DISCUSSION

THE REVOLT AGAINST DUALISM *

PROFESSOR LOVEJOY'S lectures delivered and published on the Foundation Established in Memory of Paul Carus, Editor of *The Open Court* and *The Monist,* form a worthy successor to *Experience and Nature,* by Professor Dewey. The debt of American philosophy to Mrs. Carus is evidently going to grow as the years go by. It is interesting that these two initial volumes should severally represent the two different but related philosophical tasks of constructive theory and critical survey. In one sense this is only a difference of emphasis: Dewey currently criticized as well as constructed; Lovejoy, at the end, constructs as well as criticizes. But the difference in degree results in a difference in kind.

It is a matter for general congratulation that Lovejoy subscribes to the postulational method in philosophy. He tells us that in his opinion philosophers should discuss their problems "expressly in this form: If certain things (which some philosophers or other men believe) are provisionally taken as true, what other things must be or may be true? A great part of philosophy, in other words, should consist of attempts to determine what sets of propositions, in certain fields of investigation, properly go together" (p. 257); "it is, at all events, this method that has been followed in these lectures" (p. 259).

The particular contentions to which he applies this method are of course indicated by the title of the work, but they are more specifically stated in the Preface. "The principal purpose of this volume is not to present a private and original speculation, but to show, through a critical survey of the reflection of the greater part of a generation of philosophers in America and Great Britain upon two important philosophical issues, that certain conclusions with respect to those issues have thereby been definitely established." These philosophers have made, each in his own way, "the attempt to escape from that double dualism which the seventeenth-century philosophers did not, indeed, originate, but to which they gave reasoned and methodical expression—the epistemological dualism of the theory of representative

* *The Revolt against Dualism: An Inquiry Concerning the Existence of Ideas.* By Arthur O. Lovejoy, Professor of Philosophy in the Johns Hopkins University. The Open Court Publishing Company, W. W. Norton & Company, Inc. [1930.]

perception, and the psychophysical dualism which conceives empirical reality to fall asunder into a world of mind and a world of matter mutually exclusive and utterly antithetic" (pp. 2–3). The former dualism is more fully defined as the supposition "that all apprehension of objective reality is mediated through subjective existents, that 'ideas' forever interpose themselves between the knower and the objects which he would know" (p. 3). "Against both dualisms . . . our age has witnessed an assault . . . bolder, more sustained, more resourceful, and upon a wider front, than can be found anywhere in the previous history of philosophy" (p. 3).

This revolt he divides into two phases and two single-handed campaigns. The protagonists of the first phase are G. E. Moore, William James, "the new realists", John Dewey, Knight Dunlap, Samuel Alexander, Dawes Hicks, John Laird and Bertrand Russell—all, of course, as represented in their earlier writings. These rebels are disposed of in less than forty-five pages (pp. 34–78). In the second phase we have such persons as Dewey (again), A. E. Murphy, M. C. Swabey, S. P. Lamprecht, Kemp Smith (again), G. H. Mead, Donald Piatt, and E. A. Burtt. More than seventy-five pages (pp. 79–155) are required for dispatching this band. The suppression of A. N. Whitehead's revolt—with his "denial of simple location"—calls for something like thirty-five pages (pp. 156–189). Russell—with his "unification of mind and matter"—was apparently a more stubborn (or more important?) adversary, for he is not subdued until he has been exposed to the bombardment of more than sixty-five pages (pp. 190–256). When the smoke of battle has cleared away, the double standard of dualism is unfurled and triumphantly floats through the remaining pages of the book, including the Index (pp. 257–321, 323–325). The positions won are consolidated against idealism, the sole remaining enemy.

It is of course impossible in any discussion to do justice to Lovejoy's claim of victory over all these rebels. Several careful readings of his book lead me to estimate (roughly) that he has won about fifty per cent of the bouts. Where he wins he usually wins decisively, as is to be expected from so skilful a dialectician. It would be hard to find a book in which the tasks facing the epistemologist are more clearly or more forcibly stated, although even here one cannot but think that sometimes the statement is prejudiced by the conclusions at which Lovejoy finally arrives. He rightly insists on the necessity, in framing a theory of knowledge, of keeping always in mind what we know and the fact that there is much we do not know. Any

successful theory of knowledge must fit in with achieved knowledge as well as with acknowledged ignorance; and if it is to be quickly and widely accepted it must interpret these facts as they are ordinarily interpreted. But this ordinary interpretation is not always the necessary, or necessarily the correct, interpretation. Arguing from this ordinary interpretation Lovejoy's logic is powerful and his presentation vivid. It would be a gracious task if I could confine myself here to reviewing the many contentions with which I find myself in agreement; but the space allotted, even by a generous editor, is not adequate to a complete discussion of such an important book.

The great value of the book, I suspect, will ultimately be found to consist not in the "conclusions" it has "definitely established", but in the reactions that those attacked will make to its criticisms. The likelihood is that the war has just begun instead of being definitely closed. What Lovejoy evidently regards as dry bones left on the fields of battle may turn out still to have sinews and flesh upon them and to be covered with skin, and his prophecy may have been unto the wind. We shall in time see whether they do not stand up, an exceeding great army. All the men done for in the book are at least biologically if not philosophically alive, and each will probably have something to say for himself in the spirit of Mark Twain's remark about the report of his death. For this reason I may follow my own inclination and select such arguments of the book as are provocatively interesting to me. For I feel like the Irishman who, seeing a fight, took off his coat, rolled up his sleeves, and asked whether it was a private fight, or whether anybody might get in.

But before I get in, there is a preliminary logical matter that needs attention. Between the view that "*all* apprehension of objective reality is mediated through subjective existents" (my italics), and the view that *no* apprehension of reality is thus mediated, there is a large gap. It may be that *some* apprehension *is* and *some* apprehension *is not* thus mediated. Once in a while Lovejoy recognizes this possibility, as on page 148, where he says: "What dualism has affirmed is (a) that there is a certain class of things, namely, physical things, which exist without dependence upon a specific kind of relation to a specific kind of events, namely, brain-events accompanied by perception or other modes of awareness; and (b) that there are certain other things, namely, all (*or, in a restricted form of the doctrine, most*) immediate perceptual and other data, which exist only by virtue of that kind of relation to that kind of events" (my italics). If a "restricted" dualism is possible, is not this also a "restricted"

monism? The arguments in Lovejoy's book that seem to be conclusive are those directed against the unrestricted form of monism, which attempts to put into the physical world such things as the hallucinatory objects of the drunken and the insane. Without doubt he scores against this type of monism when he says: "The only possibly significant consequence which could be deduced—though it apparently was not—from the thesis of the objectivity of all content was an affirmation of the metaphysical uses of inebriety" (p. 76).

When it comes to arguments that if valid at all are valid even against the restricted form of monism (or of dualism if you please), we have a different situation. In studying this situation may we not make in favor of this monism the distinction that Lovejoy makes in favor of his unrestricted dualism? He justifiably distinguishes between the "unnecessary aberrations of the early and long-accepted forms of dualism in modern philosophy" (p. 6), and "the dualistic position more discriminatingly" defined and reduced "to its simple essentials, without the accidental redundancies of its seventeenth-century and traditional expression" (p. 10). It seems to have taken nearly three hundred years for this dualism to get simplified by returning from its aberrations into its proper path. "Objective relativism" has been muddling along for not so many decades. May not many of the steps it has taken prove to be temporary aberrations also? If so, Lovejoy has done a service in exposing them as such, but this service does not necessarily result in the establishment of the unrestricted form of dualism. What must be done is to show that no form of objective relativism is tenable. That is a pretty big job, which it is possible that Lovejoy has not accomplished, his opinion to the contrary notwithstanding. History has a way of presenting unsuspected alternatives generically related to demolished views, and another two hundred years may give us an objective relativism recalled from all aberrations, partly by Lovejoy's criticisms, and yet in its essentials unscathed thereby. There is greater reason for this hope in that many of his attacks do not have the logical force he serenely attributes to them. Perhaps there is in his book no more carefully (yes, even meticulously) elaborated criticism than that directed against objective relativism on the score of its unwarranted exploitation of the ambiguous word 'relativity'. And yet it would seem that after much ado he only succeeds in showing that a logical critic can excel in fallacies.

It is this criticism that shall exclusively occupy our attention in the rest of this discussion. It is a fair sample of much of the book.

Lovejoy distinguishes three different meanings of 'relativity', namely, "conditionality", "perspectivity", and "respectivity" (pp. 90 ff. and Chapter IV *passim*). "One of the things most to be desired—though doubtless hardly to be expected—in the discussion not only of the philosophical doctrine we are now considering, but also of the physical theory of relativity, is the discontinuance of the use of this ambiguous word [relativity], and the substitution in each case of one or another of the expressions 'caused' or 'conditioned by', 'respective to', or 'appearing from the standpoint of'" (p. 141).

1. Of "conditionality" he says: "As applied to the case of perception, it consists in the dependence of the existence of a character, or set of characters, actually given in experience, upon the existence or occurrence of something else" (p. 90). Nothing in this initial passage, in which a definition of conditionality seems called for, is said about the limitation of the "dependence" in question to *causal* dependence, and to just one consequence of causal dependence. And yet when Lovejoy begins to unravel the tangle in which the objective relativist is involved by reason of a failure to distinguish conditionality from the other meanings of relativity, he proceeds without so much as by-your-leave to treat a conditional quality as an *effect,* and *therefore* as not a quality of something prior to the "proximate cause". The inadmissibility of equating conditionedness with causedness is seen when we remember that in mathematics the value of a function is conditioned by the value of the independent variable, but this conditionality is not, except in certain applications, a causal one. If the reply is that, in distinguishing between the three uses of the word 'relativity' by the objective or by the physical relativists, non-causal conditionality was not discovered in their employment of this term, it is to be expected that some relativists will say truly that Lovejoy has therein failed to understand their position. At any rate, he assumes that the objective relativist regards all perceived characters as causally conditioned by the percipient event (whether physiological or conscious).

Let us for the sake of argument assume it likewise. What follows? Lovejoy thinks it follows that such conditioned characters cannot be characters of what in time preceded the condition. Let us see. There is such a character as that of 'being an ancestor of a president of the United States'. Had Mr. Hoover not been elected president in 1928 an indefinitely large number of men and women of bygone days would not have acquired this character. If being conditioned by an event is the same as being caused by it, his election can be said to have

caused them to become presidential ancestors. Here then is a conditioned character that is indubitably a character of what in time preceded the "proximate" condition, *viz.*, the election of President Hoover. Even if this is not the kind of conditionality that Lovejoy had in mind, is it not the kind that some objective relativists had in mind? If the latter, then Lovejoy's nice little logical sequence, starting from the conditionality (conceded by the objective relativists) of perceived characters, and going through their consequential "existential subjectivity" to their "non-physicality", is either a *petitio* or an *ignoratio*. Which does he prefer? Perhaps it is both!

Since there unquestionably are some conditioned characters that are properly attributed retrospectively to temporal antecedents of their conditions, why in the name of logic may not objective relativists "maintain . . . that the [perceived] character [conditioned by the percipient event] does not 'belong to' the proximate relatum [the percipient event], or is not situated where that term is, but is an attribute, or occupies the position, of the ulterior relatum" (p. 91), *i.e.* of the physical object that initiated the series of physical conditions that ended in the perception? The answer that he gives will be considered in due time, when we come to "perspectivity", "respectivity" and "simultaneity". Meanwhile, as a matter of fact, we *seem* to experience many sense-characters as belonging to objects at a distance from us, objects that we have reason to believe started causal chains that have ended in the perceptions of those characters. If there is no logical reason for not attributing such characters to such objects, the burden of proof rests on the man who says that we may not do it. We shall later see (pp. 253 ff., 257 ff., and 263 ff. below) how efficiently that burden is taken up and carried.

2. The second meaning Lovejoy finds in the ambiguous term 'relativity' is "perspectivity". The objective relativist regards a percipient event as a "standpoint", and asserts, so Lovejoy says, "that the [perceived] character 'belongs to' the ulterior relatum [the physical object alleged to be perceived] . . . only *from* this standpoint". Now this proposition "seems . . . chiefly, to be intended to assert the necessary *qualitative* disparity of the content present to different percipients, even when they are said to be dealing with a common object" (p. 91). Why "only", and especially why "necessary"? The "elliptical shape of the penny" used (p. 92) as an instance of perspectivity is, even in Lovejoy's meaning of the word 'shape', common to an infinity of standpoints without variation of the "ellipticity", and to four standpoints if both 'shape' and size are con-

sidered; and past experience, interpreted by the theory of perspectives, enables an intelligent percipient to infer the different "ellipticities" that a penny has from any other standpoint not included within this infinity. Hence "what" (Lovejoy says and I italicize) "*now concerns us*" does *not* concern us at all, *viz.*, "that, if a datum, whatever its supposed situation, is *only* a perspective appearance, if it is what it is *solely* from the standpoint of the percipient and *only* for him, and, in the last analysis, *only* by virtue of his individual constitution, then his experiencing of it would not appear to afford what is commonly understood by knowledge" (p. 121); for "in the doctrine of the universal perspectivity of data—if consistently carried out—any reality as it is apart from the special circumstances under which it is perceived or thought of becomes completely unknowable" (p. 123). But in a later passage, speaking of perspective aspects, he says: "It is true that an observer of A, having some acquaintance with the laws of perspective, will be . . . able to infer the character of B" (p. 173). Which of these two contradictory assertions does he wish to stand by?

As an instance of "a general deliquescence of the notion of factual truth and falsity" (p. 123) involved in this doctrine of the perspectivity of qualities, Lovejoy quotes two passages, one from Piatt and one from Burtt, in which it is applied to time. Much that is expressed in these passages I find no more acceptable than he does, but what he finds most revolting I welcome as unquestionable, *viz.* the perspectivity of *pastness*. He insists: "For pastness, as has more than once been remarked in these lectures, is the primary and most indubitable mode of the non-relativity of fact both to the cognitive event and to the vehicles through which facts get reported; and retrospection exhibits the transcendent reference of the data of knowledge in its clearest and most obvious form. The irrecoverable and irremediable past has always been the arch-example of independence, in the epistemological as in other senses, an example upon which countless proverbs and apophthegms and passages of reflective poetry have dwelt. But it, too—even the very pastness of it—is now made dependent upon present standpoints which nevertheless are conceived to be themselves forever changing and forever lapsing into the past. In this kind of relativism the last vestige of sense disappears along with the last vestige of objectivity, and the *reductio ad absurdum* of the 'doctrine of perspectives' becomes complete" (p. 125).

Without question there is a *reductio* somewhere hereabouts, but who is the victim? Is any event, just in its intrinsic nature, past? Is the pastness of an event a "*character which it has irrespective of all*

external standpoints" (p. 128)? If so, the pastness of the stock-exchange débâcle in the autumn of 1929 was a pastness to which those who were furiously speculating in the preceding summer were curiously and unhappily blind; and the death of every person who has ever lived and has already died was past while he was alive. Lovejoy's own words, characterizing the views of some opponents—"a peculiarly complicated, confused, messy, and improbable picture of the constitution of nature" (p. 106)—would come far short of doing justice to such a situation. Of course, from the point of view of any *present, its* past is "irrecoverable and irremediable", and those "countless proverbs" and other literary masterpieces are justified in dwelling on this *retrospective* irreparableness. (Retrospectivity is a particular kind of perspectivity.) It would be interesting to have Lovejoy interpret any of these "wistful" passages in any but a perspective sense. *If* pastness "is the primary and most indubitable mode of the non-relativity of fact both to the cognitive event and to the vehicles through which facts get reported", *a fortiori* there are *no* modes of such non-relativity!

But let us turn from this impossible concept of time to the penny and its elliptical shape. The penny is the classic example that with fatal inevitability has always been used to prove that seen things are not what they seem. Now everybody knows that the penny is 'round' and not elliptical nor rectangular. Since this is a matter of common knowledge and common sense, 'round' and "round only" can the penny be! It was a stroke of genius on the part of the first epistemological dualist who chose "the round penny" to prove his point. (If he had written in the time of Homer his instinct would undoubtedly have prompted him to select "the wine-dark sea" to prove that the sea could have no other color.) But let us change the example. Take a human head—not a 'round' one—what is its shape? the profile, the full face, the reverse, or perhaps the top? A sphere is the only thing that has the same shape from all ordinary points of view, and fortunately not many of our heads are quite as spherical as the penny is 'round'. Now what *is* the shape of any human head picked out at random? Is it not a complex of an infinity of contours, from which some three or four are conventionally selected for purposes of description? If Lovejoy were to endow his Demiurgus (p. 320) with the power of creating an animal (or a spirit) who could see 'the real shape' of that human head, how would he—either Lovejoy or the Demiurgus—set about the task? Does the shape of a penny offer a different problem from that of the shape of a human head, except that

of course the penny is 'round'? Has a penny, "independently of the knowing and within its own limits" (p. 132), various contours, or only one contour, or peradventure no contour?

Perhaps what is meant is not the shape of a *physical penny* but the shape of a *mathematical circle*. In Euclidean geometry this figure has at all events the shape its definition gives it, and any other shape that it 'appears' to have is foisted on it by some percipient! But what *is* the defined shape of a circle? In the first place a circle "within its own limits" is a 'plane' figure, and is thus defined by relation to the plane in which it lies, which plane is not entirely within the limits of the circle. Secondly, it is defined by the 'equidistance' of all the points of its circumference from its center; this is a metric character and involves relation to a rigid measuring rod or to some other rigid instrument such as a compass. (The rigidity of such an instrument cannot be defined without reference to something else than the circle "within its own limits".) Thus the defining characters of a circle are characters it has "within its own limits" *only in relation to* something *without* those limits.

In a footnote Lovejoy mentions and dismisses the distinction Broad makes between "sensible form" and "geometrical shape", for the reason that he is "unable to conceive how an area can be sensibly circular without also being geometrically circular" (p. 141). Accepting Broad's definition of sensible circularity, Lovejoy's inability is as difficult for me to understand as Broad's position is for Lovejoy. Broad makes it clear that by "circular sensible form" he means the *qualitative* spatial character one sees when one looks "straight down" upon a circle (*The Mind and its Place in Nature*, p. 172). There surely *is* such a character. Perhaps Lovejoy means that this character is not a character of the mathematical area, since pure mathematics has nothing to do with sensible characters. If so, one must agree. But why call this character 'circular', when it is also seen on looking down obliquely upon an *ellipse* from any point on either of two easily defined lines? If the reason is convenience, well and good; but there is danger that the name 'circular' may lead one to suppose that this form belongs by some proprietary right to a circle, which is deprived of this right when one sees it otherwise, and which is the victim of infringement when an ellipse assumes this form. To correlate what we see with what mathematics defines as circular, it would be better to define 'sensible circularity' as 'the spatial form one sees *when* one sees *that* a figure is circular'. Now one can see that a figure is circular (within the limits of accuracy of vision) just as well when one

looks down obliquely upon it as when one looks down normally upon it. (And both ways involve a third dimension.) All that is necessary is to put the points of a compass, one on the center and the other on the circumference, and rotate the compass about the former point, taking care that both remain in the plane of the circle. On the assumption of accuracy of vision and rigidity of compass, no ellipse *in that plane* would by this test look like any circle in that plane. With this definition of 'sensible circularity' Lovejoy would be justified in denying that an area can be sensibly circular without also being geometrically circular. In fact to say that a circle ever looks like an ellipse is to make an elliptical statement. One should say that a circle in one plane looks like an ellipse in some other plane. To make a long story short, Euclidean projective geometry (with its corollary, the theory of perspectives) is as much an accurate account of projected figures in Euclidean space as is Euclidean metrical geometry.

Before leaving for a time the subject of space, it is necessary to consider the physical "dislocations" upon which Lovejoy lays emphasis as fatal to epistemological monism.[1] What I refer to is what we see when light from a seen object is reflected or refracted between object and eye (pp. 71, 75, *et passim*). Here the objective relativist, if he is wise, will insist that he does not claim to see physical objects 'where they are' *in the receptacular space* that Lovejoy seemingly would provide him with, or at least from which Lovejoy criticizes him. The relativist's demiurge, if he may have one, did not first make a static space (or even a static space-time), and then create objects (or events) which were made to 'take place' therein, and which thereupon began to enter into transactions with each other, from their several points of vantage giving way and making give way. In the objective relativist's physical world spatial directions are not directions *in* which objects *lie,* but *from* which objects *act* and *to* which[2] objects *react.* To speak technically, physical directions are *physically vectorial.* The direction of process A from process B, which reacts to A, is the direction *from* which B *receives* the impulse from A. If the sun were moving (or the earth rotating) in a static Euclidean space, the static direction of the center of the sun from any spot on the earth would be the Euclidean straight line from that spot to the sun's center; for instance, an observer would, because of re-

[1] Zöllner's lines can easily be dealt with by the epistemological monist of the "restricted" type.

[2] The very awkardness of the expression 'to a direction' shows that the native idiom, like that of the dualist, is partial to a static space, although it tolerates '*from* a direction'.

fraction, see the sun just above the horizon when in fact it was below. What he saw, because of where he saw it, could not be the physical sun, which happened to be elsewhere. Lovejoy would be correct in his vivid picture of the topsy-turvydom thus introduced by the epistemological monist into physics in connexion with such dislocations (p. 76 *et passim*). But since the objective relativist's physical space is not (or at least need not be) a "box without sides", but a system of dynamic directions and distances, the man who sees the sun in the direction from which it acts upon him sees it in its physical direction from him. (A tautology is sometimes necessary against one who denies the truth it expresses.)

Even in the ordinary affairs of life we use the word 'direction' with respect to the practical conditions under which we operate. A traveller, dismounting from a train at a crossroads in a mountainous region, asks a native the direction to Inspiration Point, farther up the mountains. What he wants is the *road*-direction to his destination. It might well be that the road that starts out from him in the direction in which a crow would fly is not the direction that he seeks. An intelligent guide would point out, not the latter direction, but the one relevant to the conditions that gave rise to the question. Now change the conditions: The traveller tells the native that he expects a motoring friend *from* Inspiration Point, and in this connexion asks for the direction from that village. The native would be a knave or a fool who should point out the direction from which any road comes that does not come from that village, even though it might be the direction from which an aviator would come. When in touring we ask for 'directions' we ask for viatic directions; and what is true of touring is true of all dynamic transactions. As Eddington has said, "To put the conclusion rather crudely, space is . . . a lot of distances interlocked".[3] Had he wished to put the matter a little less crudely, he doubtless would have added that it is a lot of *directions* interlocked. The part of space that interlocks the nautical direction from New York to Liverpool with the nautical direction from Liverpool to New York does not lie in an Euclidean straight line. Neither does the sun's *optical* direction from an observer coincide with its Euclidean direction displayed in a planetarium. Lovejoy seems to think of space in terms of a glorified Mercator's map.

The 'straight' stick 'seen bent' in the water illustrates the same principle. The optical (and by optical I mean *physically* optical) directions of the different submerged parts of the stick from the eye

[3] *The Mathematical Theory of Relativity*, p. 10.

of the observer are exactly the directions in which the observer sees these parts; hence the physically optical and the visually optical bentness coincide. One who believes, as Whitehead does, in a *metaphysically absolute* Euclidean space-time (and not merely in a *metrically universal* space-time) naturally would explain the seen bentness of the stick as a projection of sensa into the seen space-time region for the purpose (or at least with the result) of "illustrating" this region. But this seems to be a personal idiosyncrasy. Why not say that the optics of our vision is, so far as it goes, exactly the optics of physics? What is true of the bent stick is also true of one's face seen in a mirror. One sees it in the direction from which it physically acts upon one's eyes. It is a fault of interpretation, not a fault of vision, if one fails to be aware of the fact that under these conditions the optical and the tactual directions of the face from the eyes do not interlock in the path of a Euclidean straight line. In other words, the optical and visual direction in this case is not the shortest tactual direction between two points. There is nothing in the phenomena of reflexion that prevents—there is everything that justifies—the literal interpretation of the statement that one sees one's own physical face when looking in the glass. The physical and the visual directions fit nicely into each other. It is true that we do not see *all* that is physically involved. It would be pleasant if occasionally we saw more of the physical, but the little of it actually seen is better than the none of it at all offered by Lovejoy.

In sum, one cannot put the new doctrines of the objective relativist into the framework of the older physics, with its prim space where things have 'simple location'. Whitehead's alternative to simple location is not the only one. This fact illustrates the danger of thinking that epistemological dualism in its unrestricted form is established by showing the untenability of isolated positions taken by individual monists. As Lovejoy himself suggests (p. 7), a successful skirmish is not a crushing victory.

3. "Respectivity" is the third meaning disentangled from the logical pell-mell of relativity. Of it Lovejoy says: "If a term possesses this logical attribute, it must be evident to anyone who understands the term that to predicate it of a subject means nothing at all unless a third relatum, of a definite kind, is specified" (p. 137) "implicitly or explicitly" (p. 92). "A 'respective' attribute . . . always, by its logical essence, implies a triadic, not merely a dyadic, relation" (p. 92). The examples he gives of such respective terms are "larger" and "to the left". By "logical essence" seemingly is

meant logical definition. With this meaning given to respectivity it follows of course that "the criterion of respectivity is—respectivity" (p. 137); and if there have been some indiscreet objective relativists who have argued that 'blue' for instance is a respective attribute of a physical object because by definition it logically implies a perceiver, Lovejoy apparently has got them. (I do not happen to remember any such philosophers.) Any one is surely misguided who tries by mere definition to prove the actuality of a physical relation. But likewise any one is not less surely misguided who tries by mere definition to disprove such actuality. But even in the realm of pure logic this criterion cannot be applied offhand. Terms do not come to us with their definitions aboriginally and indelibly stamped on them, as Mark Twain's Adam thought when naming the animals in the Garden of Eden. Even Lovejoy the logician does not *seem* to be always sure of his ground here; else why did he say, "It has doubtless always been evident to the plain man that it is meaningless to say that one thing is 'large', *or at any rate to say that it is 'larger'*, without mentioning something else with which the size of the first is compared"? (P. 92. The reader no doubt will have guessed that the italics are not in the original.)

When we leave logical implications of logical essences aside, and go to discovered facts, we find that, in pre-relativity physics, characters previously unsuspected of being respective were later found to be so. The ancients regarded 'up' and 'down' as absolute characters; for instance the atoms of Lucretius 'fell' without falling toward anything in particular; they just fell. And yet those who spoke of them as falling understood what the word meant. The respectivity of 'up' and 'down' to centers of gravitational fields was effectively discovered only a few centuries ago. When it was discovered, there were philosophers who argued exactly as Lovejoy now argues against the respectivities that are now under debate. Again, 'north' was regarded as an absolute direction till the time of Copernicus, when it became respective to the axis of the earth's rotation. On some other planet with a different axial inclination there is a different north. And so on and so on. The history of science is strewn with the wrecks of the principle that in physics, and generally in fact, as over against abstract logic, "the criterion of respectivity is—respectivity". Sometimes even a philosopher feels inclined to concede that scientists have good grounds for accusing philosophers of trifling with "logical essences" and with the meanings of words.

Lovejoy's treatment of the respectivity of simultaneity and of

spatial lengths in the physical theory of relativity (pp. 141 ff.) gets indeed a support (which however is adventitious) from the *epistemological* muddleheadedness of the popular expositors of that theory, from whom he quotes. Physicists display no unanimity with regard to the epistemological implications of their theory. Even such a distinguished physicist as Max Born is quoted by Lovejoy as saying that "the [FitzGerald] contraction is only a consequence of the way of looking at the event (*Betrachtungsweise*), not a change of a physical reality" (p. 145). In the first part of the statement Born speaks as an epistemologist, in the second as a physicist. Is it necessary to say that the second part is the more authoritative? Any "adequate discussion of the point", as Lovejoy remarks, "would demand a long inquiry", but surely he is mistaken when he goes on to say that this inquiry "would take us far from our immediate topic" (p. 147). Until such an inquiry is definitely terminated, the bearing of the physical theory of relativity on "our immediate topic" remains problematic. But whereas a long inquiry is impossible here, perhaps suggestions may be made as to the way an objective relativist might treat the subject.

First, he might say that the only safe interpretation of a mathematical theory in physics is obtained by examining the equations in which it is expressed, and by ascertaining the physical significance given in the theory to each measure-number used in the equations, such significance being ascertained by going back to the measurements that yielded the measure-number. Secondly, he might say that in treating of present-day physics the term 'physical' should not be given "the ordinary sense of that term" (p. 144). It would seem that in general physicists are agreed that any character is 'physical' if it is *measurable*. Planck has somewhere expressly defined the physical as the measurable; Eddington has identified the nature of the physical world as consisting of "pointer readings"; Bridgman has in substance said that anything is physical which is amenable to instrumental operation; and even the most cursory reading of Einstein's works shows that he is concerned solely with the metric (including directional) characters of objects. If this is what in 'modern physics' is meant by 'the physical' there can be no question that the shapes and sizes that are present in the field of perception, the *'immediately perceived'* shapes and sizes, are authentically physical. In fact it is *only from measurements made on what is thus immediately perceived* that any inference can be drawn to metrical characters *not thus perceived*. Hence any physicist who, accepting the definition of 'physical' above

given, should deny the physical character of the shapes and sizes directly measured would stultify himself, and would also by implication say that he has no physical basis for his statements about electrons and quanta and whatever else he talks about.

Now among the characters thus ascertained by measurement some have a more restricted validity than others. For instance, in applied analytical geometry, when measuring the length of a Euclidean straight line AB, suppose we arrange that A shall have the measure-numbers 0, 0, and then find by measurement that B has the measure-numbers 3, 4. All these measure-numbers are physical *by definition,* and a resulting measure-number 5 for the length of AB would, of course, also be physical. But it happens that the measure-numbers 3, 4, are more restricted in their validity than the measure-number 5. If however 3 and 4, *arrived at by measurement,* are not physical, then 5, arrived at not otherwise than by measurement or by calculation from measurements, is not physical. Now take a further step. We arrive by measurement at a measure-number c as constant, and, by four other measurements, at the measure-numbers, x, y, z, t; and from them by simple algebraic operations we get a measure-number $\sqrt{c^2t^2 - x^2 - y^2 - z^2}$. Suppose we found that the latter measure-number had a more general validity than the measure-numbers x, y, z, t, which were used in building it up; would that prove that the component measure-numbers are not physical? Now it happens that the measure-number given above under the radical is the simplest instance of a relativistic space-time 'interval' between two events, one event having the measure-numbers 0, 0, 0, 0, and the other the measure-numbers x, y, z, t. If the special theory of relativity is true, measurements made in different systems, moving relatively under the restrictions imposed by that theory, would in general give different measure-values to t, and to at least one of the other three, *viz.*, x, y, z; but the measure-number under the radical would be the same in all cases in question.

The 'observers', if personal,[4] come in only to make the measurements resulting in the various values of x, y, z, t. If their coming-in

[4] D'Abro, upon whom Lovejoy seems to rely largely in interpreting physical relativity, says: "The word 'observer' is a very loose term and does not necessarily mean a living human being. We might replace the observer's eyes by a photographic camera, his computation of time-flow by a clock—in fact, all his senses and measurements by recording instruments of a suitable nature, whose readings any man situated in any frame could check later. The results would still be the same." *The Evolution of Scientific Thought from Newton to Einstein,* Boni & Liveright, New York, 1927, p. 152.

makes these measure-numbers "epistemologically subjective" then it makes the measure-number under the radical doubly so, for not only do the various measure-numbers got by the various observers enter into the composition of *that* number, but also some calculator has to come in to discover that the value of that measure-number is invariant; it is not got by *direct* measurement. Now a physicist like Eddington seems at times to consider the entrance of observers into the transactions as making the whole business subjective; but this type of consideration is not *physics;* it seems to be *mystics.*

If what has been said is true of modern physics, then modern relativistic *physics* does treat the differences of shapes, respective to relatively moving frames of reference, as physical differences. When Eddington says that the proposition that "a moving rod becomes shortened in the direction of its motion" is "*true* but it is not *really true*" (quoted by Lovejoy, p. 145), he probably means two different things which we can distinguish into a physical meaning and an epistemological meaning. The physical meaning is that the proposition is physically true, but not true for *all* frames of reference; in its own frame the rod is not contracted. The epistemological meaning is that all measure-numbers are only symbolic: what they symbolize is something of the nature of our consciousness. Again, when D'Abro says, as quoted by Lovejoy (p. 146), that in the theory of relativity "real shape was removed from the status of a primary quality, and there was no sense in speaking of the shape of an object in a world devoid of all observers", he tells us in the context exactly what he means by this assertion. Any statement about shape "is indefinite until such time as the conditions of observation are specified", for it "entails the mention of a relationship to something else", namely, some reference-frame. "On the other hand, the generalised primary qualities", such as "space-time configurations and tensors", "transcend this specification of relationships, that are always of a contingent nature".[5] It is for this reason that shapes are not, and intervals are, for D'Abro and other physicists, characters of "the objective universe". This reason requires a brief examination.

What is meant by 'objective'? If all technically competent observers at Greenwich agree (within limits of tolerance) that an eclipse begins at mid-day (meridian time there), such agreement has always been regarded in physics as constituting the 'objectivity' of such date; at least it had been so regarded until some physicists flew off on an epistemological tangent. Now suppose that this same eclipse

[5] D'Abro, *op. cit.*, pp. 420–21.

is found by equally competent observers at Washington to occur at a different time, *i.e.* not at mid-day (meridian time there). This fact is also 'objective'. But when by some equation one of these dates can be transformed into the other, the two of them, no longer taken separately but each connected with the other by this transformation-equation, may be said to have 'greater objectivity', as representing an agreement among observers *operating under different conditions*. Exactly the same principle holds with regard to relativistic measure-numbers. The expression under the radical sign given a few pages back is, as we saw, one consisting of numbers got by measurements in *some* frame of reference. By the Lorentz transformation a similar expression consisting of similar measure-numbers got by measurement in any *other* relevant frame is found to have the same numerical value as the former expression. This numerical value may be said to have 'greater objectivity' than the values of the component numbers, since its value is the same in any two of these frames, whereas the values of the respective components are not in general the same for any two such frames. This 'greater objectivity' is simply a name for the fact that the same measure-number is obtained by observers operating *under more widely different conditions*. Thus an interval in relativity is 'more objective' than any spatial or temporal measure-number. But the 'lesser objectivity' of the latter is not the same as 'non-objectivity'. In the same way, we may, if we wish, speak of one measure-number as being 'more physical' than another, as representing agreement of measurements made under a greater number of differing conditions. But a measure-number that is 'less physical', according to this usage, is not thereby and therefore 'non-physical', *i.e.* 'epistemologically subjective'. Such measure-number is not a 'secondary quality' in the *historical* sense of that term, leaving the rôle of 'primary quality' to the 'more physical'.[6] But this is what D'Abro's statement suggests to Lovejoy.

It is this interpretation of D'Abro's interpretation of relativity that Lovejoy supposes to be "the one accepted by most physicists" (p. 147); at any rate, he says that "it is clear . . . that no other interpretation is *more* favorable to epistemological and psychophysical monism; and this is the only point that concerns us here" (p. 147). This remark shows that sometimes Lovejoy's heart is better than his

[6] The historical primary qualities are not obtainable by combination of several secondary qualities, and hence could logically be regarded as capable of existing independently of the latter; the intervals of relativity, on the contrary, *are* mathematical combinations of spatial and temporal measure-numbers, and have no meaning for us except as such combinations.

head; for, while he evidently desires to be fair to the objective relativist, he has chosen exactly the one interpretation of physical relativity that alone is unfavorable to his opponent. No wonder then that he concludes his discussion of shape by saying: "It is, at all events, sufficiently clear, I think, that relativity physics gives no real justification to the idea that the shapes of bodies are respective characters, in such wise that different shapes (in the usual sense of the term) may truly belong to identical particulars in the objective physical world" (p. 147)!

But I cannot conclude the discussion here. The subject of time must be taken up, if only in a cursory fashion. Lovejoy objects to relativistic simultaneity on the score that it is a case "of a respectivity made-to-order" (p. 142). But are not all concepts of physics made to order? The concepts of mass and energy and gravitation (and what not?) did not come ready-made and pinned as labels on physical facts, to be read off by any one with eyes to see. Archimedes, who knew them not, was neither blind nor illiterate. Galileo was accused of making a concept to order and just escaped with his life (and fortunately with his concept). The physicist has to elaborate his concepts (and thus make them to order) with a view to arranging the data of observation and experiment. The question about a physical concept is whether, being mathematically consistent, it satisfactorily orders what it is meant to order. If it does, and especially if it alone does, it is an authentic physical concept.

The main difficulty that Lovejoy has disclosed in relativistic simultaneity is thus stated: "To introduce the notion of respectivity in dealing with the retardations [in the case of the now famous fictitious twins, one of whom undertakes a journey to a star and returns ultimately to his brother] would obviously be absurd" (p. 144). He presents this difficulty while discussing "the contractions of lengths in the direction of *unaccelerated* relative motion and the retardations of chronometers" (p. 142, my italics). In connecting this problem with the special theory of relativity he has of course the example of Einstein himself, who in §4 of his paper of 1905 did exactly this thing. But any recent discussion of this problem by a competent authority, *i.e.* any discussion written after the publication of the general theory, recognizes that it involves *acceleration,* and treats it as so doing. Lovejoy refers in another connexion, as we have seen, to Max Born's *Einstein's Theory of Relativity.* He should therefore mention that Born says of the argument which Lovejoy repeats: "The error in this argument is obvious; the [special] principle of relativity concerns *only* such

systems as are moving uniformly and rectilinearly with respect to each other. In the form in which it has been so far developed [*i.e.* in the book from which this quotation is taken] it is *not* applicable to accelerated systems." When acceleration is taken into account "it is found that under all circumstances *B's* clock goes in advance of *A's* and thus the problem vanishes".[7] Thus after the acceleration involved in the return journey, the retardation is not 'bilateral'; it is 'unilateral'.

Hence if this is the only logical difficulty to be found in relativistic simultaneity, it may be taken for granted, pending the publication of Lovejoy's review of the whole subject (p. 144, footnote),[8] that diverse respective simultaneities are *logically* faultless, especially since they have been subjected to the most searching scrutiny by perhaps the largest number of competent examiners that have ever tested a logical theory.

Now if there is nothing illogical in predicating physical simultaneity and physical non-simultaneity of the same two events, each character being predicated with respect to some "third relatum", there is surely nothing logically wrong in predicating non-physical simultaneity of a set of events which are physically non-simultaneous. This provisionally disposes of the constantly recurring argument used by Lovejoy against all forms of epistemological monism, namely, that since for instance a star and the moon are perceived as simultaneous, and since physics informs us that the physical star and the physical moon, when they severally sent out the light that 'conditions' our seeing star and moon, were not physically simultaneous, therefore it cannot be the physical star and the physical moon that we see: *what* we see as simultaneous cannot be what in the physical world is not simultaneous. This is a beautiful argument if 'simultaneous' has always an absolute and invariable meaning; once admit the respectivity of simultaneity and the door is open for simultaneities that are not

[7] English translation by Henry L. Brose, New York, E. P. Dutton & Company, p. 216, where he refers to page 282, which treats the problem as one of acceleration. D'Abro is equally explicit in stating that the case of these twins does not come under the special theory (*op. cit.*, p. 236).

[8] Since writing the above I have read Lovejoy's article, *The Paradox of the Time-Retarding Journey*, in this volume of this REVIEW. I hope later to discuss this article, which seems to me to show a fundamental misunderstanding of relativity, apparently due to the use of popular expositions instead of the mathematical equations of the theory. An equally serious misunderstanding runs through his article, *The Dialectical Argument against Absolute Simultaneity*, in THE JOURNAL OF PHILOSOPHY, Vol. XXVII, Nos. 23 and 24.

physical, and that no more conflict with physical non-simultaneities than respective physical simultaneities conflict with respective physical non-simultaneities.

No, I cannot think that "certain conclusions" with respect to recent issues "have been definitely established". There has without doubt been too much cocksureness all around. The monist has been dogmatic in asserting his monism, and the dualist no less dogmatic in asserting his dualism. A more cautious, tentative, postulational attitude is in order, together with an attempt at a sympathetic understanding of the positions of opponents. This means of course trying to understand any concept of an opponent in the context of the whole system of his concepts. For this reason objective relativism cannot be dislodged by using only the Euclidean geometry and the Aristotelian logic of subsumption as a purchase. To change the metaphor, the voice that speaks in Lovejoy's book is indeed the voice of the twentieth century, but the hand that writes the book is in many spots suspiciously suggestive of an earlier age. But even at that, *The Revolt against Dualism* will without doubt be a most influential factor in clarifying the issues it discusses. As carrying that promise every philosopher will heartily welcome it.

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MR. WHITEHEAD'S PHILOSOPHY

WITH the appearance of *Process and Reality* it may be assumed that Whitehead has presented us with his *magnum opus,* the speculative completion of his system. If this is the case it becomes pertinent to discuss the system in its entirety. This we shall attempt to do as well as we may in the scope of a few pages. While it is not true to say that his thought is organically divided into an earlier and a later period, for our purposes it is both legitimate and easier to take two phases of it and treat them separately. These aspects can never be clearly demarcated, in one sense, for from the very first one runs across leads that are clearly developed only in the completed Philosophy of Organism.

The first phase of the philosophy is that found in *The Concept of Nature, An Enquiry Into the Principles of Natural Knowledge,* and *Introduction to Mathematics.* This is the group of writings in which Whitehead is most avowedly an exponent of Realism. "Nature is that which we observe in perception through the senses. . . . Thus in a sense nature is independent of thought. . . . What I mean is