all the three incompatible terms are predicable of each event, which is obviously inconsistent with their producing change . . . It is never true the answer (to this difficulty) will run, that M *is* past, present and future. It *is* present, *will* be past, and *has been* future . . . But this explanation involves a vicious circle. For it assumes the existense of time in order to account for the way in which moments are past, present and future. Time then must be presupposed to account for the A series.{24} But we have already seen that the A series has to be assumed in order to account for time. Accordingly the A series has to be presupposed to account for the A series. And this is clearly a vicious circle.{25} To return to Dr. Broad's example . . .

> **if events have no intrinsic sense but only an intrinsic order, what meaning can we give to the assertion that the characteristic of presentness traverses the series *in a fixed direction*? All that we can mean is that this characteristic is *present* at B when it is past at A. Thus all the problems which the policeman's bulls-eye analogy was invented to solve are simply heaped on that particular series of events which is the movement of the bulls-eye.{26}**

The conclusion to which we are forced is that the position we have been discussing cannot account for time and change, and must, in the last analysis treat these two aspects of the empirical world as 'mere appearance'. However, since the theory requires that time be a self-contradictory conception, we are actually forced to look elsewhere for a theory of change, since, in the words of Whitehead, a contradiction means nothing more than that "at least one of the premises involved in the inference is false.{27}

Let us now return to the thesis that future events are non-existent, and concern ourselves with some aspects which we have not yet discussed. In the first place this theory must clearly assert that events literally arise 'out of nothing,' a process that is just as incomprehensible as the early Christian dogma of *creation ex nihilo*. It might conceivably be maintained that the present event is an 'emergent' character of the past. However, as an explanation, this not only sends us upon an infinite regress of the type 'character of the character of etc.,' but it also amounts to a tacit rejection of the thesis that event is the basic category, and to a concession to the substantialistic point of view which maintains that changing continuants be at the basis of physical phenomena. Let us note some other implications of the theory that events arise *ex nihilo*. This type of position appears, in certain cases at least, to render unintelligible the order and rhythm of natural phenomena. In this connection, certain philosophers have used the concept of a 'run of luck.' For, clearly, the non-existent can have no relations, and when the so-called future event has become actual, and thus capable of entering into relations, it already has its character. On such a position it would be extremely difficult to do more justice than did Hume to the concept of causality. An attempt has been made in recent years to explain regularity of sequence in terms of causal laws, or functions. "When I speak of 'causal laws', I mean any laws which connect events at different times, . . . In this very general sense the laws of dynamics are causal laws."{28} Thus we may lay down the following definitions: Things are those series of aspects which obey the laws of physics{29}."{30} This is by no means an unambiguous statement. What is meant by such terms as 'connect' and 'obey'? And what

is the mode of existence of a law? Now clearly either these laws are merely scientific abstractions, in which case 'connect' and 'obey' are mere metaphors, or else the term law stands for an actual entity literally governing a portion of the phenomenal world. The first of these alternatives obviously leaves us exactly where we were with the theory of the run of luck. The second thesis is much more interesting, and merits a closer examination regardless of whether or not Mr. Russell would claim it as his own. Now a theory which held that time and change are mere appearance might attempt to interpret these functions or laws as aspects of the rational structure of the universe. However, on the basis of the position we are discussing, the problem of how these entities can determine the character of events is a real one. Clearly, to assign such a role to these 'laws of nature' if a nominalistic theory of events (within the dualism of function and event) were maintained would be impossible, since, to repeat an argument mentioned above, the non-existent can have no relations, while an event that has become, and is thus capable of relations, already has a character. Thus relative to the basic hypothesis of the position we must either reject these functional entities as useless and thus return to the 'run of luck' theory, or else be forced to distinguish between a 'pure event' and the characteristics or universals which enter into it as it becomes. At this point, let us note that the theory of events is by no means as simple and clear cut as at first glance one is likely to assume, and this apart from all question as to its adequacy as an explanatory hypothesis. Thus, in our positive thesis, we shall point out that the theory of substance developed by Evolutionary Naturalism not only involves fewer assumptions, but that it is fundamentally monistic involving no dualism of substance and attribute, or of *prima materia* and Form.

Let us now attempt to draw the various considerations we have presented together, and complete the discussion of certain points we have hardly more than mentioned. To begin with, we have pointed out that the assumption of a series of events with an intrinsic order as being logically prior to time is a self-contradictory one. For our argument we are indebted to McTaggart, although the conclusion we have drawn is different from his, since we believe that the initial assumption is not the only possible one. Next we turned to the thesis that what becomes is an event with intrinsic temporal extension. This we also rejected, and for similar reasons. A third possibility, as we saw is the thesis that the temporal sequence of events is composed of an infinite series of instantaneous occurrences. The most serious objection to be made against this point of view is that it is impossible to derive extension from the extensionless, or time from a sequence of moments. It is to be understood, of course, that the future instantaneous occurrences do not exist, and thus, since each successive event brings with it no extension, a series of them, no matter how compact, cannot give birth to a single minute of duration. Let us also note the tremendous complexity of the world picture it presents. It must assume both a spatial and a temporal series of existents of which at least one (the latter) is infinite. The position we shall develop involves only, on the other hand, a spatial realm of continuing existences. This latter theory thus involves the assumption of fewer existents than any theory which maintains that 'future' events come into being (on the general hypothesis, of course, that events are the ultimate constituents of reality). There remains to discuss, though briefly, a possibility which we have, as yet, not even mentioned. Within the general frame work of the assumption that future events do not exist we have discussed the thesis that what becomes is an event with intrinsic duration, and the thesis that what becomes is instantaneous in

character. There remains the possibility that what becomes is not temporal at all, and that history is made up of a series of such entities. They are, as it were, *blurred*, to use a term expressive of our experience of rapid motion, but like this latter are such that they express what we call change. On such a theory time would be an abstracted conceptualization of a series of changes as thus conceived. Such a theory has not been expounded, at least to my knowledge, although Professor Ushenko is working along similar lines, how similar I should not care to assert. Whether or not a consistent theory can be developed along these lines, we are not prepared to say, although the considerations which follow would lead us to answer in the negative. Thus our discussion of 'laws of nature' and the 'run of luck' theory is clearly relevant to this position, and the same conclusion follows.

Now a distinction between the 'pure event' and its character, on either of these two types of theories would seem to have the following implications. In the first place, the characters which make up the successive 'states' of a 'thing' must clearly all exist (or subsist) together. For if the future characters did not exist, then our twice presented argument would apply, and we should be forced either to a second degree character (and thus to an infinite regress) or else to revert to the run of luck theory, for, clearly, the characters must be 'functionally' bound up with one another, or, to put it somewhat differently, each character must be what it is because of what the others are. Furthermore, since we wish to allow for 'interaction' between these 'things,' there must also be a functional interconnection between the characters that are said to belong to different things. Thus, to sum up, these characters are bound up into a four-dimensional whole, of which the fourth dimension is constituted by an intrinsic order of the characters. Now, we have already shown that if the past, present and future 'pure events' all exist, then time is surely a self-contradictory conception, or, may be said to have been reduced to 'mere appearance.' On the other hand, we have also seen that the units of becoming can neither be momentary, nor have an intrinsic temporal extension.{31} Let us therefore discuss the considerations presented earlier in this paragraph as they apply to the possibility we have found to remain. In the first place, let us remember that this thesis requires the arising of existence *ex nihilo*, for if it were to maintain that the entire history of the universe constituted one such 'blurred' event, then clearly we should be confronted with a block universe at its worst. In the second place, our discussion of the substratum theory of substance applies to the conception of a 'pure event.' Thus whatever this latter may mean, if it has any meaning, the merging of a pure event with a particular mass of characters is, to begin with, a completely unintelligible phenomenon. Furthermore, there is no possible reason why it should merge with one rather than with another of these characters. Lastly, the number of its existential (and subsistential) assumptions should be kept in mind. Let us conclude this criticism of the theory of events with a discussion of 'mere appearance.' At first glance it might seem as if a theory which reduced time to mere appearance (and this applies also to other features of reality) might be said to do at least some justice to a patent aspect of experience. However our contention is that since such theories involve the thesis that the concept of time is a self-contradictory one (indeed this is why they condemn time as being mere appearance), they are philosophically inadequate. They could only be accepted in case it could be demonstrated that all possible theories which would pretend to do justice to time, are fallacious. Since such a proof has not yet come forth, and seems, indeed, to be impossible, it follows that theories of

the block-universe type are speculations of the worst species, and must be rejected. Philosophers should attempt to clarify, and not to distort, experience.

IV. PHYSICAL REALISM AND THE TIME PROBLEM

We shall now turn to the elaboration of a positive theory of time and change. This presentation will be a critical continuation of the considerations advanced in the first section of this paper, and thus will claim to be founded upon the actual meanings and distinctions embedded in human experience. Our general problem will be to present a theory of substance that will be adequate as an interpretation of physical nature; one, in other words, that will be self-consistent and intelligible, avoiding traditional difficulties, and which, at the same time, will cohere with the dynamic and creative aspects of empirical reality. That such a conception is essential to the interpretation of change is shown by the following passage from A. E. Taylor's *Elements of Metaphysics* . . . . . "Change then may be defined as succession within an identity, the identity being as essential to the character of the process as the succession. In what way, then must we think of this identity or common nature which is present throughout the whole succession of changes? It should be clear that this question -- how that which changes can be permanent, -- is simply our old problem of quality and substance, how the many states can belong to one thing considered with special reference to the case of states which form a succession in time. Thus whatever is the true nature of the unity to which the many states of one thing belong, will also be the true nature of the identity which connects the successive stages of a process of change."{32}

To the Evolutionary Naturalist, the category of substance is but a critical development of the meaning of thinghood. We have already noticed the fact that the selective aspect of the cognitive process determines to a large extent which portion of our physical environment shall be regarded by us as *a* thing. Accordingly, at the perceptual level we are not concerned with thinghood in general, but rather with *this* thing, *these* things, etc. Thus this meaning is involved in *specific* objective references and characterizations. At the reflective or philosophical level, on the other hand, this meaning is abstracted and made explicit. It is generalized, so to speak, and brought face to face with all reality, although it is already, indeed, implicitly general, that is, in application. Thus we may say that a substance is a concrete thing. To put it somewhat differently, we arrive at the category of substance by abstrtacting those features which are common to all those portions of physical nature that have directly or indirectly entered our experience. At this point, of course, an inductive leap is made, and the propositions definitive of substance begin their career as elements of a basic explanatory hypothesis. It is to be understood that behind this discussion lies the realistic assumption that we know reality essentially as it is.

We may now raise the question as to what is involved in the concept of substance as thus defined. In the first place let us note that the notion is a complex one. Thus it includes certain generic aspects of reality such as time and space which have traditionally been regarded as separate categories. However, we are not concerned in this paper to differentiate and discuss these generic aspects of reality, but rather to examine the success of the concept of substance as we have derived it, as a basis for dealing with the

traditional problems of change. We shall find the following aspects of the concept of substance to be essential to our inquiry: endurance, change, intrinsic nature, structure, and property. We shall first consider the question of the relation of substance to property. We shall be concerned to see whether or not the substratum theory can be avoided, and a more adequate theory set up in its place. However, to begin with, let us briefly outline the theory of knowledge which underlies the ontological analysis, as in this manner the basis for the use to be made of the above terms will be made clear. It might be well to note that theory of knowledge moves at the level of thinghood, description and scientific knowledge, and that thus it is logically prior to metaphysics which is its natural completion, so that our mode of procedure is completely justified.

The basic principles of Critical Realism may be set down somewhat as follows: (1) The object of perceptual knowledge is an external thing *selected as an object* "by mental acts of a thoroughly organic sort."{33} (2) The object of such knowledge is not intuited, or existentially given, but is known by means of data of sense of which the pattern is differentially controlled by the pattern of the object. (3) These sense qualities in turn, though subjective in residence, are also controlled *qua* qualities in the same manner. (4) The percipient subject interprets the object by means of concepts evoked by the sensuous setting. This account is necessarily brief, and omits any reference to the genetic aspects of perception. However, it will be sufficient to serve our purposes. Now, since it is the concrete external thing which we know, what justification is there for interpreting reality in terms of a dualism of substance and attribute? It is to be remembered in this connection that, "If we disintegrate the more complex things into their component parts, and so secure atoms and even electrons, these, also, are not substances in the Lockian sense. They are specific realities about which we can gain knowledge. The matter of the physicist has nothing in common with the substance of medieval thought."{34}

We have already criticized that approach to this problem which, taking a proposition, or judgment as its point of departure, first reifies the various attributes of a thing, and then demands a unifier to unite them, and finds this in the factor referred to by the subject (of the judgment), of which the verbal simplicity leads them to infer a correspondingly simple existent. Our epistemology enables us to avoid this pitfall, for we know (1) that the function of a concept in a cognitive situation is to reveal the nature of the object, and not to refer to a self-existent property, and (2) that the *this* of a verbalized judgment expresses a reference to an object *as a whole thing*, or concrete unity, and not to a simple substratum uniting discrete attributes. "We must not *project* into the particular substance the atomistically conceived properties which we have formulated."{35} To put our conclusion somewhat differently, form or pattern is intrinsic to being, and a case of such being is a substance.

So far we have dealt with static aspects of substances. Let us now take under consideration the aspect of change. Here our basic principle will be that being is not only by nature *patterned*, it is also intrinsically *dynamic*. Thus we reject the traditional dualism of matter and force or motion. This point of view has dominated materialistic atomism, and in view of this dualism, the position may be called the billiard ball theory of matter. This 'billiard ball philosophy' has been widely accepted since the early days of reflective

thought, and has been at least ostensibly the cause of many a system of spiritualistic metaphysics. Thus it augurs well for naturalism that there is an increasingly widespread awareness of the fact that science lends no support to this outmoded materialism. The newer materialism is the materialism of emergence, of emphasis on *wholeness*, a materialism that recognizes the ultimate togetherness of all things. This, we believe is the setting of change, and it certainly is not as previous centuries conceived it.

Physical systems express their nature in their behavior. "The behavior of things throws light upon their constant nature. The color of an object is becoming a clue to its internal structure, physical and chemical. Structure and function are intimately connected."{36} At this point let us note that throughout the constructive portion of this paper the term *structure* (=pattern=form) is taken as an undefined term. Now the behavior of things can be studied, and on the basis of the knowledge thus derived certain propositions can be formulated which express or describe this behavior. Thus arises the notion of a property . . . . "What is called a property of a continuant is not an actually manifested character, but it defines what characters would be phenomenally manifested when certain assignable conditions occur. For example, the elasticity of an extensible string illustrates a property which we attribute to the string; it defines in general terms the degree of length which would be attained were the string exposed to a certain tensional force. A property, therefore, expresses a definable group of manifestations -- not as actual -- but as potential."{37} Thus we have knowledge about things that under certain circumstances they will behave in such and such manner. It is the task of the special sciences to formulate this behavior, and connect it with structure, and with structural shifts. However, once again we must warn against the temptation to reify abstractions. The following quotation admirably expresses the ontological status of a property:

> **What then are properties? Simply the elements of our tested thought of the thing. *The remarkable fact is that the difference between substance and property is an epistemological rather than an ontological one.* In a very real sense, properties as we formulate them are cases of knowledge about the existent, and yet, since knowledge must give insight into reality, the existent can rightly be said to posses these properties; its determinate nature must be such that these propositions conform to it.{38}**

Thus science can formulate laws which express to some extent, at least, if never exactly, the nature of the objects with which it deals. At this point, let us note that the terms *nature* and *intrinsic nature* express the concrete, specific being of an object. They are essentially contrast terms to such abstractions as structure and behavior. In a context where no such bifurcation has been made, or implied, we speak rather of the concrete thing than of its nature, for this latter in turn is an abstraction.

Change is an ultimate feature of existence. Out task is not to 'deduce' it, but rather to examine it in an attempt to discover what it involves. Now we have pointed out that human empirical knowing consists primarily in a deciphering of the pattern of physical situations. Correspondingly our knowledge of changing situations consists fundamentally in an awareness of changing patterns. However, as we have pointed out time and time again, these patterns or structures are abstractions. Thus, no matter how we

discover it, it is the concrete physical system which changes. We also have a second type of knowledge about things, namely, that concerning their properties. This we have defined above. It involves the assertion that things are *such that* the structure of certain situations in which they are placed, will change in such and such a manner. It follows from this that when we speak about change we are ultimately referring to the fact that physical existents are *such that* their intrinsic form or structure changes. Further than this we cannot go. {39} Let us now examine this alteration in pattern of physical systems and existents. In the first place we can express this change roughly, in the case of physical systems as the spatial re-distribution of their constituents. However this statement must not be interpreted in terms of the billiard ball theory. Thus, from the point of view of the theory we are developing, it is necessary to add that the constituents change in sympathy with their environment. Let us further note that in such cases as the disintegration of a chemical compound, or the death of an amoeba, to mention but two examples, properties are lost which belong to the whole and are expressive of its synthetic unity.

We are now in a position to distinguish between primary and secondary endurance. Of these two the latter is the endurance of a whole involving the creative synthesis of its component parts. Such an existent endures until it undergoes a sufficiently revolutionary change in structure, in which case what remains is a collection of its parts. When such a unity breaks down, certain properties characteristic of its togetherness are lost, and only those of its parts remain. The term 'levels of causality' indicates the empirical fact that as we mount up the evolutionary scale of complexity, a certain number of irreducible *types* of behavior are found. Thus it is an empirical question as to how many of these levels there are. On the other hand the theory of creative synthesis is an hypothesis to explain these empirical phenomena. Primary endurance, to return to the question at hand, is that of a being which is not composite, which is, that is to say, the lowest level of being. There may be several varieties of such being, each with its own peculiar properties and behavior, however, that there is such a level, cannot, I believe, be doubted. Here we tread on delicate ground. However, not only is there some empirical evidence for such an assumption, but the contrary assertion would confront us with an infinitely complex world, for which there is no empirical demand. If it could be shown that the conception of an infinite class is a self-contradictory one, then our assumption could not be disputed. However we shall rest with the valuable principle that entities are not to be multiplied without necessity. Thus let us note that the traditional argument for the contrary assumption from the infinite divisibility of space carries no weight, since points are conceptual constructions within an abstract system, and though this system may express properties of physical space, we have no right to read such discreteness into nature. We shall also assume that primary being is eternal in the sense that it does not cease to exist. Such ceasing to be would be unintelligible for what ground could it have?

A substance at each level is literally a unity of being with a type of behavior that is not definable in terms of that of lower or higher levels. Its behavior is expressive of the tension of its togetherness with its environment. It follows from this that the behavior of a constituent of lower level within such a complex cannot be completely accounted for in terms of its own level alone. It is here that traditional mechanism breaks down. It neglected emergence, and levels of causality, and was too *a priori* in its methods. It is now being

recognized that the laws of atomic physics, say, are merely approximate expressions of behavior, and that, to carry our conclusion to its logical limit, the emergence in the world of existents of a new level, modifies the behavior of *all* reality in a manner that could not be accounted for on the basis of previous types of behavior. Thus each science is concerned with conceptualizing a *type* of behavior, and not with following in an abstract fashion the behavior of particular existents. The new naturalism thus does justice to levels of causality, and in the realm of human relations is able to avoid the mechanistic or atomistic fatalism that was one of the weakest points of the older forms of materialism. A development of this point to a satisfactory extent, that is to say a careful discussion of the properties of being at the human level, would take the space of another paper. However, the reader may think it through for himself, and if so, I am convinced that he will agree that the hypothesis of emergence is the most striking contribution of recent philosophical thought.

We may sum up our conclusions as follows. Being persists through change, which latter we know in terms of structure and properties. Primary continuants persist only until their unity is disrupted. Change is an ultimate feature of existence. It may be defined in terms of endurance, difference, and being *such as* to 'have' a given structure. The actual change which an existent undergoes is an expression of its nature as in a physical environment. Corresponding to the various types of existences or centers of change there are different types of physical activity. Any number of these may be involved in a particular situation, from the lowest level on. In description and explanation we neglect all factors which in a pragmatic way we find to be irrelevant. Ultimately, however, the behavior of each existent is bound up with that of all the others.

Before we go on to discuss certain remaining issues of interest, let us note an important distinction which has seldom been drawn, namely that between *real* time and *chronological* time. The failure to distinguish between these two has resulted in much cosmological confusion, especially since the advent of the physical theory of relativity. We shall agree with Professor Sellars when he identifies real time with change, and thus interprets this former as being as local as are the physical existents which change. "This conception of real time as local because identical with causal change was not natural to classic physics which was interested in correspondent measurements. It desired a unity of reference, a time equally flowing for the whole world. Relativity physics was still interested in measurement because concerned with knowledge about processes. But, as we saw, it was led to substitute times for time. Time became local in the sense that time estimations necessarily varied from one frame of reference to another. We are justified in saying that the metaphysician's meaning when he asserts that time is local is still more radical than the relativist's. But the point to bear in mind is that the latter is concerned with measurement, with clocks and metric arrangements whereas the former is primarily interested in the fact of local change. It is, again, the difference between metric knowledge-about, and the categorial texture of reality.{40}

Metric time, or the dating and ordering of phenomena in a chronological series depends for its existence upon the fact that the human organism is aware of change, that is, knows things as changing, and is able to set up certain 'recurring' physical situations involving change or activity of a

'cyclical' type as points of reference for the dating of other situations in a dynamic world. By the aid of this type of phenomena we are enabled to 'project' change on space, and thus to bring it within the sphere of accurate measurement. Now, as we have already pointed out, knowledge is not an immediate intuition of physical situations, but rather an interpretation of them in terms of concepts and data subjective in residence. This, as we shall see, makes possible the fact, important for physics that the dates assigned to a physical occurrence are relative to the 'frame of reference' of the observer. By abstraction from this spatialized change we derive the temporal structure of years, numbers, seconds, etc.

Ontologically, the past does not exist except in the sense that certain propositions said to be about it may be actual factors in a *present* 'mental state.' What exists are continuants or substances, and when a substance has changed from 'having' structure A to 'having' structure B, the former no longer exists. However it is a fact about the substance that it did have structure A. And similarly with the future. The state C does not exist, but it is a fact about the substance that it will have this state. Such predictions are inductive and hypothetical, to be sure, but the significance of such a judgment is clear. Thus our thesis will be that propositions 'about the future,' and 'about the past,' are actually about continuants recognized as changing. Furthermore it is an ultimate fact that change is from . . to . . . This is the ultimate basis for the distinction between past and future. It is indeed true that practically a complication enters when we attempt to discover what structure a particular physical system actually has. Here we are bound up with subjective data and a particular frame of reference. Thus we cannot get 'out there' and intuit the state and location of a comet. We must measure, interpret, and date perceived structure ultimately with respect to the perceived structure of an object which because of the character of its behavior is chosen as a point of reference. Thus the astronomers on another planet may only just *now* be receiving data differentially controlled by the behavior of Henry the Eighth. (The *now* expresses the fact that "there is no relativity in existence."{41} The astronomers of this planet may make a naive perceptual judgment and say that Henry the Eighth *is* signing such and such a document, or else they may make an inadequate correction and make another, although more critical judgment of simultaneity. On the other hand, it is, of course an indisputable fact that Henry the Eighth has long been dead.

We perceive things changing, and we formulate judgments about their behavior just as we formulate judgments concerning their spatial structure. Thus we have dynamic as well as static conceptions, and they are likewise achieved through induction and abstraction. Needless to repeat is the fact that when a subject perceives a physical process, the meanings of thinghood and persistence are fundamentally involved. The experience of perceiving an automobile accident is thus the experience of seeing one or more things behaving in a thoroughly unpleasant fashion. At a scientific level of knowledge certain judgments regarding this behavior are explicitly formulated. Corresponding to the fact that the perceptual experience was of a dynamic or changing situation, these judgments will contain certain chronological references of a more or less general sort, and corresponding to the selective activity of the perceiving subject is the fact that in specific empirical knowledge we are concerned with specific spatio-temporal unities of behavior, the selection of which from the overwhelming immensity of

natural phenomena is determined by our interests, of whatever character they may be. Thus human cognition is selective. This is, of course, also true at that more abstract level where one is concerned with *types* of structure and behavior.

In view of these considerations it seems wise to define an event as a selected portion of the behavior of a physical system. It is an implication of this definition that an event may be complex both in the sense that more than one existent is concerned, and in the sense that a complex change is involved. An event is not an *ontological unit* or *quantum of being*. The following example will prove an excellent means of clarification. The ripeness of an apple on July 4th does not exist when the apple has rotted. However we may refer to a thing as 'having' a behavior, just as we say that it has a spherical shape. Thus we speak of (the event of) the apple's rotting, and, in the case mentioned above, of (the event of) the automobile accident. Such usage is entirely legitimate. However, the important fact is that the behavior of the apple is no more a self-existent entity than its structure. Thus the ontological situation meant when an event is referred to consists of changing physical continuants. However, the human mind can experience, and so to speak, retain their behavior. It is this capacity of the human mind to perceive and experience change, that renders possible the type of reference to things involved in the concept of an event. Ontologically there are no events. However in a sense there are events, just as, to use an analogy there are structures or forms, for the human mind is able to discriminate aspects of reality, while at the same time recognizing the categorial features of existence. *We refer a behavior to things just as we refer a spatial structure to things, and just as in the latter case we speak of the squareness of the peg, so we speak of the death of Queen Anne.* Both of these objects of thought rest on the selective and categorial character of human thought. Confusion enters in when such conceptions are uncritically interpreted by reflective thought. The key to an adequate conceptualization of reality lies not only in careful empirical investigation, but also in a considered theory of knowledge. Such is the approach of Physical Realism. The extent of its success in dealing with basic problems is a matter for the future to determine.

We have distinguished between chronological time and real time. This former, as we have seen is bound up with a spatialization of change, as when, for example, we note the space traveled by the hand of a clock. By abstraction from such cases of measurement we achieve the conception of a 'space of time' in general. It should be clear that such a construction is nothing more than a geometrical continuum taken as representing the creative passage of physical systems, on the evidence of the above mentioned technique of chronological measurement. Thus moment corresponds to point. Now it is clear that ontologically there are no points, but rather concrete extended existences. This useful geometrical concept is expressive of the fact that extension in the abstract is indefinitely divisible. Thus geometry expresses the continuity of physical extension by saying that between any two points, in this abstract system, another point can be constructed. What light do these considerations throw upon the problem of change? In the first place let us note that there are no existential gaps in change. Thus change is ontologically continuous. This follows from the fact that change adjectival to substance. However, this continuity is not the mathematical continuity of a compact series of moments. This is a consequence of the fact that a moment is a 'limit' of chronological duration, or, to put it in other words, is

expressive of the fact that a space of time is indefinitely divisible. Thus a chronological duration is, so to speak, a 'pure event', and a moment a 'limit' or point as above defined. Thus, from our conclusion that an event is not a quantum of being, it follows that a moment, in turn, is not a quantum of being or becoming, and from the above considerations it follows that no state of a substance is momentary in the strict sense of this latter term. We can express this differently by saying that chronological time is not destructive; to be such is the nature of change. In conclusion let us make the following remarks. The main thesis of this paper can be summed up in a concise, if at first sight paradoxical, sentence as follows. *Things endure, but there are no 'durations.'* Hours, minutes and moments belong to the geometry of change as do points, lines and volumes to the geometry of extension. In neither case should discreteness be projected into existence. To do so is to create problems even as did the Greeks.

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Notes

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{1} A. N. Whitehead, *Process and Reality*, p. 4 [Back]

{2} The term block universe will be used throughout this paper to indicate that type of metaphysical theory which reduces time and change to mere appearance, and for which past, present, and future in a transmuted form, go to make up reality. This point of view is most widely held among the Absolute Idealists. See the writings of J. M. E. McTaggart. [Back]

{3} A. N. Whitehead, *The Concept of Nature*, p. 49 [Back]

{4} We are not concerned with ideological results of membership in a leisure class, a factor which is important in philosophical history, but rather with the logical content of their speculations. [Back]

{5} The paradoxes, namely, of Zeno. For a presentation of these, consult any standard History of Philosophy. [Back]

{6} *Our Knowledge of the External World*, p. 112 [Back]

{7} *Ibid.*, p. 114 [Back]

{8} *Ibid.*, p. 90 [Back]

{9} See Professor Sellars' *The Philosophy of Physical Realism*, pp. 62-154, also *Essays in Critical Realism* by Drake, etc. [Back]

{10} Sellars, *Philosophy of Physical Realism*, p. 77 [Back]

{11} Calkins, ed., p. 194 [Back]

{12} Sellars, *Philosophy of Physical Realism*, p. 283 [Back]

{13}

> **The different attributes that a substance has at different moments are all predicates of the substance, and, although one of these attributes only exists at a certain moment, the fact that it is an attribute at a certain moment is eternally a predicate of the substance in question. For the substance is the same subject at all times, and as a consequence always has the same predicates since the notion of the predicate, according to Leibniz, is always contained in the notion of the subject. All my states and their connections have always been contained in the notion of that subject that is 'I'. Thus to say that all my states are enveloped in 'my' notion, is simply to say that the predicate is in the subject (J. I, 528; G II 43). From this proposition, continues Leibniz, it follows that each soul is a world apart independent of all other things except God.**

B. Russell, *La Philosophie de Leibniz*, p. 48. [Editor's Note: The original English reads: The different attributes which a substance has at different

times are all predicates of the substance, and though any attribute exists only at a certain time, yet the fact of its being an attribute at that time is eternally a predicate of the substance in question. For the substance is the same subject at all times, and therefore has always the same predicates, since the notion of the predicate, according to Leibniz , is always contained in the notion of the subject. All my states and their connections have always been in the notion of that subject which is *I*. Thus to say that all my states are involved in the notion of me, is merely to say that the predicate is in the subject (G. II. 43). From this proposition, Leibniz continues, it follows that every soul is a world apart, independent of everything else except God (G. II. 46, 47). p. 43. Bertrand Russell, *A Critical Exposition of the Philosophy of Leibniz*, 2d edition (London: George Allen & Unwin, 1967), first published in 1900.] [Back]

{14} "the substance is the same subject at all times, and as a consequence always has the same predicates." (Italics mine) [Back]

{15} We leave this phrase without definition as we are not concerned to note the sense in which, for Leibniz, time was continuous. [Back]

{16} Evolutionary Naturalism is, of course, nominalistic. It maintains that form and structure are intrinsic to being. [Back]

{17} *Our Knowledge of the External World*, p. 41. [Back]

{18} The possibility always remains that both are inadequate. [Back]

{19} *Our Knowledge of the External World*, p. 112. [Back]

{20} See bottom of page 37 for remaining alternative. [Back]

{21} See bottom of page 37. [Back]

{22} C. D. Broad, *Scientific Thought*, p. 59. [Back]

{23} McTaggart, *The Nature of Existence* (Vol. II), p. 20 [Back]

{24} "For the sake of brevity, I shall give the name of *A series* to that series of positions which runs from the far past through the near past to the present, and then from the present through the near future to the far future and conversely." *The Nature of Existence* (Vol. II), p. 10. [Back]

{25} McTaggart, *Mind* XVII, p. 468. [Back]

{26} C. D. Broad, *Scientific Thought*, p. 60. [Back]

{27} A. N. Whitehead, *Process and Reality*, p. 12 [Back]

{28} B. Russell, *Our Knowledge of the External World*, p. 116 [Back]

{29} Note traditional emphasis on physics - see discussion of emergence in last section. [Back]

{30} B. Russell, *Our Knowledge of the External World*, p. 117 [Back]

{31} This latter is particularly clear in the case of a 'pure event.' [Back]

{32} ***Op. cit.*****, p. 161** [Back]

{33} Sellars, ***The Philosophy of Physical Realism*****, p. 79.** [Back]

{34} Sellars, ***Evolutionary Naturalism*****, p. 139.** [Back]

{35} ***Ibid.*****, p. 141.** [Back]

{36} Sellars, ***Evolutionary Naturalism*****, p. 143.** [Back]

{37} W. E. Johnson, ***Logic*****, Vol. III, p. 86.** [Back]

{38} Sellars, ***Evolutionary Naturalism*****, p. 140.** [Back]

{39} We are omitting from consideration the question as to the nature and status of changing subjective phenomena. [Back]

{40} ***Philosophy of Physical Realism*****, p. 331** [Back]

{41} Ibid., p. 337. [Back]

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