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Time and the World Order

The aim of this essay is to develop a framework in terms of which some perennial puzzles about time and the temporal aspects might be resolved. The treatment is dialectical, consists, that is, in an attempt to fit standard 'positions' on the topics discussed into a sustained argument having the logical structure, if not the literary form, of a dialogue in which the participants develop and modify their views under the impact of the discussion. That the present essay falls far short of the ideal suggested by this description will be clear to anyone who ventures to begin it. It fails abjectly if construed as a comprehensive dialogue which begins in unreflective common sense and ends with all relevant puzzles resolved. It has, I hope, greater merit if viewed as an abstract of a series of excerpts from such a dialogue, a series which breaks into the discussion after it has long been under way and breaks off where it does because the dialogue is still going on.

The argument begins with some familiar puzzles about truth and time. The reader may well see through these puzzles at a glance. I hope he does, for they serve the purpose of introducing as directly and as simply as I know how the major themes which it is the purpose of this essay to explore, some of which are as baffling as any philosophy has to offer. I have "taken time seriously" since I cut my philosophical teeth on McTaggart's well-known paper on the unreality of time and the attempts of Broad and others to refute him. I soon discovered that the 'problem of time' is rivaled only by the 'mind-body problem' in the extent to which it inexorably brings into play all the major concerns of philosophy. Here, if anywhere, analysis without synopsis must be blind.

Among the topics I propose to discuss are the connections between truth, confirmability, and determinism; the philosophical and scientific significance of the three-valued logics; the relative priority of things and events; the status of time in the common-sense world, and of space-time

in macromechanics; the meaning of existence statements about episodes and things and the sense in which even existence statements about abstract entities have a tense; the objectivity of becoming (with some remarks on the significance, in this connection, of the relativity of simultaneity). As is implied by the dialectical character of the treatment, these topics make multiple appearances, and the 'conclusions' of one section are often radically recast in another.

I. FACTS, EPISODES, AND THINGS

1. Truths about Other Times

I

Suppose that the following statements, made today (1958), are all true:

- (1) S was Φ_1 (in 1957).
- (2) S is Φ_2 today (1958).
- (3) S will be Φ_3 (in 1959).

According to one version of the correspondence theory of truth—a version which it is my purpose to criticize at a later stage of my argument—the above statements are true because each of them corresponds to a fact. Thus, (1) corresponds to the fact that S was Φ_1 in 1957; (2) to the fact that S is Φ_2 today; and (3) to the fact that S will be Φ_3 in 1959. And, indeed, if these statements are true, it is a fact that S was Φ_1 in 1957; it is a fact that S is Φ_2 today; it is a fact that S will be Φ_3 in 1959.

Notice that in mentioning each of these facts, whether the fact about the past, the fact about the present, or the fact about the future, I wrote in each case, "It is a fact that . . ." We say of an episode that it *took place*, is *taking place*, or *will take place*. But if something is a fact, it is a fact, even if the verb in the that-clause is in the past or future tense. Having written this, I must at once qualify it, for it would be a mistake to suppose that we never use locutions of the form "It was a fact that . . ." or "It will be a fact that . . ." Consider, for example,

- (4) It was a fact (in 1957) that S would be Φ_2 in 1958.

But it is important to appreciate the kind of context in which statements of this sort are appropriate. They can be typified by the following:

- (5) (In 1957) Jones *thought* (*said*, *wrote*, etc.) that S would be Φ_2 in 1958; and it was a fact that S would be Φ_2 in 1958.

In other words, the kind of context in which we use such locutions as

"(In 1957) it was a fact that . . ." and "(In 1959) it will be a fact that . . ." are those in which we are viewing someone (it may be ourselves) as thinking or asserting something at a time other than the present and evaluating this thought or assertion. In the absence of concern for what someone thought or said, or might have thought or said, at a *prior time*, we should say, not

- (6) (In 1957) it was a fact that S was Φ_1 in 1957

or

- (7) (In 1959) it *will be* a fact that S will be Φ_3 in 1959

but, supposing the context to call for a fact statement at all,

- (8) It is a fact that S was Φ_1 in 1957

and

- (9) It is a fact that S will be Φ_3 in 1959.

II

When a fact statement is appropriate, and when the only temporal "point of view" in question is that of the person who makes the statement at the time of making it, the statement is always of the form "It is a fact that . . ." regardless of the tense of the verb which appears in the that-clause. It is this characteristic of what might be called "one-perspective" fact statements which has tempted philosophers to hold that the 'is' of 'It is a fact that . . .' has to do with a timeless mode of being. Thus, it has seemed proper to connect the 'was' of 'It was a fact that . . .' not with the *factuality* of the fact, but with the temporal location of the person or persons whose point of view is being considered in a two-perspective fact statement. It is argued that just as one does not say

- (10) Two plus two was equal to four

or

- (11) Two plus two *will be* equal to four,

the 'is' of

- (12) Two plus two *is* equal to four

being an 'is' which has been "detensed" (turned into a 'tenseless present') by depriving it of its normal contrast with 'will be' and 'was,' so the 'is' of a one-perspective statement of empirical fact is equally detensed, and gives expression to a "timeless mode of being" like that attributed to num-

bers. The 'was' of 'It was a fact that . . .' where the latter is appropriate, is then interpreted as an indication of the pastness of the second point of view of a two-perspective fact statement, rather than as a temporal qualification of the *factuality* of the state of affairs mentioned by the that-clause.

This line of thought is not without its insights. But that the matter is not quite so simple becomes manifest if one turns one's attention to two-perspective mathematical fact statements. For the above reasoning would lead one to expect that in cases where a *past* mathematical thinking or saying is being evaluated, it would be proper to make such statements as

(13) It was a fact that $2 + 2 = 4$.¹

Thus, we would expect to find such statements as

(14) (In 1957) Jones thought that $2 + 2 = 4$; and, indeed, it was a fact that $2 + 2 = 4$.

But, of course, we immediately sense that something has gone wrong. For just as it is odd to say

(10) Two plus two was equal to four,

so it is odd to say, even in such a context as (14), ". . . it was a fact that $2 + 2 = 4$," to say it, that is, even where two perspectives are involved.

We must surely say

(15) (In 1957) Jones thought that $2 + 2 = 4$ and, indeed, it is a fact that $2 + 2 = 4$.

The proponents of facts as 'timeless entities' may be expected to reply that this criticism actually supplies grist to their mill. They must grant, to be sure, that the two-perspective character of a two-perspective fact statement is, though *necessary to*, not a *sufficient condition* of the appropriateness of 'It was (will be) a fact that . . .' They will point out that the additional requirement seems to be that the that-clause be a *tensed* that-clause. And they can be expected to argue that the inappropriateness of "It was (will be) a fact that $2 + 2 = 4$," even in two perspective contexts, springs from the tenseless character of mathematical statements themselves, e.g., the tenseless character of "Two plus two is equal to four." It is this, they conclude, which accounts for the correctness of

(16) (In 1957) Jones thought that two plus two is equal to four; and, indeed, it is a fact that two plus two is equal to four.

¹ I deliberately switch to arithmetical notation to take attention temporarily away from the problem of the tense—or tenselessness—of the mathematical that-clause.

But while these considerations may give aid and comfort to the idea that *mathematical* facts are timeless entities, they constitute an *ignoratio elenchi* as far as the central point at issue is concerned. For by conceding that the pastness of the second perspective in a two-perspective fact statement is not a sufficient condition of the appropriateness of "It was a fact that . . ." they have abandoned the ground on which they rested their claim that the 'was' pertains *not* to the *factuality* of the fact, but simply to the pastness of the second perspective. The question thus arises, can the proponents of the "time transcendence" of facts about temporal episodes turn to their advantage the second condition of the appropriateness of 'It was (will be) a fact that . . .'—namely, that the that-clause be a tensed that-clause? And to ask this question is to recognize that these philosophers have, in effect, argued that the failure to appreciate that facts about temporal episodes are as 'timeless' as mathematical facts springs from the assumption, according to them mistaken, that discourse about temporal episodes must be *tensed* discourse. We can almost hear them expostulate, "Surely to assume that time talk must be *tensed* talk is like assuming that space talk must be 'here-there' talk!" And indeed one must grant that there is a sufficient parallel between tensed talk and 'here-there' talk to make this remark a telling one, if we were to admit that there is (in a relevant sense) space talk *about the world* which is not *at bottom* 'here-there' talk (or equivalent to it). Postponing the issues posed by the concluding clause of the preceding sentence to a much later stage in the argument, we notice that having made the above expostulation, the proponents of 'timeless facts' argue that the forms "It was a fact that . . ." and "It will be a fact that . . ." (which appear to imply that facts about episodes are temporal entities) can be dispensed with by the simple expedient of abandoning the language of tenses and replacing it by the use of detensed verbs (the 'tenseless present') together with dates. In other words, they propose to replace the three statements with which we began this paper by the following detensed statements,

- (1') S is Φ_1 in 1957,
- (2') S is Φ_2 in 1958,
- (3') S is Φ_3 in 1959,

or, introducing the archaic 'be' to play the role of a detensed 'is,'

- (1'') S be Φ_1 in 1957,
- (2'') S be Φ_2 in 1958,
- (3'') S be Φ_3 in 1959.

Since they obviously cannot be proposing that the latter are equivalent in meaning to the original statements, the claim must be that (1'), (2'), and (3') are somehow "more basic" than the original statements, as having a core meaning which is somehow *prior* to the perspectival idiosyncrasies of speakers and thinkers, and constitutes the 'neutral' foundation on which the latter are somehow built. In this detensed language, the argument concludes, it makes no more sense to say

(17) It was a fact (in 1957) that S be Φ_2 in 1958

than to say

(13) It was a fact (in 1957) that $2 + 2 = 4$ (i.e., that 2 plus 2 be equal to 4).

Rather, just as we say

(15') (In 1957) Jones thought that $2 + 2 = 4$; and, indeed, it (tenselessly) is—that is, be—a fact that $2 + 2 = 4$

so, given this use of 'be,' we would be in a position to say

(18) (In 1957) Jones thought that S be Φ_2 in 1958; and, indeed, it be a fact that S be Φ_2 in 1958.

In other words, the introduction of a postulated "stripped down" tenseless discourse about episodes, and, hence, the introduction of detensed that-clauses, would carry with it the consequence that the fact locutions appropriate to these detensed that-clauses would not be tensed locutions like 'It is (was, will be) a fact that . . .' but rather the tenseless present appropriate to fact statements in the domain of mathematics, i.e., by the above convention, "It be a fact that . . ." This "stripped down" locution would express the timeless mode of being shared, at bottom, according to this point of view, by historical and mathematical facts. The argument adds, as an afterthought, that (18) in its turn might be "stripped down" to read

(18') Jones think in 1957 that S be Φ_2 in 1958; and, indeed, it be a fact that S be Φ_2 in 1958

where 'think' like 'be' is in the 'tenseless present.'

III

That the above line of thought is profoundly mistaken is scarcely news. On the other hand, the task of exposing the numerous confusions on which it rests has not, in my opinion, been successfully completed; for

though most of the relevant distinctions have been drawn, they have not yet been mobilized into a coordinated attack on the perennial nexus of puzzles pertaining to the existence of temporal facts. It is the aim of the present paper to make an attempt in this direction. But if the full story on the mistakes involved in the thesis of the 'timeless being of temporal facts' is a long one which is scarcely under way, a provisional measure of clarification can be gained by noting that one can find a place for a 'tenseless present' in the formulation of temporal statements without assimilating this tenseless present to the tenseless present of mathematical statements. For it would obviously be perfectly legitimate to introduce a use of 'is' in accordance with the schema

(19) x is Φ at t \equiv . Either x was Φ at t or x is Φ at t or x will be Φ at t.

Thus, using the archaic 'be' for this use of 'is,' we could introduce the statement 'Eisenhower be president in 1956' in terms of the equivalence

(20) Eisenhower be president in 1956 \equiv . Either Eisenhower was president in 1956 or Eisenhower is president in 1956 or Eisenhower will be president in 1956.

And if this convention were a recognized feature of English usage, Tom, in 1955, Dick, in 1956, and Harry, in 1957, could all agree in saying, "Eisenhower be president in 1956." Would they all be "making the same statement"? Only, of course, in the sense in which "Eisenhower will be president in 1956" (said in 1955) makes the same statement as "Eisenhower was president in 1956" (said in 1957). Thus, Tom, if pressed, would say

(21) Eisenhower be president in 1956 because Eisenhower will be president in 1956.

Whereas Dick and Harry, respectively, would say

(22) Eisenhower be president in 1956 because Eisenhower is president in 1956,

(23) Eisenhower be president in 1956 because Eisenhower was president in 1956.

These considerations make it clear that the 'neutral' tenseless present, *thus introduced*, would be quite other than the tenseless present of mathematical statements. This suggests that instead of construing tensed verbs as the *enrichment* of a neutral "stripped down" 'perspective-free' mode of making temporal assertions, the device of using 'perspective-neutral'

sentences to make temporal statements may rest on and presuppose the tensed verbs of everyday temporal discourse.

IV

The argument to date suggests that whatever we are to do with the 'is' of

(21) It is a fact that $2 + 2 = 4$

we must take seriously the prima-facie tensed character of the 'is' in such statements as

(8) It is a fact that S was Φ_1 in 1957

and

(9) It is a fact that S will be Φ_3 in 1959.

If we then turn our attention to the pair

(22) It is a fact that S is Φ_2 today (1958)

and

(4) It was a fact (in 1957) that S would be Φ_2 in 1958,

we may easily be tempted to say that such facts are *temporal* entities which exist at times, and, indeed, to say that the 1957 fact that S would be Φ_2 was replaced by the 1958 fact that S is Φ_2 . We may even be led to speculate whether it could be a fact today that S is Φ_2 , without its having been a fact (in 1957) that S would be Φ_2 .

Now there is a sound kernel of truth in the idea that facts about episodes are temporal entities. And if we focus our attention on 'one-perspective' fact statements, that is, fact statements which express the speaker's point of view at the time he makes them, it is tempting to put this by saying that a fact *quoad* ourselves now is a *present* entity, even though it is a fact *about* the past or *about* the future. And having said this, it may well occur to us that this 'insight' enables a resolution of a classic puzzle about truth. For suppose that we were committed to the idea (confused but endemic) that "the past and the future do not exist." We might well say with a sense of relief, "Thank goodness that among the things which exist are *present* facts *about* the past and *present* facts *about* the future. For these account for the truth or falsity of our thoughts and statements about the future and the past. For if there were no *present* facts about the past and the future, there would be nothing for these thoughts to correspond to, and they would be neither true nor false!"

It is not my purpose to dwell on error for its own sake. But it will, I

believe, be worthwhile to reflect on the above misinterpretation of the correspondence theory of truth because of its connection with a familiar gambit, which develops as follows. Facts about the present are in a privileged position. For the fact that S is now Φ_2 has as its companion the *episode*² of S's being Φ_2 . This episode exists *now*. On the other hand, neither the episode of S's being Φ_1 nor the episode of S's being Φ_3 exists *now*. The former episode existed in 1957, the latter *will* exist in 1959.

The next step in this line of thought is to argue (not implausibly) that the existence of the *episode* of S's being Φ_2 is more basic than the existence of the *fact* that S is Φ_2 . Surely, it is said, episodes are the very stuff of the world; and even if they are not, they are surely presupposed by facts about them. What, then, of facts about the future and the past? There are such facts, and they are responsible for the truth of such of our statements about the future and the past as are true. But while the *facts* that S was Φ_1 and that S will be Φ_3 exist *now*, the corresponding episodes do *not* exist (though one *did* exist and the other *will* exist).

At this point, the argument, concentrating its attention on statements and facts about the future, takes a familiar turn. Since the episode of S's being Φ_3 does not now exist, it cannot account for the present existence of the fact that S will be Φ_3 . Unless, therefore, we are going to abandon the idea that statements about the future are ever true, we must find some explanation of how there can be the fact that S will be Φ_3 in 1959 although the episode of S's being Φ_3 does not exist. Is there anything which *does* exist and can account for the fact that S will be Φ_3 in 1959? Yes, continues the argument, there is such a thing, namely the set of facts about the present which physically imply that S will be Φ_3 in 1959. For if we knew what these facts were, we could properly say

(24) It is a fact that $S_1, S_2, S_3, \dots, S_n$ are thus and so; *therefore* it is a fact that S will be Φ_3 in 1959

and

(25) It is a fact that S will be Φ_3 in 1959, *because* it is a fact that $S_1, S_2, S_3, \dots, S_n$ are thus and so.

This is summed up by saying that facts about the future *exist* as (*physically*) *implied by facts about the present*. The conclusion is then drawn

² The term 'episode' will be used, for the time being, in a broad sense in which no distinction is drawn among episodes, events, states, etc. These distinctions will be subsequently drawn to a degree of precision which suffices for the purposes of this paper.

that statements about the future are true or false only to the extent that the future is (physically) determined by the present, or, to put it negatively, to the extent that there are 'gaps' in the set of facts about the future which are implied by facts about the present, there are formulable statements and corresponding thinkable thoughts about the future which are neither true nor false.

We have reached the point at which the major confusions which make the above gambit possible must be cleared away before we can locate the element of truth it contains. But before we undertake this task, it is worth noting that if the argument is sound, it applies to the past as well as to the future. Thus, facts about the past would exist as (physically) implied by facts about the present state of the universe, and the truth of statements and thoughts about the past would rest on these implications. Now there is surely no greater a priori (as opposed to empirical-scientific) reason for supposing that the present uniquely determines the past ('retro-determinism') than for supposing that it uniquely determines the future ('antedeterminism'). Once, therefore, the 'practical' sense in which the past is 'determined'—there can be no action which is the bringing about of a past state of affairs as my lighting a match was the bringing about of a future state of affairs (surely an analytic statement as these words are ordinarily used)—is distinguished from the 'theoretical' sense in which it is not self-contradictory to say that there are facts about the past which are not 'determined by' ('in principle inferable from') the present, we see that the above analysis confronts us with the challenging idea that there may well be formulable statements and thinkable thoughts about the past which are neither true nor false. Indeed, by no means the least startling prima-facie implication of the analysis is that while the statement 'S is Φ_1 ' made in 1957 may well have been true, the corresponding statement, made today, 'S was Φ_1 in 1957' may be neither true nor false as neither (physically) implied by nor (physically) incompatible with the contemporary (1958) state of the universe. One might even begin to wonder whether, to schematize a medieval example, 'S was Φ_1 in 1957,' said in 1958, might be false, although 'S is Φ_1 ,' said in 1957, was true. Clearly something has gone wrong, and we must find out where.

v

In introducing the above line of thought, I pointed out that the idea that facts *quoad* ourselves now, that is, facts referred to by 'one-perspec-

tive' fact statements, are *present* entities has the virtue of taking seriously the present tense of "It is a fact that . . ." For that in the case of facts about episodes, at least, the 'is' of 'It is a fact that . . .' is indeed in the present tense is clear once one abandons the attempt to detense temporal statements. Thus, the 'will be' in the that-clause of

(9) It is a fact that S will be Φ_3 in 1959

is 'will be' by contrast to the present tense of the 'is.'

But what can it possibly mean to say that facts *quoad* ourselves now are *present entities*? And in what sense, if any, is the fact referred to by the 'two-perspective' fact statement

(4) It was a fact (*quoad* 1957) that S would be Φ_2 in 1958

a *past entity*? The answer involves a recognition of the intimate connection between

(8) It is a fact that S was Φ_1 in 1957,

(22) It is a fact that S is Φ_2 today (1958), and

(9) It is a fact that S will be Φ_3 in 1959

on the one hand, and

(26) The statement 'S was Φ_1 in 1957' is a true statement,

(27) The statement 'S is Φ_2 today' is a true statement, and

(28) The statement 'S will be Φ_3 in 1959' is a true statement

on the other. Each of the former three is a very close cousin, I might almost say a brother, of its counterpart in the latter trio.

Notice that I did not write, instead of (26), 'The sentence "S was Φ_1 in 1957" is a true sentence,' for in discussing problems pertaining to tense, it is essential that we avail ourselves of Strawson's distinction between *statements* and *sentences*. Thus, to refer to the statement 'S will be Φ_3 in 1959' is to refer to the sentence 'S will be Φ_3 in 1959' as used (indeed, as what *would be*—properly—used) at a certain time (or during a certain period of time), and when I say

(28) The statement 'S will be Φ_3 in 1959' is a true statement

the time in question is *now* (in a relevant sense of 'now').

Notice, next, that I can also say

(29) 'S will be Φ_3 in 1959' was a true statement,

in which case the reference is to the same sentence as used at a time before now; while if I say

(30) 'S will be Φ_3 in 1959' will be a true statement,

the reference is to a future (but still pre-1959) use of this sentence. Thus, the 'is,' 'was,' and 'will be' of 'is a true statement,' 'was a true statement,' and 'will be a true statement' indicate the time at which the sentence in question would be properly used to make the statement characterized as true.

Note, next, that we say,

(4) It was a fact (*quoad* 1957) that S_2 would be Φ in 1958

and not

(31) It was a fact (*quoad* 1957) that S will be Φ_2 in 1958.

The explanation is to be found by reflecting on the parallel between

(32) That S would be Φ_2 in 1958 was a fact

and

(33) ' S will be Φ_2 in 1958' (said in 1957) was a true statement.

For whereas the that-clauses of

(34) It is a fact {that S was Φ_1 in 1957, that S is Φ_2 today, that S will be Φ_3 in 1959}

refer (in a manner to be discussed) to *present* uses of the sentences " S was Φ_1 in 1957," " S is Φ_2 today," and " S will be Φ_3 in 1959" (or their translations in any language), the that-clause, for example, of (4) refers to a *prior* use of the sentence " S will be Φ_2 in 1958" (or any of its translations), a reference which is manifest in (33). In short, the 'was' of 'It was a fact that' like the 'is' of 'It is a fact that' locates the time with respect to which the use of one or another of a specified set of mutually translatable sentences (including 'mental sentences') is being considered.

These considerations, incidentally, make it clear why the initial 'is' of

(21) It is a fact that $2 + 2 = 4$

is as tenseless as the '=' of the mathematical statement itself. For mathematical sentences, not being tensed, are appropriately used at any time and make "the same statement" on each occasion, whereas in the case of tensed statements, different sentences ("differently tensed counterparts") must be used to "make the same statement" at relevantly different times. Thus, " S will be Φ in 1958" (said in 1957) and " S is Φ_2 today (1958)" (said in 1958) "make the same statement." The 'is' of (21) does not serve the purpose of indicating that a present *rather than* a past or future use of the sentence " $2 + 2 = 4$ " is under consideration.

VI

I wrote above that each of a trio of fact statements, for example,

(9) It is a fact that S will be Φ_3 in 1959,

is a cousin, perhaps a brother, of a certain truth statement, thus

(28) The statement ' S will be Φ_3 in 1959' is a true statement.

Let me now burn my bridges and say that they are identical twins, and, in general, that statements of the form

(35) It is a fact that p ,

where 'p' represents a sentence, do not differ in sense from

(36) 'p' is a true statement *in our language*.

The reference to our language (now) is, of course, essential if we are to have any chance of circumventing Church's "translation argument" against linguistic interpretations of 'abstract entities.' And even with its inclusion, the thesis is a brutal oversimplification, as any isolated philosophical claim must be. I have discussed Church's argument on another occasion³ and believe myself to have shown that and how it can be circumvented. But for the purposes of the present discussion I shall simply postulate that the above equation stands. For part of the case which can be made for it consists in the light it throws on the puzzles in which we are involved.

The actual crux of the matter is that if this "nominalistic" thesis be granted, then the equivalence

(37) The statement in (our language) L , " S will be Φ_3 in 1959," is true $\cdot \equiv \cdot$ it is a fact that S will be Φ_3 in 1959

is of a piece with

(38) We're here $\cdot \equiv \cdot$ we're here.

The classical correspondence theory of truth combines a fundamental insight with a fundamental error. It confuses between (and I oversimplify to make the point stand out)

(39) ' S will be Φ_3 in 1959' is true $\cdot \equiv \cdot$ S will be Φ_3 in 1959,

which is both nontrivial and true, and

(40) ' S will be Φ_3 in 1959' is true $\cdot \equiv \cdot$ it is a fact that S will be Φ_3 in 1959,

³ "Grammar and Existence: A Preface to Ontology," *Mind*, 69:499-533 (1960); also "Truth and 'Correspondence,'" *Journal of Philosophy*, forthcoming (1962).

which has, in essence, the form

$$(41) p \equiv p.$$

The second point to be noted is that while the equivalence

$$(42) \text{ 'S will be } \Phi_2 \text{ in 1958' (said in 1957) was true} \cdot \equiv \cdot \text{ it was a fact (quoad 1957) that S would be } \Phi_2 \text{ in 1958}$$

is as sound as two dollars, it does not illuminate what it is to characterize a past statement as true, for it shares the triviality of (40). It is therefore important to note that whereas the nontrivial semantical equivalence (39), which concerns a statement properly made *now*, involves a use on the right-hand side of the sentence⁴ used to make the statement mentioned on the left-hand side and characterized as true, a nontrivial semantical equivalence concerning past statements cannot involve the use on the right-hand side of the sentence⁵ used to make the statement mentioned on the left-hand side, and characterized as true. We must use on the right-hand side the appropriate differently tensed counterpart of this sentence.⁶ A parallel point can be made concerning the truth of certain spatial statements; thus if Jones, *yonder*, says "The box is over here," the appropriate nontrivial semantical equivalence is

$$(43) \text{ 'The box is over here' (said by Jones yonder) is true} \cdot \equiv \cdot \text{ the box is over there.}$$

Thus, to apply the semantical explication of truth to past statements we must place on the right-hand side the sentence which is the appropriate differently tensed counterpart of the sentence⁷ used to make the original statement; for example,

$$(44) \text{ The statement 'S will be } \Phi_2 \text{ in 1958' (made in 1957) was true} \cdot \equiv \cdot \text{ S is } \Phi_2 \text{ today (1958).}$$

I shall have more to say about differently tensed counterparts at a later stage in my argument. For the moment I shall limit myself to pointing out that the right-hand side of a semantical truth equivalence is always a statement in our language, *here and now*, so that even when the statement which is being characterized as true is past or future, the characterizing of it as true expresses our point of view *here and now*.

⁴ Or, if it is in another language, the translation into our language of the sentence . . .

⁵ See fn. 4.

⁶ See fn. 4.

⁷ See fn. 4.

2. Do Past and Future Episodes Exist?

VII

It will be remembered that the views we were examining in Section IV above made certain assumptions pertaining to *facts* and *episodes* in order to argue that statements about the future are true or false only if the states of affairs they express are physically implied by or physically incompatible with facts about the present state of the universe. In the meantime, we have shown that one of the ideas on which the argument rests, viz., that truth is a 'correspondence' between statements and facts, is a mistake. It is equally important to see that the other idea to which it appeals, viz., that facts about the present are privileged in that 'there are' present episodes, but no past or future ones, is also a mistake. It can readily be shown to rest on a confusion between

$$(45) \text{ The (future) episode, E, does not 'exist'—i.e., is not taking place}$$

and

$$(46) \text{ The (future) episode, E, does not 'exist'—i.e., there is no such thing as this episode.}$$

Episode E would, of course, simply not be future if it were taking place. But that there is no such thing as a future episode is surely false, and escapes being obviously so only because it is confused with the idea that no future episodes are taking place. To dispel this confusion, it is necessary to see how the language of 'episodes' or 'events' is related to simple tensed statements of the kind with which this paper began.

But first a terminological remark is in order. It will undoubtedly have been noticed that in the preceding sections the term 'episode' has, with a minimum of warning, been stretched to cover items which would not ordinarily be so designated. Thus, we would not ordinarily say that the statement "The soup is salty" reports an episode, even though it does report something that "comes to pass." Thus, we distinguish, for example, between 'episodes' and 'states.' It is no easy task to botanize the various kinds of temporal statement, or to find a plausible term for the broader category to which both episodes ('the salting of the soup') and states ('the being salty of the soup') belong. Perhaps they might be lumped together under 'outcome.' For the time being, however, I shall avoid any discussion of states, and limit myself to episodes proper. I shall, therefore, modify the original statements, with which I began, to read

- (1') S became Φ_1 in 1957,
- (2') S is becoming Φ_2 today (1958),
- (3') S will become Φ_3 in 1959,

- | | |
|---|---------------------------------------|
| It is the case that S be-
came Φ_1 | S's becoming Φ_1 took place |
| It is the case that S will
become Φ_1 | S's becoming Φ_1 will take place |

and ask how such episode expressions as "S's becoming Φ_1 ," "S's becoming Φ_2 ," and "S's becoming Φ_3 " are related to statements of these forms.

Actually, the relation between episode expressions and tensed statements which are about *things* rather than *episodes* is quite simple, and has been formulated with reasonable clarity by more than one philosopher.⁸ Thus, the episode expression 'S's becoming Φ_1 ' is derivative from tensed statements to the effect that S is (or was or will be) Φ_1 in accordance with the following equivalence schema:

- (47) S's becoming Φ_1 {is taking place, took place, will take place}
 $\cdot \equiv \cdot$ S {is becoming, became, will become} Φ_1 .

Thus we note that there are two kinds of *singular term* which can be derived from tensed statements of the kind represented on the right-hand side of (47): (a) *that-clauses*, thus,

- (48) That S will become Φ_1 ,

and (b) *episode-expressions*, thus,

- (49) S's becoming Φ_1 .

We have already argued that singular terms of the former kind are a special kind of statement-mentioning device and are metalinguistic in character. This being so, we can appreciate the truth contained in the idea that *episodes* are more basic than *facts*; for *episode-expressions*, unlike *that-clauses*, are in the *object language*.

On the other hand, it is important not to be misled by this insight into supposing that episodes are the entities of which the world is 'made up,' for although it is correct to say that episode-expressions 'refer to extralinguistic entities'—indeed, to *episodes*—the above account tells us that episodes are *derivative* entities and rest on the referring expressions which occur in tensed statements about things (or 'substances').

It is worth noting, in this connection, that though there is a necessary equivalence between the corresponding statements in the following two columns,

- (48) It is the case that S is S's becoming Φ_1 is taking place
 becoming Φ_1

⁸ I have particularly in mind Hans Reichenbach's discussion of events and things in his *Introduction to Symbolic Logic*.

each statement on the left is differently related than its right-hand counterpart to the 'basic' statement from which it is derived. Again, corresponding to the right-hand statements we have the set of (respectively) equivalent statements,

- (49) It is the case that S's becoming Φ_1 is taking place,
 It is the case that S's becoming Φ_1 took place,
 It is the case that S's becoming Φ_1 will take place.

That it can be illuminating to play with the compounding of singular terms of these two varieties will become clear in the sections yet to come.

It is also worth noting—this time as an aside—that both types of singular term (*that-clauses* and *episode-expressions*) function in "predicative" implication statements.⁹ We can say not only

- (50) *That the litmus paper was put in acid* (physically) implies
that it turned red

but also

- (51) *The litmus paper's being put in acid* (physically) implied
its turning red.

(Note the subtle difference in tense structure of these equivalent statements.) The fact that episode expressions occur as singular terms both in the fundamental, patently object language, contexts explicated in (47) and in such predicative implication statements as (51) gives prima-facie support to the idea that (physical) implication is a relation *in re* between events, an idea which finds no support in statements like (50) once the metalinguistic character of *that-clauses* is understood. This makes it doubly important to see that episode-expressions are grounded in tensed statements about things, where these statements, since they are not singular terms, must be *that-ed* (in effect, quoted) to serve as the subject of statements to the effect that something physically implies something else.

⁹ By a 'predicative implication statement' I mean an implication statement in which the function '_____ implies _____' plays the role of a predicate, taking singular terms as its substituends. These statements are to be contrasted with the contrived (but illuminating) form '_____ \supset _____' in which statements rather than singular terms fill in the blanks to make 'material implication' statements.

I have pointed out that episode-expressions are introduced in terms of the equivalences represented by schema (47). The next step is to explore the relationships represented by the schema

(52) S's becoming Φ_1 is {present, past, future} $\cdot \equiv \cdot$ S's becoming Φ_1 {is taking place, has taken place, will take place}.

The corresponding statements on the left- and right-hand sides are clearly equivalent. But before we ask whether this equivalence is an identity of sense, let us note that the introduction of the adjectival expressions 'past,' 'present,' and 'future' makes possible, when combined with various tenses of the copulative 'is,' the introduction of the forms

(52) E was present (past, future)

and

(53) E will be present (past, future)

which, by the use of one overt tensed verb, make statements that would require the use of complex tenses if reformulated as statements about things rather than episodes. Thus, while

(54) S's being Φ_1 is future

is the counterpart of

(55) S will become Φ_1 ,

to get the counterpart of

(56) S's becoming Φ_1 was future (in 1900)

we must say something like

(57) (In 1900) S was (yet) to become Φ_1 ,

and to get the nonepisodic counterpart of

(58) S's becoming Φ_1 will be past (in 1960)

we must say something like

(59) (In 1960) S will (already) have been Φ_1 .

These considerations call attention to the fact that there are several ways in which we can make 'two-perspective' temporal statements. Thus, compare

(60) It was a fact (quoad t) that S would now (1958) become Φ_1 ,

(61) (At t) S was to become Φ_1 today (1958),

(62) S's becoming Φ today (1958) was future (quoad t).

Of these, the first has, we have seen, roughly the form

(60') 'S will become Φ_1 in 1958' (said at t) was a true statement.

But what of (62)? Surely it also has a metalinguistic force. That it is equivalent to

(63) 'S's becoming Φ_2 will take place in 1958' (said at t) was a true statement

is reasonably clear. I propose to argue that this equivalence is an identity of sense, and that, more generally,

(64) E {is, was, will be} past (at t) $\cdot \equiv \cdot$ 'E took place' (said at t) {is, was, will be} true

(65) E {is, was, will be} present (at t) $\cdot \equiv \cdot$ 'E is taking place' (said at t) {is, was, will be} true

(66) E {is, was, will be} future (at t) $\cdot \equiv \cdot$ 'E will take place' (said at t) {is, was, will be} true

If we combine these schemata with considerations relating to the moves from either

(67) S was true

or

(68) S will be true

to

(69) S' is true

where S' is the appropriate differently tensed counterpart of S which is used now to make the statement which S was used to make (in case (67)) or will be used to make (in case (68)), we have a direct route from statements of the forms represented by

(70) E {is, was, will be} {present, past, future}

to statements of the form

(71) E is taking place (has taken place, will take place)

and hence (in simple cases) to statements of the form

(72) S is becoming (has become, will become) Φ_1 .

But more of this in a moment. For it remains to suggest that even the second of the three ways of making a two-perspective statement listed above, namely,

(61) (At t) S was to become Φ_1 today (1958)

has a metalinguistic component to its sense, and involves a tacit quoting

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X

of "S will become Φ in 1958" as appropriately tokened at the prior time t. For a temporal perspective is always a cognitive perspective, *the perspective of a user of temporal language*. But to bring out the metalinguistic component of (61) requires a deeper analysis of temporal expressions, and, in particular, at least a rudimentary account of how they are tied up with references to dates, moments, and periods of time.

IX

Let us consolidate some of the ground which has (tentatively) been won, by noting that the classical notion that 'there is' a series of events related by *earlier than* (or *precedes*), where the 'is' of

(73) E_1 is earlier than E_2

is in the 'tenseless present,' is a mistake if it is supposed that this 'tenseless present' is logically independent of the use of tensed verbs. Actually, of course, if 'earlier than' is to be a temporal predicate at all, the 'is' of 'is earlier than' can be 'tenseless' only as the 'be' of the sentence "Eisenhower be president in 1956," so contrived as to be suitable for making a statement and, in an appropriate sense, the same statement, whenever it is used, was 'tenseless' only by virtue of its stipulated equivalence to a disjunction of three sentences involving, respectively, the past, the present, and the future tenses of 'to be,' as in (20). In the case at hand, we have the equivalence

(74) E_1 precedes $E_2 \cdot \equiv \cdot$ either E_1 is present and E_2 future, or E_1 was present and E_2 future, or E_1 will be present and E_2 future.

Notice, of course, that in (74) the component " E_1 was present and E_2 future" must have the sense of " E_1 was present and E_2 was at that time future." In other words, this component must be construed as having the force of

(75) ' E_1 is taking place and E_2 will take place' was true

rather than

(76) ' E_1 is taking place' was true and ' E_2 will take place' was true.

Obviously the latter entails the former only if the statements "E is taking place" and "E will take place" are construed as made or to be made at the same time. In the case of (75) this proviso is unnecessary, since we have to do with one conjunctive statement rather than two statements.

Are there past and future episodes? That the answer is 'yes' is surely a foregone conclusion, but the logical niceties remain to be determined. To begin with, something must be said about the status of the very term 'episode.' That it is a common noun, and that "There are episodes" has the same general form as "There are lions," is clear. But more than this we can say that 'episode,' like 'property' and 'relation,' is a 'category word'; and to say this is to say that like the latter pair it is the counterpart in the material mode of a logical pigeonhole for a certain class of expressions in our language. Thus,

(77) E is an episode

tells us no more about E than is exhibited by

(78) E is taking place or has taken place or will take place

and serves to indicate that the singular term represented by 'E' is the sort of term which belongs in this type of context. Thus, to say that there are episodes is, in effect, to say that *something*¹⁰ either is taking place, has taken place, or will take place. And as saying this it is equivalent to (though it does not have the same sense as) a statement to the effect that *something* is either present, past, or future. These statements can be put *logistic* as follows:

(79) (Ex) x is taking place \vee x has taken place \vee x will take place;

(80) (Ex) x is present \vee x is past \vee x is future.

If, now, we introduce into the latter the categorizing function, 'x is an episode,' to obtain

(81) (Ex) x is an episode \cdot x is present $\cdot \vee \cdot$ x is an episode \cdot x is past $\cdot \vee \cdot$ x is an episode \cdot x is future,

we are in a position to note the different roles played by the first and second occurrences of 'is' in each of the disjuncts. For while the second 'is' in each case is in the present tense in a full-blooded sense (i.e., the context admits 'was' and 'will be' as well as 'is'), the first is not. The first 'is' is in the 'tenseless present,' as is the 'is' in all categorizing statements, thus

(82) Triangularity is a quality.

¹⁰ 'Something' here does not, of course, mean *some thing*, i.e., *some continuant or substance*. It is the ordinary language equivalent of so-called existential quantification and as such moves from category to category depending on context, just as the reversed 'E' of the 'existential' operator is appropriately combined with variables of all types, thus, ' $(\text{Ex}) \dots x \dots$ '; ' $(\text{Ef}) \dots f \dots$ '

We may, indeed, say

(83) E was an episode,

but this has the force of

(84) E is an episode · E has taken place.

In other words, the past tense is connected not with the *categorizing*, but with the temporal location of the categorized entity.¹¹

On the other hand, the second 'is' in each disjunct of (81) is full-bloodedly in the present tense, for the functions

(82) x is {present, past, future}; [*x* {is taking, has taken, will take} place' is true]

are, as we have seen, to be contrasted with

(83) x was {present, past, future} (at t);
[*x* {is taking, has taken, will take} place' (said at t) was true]

and

(84) x will be {present, past, future} (at t);
[*x* {is taking, has taken, will take} place' (said at t) will be true].

Thus, to say that some episodes are past or that some episodes are future (or, for that matter, that some episodes are present) is simply to affirm one of the disjuncts in the statement which is the explicitly categorized form of the assertion that there are such things as episodes. For

(85) There are episodes

has, as we have seen, the force of

(86) (Ex) x is a present episode \vee x is a past episode \vee x is a future episode,

which we may read

(87) *Something* is either a present episode or a past episode or a future episode

and is equivalent to

(88) *Something* is a present episode \vee *something* is a past episode \vee *something* is a future episode.

¹¹ I shall return to the topic of the role of the present tense in categorizing statements at a later stage in the argument.

Our discussion of the difference between the 'is' of 'is an episode' and the 'is' of 'is present (past, future)' makes it clear that the 'are' in

(89) Some episodes are {present, past, future}; [(Ex) x is a {present, past, future} episode]

is full-bloodedly in the present tense, for while this 'are' contains the 'tenseless present' of the categorizing function, 'x is an episode,' it also contains the full-blooded present tense of the functions 'x is present,' 'x is past,' and 'x is future.' Thus the statements

(90) There are {present, past, future} episodes

contrast with

(91) There were {present, past, future} episodes;
[There are episodes which were {present, past, future}]

and

(92) There will be {present, past, future} episodes;
[There are episodes which will be {present, past, future}]

which are based on the functions 'x was present (past, future)' and 'x will be present (past, future).'

It is important to see that

(93) There are past episodes

and

(94) There were past episodes

make quite different statements, as do

(95) There are future episodes

and

(96) There will be future episodes.

For this puts us in a position to see that to suppose that the correct way of talking about the existence of past and future episodes is by saying

(94) There were past episodes

and

(96) There will be future episodes

is to make a simple mistake. It is, indeed, incorrect to say either

(97) Past episodes are taking place

or

(98) Future episodes are taking place.

Here the tense of 'to be' must agree with the temporal adjective applied to the episodes. On the other hand, the 'are' of (93) and (95), as traceable to the functions 'x is past' and 'x is future,' and hence as giving expression to our temporal point of view in making these statements, contrasts radically with the 'were' of (94) and the 'will be' of (96) which are traceable to functions ('x was past,' 'x will be future') each of which locates (from our point of view) a second and different point of view from which the episodes in question might have been, or might yet be, viewed.

Thus, to make 'single-perspective' existence statements about episodes, we must use the present tense,

(90) There are {present, past, future} episodes

and hence make statements which, by virtue of their relationship to simply tensed statements about changeable things, are, in elementary cases, equivalent, respectively, to

(91) (ES) (Ef) S {is becoming, became, will become} f.

3. Time and Temporal Relations in a World of Things

XI

The above analysis throws light, I believe, on a number of venerable and well-worn puzzles. Thus, philosophers have been prone to ask, "How can two successive events be temporally related if when the earlier event exists, the later does not yet exist, and when the later event exists, the earlier event no longer exists?" Surely, it has been argued, the terms of any relation must 'coexist.' I will not take the time to apply the above considerations to this elementary confusion. What is of somewhat greater interest, however, is that our analysis throws light on the sense in which 'there are' temporal relations at all. For while there clearly are temporal relations between events, the latter (we have argued) have a derivative status in the sense that statements about events are, in principle, translatable into statements about changeable things. If we put this somewhat misleadingly by saying that 'ultimately' or 'in the last analysis' there are no such things as events, we must also say that 'ultimately' or 'in the last analysis' there are no such things as temporal relations.

It is impossible, however, to make sweeping statements about temporal relations without coming to grips with topics of the most central importance which have simply been bypassed in the argument to date. Thus it will undoubtedly have been noticed by readers who are sensitive to classi-

cal issues in the philosophy of time that I have permitted myself to pass back and forth from tensed statements about things which make no explicit reference to *location in time*, to tensed statements about things which contain a reference to a *moment* or *period of time*, thus, "S was Φ_1 at t ." Now concepts pertaining to time, and moments or periods of time, are *metrical* concepts, and involve *logical individuals*, whether derivative (as we have construed episodes to be) or *primitive* for which metrical relationships have been defined. It is time, therefore, that we faced the fact that if we are going to take *things* as our only primitive logical individuals, we must find a *nonrelational* way of talking about *changing things* by the use of tensed verbs which provides a logical basis for statements about topological and metrical *relations* between events when it is translated into the derived framework of episodes and events which we have been concerned to analyze. For once the transition from tensed talk about things to a topologically ordered framework of events has been made, we will have established contact with the many excellent explorations of the constructibility of concepts pertaining to time and its periods and moments on a basis consisting of topologically characterized relationships among events, which exist in the literature of the subject.

There are, roughly, two ways in which the step from a relationally ordered system of events to time, its periods and moments, has been conceived. (1) There is the idea that concepts pertaining to time are explicitly definable in terms of such a relation between events as *overlapping*, thus Whitehead's account in terms of the 'Method of Extensive Abstraction'; (2) there is the idea that time has the status of a quasi-theoretical entity the ultimate particulars of which are *moments*. According to the latter interpretation, metrical relationships between periods and moments of time would be 'idealized' counterparts of empirically ascertainable metrical relationships between episodes pertaining to everyday (and scientific) things. It is the latter approach which I would defend. It is therefore incumbent on me to explain what I mean by characterizing time as a *quasi-theoretical* entity.

Actually, it is misleading to use the term 'theoretical' in this context at all. For all that *time* has in common with *population of molecules* is the existence of rules for coordinating statements concerning empirically ascertainable metrical relations between episodes pertaining to the things of everyday life and science, with statements locating these episodes, rela-

tively to other episodes, in time, that is, with statements having the characteristic syntax of statements "about time." There remains the essential difference that time is introduced as a *metrical framework* rather than, as in the case of molecules, as part of the content of the world. Needless to say, the fact that we can say that 'time' refers to time, i.e., talk semantically about expressions such as 'time,' 'the year 1900,' 't₀,' etc. throws no light whatever on the status of time, since it simply gives expression to the fact that temporal expressions have a use.

"But," it will be said, "even granting that something like the position you have been sketching can stand the gaff, you have not yet shown how metrical relations between empirically ascertainable episodes can be derivative from *nonrelational* temporal facts concerning things. For, as you yourself have insisted, if things are the only basic individuals, then all relational temporal facts pertaining to episodes must rest on nonrelational temporal facts pertaining to things." The answer to this challenge consists in calling attention to such locutions as

(92) Nero fiddled *while* Rome burned

and noting that 'while' is a connective which connects statements and remembering that *statements are not singular terms*. In other words, the answer is simply that we must not equate statements involving temporal connectives such as 'while' with statements formulating temporal relations between episodes, thus

(93) Nero's fiddling coincided with Rome's burning.

Nor are statements of this kind to be equated with statements explicitly mentioning periods of time, thus

(94) Nero fiddled during the period of time in which Rome burned.

On the other hand, it must be granted that these temporal connectives are free from involvement with the framework of time only in a hypothetically primitive use. For tensed discourse with these connectives, but without the framework of time, would constitute a most primitive picture of the world.

XII

Assuming that some such account of the dating of episodes is true, the next point to note is that the rules coordinating time and its moments with discourse about changing things permit us to speak not only of epi-

sodes,¹² but also of the periods and moments of time, as past, present, or future, as having been past, present, or future, and as going to be past, present, or future. And the application of 'is (was, will be) present (past, future)' to moments clearly rests on their application to events in a way which is roughly indicated by the formula

(97) $t_1 \{is, was, will be\} present \cdot \equiv \cdot (E) E \text{ occupies } t_1 \supset E \{is, was, will be\} present$

which, for simplicity's sake, has been put in terms of moments and momentary events.

Again, the concept of one moment as preceding another moment in the continuum of time is exhibited by the formula

(98) $t_1 \text{ precedes } t_2 \cdot \equiv \cdot t_1 \text{ is present and } t_2 \text{ future or, } t_1 \text{ was present and } t_2 \text{ future or, } t_1 \text{ will be present and } t_2 \text{ future.}$

We can also introduce 'now' as an expression referring to the present moment, thus,

(99) $Now = (t) t \text{ is present.}$

It is essential to note the tensed character of the 'is' on the right-hand side, for this formula highlights the fundamental role played by tensed verbs in temporal discourse. We can put this point roughly by saying that 'now' is to be understood in terms of 'is,' not 'is' in terms of 'now' construed as a basic demonstrative. Or, more accurately, *this is the account of 'now' we must give if we are to construe our language as one in which the basic logical individuals are changeable things*. For we shall subsequently be exploring the logic of a framework which, while not that of ordinary discourse and, indeed, an invention of the philosophers, is, *if consistently developed*, a legitimate alternative to the framework of things. The basic logical individuals of this new framework are 'events' in a sense

¹² It is, perhaps, worth noting that 'S remained Φ ' generates the dull or 'null' episode of S's remaining Φ , 'null' in the sense that remaining Φ is a limiting case of a going's on which is a change. Notice, also, that whereas the idea of a momentary episode (change) is, strictly speaking, nonsense, the idea of a momentary state is not. The latter is introduced by the equivalence between

(95) $x \text{ remains } \Phi \text{ throughout } p$

and

(96) $x \text{ is } \Phi \text{ at every moment of } p.$

(These statement forms, of course, presuppose the coordination of episode talk with time talk.) The idea of episodes as consisting of a continuum of momentary states would be a reconstruction, in terms of the framework of time, of the idea of an episode on which this framework rests.

of this term which is radically different from 'episode' or 'event' as they occur in the framework of things. In this 'event' framework, 'now' will play a radically different role. That the two frameworks are, in an important sense, equivalent and easily confused will be found to account for many of the recurring ontological puzzles concerning time and change.

Another important schema is the following, which relates 'was true' and 'will be true' to 'is true':

$$(100) \text{ 'E}_i \text{ is taking place' (said at) } t_i \{ \text{is, was, will be} \} \text{ true} \cdot \equiv \cdot \text{ 'E}_i \{ \text{is taking place, took place, will take place} \} \text{ at } t_i \text{ (said now) is true.}$$

With these equivalences behind us, we are in a position to introduce the metaevent expression 'E_i's being present,' which we can abbreviate as 'E_{pr}[E_i]' in terms of the schema

$$(101) E_{pr}[E_i] \{ \text{is taking, has taken, will take} \} \text{ place at } t_i \cdot \equiv \cdot E_i \{ \text{is, was, will be} \} \text{ present at } t_i.$$

(Note that 'E_i is present at t_i' has the force of 'E_i is now present.' We have not yet introduced the *detensed* form 'E_i "is" present at t_i.' This can, of course, be done as follows, using as before 'be' for the detensed 'is,'

$$(102) E_i \text{ be present at } t_i \cdot \equiv \cdot E_i \text{ is present at } t_i \text{ or, } E_i \text{ was present at } t_i \text{ or, } E_i \text{ will be present at } t_i,$$

where it is a necessary truth that

$$(103) E_i \text{ be present at } t_i \supset : (t) t \neq t_i \supset \neg (E_i \text{ be present at } t)$$

i.e., there is only one time, the time which it occupies, at which a (momentary) event "is" (*be*) present, as there is only one time (*now*) at which a (momentary) event is present.)

Continuing the line of thought initiated by schema (101) we add

$$(104) E_{pr}[E_i] \text{ is (now) } \{ \text{present, past, future} \} \cdot \equiv \cdot \text{ 'E}_{pr}[E_i] \{ \text{is taking, has taken, will take} \} \text{ place' (said now) is true.}$$

From these equivalences, together with certain considerations which have not been spelled out, but are reasonably straightforward, we can derive

$$(105) E_{pr}[E_i] \{ \text{is taking, has taken, will take} \} \text{ place at } t_i \cdot \equiv \cdot E_i \{ \text{is taking, has taken, will take} \} \text{ place at } t_i$$

and

$$(106) E_i \text{ is } \{ \text{present, past, future} \} \text{ (now)} \cdot \equiv \cdot E_{pr}[E_i] \text{ is } \{ \text{present, past, future} \} \text{ (now).}$$

To spell out the relationship in a particular case, note that

$$(107) E_{pr}[E_i] \text{ is future} \cdot \equiv \cdot \text{ 'E}_{pr}[E_i] \text{ will take place' is true} \\ \cdot \equiv \cdot E_{pr}[E_i] \text{ will take place} \\ \cdot \equiv \cdot (Et) E_i \text{ will be present at } t \\ \cdot \equiv \cdot (Et) \text{ 'E}_i \text{ is taking place' (said at } t) \\ \text{will be true} \\ \cdot \equiv \cdot (Et) \text{ 'E}_i \text{ will take place at } t \text{ (said now) is true} \\ \cdot \equiv \cdot E_i \text{ is future.}$$

The steps which have not yet been adequately clarified (though intuitively sound) are those which involve quantification over moments. For these steps tacitly involve such principles as

$$(108) 1 E_i \text{ is now future} \supset : (t) t \text{ precedes now} \supset E_i \text{ was future at } t \\ 2 E_i \text{ is now past} \supset : (t) t \text{ follows now} \supset E_i \text{ will be past at } t \\ 3 E_i \text{ is now present} \supset : (t) t \text{ precedes now} \supset E_i \text{ was future at } t \\ \supset : (t) t \text{ follows now} \supset E_i \text{ will be past at } t \\ 4 E_i \text{ is now future} \supset : (Et) t \text{ follows now} \supset E_i \text{ will be present at } t \\ 5 E_i \text{ is now past} \supset : (Et) t \text{ precedes now} \supset E_i \text{ was present at } t.$$

It is therefore time to note that the temporal relation between the metaevents E_{pr}[E_i] and E_{pr}[E_j] like the relation between E_i and E_j is 'timeless' only as involving a disjunction of tenses, thus,

$$(109) E_{pr}[E_i] \text{ precedes } E_{pr}[E_j] \cdot \equiv \cdot E_{pr}[E_i] \text{ is present} \cdot E_{pr}[E_j] \text{ is future, or } E_{pr}[E_i] \text{ was present} \cdot E_{pr}[E_j] \text{ was future, or } E_{pr}[E_i] \text{ will be present} \cdot E_{pr}[E_j] \text{ will be future.}$$

And the cumulative force of the principles and equivalences set down above is to make intelligible the 'analytic' character of the principle that "earlier events become present before later events," i.e., that, to use the traditional (and dangerous) metaphor, the "bulls-eye of the present moves along the series of events from earlier to later," for it is a consequence of these principles and equivalences that

$$(110) E_i \text{ precedes } E_j \supset E_{pr}[E_i] \text{ precedes } E_{pr}[E_j].$$

It is also important to note, for future reference, that if it is granted that

(111) E is (now) present \supset : (t) t precedes now \supset E was future at t

and that

(112) E was future at t \supset : 'E is future' (said at t) was true
 (113) 'E is future' (said at t) was true $\cdot \equiv \cdot$ 'E will take place' (said at t) was true
 (114) 'E will take place' (said at t) was true $\cdot \equiv \cdot$ 'S will be Φ ' (said at t) was true

where E = S's being Φ); and, finally that

(115) 'S will be Φ ' (said at t) was true $\cdot \equiv \cdot$ It was a fact (quoad t) that S would be Φ at a time subsequent to t

then the very structure of time talk, as we have laid it out, involves that

(116) S is $\Phi \cdot \equiv \cdot$ It was always a fact that S would be Φ
 $\cdot \equiv \cdot$ 'S will be Φ ' (said at any time before now) was always true.

4. Do Past and Future Things Exist?

XIII

The explorations of the preceding sections make possible a clarification of certain concepts pertaining to *becoming*. The first thing to note is that if we have in mind by 'becoming,' *becoming* Φ , then both things and events can be the subjects of becoming, thus

(116) S {is becoming, became, will become} red
 E {is becoming, became, will become} more and more past.¹³

The next thing to note is that whereas both *things* and *events* can *become* Φ , *only things become in the sense of come into being*. Many of the puzzles pertaining to becoming rest on a failure to see that in no ordinary sense do events come into being. To equate

(117) E is becoming present

¹³ It is not my purpose to analyze statements of these forms where the subject is an event and the predicate other than a temporal predicate. That there are such statements is clear, thus 'E is becoming less and less approved.' There is, indeed, a sense in which events, as McTaggart points out, can change only with respect to temporal characteristics, but this means only that other changes are to be analyzed in terms of change with respect to temporal characteristics, so that the claim is true only in the sense in which "only primitives exist."

with

(118) E is coming to be (or coming into existence)

is either to make a mistake, or to stipulate a new use for 'come to be' ('come into existence'). For, as we have seen, there is an *elementary* sense in which *there are* future events (and past events) as well as present events. Thus, if

(119) E shall come to pass

is construed (as, I suspect, it is often construed) as

(120) E shall come to be (come to exist)

rather than

(121) E shall come to *take place* (i.e., will take place)

one is likely to think that the fact that E "shall come to pass" implies that *there is no such event as E until it takes place*. (Of course, E will not be present until it takes place.) It is easy to fall into the absurdity of supposing that the fact that future events "shall come to pass" implies that there are no future events.

We shall be discussing in a moment the coming into being and the passing away of *things*. Before we take up this crucial topic, the topic of 'absolute becoming' (as contrasted with 'becoming Φ '), let us remind ourselves that the most puzzling of traditional puzzles about becoming have to do with its status as 'objective' or 'subjective.' Thus, it is asked, would there be becoming if there were no knowing minds immersed in the temporal order? To this latter question, the answer implied by our analysis is, in a certain sense, No. But to say this at this stage is not to say that becoming is in any usual sense 'subjective,' but merely to remind ourselves that however 'objective' temporal statements may be in the sense of belonging to intersubjective, rational discourse, they are irreducibly 'token-reflexive.' After all, the world would contain no *heres* and *theres* if it included no users of 'here' and 'there'—or their equivalents. And to think of a possible world as containing *heres* and *theres* is, in effect, to imagine oneself in it, using 'here' and 'there.'¹⁴

It is tempting to suppose that the expressions 'here' and 'there' are the spatial counterparts of 'now' and 'then.' And, of course, in a sense this is

¹⁴ This generates the question, 'Can we describe in nontensed terms what a world must be like for tensed talk to be appropriately used in it?' The present essay is, in a certain sense, a preface to an exploration of this fundamental issue in the philosophy of time. See also Sec. 8 below.

true. But to be impressed by the similarity between 'x is here' and 'x is now' is to run the danger of overlooking an important difference, namely, the association, in the latter case, of the *temporal* predicate 'now' with the *temporal* present tense of 'to be,' as contrasted with the association, in the former case, of the *spatial* predicate 'here' with the *temporal* present tense of 'to be.' To put the point bluntly, our language does not contain spatial tenses.

But before we assess the significance of this difference, let us press the similarities. Thus, just as the temporal dimension of discourse presents us with what we have called 'differently tensed counterparts,' the spatial dimension presents us with what can be called 'differently located counterparts.' If S_1 is *here* (where we are) and S_2 is *there*, the statements, which we now make,

- (122) S_1 is here
- (123) S_2 is there

have, as counterparts, the statements, made by someone over there,

- (124) S_1 is there
- (125) S_2 is here

so that we can say not only,

- (126) (From here) it is a fact that S_1 is here
- (127) (From here) it is a fact that S_2 is there

but also (albeit somewhat forcedly)

- (128) (From there) it is a fact that S_1 is 'there'
- (129) (From there) it is a fact that S_2 is 'here'

that is, both

- (130) ' S_1 is here' (said here) is a true statement
- (131) ' S_2 is there' (said here) is a true statement

and

- (132) ' S_1 is there' (said there) is a true statement
- (133) ' S_2 is here' (said there) is a true statement.

Suppose, now, someone were to argue as follows: "The distinction between *here* and *there* is, in an important sense, 'subjective,' for while discourse about *here* and *there* is rational, intersubjective discourse, there would be no such thing as *here* or *there* if there were no language users using expressions having the force of 'here' and 'there.' On the other hand," he continues, "spatial relationships, like 'between,' 'colinear with,'

'perpendicular to,' etc., are objective, and would be in the world even if there had been no language users. These *objective* relations are presupposed by the distinction between *here* and *there*, for it is because language users stand in the objective relations they do to other people and things that they can make proper use of the expressions 'here' and 'there.'" Having thus prepared the way, he goes on to expostulate, "Surely the same is true in the case of time. Must there not be relations independent of the distinction between *now* and *then* which are presupposed by this distinction, and are as objective as the spatial relations mentioned above?"

The above argument is as old as the hills, and it points up a familiar dilemma. On the one hand there is the fact that if our argument to date is sound, all temporal concepts contain an irreducibly 'subjective' element (though the term 'subjective' must be used, as we have seen, with caution); on the other hand, the analogy of spatial discourse suggests that the 'token-reflexive' aspects of temporal discourse rest on 'purely objective' temporal relations which would 'be there' even if there were no language users. Is there any way out of this dilemma?

It might seem that not only is there a way out, but we have already taken it. For have we not undercut it by arguing that events have a derivative status? In the framework of things, it is *things* which stand in spatial relations (though they do so at a time), whereas it is *events* which stand in temporal relations. Have we not shown that there is a 'level of being more basic than the level of events' and have we not therefore shown that even if all temporal relations between events contain an irreducibly 'subjective' element, nevertheless the existence of *changing things* is objective? Can we not say with Bergson that the framework of temporal relationships rests upon a nonrelational mode of becoming (his *durée*, more adequately categorized)? The answer is, of course, that even if we have shown that something remotely analogous to what Bergson had in mind is true, to establish the derivative status of the relational framework of events is by no means to find a 'purely objective' foundation for temporal facts. For even if statements of the form ' E_1 overlaps (overlapped, will overlap) E_2 ' rest on statements of the form represented by 'Nero fiddled while Rome burned,' we are still confronted by the irreducibly tensed, and hence, in the sense in which we are using the term, 'subjective' character of such statements.

Nevertheless, as I hope to show, the step of locating the 'radical sub-

jectivity' of 'becoming' in tensed statements about things rather than in relational statements about events is a significant advance toward dissolving the puzzles. In addition to its role in facilitating the next steps in the argument, it serves the immediate purpose of making us aware of the limitations of analogies drawn from space. For it brings us back to the difference pointed out above (p. 558) between 'x is here' and 'x is now,' by highlighting the irreducible role of tensed verbs in the expression of temporal facts.

XIV

Further progress requires a scrutiny of the logical connections between the concept of existence and concepts pertaining to temporal location. It can best be introduced by taking a closer look at exactly how the analogy of space generates puzzles with respect to the status of *becoming*. We have all heard arguments of the following sort: "The basic individuals of the framework of time are events. They are the domain of a purely objective relation of *earlier than*. 'Now' is a token-reflexive expression tokens of which, occurring in the system of events, give expression to, and have as an essential part of their sense, their location in the system. The distinction between *now* and *then* exists only with respect to (from the point of view of) linguistic events in the system. The objective status of the events as a temporal order is independent of the distinction between *now* and *then*, and, indeed, the temporal order is prior to and embraces the perspectival facts which are constituted by the occurrence of token-reflexive linguistic events. The temporal order exists in a sense which is independent of, and prior to, any use of token-reflexive expressions. Statements to the effect that such and such events exist are *tenseless* statements. To say that a certain event *will exist* is to say that it exists (in a tenseless sense) *and is later than now*. After all," the argument concludes, "it is well known that the concept of existence is nothing more than the *existential* operator, which is no more tensed than 'or' or 'not.'"

But while this argument has proved persuasive, it leaves us puzzled. The idea of a *tenseless* existence of events *tenselessly* related by *earlier than* has a flavor of absurdity, if not of self-contradiction. To view the status of *now* and *then* as a matter of the presence in a *tenselessly* existing relational order of tokens of 'now' and 'then' is to run counter to the idea, at least as persuasive as the above argument, that to say of two events that one is earlier than the other is to use, and not merely to *mention* a tem-

poral token-reflexive expression. And if this latter idea is sound, how can there be such a thing as a token-reflexive-free statement to the effect that there exist events which are related as earlier to later?

But the above remarks only heighten the tension, and provide no relief. And a review of the situation makes it clear that the tension is focused in the clash between "Statements to the effect that such and such events exist are tenseless statements" and "The idea of a tenseless existence of events . . . has a flavor of absurdity . . ." Clearly this conflict can only be resolved by a careful analysis of the concept of existence as it relates to entities in time.

Let us first discuss the concept of existence as it appears in the framework of things. In this framework, it will be remembered, the basic logical individuals are things (or substances or continuants), and the *names* of the language refer to these individuals. While things are referred to by names, the fundamental form of event expressions *in the thing framework* is indicated by the following: 'S's being Φ ,' 'S's becoming Φ ,' 'S's V-ing (or being V-ed)' (where 'V' represents an appropriate verb). Both 'S' and 'S's being Φ ' are *singular terms*, but their statuses within this category are radically different. We have already had quite a bit to say about the 'existence' of events and, indeed, of past, present, and future events within the framework of things. It is time we said something about the 'existence' of things themselves.

Let me put my finger on the essential point at the very beginning. Existence statements about things are as irreducibly tensed as statements about the qualitative and relational vicissitudes of things. Thus paralleling

$$(134) S \{ \text{is, was, will be} \} \Phi$$

we have

$$(135) S \{ \text{exists, existed, will exist} \}.$$

How are these latter statements to be understood?

Here we run head on into the fact that it is widely thought (indeed, taken for granted) that there are no such statements, or, more accurately, that there are no such statements *if S is construed as a name*. It is, in short, almost dogma that existence statements are statements having the form '(Ex) . . . x . . .' and that the difference between general existence statements and singular existence statements lies in the presence or absence of a uniqueness condition. I wish to contend, for reasons which I

have developed in another context,¹⁵ that the truth is the very opposite of this dogma, and that existence statements invariably are of the form

(136) N exist(s)

where 'N' is either a *proper* name, in which case the statement is a singular existence statement, or a *common* name, in which case the statement is a general existence statement.

We have all been brought up to recognize that the argument

(137) Lions exist
Leo is a lion
Therefore Leo exists

exhibits a misunderstanding of the logical form of 'Lions exist.' The latter does not stand to 'Leo exists' as 'All men are mortal' stands to 'Socrates is mortal.' On the other hand, the fallacy does not consist in forming a nonsense sentence 'Leo exists' under the impression that such a parallel exists. The sentence 'Leo exists' makes perfectly good sense, and is not to be construed as the mistake of putting a *name* (instead of a variable) after the 'existential operator' or reversed 'E.' Nor is the fallacy adequately exposed by rendering it, *logistique*, as

(138) (Ex) x is a lion
Leo is a lion
Therefore, (Ex) x = Leo.

For while 'Lions exist' would not be true unless '(Ex) x is a lion' were true, and while 'Leo exists' would not be true unless '(Ex) x = Leo' were true, these logistical expressions do not represent the sense of the original existence statements.

How are these existence statements to be understood? Let me begin with the rough suggestion that ('S' being a proper name)

(139) S exists (did exist, will exist)

has the sense of

(140) Something satisfies (satisfied, will satisfy) the criteria for being called S,

where the criteria include a uniqueness condition. Notice that an everyday rendering of (140) runs

(141) There is such a (unique) thing as S.

¹⁵ See "Grammar and Existence: A Preface to Ontology."

If this suggestion is sound, it springs to the eyes that there is a general resemblance (such as we would naturally expect) between 'Leo exists' and 'Lions exist,' for the latter would have, roughly, the sense of

(142) Something satisfies the criteria for being called a lion

or

(143) There are such things as lions.

Notice that both (142) and (143) are in the present tense, as is 'Lions exist.' It is important to realize that we are dealing with the schema

(144) Ks {exist, existed, will exist} · ≡ · Something {satisfies, satisfied, will satisfy} the criteria for being called a K · ≡ · There {are, were, will be} such things as Ks.

The crucial point is that statements of the form

(145) (Ex) . . . x . . .

are not as such in any ordinary sense existence statements. They correspond to existence statements, where they have the force of

(146) (Ex) x is properly called (an) N

where 'N' is a proper or common name. Most of the puzzles about existence, and, in particular, puzzles about the existence of abstract entities, are rooted in a crude equation of existence statement with 'existentially quantified' statement.

If one thinks that 'S exists' has the force of '(Ex) x = S,' one will conclude that things have a 'tenseless' existence, for the function '(Ex) . . . x . . .' is not a tensed function. If, for example, one construes

(147) Eisenhower exists

(i.e., 'There is such a person as Eisenhower') as

(148) (Ex) x = Eisenhower,

one will conclude that the existence of Eisenhower is a tenseless existence, and go on, perhaps, to contrast his tenseless existence with the tensed truths which record his history. The truth of the matter, however, is that 'Eisenhower exists' is, as it seems to be, a tensed statement, and has the force of

(149) (Ex) x satisfies the criteria for being called Eisenhower.

On the other hand, 'Napoleon existed' has the force of

(150) (Ex) x satisfied the criteria for being called Napoleon.

Similarly, 'Men will exist' has the force of

(151) (Ex) x will satisfy the criteria for being called a man.

It is, therefore, a radical mistake to suppose that in the framework of things the basic individuals of the framework have a tenseless existence, with tenses playing a role only at the level of predication about them.

The above line of thought is reinforced by the following consideration. Once we realize that 'existence' is not to be confused with 'existential' quantification, we are in a position to note that whereas such radically different existence statements as

(147) Eisenhower exists

and

(152) Triangularity exists,

not to mention

(153) Lions exist

and

(154) Numbers exist,

have in common the general form

(155) (Ex) x satisfies the criteria for being called (an) N ,

there is a radical difference between the first and second member of each pair, a difference which concerns the nature of the *criteria*. And once we reflect on these differences we note that whatever may ultimately be true of (152) and (154), the existence statements concerning Eisenhower and lions essentially involve a relation to the person making the statement. For to say that Eisenhower exists is to imply that he belongs to a system (world) which includes *us* as knowers (i.e., language users). In other words, such statements as that Eisenhower exists have an intimate logical connection with statements which give expression to their own location in the framework to which belongs the referent of the statement (in this case Eisenhower), i.e., token-reflexive statements. And the token-reflexive statements in question are those which formulate the nexus of observation and inference in terms of which the claim that there is something which satisfies the criteria for being called Dwight D. Eisenhower would be justified.

Again, even though proper names are not shorthand for definite de-

scriptions, they have a sense which is properly formulated as a definite description. And the use of the proper name presupposes the truth of the Russell sentence which is the foundation of the description. Thus, the sense of 'S' is given by expressions of the form ' $(\iota x)fx$.' It would, however, be a mistake to conclude that the sense of 'S exists' is given by ' $E!(\iota x)fx$.' For while 'S exists' is in some sense equivalent to ' $E!(\iota x)fx$,' the former makes *explicit* something which is only implicit in the latter, and *what* it makes explicit is the claim that the framework (the language) to which both 'S' and ' $E!(\iota x)fx$ ' belong is our language in its straightforward or primary use, and that the things and states of affairs of which it speaks are *our companions*, so to speak. For if we reflect on the difference between *fictional* names (e.g., 'Oliver Twist') and the criteria which constitute their sense (say, ' $(\iota x)Fx$ ') and '*real*' names (e.g., 'Dwight D. Eisenhower') and the criteria which constitute *their* sense (say, ' $(\iota x)Gx$ ') we see that it is not enough to say that the difference between them consists in the fact that we are entitled to say ' $E!(\iota x)Gx$ ' but not ' $E!(\iota x)Fx$.' For in *fictional* contexts we are as entitled to say ' $E!(\iota x)Fx$ ' as to use the name 'Oliver Twist.' Obviously, then, the crux of the concept of (*actual*) *existence* is to be found in the distinguishing traits of the *real life* as contrasted with the *make-believe* or *fictional* use of language. Thus, to explicate 'S exists' it is not sufficient to call attention to its equivalence to ' $E!(\iota x)fx$ ' or to emphasize that a tensed verb is lurking in the function ' fx ' or to emphasize that being *the thing which is f* is the criterion for being called S. One must also make explicit the *real-life* character of the latter statement. And this can be done only by making explicit its connection with our activity as *knowers*, rather than as *storytellers*. And it is clearly a reasonable step in this direction to suggest the equivalence

(156) S exists $\cdot \equiv \cdot$ S belongs to a system of things which includes *this*.

It is not, however, my purpose on this occasion to explore in further detail the relation of token-reflexive expressions to the concept of observation, or to analyze the concept of observation. For my purposes it is sufficient to note that if the above equivalence is, as I suggest, a necessary one, then it follows that existence statements have a different sense on each occasion of their use in the sense in which 'this' has a different sense on each (relevantly) different occasion of its use. And we have been led

once again to recognize the essential token reflexivity of existence statements.

xv

In the thing framework, then, statements asserting the existence of named individuals are fully tensed statements. The nontensed form '(Ex) $x = S$ ' is not the logistical formulation of an existence statement, though of course if S exists, then it is necessarily true, *logistica*, that (Ex) $x = S$. We can, if we wish, introduce a tenseless form

(157) S 'exists'

in terms of a disjunction of tenses, thus,

(158) S 'exists' $\cdot \equiv \cdot$ S exists or S existed or S will exist.

(Notice, however, that though (157) is, in a sense, tenseless, it expresses the temporal point of view of the speaker, so that two people who avail themselves at relevantly different times of this sentence will be making the same statement only in the sense in which differently tensed counterparts make the same statement. The fundamentally tensed character of (157) would also become manifest if this contrived verb were to be used in two-perspective statements.)

Again,

(159) There are future things

is to be understood as a derived statement which rests on

(160) S is future $\cdot \equiv \cdot$ 'S will exist' is true

and, hence, on

(161) S will exist.

Here we find a crucial difference between *things* and *events* (in the thing framework), for, as we saw,

(95) There are future episodes

does not rest on

(162) E will exist

but rather on

(163) E will take place

which is equivalent to a statement of the form

(164) S will V.

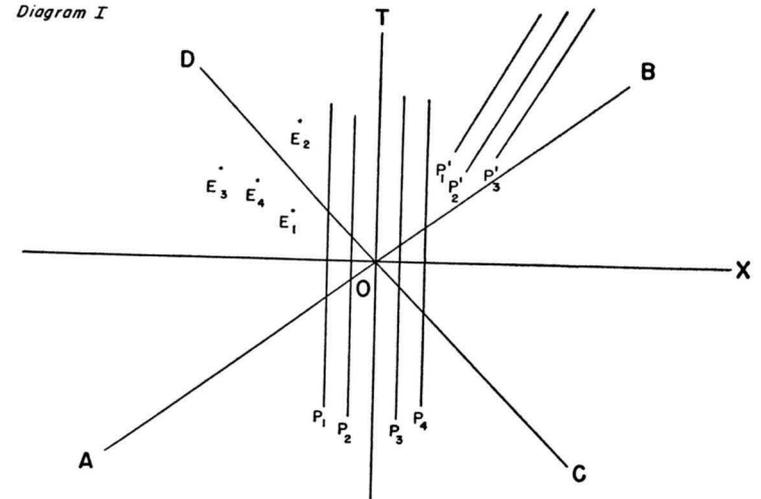
5. Relativity and the Objectivity of Becoming

xvi

Philosophers who have taken relativity seriously—and for our purposes we can limit ourselves to the Special Theory—have often wondered how it can be reconciled with the idea that there is such a thing as *becoming*, whether 'qualitative' (i.e., coming to be Φ) or 'absolute' (i.e., coming to be (exist)). "For surely," they are prone to argue, "relativity theory has an event ontology, and pictures the world as a continuum of events for which the distinction between 'past,' 'present,' and 'future' is relative not only to a *now* (which is obvious), but to a set of coordinates which is only one among many sets of coordinates, each of which is an equally authentic structuring of the world into one temporal and three spatial dimensions. And," they continue, "if we call 'objective' that which is a matter of inter-subjective reasoned agreement, then according to the picture of the world painted by relativity theory, neither spatial distances nor temporal intervals are objective, but only the space-time separations of events (and their character as 'space-like' or 'time-like'), for only the space-time separations of events are invariant with respect to the measurements of all 'galilean' observers. How," they conclude, "can *becoming* be *objective* if time itself is not objective, but dissolves into a multitude of times each of which is a 'shadow,' to use Minkowski's metaphor, of a more basic reality (i.e., space-time)?"

The (imaginary, but representative) philosopher from whom the above is quoted is, of course, seriously confused. His confusions, however, are aided and abetted by most of the existing philosophical 'clarifications' of relativity—and our philosopher has at least the merit of taking his role as a philosopher seriously. Much of the groundwork has already been laid in the previous sections for a dispelling of these confusions. But certain considerations have been left to one side and must now be discussed before this groundwork can be used.

The reader who is familiar with the philosophy of measurement will undoubtedly have noted that our previous discussion of events and episodes in the framework of things has been tacitly built on the assumption that the events in which the things of this world participate constitute a four-dimensional continuum which, in its turn, is a temporal continuum of spatial, three-dimensional continua. And, indeed, we have been taking for granted, rather than exploring, the *metrical* character of this con-



set of coordinates which is selected from the infinite set of alternative sets of coordinates which are subject only to the requirement that any T axis (for this metricizing) be parallel to T, O being an arbitrarily selected event. (3) The X axis represents the spatial dimension of the metricizing, and any two points at equal distance above or below the X axis represent events which are simultaneous with respect to this metricizing. (4) The lines AB and CD represent the histories of photons 'passing through' O. All pairs of events which can belong to the history of one particle must be connectable by a line which is such that a parallel to it through O falls within the angle DOB. Thus, E_1 and E_2 can belong to the history of one particle, whereas E_3 and E_4 cannot.

Consider, next, the situation represented by Diagram II. Suppose that E_5 and E_6 belong to the history of an observer S' in uniform motion relative to the original observer S . Suppose, furthermore, that O is an event in the history of S , and that the T axis coincides with the history of S (at least in so far as the measurements defining the metrics represented by this diagram are concerned). We can now represent a second metricizing of the continuum of events, a metricizing with respect to measurements belonging to the history of S' , by choosing the same origin, but drawing the new T axis (T'), and the new X axis (X') at angles to the original axes. T' will be parallel to E_5E_6 and X' will be symmetrically located on the other side of the line AOB. We could, of course, have drawn our original diagram to represent the metricizing of the con-

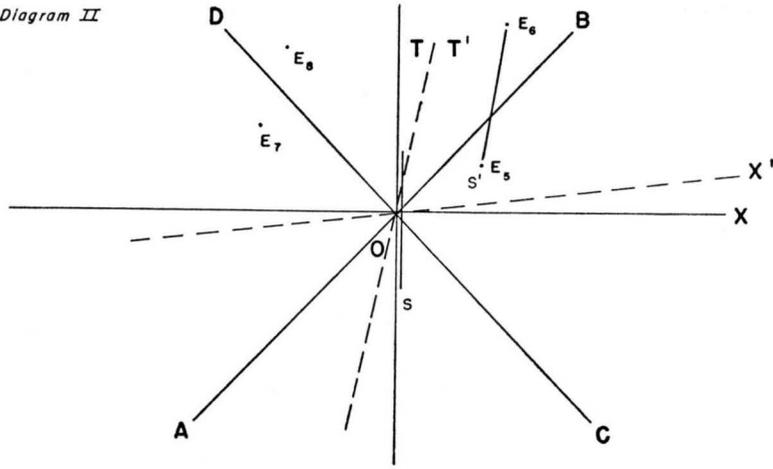
tinuum of events.¹⁶ When, therefore, it is said that the structuring of the continuum of events into three spatial and one temporal dimension is relative to a given system of world lines (galilean frame), we must ask ourselves in what sense the continuum of events is 'prior' to its metricizing by an actual (or hypothetical) observer who belongs to this frame—at least during the process of establishing the congruences which constitute this metricizing. And to ask this is also to ask in what sense space-time intervals are 'prior' to the variety of their separations into spatial distances and temporal intervals with respect to different galilean frames. For most of the confusions about the Special Theory concern the relative 'reality' of (a) the continuum of events; (b) space-time; (c) our space and our time.

Given that the 'four-dimensional continuum of events' has been 'metricized' by an observer in one galilean frame, and representing this metricizing as a cutting up of the continuum into a temporal series of three-dimensional spatial cross sections, the Lorentz transformations provide us with a way of calculating the metricizing of this continuum into a temporal series of three-dimensional spatial cross sections with respect to any other galilean frame. And, of course, these cross sections will consist of different sets of events in the two metricizings where the observers are in uniform relative motion with respect to each other. In a typical space-time diagram, the metricizing of the continuum with respect to the first frame is represented as in Diagram I. The system of particles (P_1, \dots, P_n) which constitutes the frame is represented (more accurately, of course, their histories are represented) in the diagram by straight lines parallel to the T axis. And the second galilean frame, moving with respect to the first, is represented (its history is represented) by a system of parallel straight lines at an angle to the T axis, P'_1, P'_2, \dots, P'_n .

A number of points are to be noted at once. (1) The metricizing is to be understood as a system of direct and indirect measurements, i.e., congruence relations between certain sets of events belonging to the frame (the 'measurements') and other sets of events (the 'measured' events). The metrical character of the system of particles constituting the frame, including the observer, is, of course, as much a function of these measurements as the metrical character of any event or string of events belonging to the continuum. (2) The point O represents the origin of a particular

¹⁶ In the following remarks I shall make the usual simplification of things and events into particles and motions.

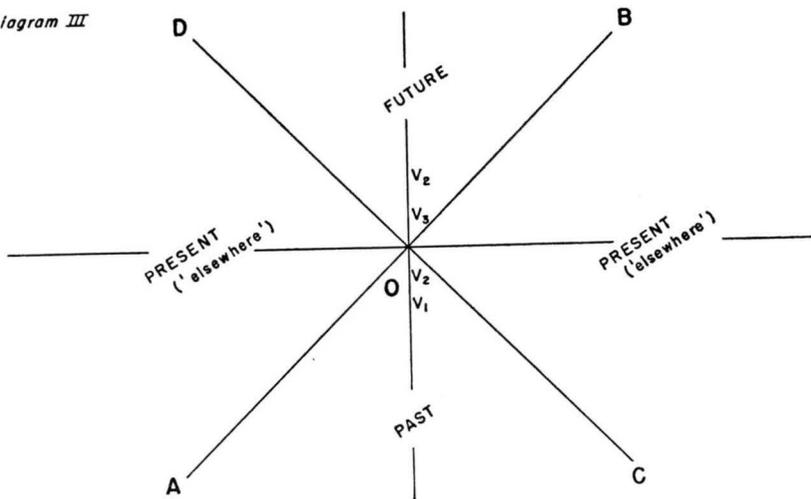
Diagram II



tinuum by S', in which case the situation with respect to the axes would be reversed, T' and X' being at right angles, and T and X forming an acute angle in the upper right-hand quadrant, as do T' and X' above.

It is often said that in such diagrams as these, the intersecting lines AOB and COD (the 'cone' constituted by actual and possible 'paths' of photons passing near S at O) divide the continuum of events into three regions, a 'past,' a 'future,' and a 'present' (or 'elsewhere'); see Diagram III. This, however, is a most dangerous way of putting a sound point. The correct way of putting the point is to say that the region mislabeled

Diagram III



'future' is the region containing the events which are properly labeled 'future' not only by S (speaking at O) but by any observer belonging to a galilean frame in relative uniform motion with respect to S, and who, at the moment of speaking properly, calls O 'now.' Or, abstracting for the moment from the distinction between 'past,' 'present,' and 'future,' we can say that any event in the region labeled 'future' in the diagram will be classified as later than O by all galilean observers who cut the pie of events into temporal series of spatial cross sections. Similarly, to label the regions contained within AOD and COB 'present' is properly speaking to say that for every event in these regions there is a possible observer passing near S at O with a permissible relative velocity who would properly label it as 'present' if, at the moment of speaking, he properly labels O 'now,' and would properly say that the event in question is neither earlier nor later than O.

Now what these considerations amount to is simply that the metricizing of a set of events into a three-dimensional spatial array and the metricizing of spatially related events into a one-dimensional temporal array are *not independent operations*. It brings out clearly the fact that a framework of events structured into a past, a present, and a future is a metrical framework, as is a framework of events structured into a series of three-dimensional cross sections related by *earlier than*.

In what sense are space-time intervals "more real" than lapses of time and spatial distances? Only in the sense that the space-time interval between two events is an invariant quantity with respect to the Lorentz transformations, that is, with respect to all metricizings into a temporal order of spatially related events. To suppose that it is in any other sense "more real" is, as we shall see, analogous to supposing that events as *standing in the earlier-later relations* (with respect to a given metricization) are "more real" than events as *past, present, or future* (in a given metricization) because *earlier than* is invariant with respect to "the changing location of the 'now.'"

Confusion is twice confounded when it is supposed that the 'cone' represented by the angle DOB constitutes the "edge of becoming." For just as it is a mistake to think of the area within the angle as "the future with respect to S at O" (except in a very Pickwickian (derived) sense of 'future'), so it is a mistake to think of the series of light ray 'cones' whose vertices lie along T' (at V₁, V₂, . . . , V_n) as stratifying events into layers

of those which have just become with respect to V_i , that is, as representing "the moving surface of becoming."

We must now remind ourselves that although we have permitted ourselves to speak above without qualification of a framework of events, these events have a derivative status in the sense that singular terms referring to events are contextually introduced in terms of sentences involving singular terms referring to things. And we must remind ourselves that in the framework of things it is *things* which come to be and cease to be, and that the event which is the coming to be or the ceasing to be of a thing itself neither comes to be nor ceases to be but (like all events) simply takes place. On the other hand, all metricizings in the framework of things is a matter of the locating of *events*, including the events which are the coming to be and ceasing to be of things. Thus, while neither

(165) S was Φ at t

nor

(166) S came into being at t

says that S is a series of events which includes, at time t, earlier than now, an event which, in the case of (165) is of a certain kind, and, in the case of (166) is the first event in the series, nevertheless these statements specify *when* S was Φ and *when* S came into being, with reference to a metric system of events. Thus (165) and (166) are necessarily equivalent to certain statements of the form

(167) E took place at t

but do not have the same sense as these statements. For (167) represents statements which, made explicit, have the forms

(168) S's being Φ took place at t

(169) S's coming to be took place at t.

These considerations remind us that a sound account of time must combine a recognition that statements of the form

(170) S is (was, will be) Φ at t

involve a framework of events, i.e., of 'individuals,' which *take place*, with the recognition that the framework of events, made explicit, shows its dependence on the framework of tensed statements about things.

I have already¹⁷ sketched an account of time which indicates how *relational* statements pertaining to *events* are grounded in nonrelational state-

¹⁷ Above, Sec. 2.

ments pertaining to things. All that is needed to provide the sought-for clarification of the status of the "continuum of events" differently "cut up" by S and S' is to recognize that metrical relations between events are simply a special case of relations between events, and are similarly grounded in the use of temporal connectives which combine tensed statements about things, as contrasted with relational predicates which have event expressions as their terms.

Once we fully appreciate the fact that while a thing has as its counterpart in a framework of events a series or 'string' of events, it is not to be identified with this series or string, and once we appreciate the metrical character of time and temporal relations, we see that while it is in a sense correct to say, in the context of relativity theory, that two observers in relative uniform motion "measure the same events" but "order them differently with respect to spatial and temporal relations," it can also be very misleading. For it implies that events are logically prior to the changing things which are metricized by the use of clocks and rods. Rather we should say that just as certain metrical quantities are invariant with respect to all galilean metricizings of changing things as spatial and temporal, so certain topological features are invariant with respect to *all* metricizings of these same things without qualification. And it is therefore essential to note that topologically characterized events, instead of being the concrete reality of the world process, *are simply abstract features common to all metrical pictures of the world*. The temptation to think of the continuum of events topologically conceived apart from specific metrics as the basic reality which includes these metrics as specific patterns of topological relationship is a mislocation of the fact that metrical discourse about events is rooted in premetrical tensed discourse in which we talk about doing this or that *while (before, after)* other things do this or that in our immediate practical environment.

Now the burden of my remarks is, to put it simply, that it is a radical mistake to suppose that what *really* is, is that which is common to metrical frames. In other words, it is not correct to identify *real* with *invariant features of metrical pictures of the world*. For the status of these invariant features is surely an ontologically secondary one; they are abstract facts about the changing things which are the primary realities. On the other hand, these metrical pictures do not *falsify*, they simply are what they are in accordance with their own logic. It is therefore by no means inconsistent with the above to say that a consideration of abstract topological facts

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about the histories of things may throw light upon the puzzles of becoming. For while the simultaneity or successiveness of two events which belong to different things is a metrical property of these events in relation to a frame of reference, so that the "same" events may be simultaneous relative to one frame and successive with respect to another, two events belonging to the same thing have a topological order which is invariant with respect to all metrical frames. Thus, while the total set of copresent events (relative to S) is not the same set of events which are copresent for S', the temporal order of the events which belong to one and the same thing is (with qualifications which pertain to the idealization of things into punctiform particles) frame invariant, as is the order in which these events become less and less future, then present, then more and more past.

It is often said that we must avoid 'spatializing' time. Statements to this effect are invariably confused, for in so far as they imply that we should not think of time in metrical terms they are actually a contradiction. But they do contain insights which account for their vitality. These are the insights that changing things are not to be identified with their histories, that time as a measure of events is also a measure of things, and that the foundation of temporal discourse is the use of tensed verbs and nonrelational temporal connectives.

XVII

Attention has been called to three modes of invariance between different metricizings of 'the' events happening to the things of the world: (1) the topological invariance discussed above; (2) the metrical invariance specified by the Lorentz transformations; (3) the invariance, within a metrical frame, of the earlier-later relation with respect to different nows. It remains only to spell out in somewhat more detail the fact that these invariances constitute three levels of abstraction from the primary mode of existence of a framework of events, which is their existence as *divided* (with respect to a particular frame) into a particular now with its correlative future and past. The earlier-later relation has its primary mode of being as earlier-later in the context of a specific past-present-future.

It is but another way of making this point to call attention to the fact that temporal statements exist primarily as statement episodes, which have, as such, an irreducibly 'token-reflexive' character. A temporal picture of the world does not have the form of Diagram IV, nor even that of Diagram V, for while the latter recognizes that 'reality' is that which

Diagram IV

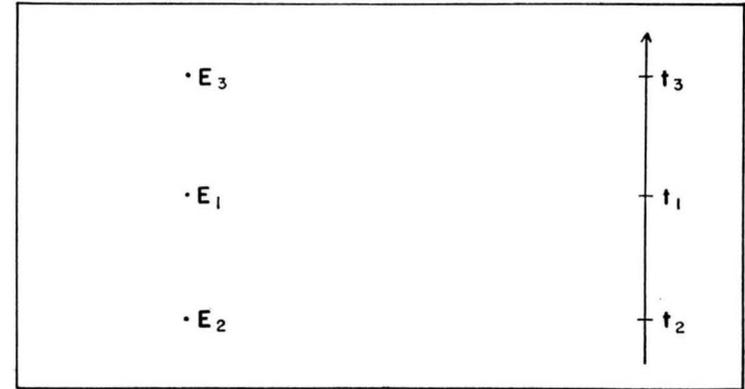
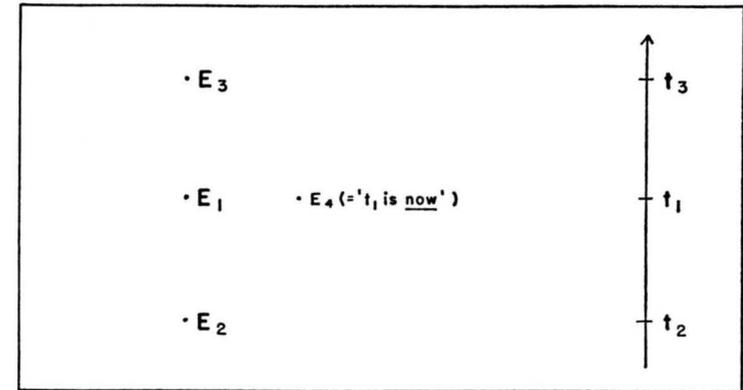


Diagram V



includes, in addition to nonlinguistic events, correct utterances of 'this,' 'here,' 'now,' etc., it may blind us to the fact that reality is that which includes *this* (not merely 'this'), *here* (not merely 'here'), and *now* (not merely 'now'). And reality is the same for two observers only as one person's *this* is another person's *that*, and one person's *now* is another's (or, subsequently, the same person's) *then*.

Thus, a person who uses that which is shown in Diagram VI is giving a temporal picture of the world.¹⁸ And while all true (ideal) pictures of the world will agree in the linguistic episodes they mention, they will use relevantly different token reflexives to do so.

¹⁸ And to picture a 'possible' world (as opposed to merely setting up the language for picturing it) is to tell a consistent story by the *make-believe* or *storytelling* use of token reflexives, and, therefore, to *pretend* that one is in it.

Diagram VI

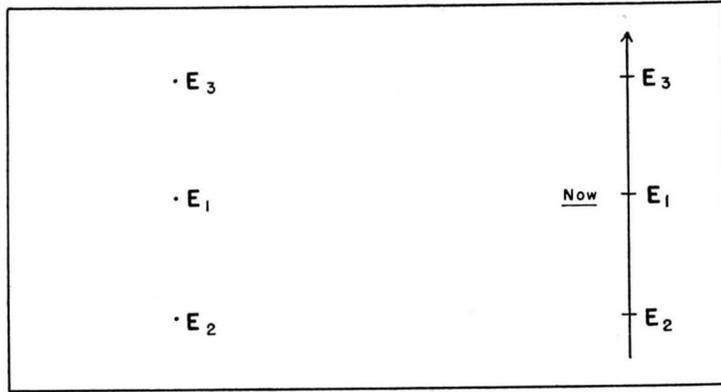


Diagram VII

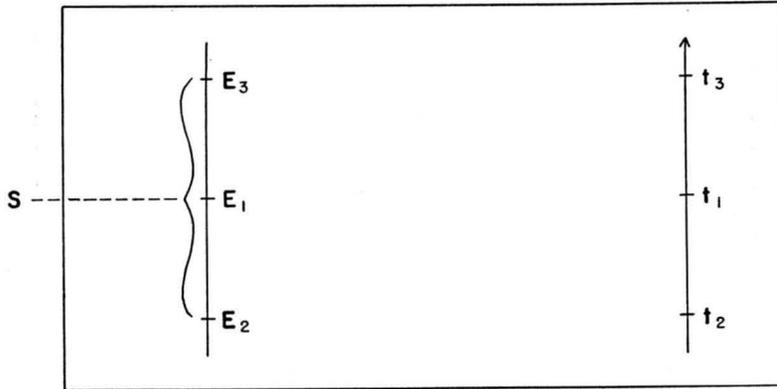
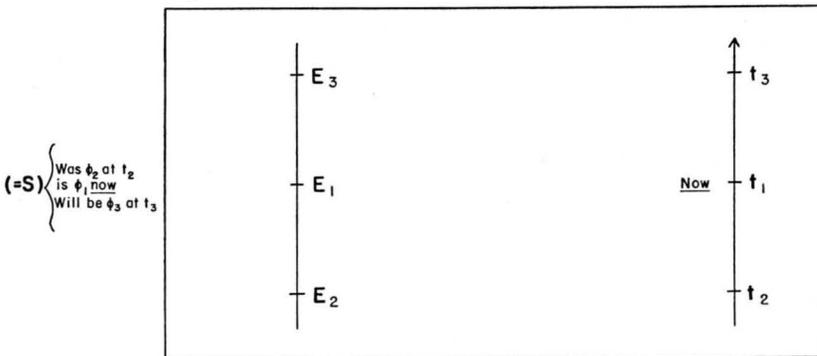


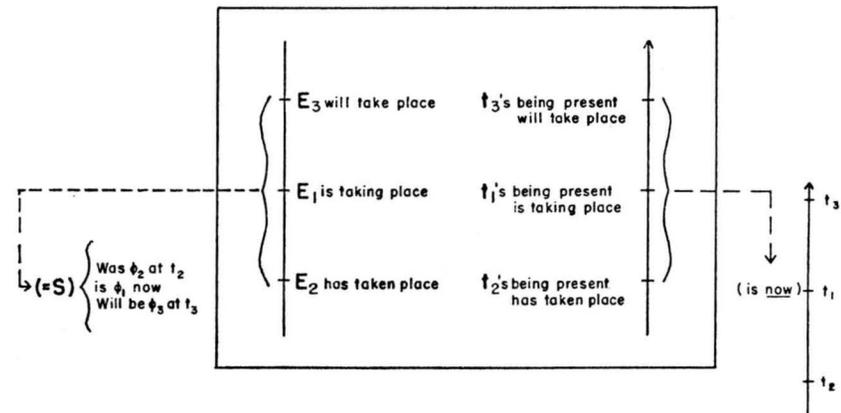
Diagram VIII



How do *things* fit into a temporal picture of the world? Not being events or strings of events (represented, respectively, by points and lines) they must, in a sense, lie outside the above picture (as, we shall see, must time). The general sort of thing which must be done is clear. We must represent things by symbols outside the rectangle, connecting them by, say, broken lines, representing a relation of *belonging to*, to their histories. (See Diagram VII.) More than this, we must include in the picture statements of the form 'S was ϕ at t ,' which can be done as shown in Diagram VIII.

Finally, we must distinguish between time and events pertaining to time; for only the latter belong in the event framework represented by the rectangle. Thus we must distinguish between a moment, t , and the event of the moment's being present with respect to a given perspective and, above all, between the event of the moment's being present with respect to a given perspective and the event of the moment's being present. The latter, of course, is the essential feature of a temporal picture of the world. This gives us Diagram IX as a primary picture of the world. In this picture, while the metrical character of temporal discourse is emphasized, the lower left-hand corner contains the irreducible element of *tensed discourse about things* which is the heart of the picture.

Diagram IX



6. The Problem Recast: an Ontology of 'Events'?

XVIII

Now it might be argued that although the basic individuals of ordinary discourse and, indeed, of physical science, are continuants or changing

things, and although in this framework events have the derivative status exhibited by the forms 'S's becoming Φ ,' 'S's V-ing' (or 'being V-ed'), 'S's being ψ ,' we can perfectly well conceive of a framework in which the basic individuals are the counterparts of the point-instant events of a sophisticated thing framework, and the counterparts of things are 'genidentical' series of basic individuals, their property of belonging together in one 'world-line' being defined in terms of spatio-temporal order and empirical laws as these latter, in their turn, appear when recategorized to fit this new framework.¹⁹ If we call this new framework the framework of 'events,' we see at once that the differences between it and the framework of substances or things will be systematic and pervasive. For the basic sentences of the new framework will be quite unlike the basic sentences of the framework we have been exploring to date. And this difference at the level of basic sentences will infect the entire framework.²⁰ It is obvious, to begin with, that the names of the 'event' framework could not be translated into the names of the thing framework; that the same is true of the primitive predicates of the two frameworks is equally clear after a moment's reflection. What is more interesting, and to the point, is that in this new type of framework temporal facts would be more like spatial facts in that the role of tensed verbs, if introduced at all, would be derivative from that of token-reflexive predicate expressions combined with a tenseless copula. That is, just as spatial discourse in the thing framework contains such sentences as

(171) S is here

where the copula, though temporal, has no spatial sense, and the spatial-reflexive role is played by 'here,' so, in this new framework,

(172) x is now

would combine a nontensed 'is' with the temporal-reflexive 'now.' In other words, representing this nontensed role of 'is' by 'be,' the new framework would involve a more thoroughgoing parallelism between

¹⁹ It is essential to note that the concept of a world line in a four-dimensional continuum of events finds a proper, though highly derived, place in the framework of things. It has too often been supposed by philosophers (and physicists) who discuss the Special Theory of Relativity that the Minkowski mathematical apparatus automatically carries with it a commitment to an ontology of 'events.' This, as is shown by the argument of the preceding sections, is simply a mistake.

²⁰ For an evaluation, all things considered, of this systematic difference, see Sec. 9 below.

(173) x be here

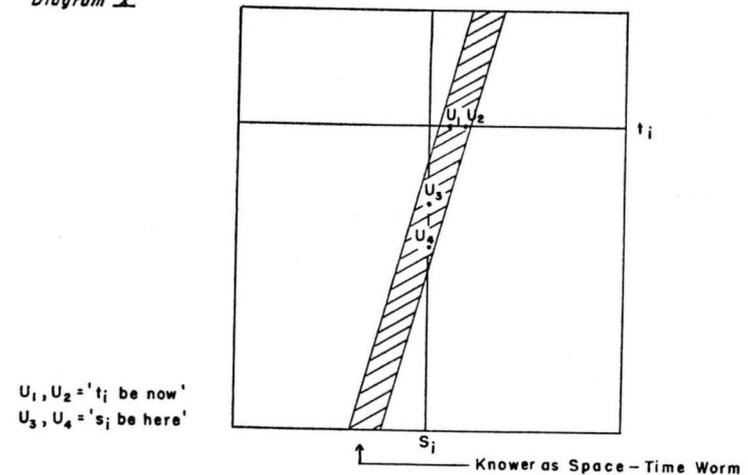
and

(174) x be now

than is characteristic of the framework of things.²¹

Let us permit this suggestion to grow before we evaluate it. Notice, in the first place, that whereas in the thing framework event expressions are derived expressions, the entities which in the new framework are the counterparts of events—let us call them 'events'—are nameable. Thus, 'x₁' is a name, and not shorthand for a noun phrase. Note, next, that in the 'event' framework the basic form of discourse pertaining to the becomingness of things will be relational, as contrasted with the nonrelational character of basic tensed discourse about things. Only at the derived level of events did we find terms for temporal relations in the frame-

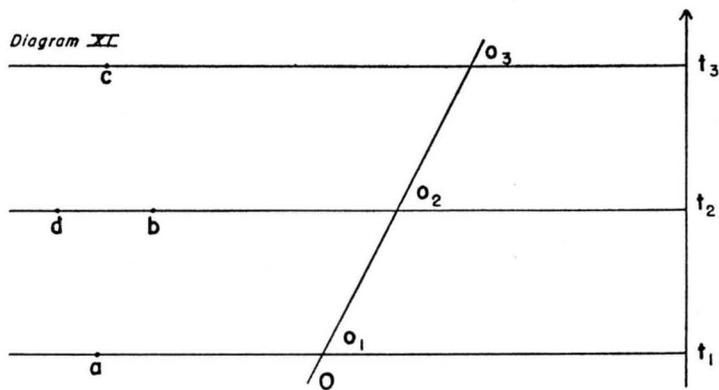
Diagram X



²¹ Although this parallelism is complete for the purposes of the present, introductory remarks on the framework we are analyzing, there remains a radical difference between 'here' and 'now' which touches the heart of the difference between the spatial and the temporal dimensions of discourse. This difference concerns the fact that no two utterances of 'now' by one speaker are strictly simultaneous, whereas two utterances of 'here' can be at the same place. Thus, two utterances of the form 't_i be now'—by one speaker—must refer to different times, whereas two utterances of the form 'S_i be here' can well refer to the same place. (See Diagram X.) It might be thought that the fact that a spatially large speaker might say 't_i be now' out of each corner of his big mouth restores the symmetry. But, of course, to make a Kantian point, these two statements would not be statements by the same knower, unless that knower makes the conjunctive statement, in which case one of the utterances of 't_i be now' would be redundant.

work of things. It would not be surprising, therefore, to find those who elaborate the ontology of 'events' to believe that a simple distinction between the 'subjective' or 'perspectival' relational properties of 'events,' such as *after now* and *before now*, and an underlying 'objective' system of temporal relations—'events' as the domain of *earlier than*—will do for time what the distinction between the perspectival spatial attributes of things (at a time) and the 'objective' system of spatial relations they presuppose does for space.

In order to worm our way into this framework and to see what form our puzzles about becoming and passage take in the ontology of 'events,' let us, postponing relativity considerations, conceive of the world as a four-dimensional continuum of 'events' construed as basic particulars which are the terms of spatial and temporal relations. Representing a system of spatially related events by a line in the horizontal dimension, Diagram XI gives us an initial picture of the world as a system of 'events' (a, b, c, and d are 'events' at different places and/or times; O is the 'history' of an observer belonging to the system, o_1 , o_2 , and o_3 being, respectively, contemporaneous with a, b, and c).



It is assumed, of course, that the spatial cross sections (represented by horizontal lines) are the domain of a relation R, roughly *earlier than*, which has the properties necessary to define an open, continuous *order of between-ness*. It is also assumed that the set of cross sections constitutes a *series* as well as an *order of between-ness*. (Cf. the distinction between the *series* of numbers and the mere *between-ness* of points on a line apart from perspectival considerations.) It is also assumed that the

occurrence of linguistic and conceptual 'events' in the 'history' of O constitute a *series* as well as an *order of between-ness*. And, finally, it is assumed that the temporal expression 'now' gives expression to the place of 'statement' events containing it in the series which makes up the 'history' of O.

If, now, we begin by focusing our attention on the system of 'events' as the domain of 'objective' temporal relations it seems reasonable to suppose that these 'objective' temporal relations are formulated by statements which are completely lacking in token reflexivity, so that token-reflexive statements can be laid aside for subsequent reflection. It is tempting, in other words, to suppose that there is a set of non-token-reflexive statements which simply formulate the 'objective' temporal relations which are the presupposition of the use of token-reflexive statements such as 'a be before now' 'b be now,' and 'c be after now.' We therefore focus our attention on such statements as

- (175) a be Φ ,
- (176) a be R to b,
- (177) b be (spatially) between c and d,
- (178) a be at t_1 ,
- (179) b be at t_2 .

We would, if we took the above tack, construe the fact that O can make a statement of any of these forms at any time, and that if it is true as made at one time, it is true as made at any other time, as indicating that these statements have the same sense at all times, exactly as '2 + 2 = 4' has the same sense at all times. We would construe the token-reflexive statements

- (180) a be at t_1 · t_1 be before now,
- (181) b be at t_2 · t_2 be now,
- (182) c be at t_3 · t_3 be after now,

which are true²² only if they are made in the appropriate temporal relation to a, b, and c, respectively, as built on the non-token-reflexive foundation provided by the 'objective' statements.

Thus, if someone were to suggest that in addition to the 'objective' form of predication,

- (183) x be Φ

²² Note that to characterize these statements as true (as made at a certain time) is to project ourselves imaginatively into the framework and regard O as one of us.

we also need the form

(184) x be Φ now

to be abbreviated as

(185) x is Φ

where 'is,' unlike 'be,' is a tensed verb, we might well reply that such a form might well be *introduced*, provided we are not misled by it. The parallel introduction of

(186) x was Φ

as equivalent to

(187) x be Φ before now

would bring this danger to a head, for there would be the temptation to suppose that

(188) a was Φ

stands to

(189) a is Φ

as, in the thing language,

(190) S was Φ

stands to

(191) S is Φ .

But, whereas things exist *throughout* periods of time and can change, 'events' exist *at* moments of time and, in a sense, cannot change. Thus, whereas (191) is compatible with

(192) Not-(S was Φ)

in the sense that S may well have come to be Φ from a state in which it was not Φ , the only way in which (189) can be compatible, in an event framework, with

(193) Not-(a was Φ)

is by virtue of the latter's containing the assertion that a be not a past event. Thus,

(194) a is $\Phi \cdot \equiv \cdot a$ be $\Phi \cdot a$ be at now

(195) Not-(a was Φ) $\cdot \equiv \cdot$ not-(a be $\Phi \cdot a$ be before now).

Consequently, the truth of (193) follows from the truth of (189).

This can be put more simply by saying that there is a sense in which

'events' do not change except with respect to perspectival temporal characteristics. We have already seen that with certain necessary qualifications something like this is true of events and episodes in the framework of things. This makes it doubly necessary to bear in mind the essential difference between the 'events' of the 'event' frame, and the events of a thing frame. Thus, while both the 'a' of the 'event' framework and the 'E₁' of the thing framework are singular terms, their statuses within this category are radically different.

Following up the above line of thought we would conclude that perspectival temporal statements are built on 'objective' temporal statements not only in the sense that they have the form

(196) x be at $t \cdot t$ be {before now, now, after now}

but in the more radical sense that the conjunct 'x be at t' is independent of any reference to a now. We would also conclude that the attribution of an empirical characteristic to an 'event' in the past, present, or future is to be construed as the conjunction of a perspectival temporal statement locating the time occupied by the event with respect to the speaker speaking, and a tenseless statement of attribution, thus:

(197) c will be $\Phi_3 \cdot \equiv \cdot c$ be $\Phi_3 \cdot$ the time of c be after now

(198) a was $\Phi_1 \cdot \equiv \cdot a$ be $\Phi_1 \cdot$ the time of a be before now.

7. More on 'To Exist'

XIX

The question to which all the preceding is but an introduction concerns the sense in which, in an 'event' framework, past and future 'events' can be said to exist. We saw that in the thing framework it is perfectly legitimate to say

(90) There are {past, present, future} episodes

and we distinguished carefully between

(95) There are future episodes

and

(96) There will be future episodes

and, correspondingly, between

(93) There are past episodes

and

(94) There were past episodes

by pointing out that the second member of each of the latter pairs is a two-perspective statement, resting, respectively, on the forms

(199) E *will be* future (*quoad then*)

and

(200) E *was* past (*quoad then*)

as contrasted with

(201) E *is* future (*quoad now*)

and

(202) E *is* past (*quoad now*)

We also saw that if we were to reformulate (93) and (95) to read 'Past episodes exist' and 'Future episodes exist,' and if we were to suppose that in the case of episodes the various *tensed* forms of 'to exist' are equivalent to the corresponding tensed forms of 'to take place' we could easily be led to deny that either past or future events exist. For the obviously true statement 'Future events are not (yet) taking place' would be taken to entail 'Future events do not (yet) exist.' The solution of this perplexity lies, as we saw, in the fact that the maxim "The existence of events is their taking place" is sound only if, instead of proceeding as above, we take "There are episodes' to be equivalent to 'Something is taking place, or has taken place or will take place,' and, in accordance with the schema

(203) Φ Ks exist $\cdot = \cdot$ Ks exist and some of them are Φ

construe

(95) There *are* future episodes

as

(204) There *are* episodes and some of them *are* future

where the form

(205) E *is* future

is equivalent (via "'E will take place' is true") to

(206) E *will* take place.

We also saw that to say that there are future episodes is equivalent to saying something like

(91) (ES) (Ef) S {is becoming, became, will become} f.

Now in an 'event' framework, the statement

(207) There are future 'events'

cannot be reduced to tensed statements about things. 'Events' being the basic particulars of this frame, we come to rock bottom with the very first step, that is, the step to

(208) There are 'events' and some of them are future,

which, in the language proposed for the frame, would seem to amount to

(209) (Ex) x be an 'event' \cdot x be later than *now*

where the statement

(210) (Ex) x be an 'event'

is a *tenseless* affirmation of existence. If so, the fundamental form of an existence statement in the language of 'events' would be

(210) There *be* 'events'

and this statement would affirm, in a purely 'objective' manner, the existence of entities which, in relation to different points of view, would have the perspectival ('subjective') characteristics of pastness, presentness, and futurity.

On the other hand, we are strongly tempted to say that in an 'event' framework, future 'events' are those which *don't* exist but *will* exist, while past 'events' are those which *don't* exist but *have* existed. And the ground of this temptation lies in the fact that in the thing framework the existence of things finds its expression in *tensed* statements, for if *in one way* 'events' in the 'event' framework correspond to *events* in the thing framework, in another way they correspond to *things*, being the basic individuals of their frame. Thus we are tempted on the one hand to say that statements in the framework of 'events' which affirm the existence of 'events' are purely 'objective,' and, on the other hand, to say that they must have a perspectival character or 'subjectivity' corresponding to the 'existed,' 'exist,' and 'will exist' of the thing framework.

To resolve this puzzle, we must take a closer look at those statements in the thing framework which 'affirm the existence of things.' Part of the trouble lies in the ambiguity of the phrase 'statements which affirm the existence of things.' Consider, once again, the statement 'Napoleon existed' or 'There was such a person as Napoleon.' If our general account of the force of existence statements was correct, these statements concern the being satisfied of name criteria, so that

(211) Something {satisfied, satisfies, will satisfy} the 'N'-criteria

is the general form of an existence statement. But to satisfy criteria is to have the criterion characteristics (or an appropriate selection of them, if they do not constitute a set of separately necessary and jointly sufficient conditions). Thus we must break the formula down into

(212) Something $\{was, is, will be\} \Phi_1, \dots, \Phi_n$ to be Φ_1, \dots, Φ_n is to be appropriately called N

and in this expanded formula, the tenses of the first conjunct are straightforward and pose no special problem in this connection. But the tense of the 'is' in the second conjunct is more interesting, for, as a statement about the criteria for a name, it makes a reference to a language; and if we reflect on which language it refers to, the answer can only be our language now. For whereas

(213) Something was appropriately called Napoleon

does not entail that we call anything Napoleon,

(214) Napoleon existed

does imply that we call something (i.e., Napoleon) Napoleon. Thus, (214) has the force of

(215) $(Ex) x$ was $\Phi_1, \dots, \Phi_n \cdot \Phi_1, \dots, \Phi_n$ in our language are the criteria for the singular term 'Napoleon'

and, in general,

(216) $N \{existed, exists, will exist\} \equiv (Ex) x \{was, is, will be\} \Phi_1, \dots, \Phi_n \cdot \Phi_1, \dots, \Phi_n$ in our language are the criteria for the proper name 'N'

and

(217) $Ns \{existed, exist, will exist\} \equiv (Ex) x \{was, is, will be\} \Phi_1, \dots, \Phi_n \cdot \Phi_1, \dots, \Phi_n$ in our language are the criteria for the common name 'N.'

One more remark on existence statements in the thing framework before we apply our results to 'events.' It concerns the peculiar status of what can be called 'categorical existence statements,' thus, "Things exist," 'qualities exist,' 'relations exist,' etc. It is important to catch the difference between category words and ordinary common names; for example, between 'thing' and 'lion.' One might expect that 'things exist' has the sense of

(218) $(Ex) x$ satisfies the criteria for being called a thing.

But 'thing' is not a common name of things, nor 'quality' a common name of qualities. Rather, as Carnap has correctly emphasized,

(219) . . . is a thing

has the force of

(220) '. . .' is a thing word in L

where, I would emphasize, L is understood to be our language as used in (219), so that (219) presupposes the existence in our language (now) of a domain of thing words and statements of the form

(221) W is a thing word in our language (now).

We must, therefore, be careful to avoid inferring that the move from

(222) Leo is a thing

to

(223) $(Ex) x$ is a thing

is a simple parallel to that from

(223) Leo is a lion

to

(224) $(Ex) x$ is a lion

or that (223) is simply a very abstract example of the form

(225) $(Ex) x$ is a K

or that because ' $(Ex) x$ is a lion' is correlated with 'Lions exist' and, like the latter, is a tensed statement, contrasting with ' $(Ex) x$ was a lion' and ' $(Ex) x$ will be a lion,' ' $(Ex) x$ is a thing' is correlated with 'Things exist,' or that if it is, it can meaningfully have a past or future tense.

Perhaps the best thing to say at this point is that the traditional view that categories are *summa genera* is a mistake, and that it is this mistake which underlies the idea that statements of the form

(226) Something is a thing

or, *logistic*,

(227) $(Ex) x$ is a thing

are well formed. It is, therefore, worth noting that even if we reject these forms²³ and, correspondingly, restrict existence statements to statements

²³ Which is not to say that such expressions as 'white thing,' in general, expressions of the form 'f-thing,' may not be introduced contextually in terms of the equivalence,
(228) $x \in$ White thing $\equiv \cdot x \in$ (all the x's such that x is white).

involving proper or common names (excluding category words) there still remains a role—often confused with the above—for the sentences

(229) Some things {have existed, exist, will exist},

for these forms of words may be used to express the idea that there are true statements of the forms

(230) S {has existed, exists, will exist}

(231) Ks {have existed, exist, will exist}

where 'S' is the proper name of a thing, and 'K' is a thing-kind expression, e.g., 'lion.'²⁴ Thus to say that "future things are things which will exist" is to express the equivalence schemata,

(232) S is a future thing \equiv (S is a thing) \cdot S will exist

(233) Ks are future things \equiv (Ks are things) \cdot Ks will exist

where 'Ks are things' has the force of 'K is a thing-kind expression' and tells us what kind of expression belongs in the blank of

(234) . . . is a K.

8. Existence and Tense

xx

Now if this analytic framework is correct, it follows that in the language of 'events' the expression

(235) Events exist

construed as an existence statement containing the category word 'event' is, if permitted at all, of the form

(236) Individuals exist

and, as resting on singular statements such as

(237) a is an individual,

is in the material mode of speech, and has no past or future tenses, for, as we saw, it gives expression to the present use of 'a' in our language. On

²⁴ Notice that if it is granted that abstract singular terms are metalinguistic references to expressions in our language, e.g., 'Triangularity' to 'triangular,' 'dissolution' to 'to dissolve,' 'mankind' to 'man,' then the idea that abstract entities have a timeless existence has its source in the fact that to refer to triangularity is to refer to our present use of 'triangular' and that no past or future use of this word is relevant to "the existence of triangularity." Thus, both the criteria and that to which the criteria apply are present, and necessarily so, in the case of abstract singular terms and abstract common nouns, whereas in the case of singular terms and common nouns which name individuals, though the criteria are present, the *nominata* need not be.

the other hand, (235) can also be construed as giving expression to the idea that there are true statements of the form

(238) a exists

and

(239) Ks exist

where 'a' and 'K' are singular and common names of 'events.'

In these terms our problem is to determine whether, in the 'event' framework, existence statements of the latter type (i.e., the type represented by (238) and (239), rather than (235) construed as a categorical existence statement) have the force of tensed statements. In other words, to use the language we have constructed for the 'event' framework, is the basic form of an existence statement,

(240) a be existent

or

(240) a be existent {before now, now, after now}?

At first sight it might appear that the former is the appropriate form, for, we might argue, the existence statement in question is to be equivalent to

(241) (Ex) x be $\Phi_1, \dots, \Phi_n \cdot \Phi_1, \dots, \Phi_n$ be our criteria now for 'a'

in which case the only way in which 'now' enters in is with respect to the criteria, and not with respect to the time of the item which satisfies them. Thus, we might argue, whether the 'event' be past or future, the criteria will be *now-criteria*, so that (241) consists of a 'purely objective' component, ' $(Ex) x$ be Φ_1, \dots, Φ_n ' which specifies the satisfying of the criteria, and a perspectival component specifying the criteria. The conclusion we would draw is that the basic form of existence statements concerning individual events is that illustrated by (240), which is equally appropriate whether a be before *now*, *now*, or after *now*.²⁵

The above reasoning, based as it is on the idea of a purely objective component, may conceal a dangerous error. It all depends on how the criteria for 'a,' represented by ' Φ_1, \dots, Φ_n ' are conceived. If it is tacitly

²⁵ Though, of course, taking (240) as basic, we could introduce the form represented by

(242) a {existed, exists, will exist}

as equivalent to

(243) a be existent \cdot a be {before now, now, after now}.

presupposed that these criteria include relational properties involving temporal priority or succession, and hence, leaving aside speculations about time-dimensionally closed worlds, a relation capable of defining a temporal serial order, then the fat is in the fire. For, as we have already seen, 'earlier than,' far from being logically independent of the distinction between *past*, *present*, and *future*, is inextricably bound up with them. The only way in which this error can be avoided is by substituting a *nontemporal counterpart* of 'earlier than' in specifying the criteria for 'a,' where by speaking of this counterpart as *nontemporal I mean only that it does not belong to the circle of concepts (earlier, later, past, present, future, now, then, etc.) which together make up the framework of ordinary temporal discourse*. It is not my purpose to deny that such a counterpart can be found.²⁶ My aim is simply to emphasize that 'earlier than' can define the 'objective' order taken for granted by the above reasoning only if it is given a new use in which (a) it is freed from its dependence on egocentric discourse, and (b) as a necessary condition of this, it is made to stand for a theoretical construct in thermodynamics by means of which an *intrinsic*²⁷ serial order can be defined which would be the *explanation* of temporal order in the ordinary sense much as theoretical chemistry gives an explanation of the solubility of table salt in water. If these considerations are sound, then the idea that, in an 'event' framework, events have a timeless existence in which they stand in objective *temporal* relations and constitute a system which includes the perspectival distinctions of pastness, presentness, and futurity as properties relative to points of view located within the system is a mistake. It is the mistake of assuming that a primary *temporal* picture of the world can be one which does not use but only *mentions* the term 'now.'

Let me unpack this point by offering an analysis of the status of 'intersubjectivity' in the 'event' framework. The basic intersubjective entities of the frame are, of course, the individual 'events' themselves. Thus, just as *thing-names* in the framework of things can have the same referents for all observers regardless of their frames of reference or the location of their *nows*—even though the *criteria* employed by these observers are the

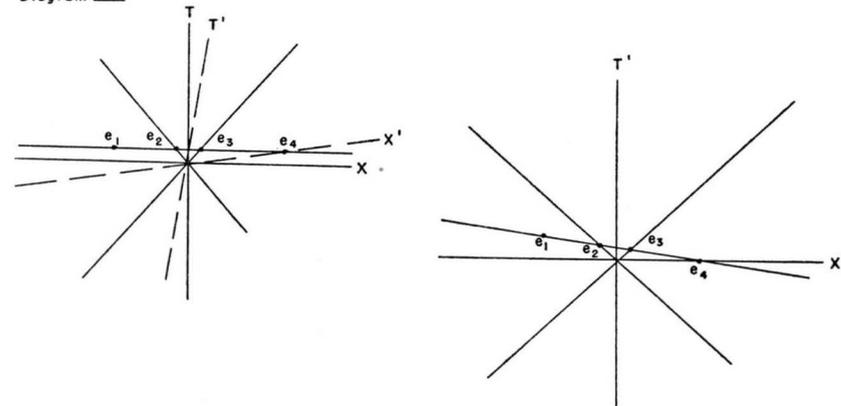
²⁶ Recent attempts by Reichenbach and others to find a physical counterpart of the serial character of 'earlier than' are explored by Adolf Grünbaum (to whom I am indebted for many helpful comments and criticisms) in his essay for the present volume. These attempts are to be contrasted with McTaggart's attempt to construct a meta-physical counterpart.

²⁷ Intrinsic in the sense in which the series of integers has an intrinsic order.

'same' only in the sense that they transform into each other and/or are differently tensed counterparts—so 'event' names can have the same referents for all observers communicating with one another in terms of a given framework of 'events.'

Again, just as a primary picture of the world in the framework of things is a *tensed picture*, and detensed pictures have their roots in tensed pictures, so, in the case of an 'event' framework, a primary temporal picture is a picture with a *now*. And even if one observer's *now* is another observer's *then*, or one observer's simultaneous cross sections of the world are another observer's sets of differently dated 'events' (see Diagram XII), each of their *now*-pictures is a primary picture, and the purely topological pic-

Diagram XII



ture (which includes the measurements performed by S and S' as topological facts) which is common to them is not *the primary picture* of the world construed as a system of 'events,' but merely a topological abstraction common to the various primary pictures; and the topologically formulated location of individual events in the topological picture is merely the topologically invariant features of the criteria which identify these 'events' in a primary picture.

It follows that an 'objective' *temporal* picture exists only as an abstraction common to a class of 'subjective' (perspectival) *temporal* pictures, and that

$$(244) \text{ a be before b}$$

is not logically prior to, and does not make sense without,

$$(245) \text{ Either a be present now } \cdot \text{ b be future now or a be present}$$

before now · b be future then or a be present after now · b be future then.²⁸

If we apply these considerations to existence statements, we see that both conjuncts of (241) are, as belonging to a primary temporal picture of the world, irreducibly ‘tensed.’ And to make this ‘tensed’ (token-reflexive) character explicit is to formulate our analysis of existence statements pertaining to individual ‘events’ as the equivalence

(246) a be existent {before now, now, after now} · ≡ · (Ex) x be {before now, now, after now} and x be Φ_1, \dots, Φ_n and ‘ Φ_1, \dots, Φ_n ’ be our criteria now for ‘a.’

“But why,” it may be asked, “need existence statements belong to a primary picture? Why may they not belong to a level of abstraction which, though rooted in a primary picture, does not make its rootedness in our present primary picture manifest?” The answer, surely, is that, as was pointed out in the case of things, only a primary picture with its explicit now makes clear the nonfictional character of the statement, its rootedness in the real-life activities of observation and inference. It is failure to appreciate this dimension of existence statements which has made plausible the idea that singular existence statements have the form illustrated by

(247) (Ex) x = a

and that general existence statements have the form illustrated by

(248) (Ex) x ∈ K.

And it is a failure to think through the implications of the idea that existence statements concern, at bottom, the having application of specific proper and common names which has made plausible the idea that things (in the thing framework) and ‘events’ (in the ‘event’ framework) have a tenseless mode of existence which is prior to the ‘perspectival’ characteristics of pastness, presentness, and futurity. In short, if one confuses between existence statements and ‘existentially’ quantified statements, one will think that ‘(Ex) x = a’ (in the ‘event’ framework) and ‘(Ex) x = S’ (in the thing framework) make existence statements, and interpret the fact that any observer at any time can make ‘existentially’ quantified state-

²⁸ Note that to grasp the directedness of time is to use token-reflexives in primary pictures of the world. A scientific account of this consciousness must therefore be a scientific account of the mechanisms involved in token-reflexive verbal and conceptual activity. Needless to say, this scientific account of temporal discourse as a fact in the world must not be confused with the grasping of the directedness of time which is the use, rather than the mention, of token-reflexive temporal expressions.

ments of these forms, the domain of which is the totality of ‘events’ or things irrespective of their perspectival characters as past, present, or future (with respect to the speaker speaking) to mean that the existence of ‘events’ or things is a purely nonperspectival fact.

And if one makes these mistakes, one will suppose, if one works with a framework of ‘events,’ that the world has, as its primary mode of being, existence as a topologically ordered system of ‘events’ (topological space-time) which contains (a) a multitude of (relative) subsystems of metrical relationships characterized by quantitative invariances (which constitute metrical space-time), and (b) a multitude of perspectival facts concerning pastness, presentness, or futurity (with respect to particular points of view defined with respect to given metrical systems) as special (and complicated) topological facts about these ‘events.’ And to suppose that an a-temporal existence of such a topological matrix of metrical temporal relations is the primary mode of being of the world is (a) to reify once again (cf. XVI above) an abstraction common to temporal pictures; (b) to suppose that the non-perspectival relationships which are thus conceived to underlie all temporal perspectives are in a full—rather than analogical—sense temporal relationships.

The existence of the world as well as of the ‘events’ which make it up is irreducibly perspectival. The structure of the world as a temporal structure is irreducibly perspectival—though not, as we have seen, ‘subjective’ in any pejorative sense. The non-perspectival structure which, as realists, we conceive to underlie and support perspectival temporal discourse is, as yet, a partially covered promissory note the cash for which is to be provided not by metaphysics (McTaggart’s C-series), but by the advance of science (physical theory of time).

9. Things or ‘Events’?

xxi

I shall conclude Part I of this essay on time and the world order with a brief discussion of this question: Which does the world really consist of, things or ‘events’? It will come, I hope, as no surprise that my answer is that in one sense these are not genuine alternatives, while in another the answer is obviously things.

Questions as to the reality of time arise, in part, from puzzles concerning the place of temporal expressions in a primary picture of the world,

and, in part, from puzzles concerning what it is that *primarily* exists. Now in the thing framework it is *things* which primarily exist, and in the 'event' framework it is 'events' which primarily exist. The contrast, in each case, is between the items which are *named* (by both proper and common names) and the items which are either contextually introduced (e.g., events in the thing framework, and 'things' in the 'event' framework) or are at bottom *linguistic entities* (thus *qualities, relations, facts*).

Only in a framework of 'events' are there *primitive temporal relations*, for only in an 'event' framework is the sort of singular term required by temporal relations *basic*. Thus it is essential to note that in an 'event' framework temporal relations hold between items which *have existed and no longer exist* on the one hand, and items which *are yet to exist* on the other. In a thing framework, the corresponding temporal facts concern episodes which *have taken place*, on the one hand, and episodes which *are yet to take place on the other*. If one confuses existence statements with 'existential' quantification, and if one confuses the 'events' of an 'event' framework and the events of a thing framework, one will immediately generate the puzzle 'How can temporal relations obtain between an item which exists and one which doesn't exist? Doesn't "aRb" entail "(Ex) (Ey) xRy"?'

The more one appreciates the systematic character of the difference between the framework of things and the framework of 'events,' the more one comes to realize that the latter framework is *in the first instance* simply a reaxiomatization of the former, and differs from it only as a Euclidean geometry axiomatized with one set of primitives differs from one which has been axiomatized with another set of primitives. Which is the 'correct' axiomatization? If this is interpreted as a question concerning the structure of 'ordinary' temporal discourse, it seems to me to be perfectly clear that the basic individuals of this universe of discourse are things and persons—in short the 'substances' of classical philosophy. It is, I believe, only when the deeper levels of physical theory are approximated that the framework of 'events'-in-Time ceases to be a mere reaxiomatization of the framework of changing-things-in-Time and becomes, instead, the anticipation of a scientific (rather than metaphysical) framework in which the temporal dimension of the macro-world finds its adequate theoretical counterpart in a dimension of physical content.

However this may be, our analysis has made clear that a primary picture of the world is always a perspectival picture, and would be a perspectival

picture even if the theoretical framework envisaged above were to become our primary conceptual structure (i.e., we were to perceive the world in terms of it). We have already seen, however, that the irreducibly perspectival character of primary pictures and of the existence of the pictured world is compatible with the non-perspectival (though perspective embracing) *character* of the latter.

II. DETERMINISM AND TRUTH

10. Decidability and Truth: Toward a Three-Valued Logic?

XXII

I have argued (Part I, pp. 554ff) that

(249) 'E is taking place' (said *now*) is true

entails

(250) 'E will take place' (said *then*) was true

and hence, where E = S's becoming Φ_2 ,

(251) S is becoming Φ_2

entails

(252) 'S will become Φ_2 ' (said *then*) was true

and, in particular, that

(253) S is becoming $\Phi_2 \supset : (t) t$ is before *now* \supset 'S will be Φ_2 '
(said at t) was true

or, to use the language of facts,

$\supset : (t) t$ is before *now* \supset it was (*quoad*
t) a fact that S would become Φ_2 .

Briefly, I called attention to the fact that the very language of time carries with it the idea that if we are in a position to say

(254) S (said *now*) is true

then, *ipso facto*, we are in a position to say

(255) S' (said *before now*) was true

and

(256) S'' (said *after now*) will be true

where S, S', and S'' are what we have called differently tensed counterparts. To make the same point in the language of facts, if it is a fact that p, then it was (with respect to all times before *now*) a fact that p' and will be

(with respect to all times after now) a fact that p'' , where the sentences represented by ' p ,' ' p' ,' ' p'' ,' respectively, are also differently tensed counterparts.

It follows that if we are in a position to say

(257) 'S will be Φ_3 ' is true

which is, of course, to be in a position to say

(258) S will be Φ_3

we are, *ipso facto*, in a position to say

(259) 'S is Φ_3 ' will be true

(260) S's being Φ_3 is future

(261) It will be a fact that S is Φ_3 .²⁹

On the other hand, it has been argued, as is well known, that in certain cases, at least, properly formed statements of the form

(258) S will be Φ

are neither true nor false. It would follow from the above considerations that in these cases not only

(257) 'S will be Φ ' is true

but also

(259) 'S is Φ ' will be true

and

(264) 'S will be Φ ' was true

are also neither true nor false. But before we explore the significance of the fact that to say

(265) 'S will be Φ ' is neither true nor false

is to be committed to saying

(266) 'S is Φ ' will be neither true nor false

let us take a closer look at the reasons which have been offered in support of the claim that (certain) statements about the future are neither true

²⁹ As far as my ear for, and knowledge of, the English language is concerned, there is no clear convention for indicating that the occasion of S's being Φ_3 in question is contemporaneous with the statement which will (from our present point of view) affirm it, rather than with our statement (261). Perhaps we may distinguish between

(262) It will be a fact that S will be Φ_3

and

(263) It will be a fact that S will be yet to be Φ_3

and use the former for the sense desired.

nor false. They are, as we have already noted, reasons which purport to connect truth or falsity with physical implication. In particular, they attempt to show that

(267) ' \dots ' is {true, false}

entails

(268) That \dots is {physically implied by, physically incompatible with} the present state of the universe.

Our explorations have made it clear that one line of thought which has been offered in support of this contention is unsound. That line of thought was based on the idea that to say of a statement that it is true is to say that it corresponds to a fact.³⁰ It proceeded to argue that (a) episodes are more basic than facts; (b) future episodes do not yet exist; hence (c) facts about the future exist only as physically implied by facts about the present. This line of thought was undercut by showing that while there is a perfectly legitimate sense in which episodes are more basic than facts, the idea that 'future episodes do not yet exist' is radically confused. Future episodes are simply those which have yet to take place.

If, then, there are future episodes, i.e., certain episodes will take place, the corresponding statements about the future are true and their contradictories false. On the other hand, to say that there are future episodes is to say something like

(271) (ES) (Ef) (Et) S will be f at t.

Thus the claim that there are facts about the future, the claim that certain statements about the future are true, and the claim that there are future episodes all have their ground in common or garden variety statements in the future tense.

But if the line of thought we have been criticizing won't do, there are other considerations which point to a connection between empirical truth and causal implication. For surely, it will be said, to make a statement is

³⁰ I pointed out that while it is perfectly correct to say that true statements correspond to facts, this amounts to no more than saying that true statements translate into true statements. In short, the 'correspondence theory of truth' in its traditional form confuses between

(269) S (in L) is true \equiv (Ep) S (in L) means $p \cdot p$

and

(270) S (in L) is true \equiv (E that p) \cdot S corresponds to that p \cdot that p is a fact.

For a more adequate formulation of this point see "Truth and 'Correspondence,'" referred to in fn. 3 above.

to imply ('contextually' or 'pragmatically') that one *has good reasons* for what one asserts, and that the statement is *to be withdrawn* if these reasons fail to withstand criticism. It needs only a hasty move or two (usually aided and abetted by the confusions already exposed) to conclude that a statement *isn't a statement* unless *there are* (in principle) *good reasons* for or against the statement.³¹ The philosopher who takes this line construes the implication between *making a statement* and *having reasons*, as resting on a more basic connection between the statement-making role and *there being reasons*, reasons which, if known, could be used to support (or attack) the statement. Thus the form of words "S will be Φ " would express a statement if and only if there were reasons, R_1 , which, if one but knew them, would authorize either

(272) $R_1 \cdot R_2, \dots, R_n$. Therefore, S will be Φ .

or

(273) $R_1 \cdot R_2, \dots, R_n$. Therefore, S will not be Φ .

Finally, he argues that these reasons from which, if we but knew them, 'S will (not) be Φ ' could be inferred must, in the last analysis, concern the *present state of the universe*, and contends that "S will be Φ " makes a statement if and only if the present state of the universe 'determines' either that S will be Φ or that S will not be Φ .³² In short, his contention is that 'statements' which are, in this sense 'undecidable' are not statements at all, though they are closer to being statements than forms of words which fail to make statements for such familiar reasons as that they contain a name or demonstrative which fails to denote, or contain nonsense syllables, or inappropriately combine otherwise meaningful expressions. In effect, then, our philosopher is proposing to distinguish within the class of forms of words which if they fail to make statements do so only because they are—in his sense—undecidable (let us call them 'putative statements') two subclasses: (a) *statements proper*; (b) a comple-

³¹ It would clearly be absurd to say that a person hasn't made a statement unless he has good reasons for what he says. The statement-making character of a particular utterance is 'intersubjective' and independent of the soundness of the reasons which the speaker would adduce to support it.

³² If one takes into account probability arguments and demands only that the truth or falsity of a statement, S, which asserts that p, presupposes that the present state of the universe imply that p (or that not p) either 'deterministically' or 'probabilistically,' then the position becomes highly paradoxical, to say the least, for then a certain degree of probability would divide statements from non-statements (or, if one prefers, true or false statements from statements which are neither true nor false), namely, the minimum degree which permits the conclusion '. . . therefore, *probably* p.'

mentary class of putative statements which are not statements proper (let us call them *quasi-statements*). He then tells us that only statements proper are either true or false, quasi-statements being neither true nor false.

He now argues that if we always knew whether or not a given putative statement was 'decidable,' and, hence, a statement proper, we could appropriately use a two-valued logic. Furthermore, he argues that if we had reason to accept the thesis of determinism (retro-determinism as well as ante-determinism) we would be in a position to accept all putative statements as statements, so that the above distinctions would be 'academic.' He then points out that the thesis of determinism is challenged by most if not all contemporary philosophers of science, and concludes that we should *build our logic around putative statements and make it three-valued*. Putative statements would be either true, false, or middle ('undecidable'). Statements, on the other hand, would be either true or false.

XXIII

Let us begin our examination of the above line of thought by pointing out that few if any philosophers have held that not all statements about the past are either true or false,³³ as contrasted with the multitude who have held the corresponding thesis about the future. What would they say if confronted with the above argument? Would they reject the claim that *true or false* implies 'decidability' (in principle) and argue that statements about the past are either true or false whether or not they are (in principle) inferable from the present state of the universe? Or would they argue that *since* every statement about the past is either true or false, retro-determinism (by a kind of 'transcendental deduction') must be true? Needless to say, whichever line they took would be equally applicable to statements about the future.

We shall pick up this thread at a later stage in the argument. For the moment it has served the purpose of introducing an argument against the suggestion under consideration which highlights its paradoxical character, and in doing so brings out its broader implications. According to that suggestion, it runs, we can no longer assume that if the form of words

(2) S is now Φ_2 (in 1958)

³³ We have reverted, for the moment, to more traditional terminology in which 'statement' has, roughly, the sense of 'putative statement' as introduced by our fictitious philosopher.

(said today) makes a statement, then the corresponding form of words

(274) S will be Φ_2 in 1958

(said in the same language in 1950) made a statement at all, let alone a true one. For if the state of the world in 1957 did not (physically) imply that S would be Φ_2 in 1958, then, on the view in question, the second form of words failed to make a statement. Surely, however, the argument concludes, it is a desideratum of any explication of the nexus of epistemic terms pertaining to statements that not only the same form of words may be used by two people to make the same statement irrespective of the difference in value of the reasons by which they would support it, but also that what I have been calling *differently tensed counterparts* (e.g., 'S will be Φ_2 in 1958' said in 1950, and 'S is now Φ_2 (in 1958)' said in 1958) both make a statement if either makes a statement. Of course the statements must indeed be differently tensed counterparts. This means, roughly, that the only relevant difference between them is one of tense. There must be no difference in meaning between the 'S' and ' Φ_2 ' of the first and the 'S' and ' Φ_2 ' of the second. 'S' must refer to the same individual on each occasion; and, obviously, if ' Φ_2 ' contained a covert reference to circumstances contemporary to the time of utterance—if, for example, it were definable as 'approved by our graduating class'—the statements would not be counterparts. Let us call predicates which satisfy this condition "tense-indifferent predicates."

Now it is a framework trait of ordinary discourse, in so far as it pertains to the physical properties of physical objects, that tense-indifferent predicates are the rule rather than the exception, just as it is a framework trait of ordinary *ordinary* discourse (though not of ordinary *scientific* discourse) that *shape*, *size*, and *weight* are independent of relative motion. Yet even if it should be in some sense a regulative ideal of scientific investigation that the basic concepts of an ultimately satisfactory explanation of physical phenomena be tense-indifferent, it is by no means necessary that the same should be true of physics-on-the-way. It is arguable that the development of quantum theory, by implicitly introducing a reference to the occurrence of a certain kind of event (a 'measurement') into its fundamental concepts, has, in effect, constructed relation-ized³⁴ cousins of pre-quantum-theory concepts, just as relativity kinematics has replaced

³⁴ I use this barbarism because the term 'relativized' has acquired a specific meaning in contemporary physical theory.

pre-relativity magnitudes by relationized counterparts. And it is also arguable that the 'paradoxes' of quantum theory spring from a failure to reflect this implicit relationizing in the explicit syntax of the theory. (It was a stroke of good fortune that the modern revolution in kinematics was guided by a philosopher-scientist who from the beginning reshaped the language of kinematics to give explicit recognition to the conceptual changes it involved.) If so, then the required revision of the language of QM would bring with it a radical modification of the role of differently tensed counterparts.

The notion of a regulative ideal of scientific investigation is a difficult one to pin down. Clearly it implies a distinction between *regulative ideals* and such highly general *inductions* of whatever 'order' as may emerge at any given stage of scientific development. When it is said, for example, that a deterministic world picture is a regulative ideal of scientific investigation, it is implied that determinism, thus conceived, is not an inductive conclusion which could be confirmed by evidence (itself consisting of inductive conclusions) available at one time, and subsequently disconfirmed by new evidence. I have discussed this topic in another place,³⁵ and shall simply indicate my conviction that something like the Kantian conception of ideals of reason can be defended. My present concern is to point out that the hope of classical physics that its particulate concepts, which share the tense-indifference of the molar concepts of classical mechanics in which they were rooted (by means of highly qualified analogies), would permit the formulation of deterministic laws has proved incapable of realization.

Needless to say, if at some future date QM should be given a deterministic substructure, this substructure might well be constructed from tense-indifferent predicates. In any event, it is essential to note that though the revision of the language of QM suggested in the previous paragraph but one would, in a sense, diminish the role of differently tensed counterparts by introducing into its basic state descriptions a reference to individual measurement episodes, it would, of course, not *eliminate* differently tensed counterparts altogether, any more than the language of relativity kinematics finds no place for statements which do not characterize kinematic situations in relation to a specific frame of reference. It simply means that differently tensed counterparts would occur at a de-

³⁵ See the concluding sections of my paper on "Counterfactuals" in the second volume of *Minnesota Studies in the Philosophy of Science*.

rived level of the language and would have a more complicated logical structure.

Now there is all the difference in the world between the *scientific* (methodological) thesis—that the fact that the failure of the fundamental magnitudes of classical physics to yield deterministic laws, together with the fact that these concepts when placed in the context of QM generate paradoxes and anomalies if their classical heritage is taken seriously *with or without the assumption of strict (nonstatistical) determinism*, is to be met by relationizing these concepts in a way which destroys their tense-indifference—and the *metaphysical* thesis—that *terms which are granted to be tense-indifferent* can make a statement when put together at one time in one tense, and yet fail to make a statement when put together at a different time in a different (but appropriate) tense. The scientific thesis is a legitimate move in the strategy of man's intellectual warfare against nature; one which involves no commitment on issues of ontology. The metaphysical thesis is, on the other hand, a simple mistake. For if anything has emerged from the explorations which make up the first part of this essay, it is that it is 'analytic of' the framework of tensed discourse and tense-indifferent terms that if a tensed sentence constructed from them can be used at a certain time to make a statement, its differently tensed counterparts, used at appropriate times, also make statements, and, indeed, in an appropriate sense, the same statement.

It would seem, then, that if we had to choose between the view which says that of two differently tensed counterparts one may make a statement and be either true or false while the other is neither true nor false as *not making a statement*, and the view that if one makes a statement they both make statements, but that one of these statements might be neither true nor false, we should choose the latter. I wrote, "If we had to choose . . ." because it is by no means clear that such a choice is forced upon us. Certainly the notion of a statement which is neither true nor false is a startling one. Perhaps, however, it can be fitted into a larger framework which would put us at our ease. Perhaps it cannot.

XXIV

Before we take leave of the view that a 'putative' statement which is not 'in principle' 'decidable' is not a genuine statement, it is important to draw some distinctions. It will not have escaped the reader's attention

that the term 'decidable' is highly ambiguous. There is all the difference in the world between 'decidable by us now on the basis of directly obtainable evidence which we are conceptually prepared to recognize as such,' 'decidable by us now if we had adequate knowledge of the present state of the universe,' 'decidable by those of us who have lived or will live at some time or other on the basis of directly available evidence which they are conceptually prepared to recognize as such,' etc., etc. The changes can be rung on the qualifications of the 'decider' and his status as actual or hypothetical. It is well known that over the past few decades the idea has gained ground that a putative statement of fact which is not 'in principle' 'decidable in some sense of 'decidable' is neither true nor false as *not making a statement*. But it seems to be clear that philosophers who take this line have, by and large, not used the term 'decidable' in the sense in which it implies the *existence of evidence* which is 'in principle' 'obtainable' by us, whatever latitude be taken in defining this 'in principle obtainability.' Rather they have tended to explicate this decidability in terms of 'observation predicate' and 'syntactically well-formed expressions constructed from observation predicates.' It is one thing to say that "S was Φ at t" is meaningful if and only if a primary picture (a tensed story which refers to ourselves *here and now*) which includes this form of words is equivalent to a primary picture which contains (in addition to purely logical devices) only observation predicates, predicates definable in terms of observation predicates, properly introduced theoretical predicates, and proper names the presuppositions of which are reasonably held to obtain. It is quite another thing to say that this form of words is meaningful if and only if *there is in principle obtainable evidence*—evidence obtainable by us—which would tell us whether "S was Φ at t" is true (or false); that is, it is quite another thing to say that the form of words in question is meaningful if and only if the present state of the universe is such that there is a realizable program of investigation starting from here and now which would provide the premises for an inference concerning its truth or falsity. The difference between these two conceptions has not always been clearly noted, however obvious it may be when thus brutally expressed.³⁶

³⁶ Thus Ayer's account of the meaningfulness of statements about the past in the first edition of *LTL* would seem to be rooted in a tacit commitment to decidability in the latter sense. For he demands that certain future observations be 'possible' which imply either the statement about the past or its contradictory. It must be ad-

11. Decidability and Truth: A Radical View

xxv

Let us turn our attention, therefore, to the philosopher who argues (whether on well- or ill-conceived grounds) that statements about the past or the future are neither true nor false, but statements none the less, if they are undecidable in the radical sense that the state of affairs which they formulate is neither physically implied by nor physically incompatible with the present state of the universe. He argues, in brief, that 'true or false' entails 'decidable now'—'decidable' in principle, whatever exactly this may mean. Statements which are not decidable he calls 'middle.' Thus, 'middle' entails 'neither true nor false,' and 'true or false' entails 'not middle.'

Now, unless our philosopher is careful, he is likely to fall into a trap. The trap concerns the slogan "Once true (middle, false), always true (middle, false)." For this slogan turns out, on examination, to contain a hidden ambiguity, and to be in one sense admissible, but in another sense not. The ambiguity arises from the existence of differently tensed counterparts. Suppose, for example, that Jones (in 1900) says

(275) *S will be Φ_2 in 1958*

and Smith (in 1958) says

(276) *S is Φ_2 (in 1958).*

There is, we have seen, an important sense in which Jones and Smith are making the same statement. Suppose, now, that this statement was undecidable *quoad* 1900, but is decidable *quoad* 1958. We (1958) are tempted to say

(277) '*S is Φ_2 in 1958*' (said today) is true or false

but that

(278) '*S will be Φ_2 in 1958*' (said in 1900) was neither true nor false, but middle.

To do so, however, would be to make a simple mistake. The statement

(279) '*S is Φ_2 in 1958*' (said today) is true or false *if and only if* '*S is Φ_2 in 1958*' (said today) is decidable now

mitted, however, that if his further requirement (however odd) that statements about the past 'have the same sense' as these verifying or falsifying statements about the future is taken literally, then Ayer's account turns out to be a variety of the 'well-formed story' version of the criterion, a version modified to require that *all basic primary pictures of the world be stories about the future alone!*

falls under the equivalence schema

(280) '*. . .*' (said today) is T or F \equiv '*. . .*' (said today) is decidable now.

But what equivalence schema shall we lay down for the differently tensed counterparts of '*. . .*' which it would have been appropriate to utter in the past? In terms of our example, which of the following equivalences is correct:

(281) '*S will be Φ_2* ' (said earlier) was T or F \equiv '*S will be Φ_2* ' (said earlier) was decidable then

or

(282) '*S will be Φ_2* ' (said earlier) was T or F \equiv '*S will be Φ_2* ' (said earlier) is decidable now

or is, perhaps, neither of these equivalences correct? To resolve this puzzle, it must first be noted that if Jones told me yesterday that it would rain today, and it does, and I therefore characterize his statement as true, I do so not by saying "Jones's statement is true," but rather "Jones's statement was true." The 'was' serves to indicate that the statement being characterized as true occurred in the past; *but the 'point of view' expressed by the characterizing of it as true is that of myself now.*

It appears, then, that where the point of view of the statement

(283) '*. . .*' (said earlier) was true

is that of the later speaker who uses this form of words, as it will be unless the context is an oblique one, the 'was' refers to the time at which the statement '*. . .*' would appropriately have been made, and not to the point of view with respect to which it is characterized as true. If so, then the right-hand side of the equivalence which is to express the desired connection between 'true or false' and decidability will concern decidability with respect to the speaker who makes the truth statement at the time he makes it. Shall we, then, formulate the equivalence as

(284) '*. . .*' (said earlier) was T or F \equiv '*. . .*' (said earlier) is decidable now?

This won't quite do, though we are getting warm, for strictly speaking it is only a statement appropriately made now which can properly be said to be decidable now. This means that 'decidable now' unlike 'true or false' is properly predicated not of the earlier statement but of its re-tensed

counterpart appropriate to the present. Thus, in terms of our example, the desired equivalence would read:

(285) 'S will be Φ_2 ' (said earlier) was true or false $\cdot \equiv \cdot$ 'S is Φ_2 ' (said now) is decidable now

or, in general

(286) S' (said earlier) was true or false $\cdot \equiv \cdot$ S (said now) is decidable now,

where S and S' are differently tensed counterparts.

What, then, it may be asked, is the equivalence which relates 'true or false' to 'decidable then'? It clearly can't be

(287) S' (said earlier) was true or false $\cdot \equiv \cdot$ S' (said earlier) was decidable then,

for this together with the above equivalence (286) would entail

(288) S (said now) is decidable now $\cdot \equiv \cdot$ S' (said then) was decidable then,

an equivalence which, according to the assumptions of the present discussion, does not obtain. But what, then? The answer must surely be that *the question itself is a mistake*. There can be no equivalence of the form

(289) '. . .' (said then) was T or F $\cdot \equiv \cdot$ '. . .' (said then) was decidable then

to do the job done by (280) for the reason, already emphasized, that the predicate 'true' is an endorsing expression (and 'false' the opposite of an endorsing expression) which expresses the point of view of the speaker. Thus, if *decidability quoad X* is relevant at all to 'true or false,' it must be *decidability quoad the speaker speaking*. In short, the decidability relevant to 'true or false' would have to be 'decidability now.'

There is, however, an equivalence statement which is easily confused with the above and which seems to formulate as close a connection between 'true or false' and 'was decidable then' as can be asserted without nonsense, namely,

(290) '. . .' was rightly said to be T or F $\cdot \equiv \cdot$ '. . .' was decidable then.

Notice, however, that this time the expression 'true or false' occurs in an oblique context, and does not express the point of view of the person making the equivalence statement.

To sum up, suppose that S, S', and S'' are three differently tensed coun-

terparts of which S is the one appropriately used today, S' the one appropriately used in the past, and S'' appropriately used in the future, then

(291) S is true $\cdot \equiv \cdot$ S' was true $\cdot \equiv \cdot$ S'' will be true

and, always on the assumption, which, for the moment, we are not questioning, that 'true or false' presupposes 'decidable now'

(292) S is T or F $\cdot \equiv \cdot$ S' was T or F $\cdot \equiv \cdot$ S'' will be T or F $\cdot \equiv \cdot$ S is decidable now

whercas

(293) S' was decidable then $\cdot \equiv \cdot$ S' was rightly said to be T or F
S'' will be decidable then $\cdot \equiv \cdot$ S'' will be rightly said to be T or F

but neither

(294) S' was T or F $\cdot \equiv \cdot$ S' was decidable then
S'' will be T or F $\cdot \equiv \cdot$ S'' will be decidable then.

We can now separate out the sense in which even on the assumption of an equivalence between 'true or false' and 'decidable now' we could say "Once true (false, middle), always true (false, middle)" from the sense in which we could not. For given that 'S is Φ ' is decidable now,

(295) 'S is Φ ' is true $\cdot \equiv \cdot$ 'S will be Φ ' was true $\cdot \equiv \cdot$ 'S was Φ ' will be true,

which gives us the sense in which "Once true, always true." On the other hand, given that 'S will be Φ ' was not decidable then we can say

(296) 'S will be Φ ' would have wrongly been said to be true or false

and, specifically,

(297) "'S will be Φ ' is true" was wrongly said

whereas we can say,

(298) 'S is Φ ' is rightly said to be true or false

and, specifically,

(299) "'S is Φ ' is true" is rightly said,

which gives us the sense in which "Once true, always true" would, on the assumptions we have been considering, be false.

Now it might be thought that

(300) “‘S will be Φ_2 ’ is true” was wrong³⁷

must be false, given that

(301) ‘S is Φ_2 ’ is true

on the ground that if (301) is the case, then,

(302) ‘S will be Φ_2 ’ was true

so that

(303) “‘S will be Φ_2 ’ is true” was true

and if true, “‘S will be Φ_2 ’ is true” (said at the earlier time at which the question of S’ being Φ_2 in 1958 was not decidable) could not have been ‘wrong’ or ‘incorrect.’ But, of course, the move from (302) to (303) is open to challenge on the ground that it begs the question by assuming that “‘S will be Φ_2 ’ is true” was ‘right’ or ‘correct.’ The move in question must not be confused with that from

(302) ‘S will be Φ_2 ’ was true

to

(304) “‘S will be Φ_2 ’ was true” is true

which does not, at least directly, involve this assumption. The difference between the two moves—that from (302) to (303) on the one hand and that from (302) to (304) stands forth clearly if we make proper use of the semantic ‘definition’ of truth. Thus (304) takes us directly to (302), and thence to (301), and finally to

(305) S is Φ_2

simpliciter. It is thus clear that at every stage in this series the endorsing expressed by the word ‘true’ in every occurrence is *our endorsing now*. On the other hand, the endorsing expressed by the first occurrence of ‘true’ in (303) is that of the pastlings, and to assert (303) is not only to concur in their endorsement, but to grant that their endorsement was ‘right’ or ‘correct’ in the sense under question. If this presupposition does not obtain, (303)—the challenge continues—must be withdrawn, and is

³⁷ I have been using ‘wrong’ rather than ‘incorrect’ because the literature of normative expressions is full of variously drawn distinctions between ‘objectively wrong,’ ‘subjectively wrong,’ ‘putatively wrong,’ etc., and I wish to mobilize an awareness of the puzzles which generate these distinctions. It will not have escaped the reader that a ‘strong’ sense of ‘objectively wrong’ is required by the view we are examining.

no longer available as a premise from which the ‘rightness’ of the pastlings’ characterization of ‘S will be Φ_2 ’ as true can be inferred.

XXVI

Before we consider a more telling objection to the idea that statements which are undecidable at the time at which they are made are incorrectly said (at *that* time) to be either true or false, let us develop this idea in terms of certain formulas which seem to give it proper expression:

A-1. ‘S is decidable now’ does not imply ‘S’ was decidable *then* (in the past)’ nor does it imply ‘S’ will be decidable *then* (in the future)’

where S, S’, and S’’ are appropriately tensed counterparts.

- B-1. S is decidable now \equiv S is true \cdot v \cdot S is not true
- B-2. S is decidable now \equiv S’ was true \cdot v \cdot S’ was not true
- B-3. S is decidable now \equiv S’’ will be true \cdot v \cdot S’’ will not be true
- C-1. ‘S is Φ ’ is true \equiv S is Φ
- C-2. ‘S was Φ ’ will be true \equiv S is Φ
- C-3. ‘S will be Φ ’ was true \equiv S is Φ
- C-4. ‘S is Φ ’ is false \equiv S is not Φ
- C-5. ‘S was Φ ’ will be false \equiv S is not Φ
- C-6. ‘S will be Φ ’ was false \equiv S is not Φ

If, now, we introduce the predicate ‘middle’ in terms of the equivalence

D-1. ‘S is Φ ’ is middle \equiv ‘S is Φ ’ is not decidable now

we have

- D-2. ‘S will be Φ ’ was middle \equiv ‘S is Φ ’ is not decidable now
- D-3. ‘S was Φ ’ will be middle \equiv ‘S is Φ ’ is not decidable now

and, abbreviating ‘middle’ by ‘M,’

- E-1. S is M \equiv \sim (S is true v S is false)
- E-2. S’ was M \equiv \sim (S’ was true v S’ was false)
- E-3. S’’ will be M \equiv \sim (S’’ will be true v S’’ will be false)

Hence,

F-1. S is M \equiv S’’ was M \equiv S’’ will be M

and

G-1. ‘S is Φ ’ is M \equiv ‘S will be Φ ’ was M \equiv ‘S was Φ ’ will be M \equiv \sim (S is Φ v S is not Φ)

With these formulas in front of us, let us consider a more telling objection to the idea that statements which are undecidable at the time at

which they are made are 'incorrectly' said at that time to be either true or false. The objection has as its premise the principle that where **S** is properly used, '**S** is true' is also properly used. It proceeds to point out that if "'S will be Φ_2 ' is true" was incorrect, it follows, given this principle, that '**S** will be Φ_2 ' itself (said then) must also have been incorrect. But this, surely, implies that our pastlings had no way of 'correctly' formulating a prediction about the state of **S** in 1958. For they could 'correctly' say neither '**S** will be Φ_2 ' nor '**S** will not be Φ_2 .' Yet the very thesis itself insists that statements which are undecidable at the time at which they are made are *statements*, nonetheless, and hence, presumably, 'correctly' made, even though they cannot be 'correctly' characterized as true or as false. The thesis seems, therefore, to be confronted by the following dilemma. Either it grants that '**S** will be Φ_2 ' was correct, in which case it must surely grant that "'S will be Φ_2 ' is true" was equally correct; or it denies that '**S** will be Φ_2 ' was correct, in which case it must surely grant that that '**S** will be Φ_2 ' was not a statement. In either case the thesis would collapse.

Before commenting on this dilemma, let us consider a possible line of reply to the initial formulation of the objection. This formulation was that the pastlings would have no 'right' way in which to make a prediction about the state of **S** in 1958. The reply to be considered is that while they can say neither '**S** will be Φ ' nor '**S** will not be Φ ,' they can perfectly well avail themselves of a third form of statement, namely,

$$(305) \text{ S will ? be } \Phi_2$$

where '?' is a monary connective introduced by the equivalence

$$\text{H-1. S will ? be } \Phi \equiv \sim [\text{S will be } \Phi \vee \sim (\text{S will be } \Phi)]$$

or, in general

$$\text{H-2. ? S} \equiv \sim (\text{S} \vee \text{S}).$$

And, indeed, it can be seen that unless the object language contains tautologies of the form '**S** \vee \sim **S**?' rather than '**S** \vee \sim **S**' the semantical equivalences C-1 and C-4 would lead to the logical truth of

$$(306) \text{ 'S is } \Phi \text{ is true } \vee \text{ 'S is } \Phi \text{ is false}$$

and hence exclude the 'middle' which it is desired to include.

If, however, we introduce this new connective, we note that we are committed to the equivalence

$$\text{G-1. S is ? } \Phi \equiv \text{ 'S is } \Phi \text{ is M.}$$

And it is at once clear that this equivalence differs from

$$\text{C-1. S is } \Phi \equiv \text{ 'S is } \Phi \text{ is true}$$

and

$$\text{C-4. S is not } \Phi \equiv \text{ 'S is } \Phi \text{ is false}$$

in that the right-hand side of G-1 contains the explicitly pragmatic notion of undecidability, whereas the notions of truth and falsity, though they may well *in some sense* imply decidability *in some sense*, do not seem to have as straightforward a relation to decidability as the thesis demands.

Thus, the relation between

$$(307) \text{ S is true or S is false}$$

and

$$(308) \text{ S is decidable now}$$

cannot be identity of sense, for the sense of

$$(309) \text{ ' . . . ' is true}$$

is given by the schema

$$(310) \text{ ' . . . ' is true} \equiv \text{}$$

with the result that the sense of

$$(311) \text{ ' . . . ' is true or ' . . . ' is false}$$

is given by the schema

$$(312) \text{ ' . . . ' is true or ' . . . ' is false} \equiv \text{ or } \sim \text{}$$

Thus even the sense of

$$(313) \text{ 'S is ? } \Phi \text{ is true or 'S is ? } \Phi \text{ is false}$$

would be given by its equivalence to

$$(314) \text{ S is ? } \Phi \text{ or S is not ? } \Phi$$

rather than by

$$(315) \text{ 'S is ? } \Phi \text{ is true or 'S is ? } \Phi \text{ is false} \equiv \text{ 'S is ? } \Phi \text{ is decidable now,}$$

and the sense of "'S is ? Φ ' is true" by the equivalence

$$(316) \text{ 'S is ? } \Phi \text{ is true} \equiv \text{ S is ? } \Phi.$$

Continuing, for the moment, to beat around the bushes, we notice that whatever one is to make of the thesis under examination, one would have to be careful about the interpretation of the equivalence

$$(317) \text{ 'S will be } \Phi \text{ was M} \equiv \text{ S is ? } \Phi$$

which emerges from G-1 together with H-1. For it is easy to forget that

(318) 'S will be Φ ' was M

has a sense which is given by the equivalence D-3, which concerns decidability now, and to confuse (318) with

(319) 'S will be Φ ' was undecidable then.

Thus the following two equivalences obtain:

H-1. 'S will be Φ ' was M \equiv S is ? Φ

H-2. 'S will ? be Φ ' was true \equiv S is ? Φ

but neither

(320) 'S will be Φ ' was undecidable then \equiv 'S will be Φ ' was M

nor

(321) 'S will be Φ ' was undecidable then \equiv 'S will ? be Φ ' was T.

Surely the thesis that a statement which is undecidable at the time at which it was made is incorrectly said at that time to be either true or false rests on a failure to note that

(322) A statement which was undecidable was neither true nor false

doesn't follow from

(323) A statement which is undecidable is neither true nor false

and it was by exposing the fallacy of this inference that we were led to reformulate the claim intended by (322) to read

(324) A statement which was undecidable was 'incorrectly' said to be either true or false.

12. Decidability and Truth: Conclusion

xxvii

Let us return, now, to the dilemma which was posed as an objection to the thesis under examination. What does it amount to? and is there any way out? The answer is to be found by noting that it is simply not true that the form

(305) S will ? be Φ

provides the pastlings with a way of making a statement about the future of S. For if this form is introduced in terms of the equivalence H-1, it can make a statement only if the equivalent on the right-hand side of H-1

makes a statement, and hence only if both 'S will be Φ ' and 'S will not be Φ ' made statements. Thus, granting the assumption of the objection, namely that where S is correct, 'S is true' is also correct, it follows that 'S will ? be Φ_2 ,' used by the pastlings, made a statement if and only if 'S will be Φ_2 ' made a statement, and, hence, only if "'S will be Φ_2 ' is true" made a statement. Thus the introduction of the statement form 'S is ? Φ ' does not provide a means of reconciling the claims of the thesis with the idea that the pastlings can make a prediction about the state of S in 1958 with respect to the property of being Φ_2 .

Shall we conclude that the thesis that a statement which is undecidable when it is made is incorrectly said at that time to be either true or false collapses into the thesis that such a form of words does not make a statement at all, but is rather a "pseudo-statement," a thesis which we have already—but perhaps prematurely—dismissed? I think we must, for I see no escape from the principle that where S makes a statement 'S is true' also makes a statement. And it seems to be clear that to deny that 'S will be Φ ' was 'right' or 'correct' differs only verbally from denying that it made a statement.

But if it is admitted that 'S will be Φ ' made a statement, and, consequently, that "'S will be Φ ' is true" made a statement and was itself 'correct,' we are surely forced to deny that the truth or falsity of statements is, in the sense envisaged, dependent on their decidability or non-decidability at the time at which they are made. For if

(325) 'S will be Φ_2 ' is true

made a statement as used by the pastlings, surely it made the same statement as

(302) 'S will be Φ_2 ' was true

which we, today (1958) might say. But if (302) has any connection with decidability of the kind envisaged by the thesis, it is, we have seen, with decidability now, rather than with decidability then. And if (325) made the same statement as (302) makes today, then it made the same statement as

(301) 'S is Φ_2 ' is true

(made today), so that unless the decidability of a statement made at one time entails the decidability of all its differently tensed counterparts, when they are appropriately used, (301) can't be equivalent to

(325) 'S is Φ_2 ' is decidable now and not false.

At this point the proponents of the thesis may retreat to a weaker form of the decidability thesis by insisting that instead of connecting 'true or false' with 'decidable at a certain time (i.e., the time of utterance),' all they have meant to do is connect it with 'decidable ever'—i.e., with the property of not being physically implied by any evidence in principle available to anybody at any time. That this would get them out of the above difficulty is clear. Has it any other virtues?

The thesis then reduces, roughly, to the idea that a statement is neither true nor false if it is at no time decidable. This, however, does not make sense as the idea that no state of the universe, past, present, or future, physically implies that the episode in question occurs or does not occur. For one state of the universe even logically implies that the episode in question occurs or does not occur. It must therefore be the idea that no evidence, obtainable at any time in a certain way (by the use of perception and 'in principle' definable instruments) physically implies the occurrence or non-occurrence of the episode in question.

Clearly such a modified thesis is in the neighborhood of the familiar conception of empirical meaningfulness (and in this sense of truth or falsity) as syntactical well-formedness from observational primitives which was characterized in an earlier section. Yet it does not coincide with it, and amounts to the idea that a form of words can be in this sense meaningful, and belong to a primary picture (state description) of the world, and yet be an empirically undecidable element in the picture.

Now there do seem to be such 'statements,' specifically in the field of QM. Should they be called 'pseudo-statements'? Or should we, indeed, call them statements which are neither true nor false, but middle? Surely the answer lies in the fact that we cannot separate a form of words for making statements from the conceptual framework to which it belongs, and we must take seriously the evolution of conceptual frameworks. The above 'in principle definability' is a framework conception, and, in this sense *quoad* the speaker speaking. Thus, once we take seriously the difference between the *semantical* predicates 'true' and 'false' and the *pragmatic* predicate 'undecidable' and ponder on the consequent difference between 'S is ? Φ ' (construed as the equivalent of "'S is Φ ' is undecidable") on the one hand, and 'S is Φ ' and 'S is not Φ ' on the other, we see that the alternatives mentioned above are false alternatives. What we

must rather say is that while to have reason to suppose that a statement in our frame is radically undecidable is to have a radical reason for refusing to say that it is true or that it is false, and, consequently, a reason for saying that it is 'middle' if 'middle' is construed as a pragmatic rather than a semantic predicate, the heart of the matter is that such statements are symptoms of the breakdown of a conceptual frame, a breakdown which requires its reconstruction along lines which would eliminate the possibility of such 'in principle' undecidable statements. This is the task which confronts contemporary quantum mechanics, and the program of this paper as a whole has been to show that this task belongs to neither logic nor semantics, but to empirical science.

XXIX

A concluding postscript: If 'M' is to be on a par with 'T' and 'F,' its sense must be given by some such schema as I-3 in this set:

- I-1. 'S is Φ ' is T \equiv S is Φ
- I-2. 'S is Φ ' is F \equiv (S is Φ)
- I-3. 'S is Φ ' is M \equiv ? (S is Φ)

In other words, if 'M' is to be a genuinely *semantical* alternative to 'T' and 'F,' the sense of "'S is Φ ' is M" must be given by its equivalence to 'S is ? Φ ,' where the latter is to be understood in terms of the tautology

$$(326) S \text{ is } \Phi \text{ or } S \text{ is not } \Phi \text{ or } S \text{ is ? } \Phi$$

as a tautology in a language with a three-valued logic. For while its *semantical* character could be ensured by equating 'M' with 'neither T nor F,' this move would be pointless unless its object-language counterpart, '?,' was interpreted as an expression in an object language with a genuinely 'three-valued' structure, i.e., in terms of the 'three-valued' tautology

$$(327) S \vee \sim S \vee ? S$$

(where the symbols ' \vee ,' ' \sim ,' and '?' play the new role appropriate to a three-valued logic), and not in terms of a two-valued contradiction, thus,

$$(328) ? S = \sim(S \vee \sim S).$$

In any event, 'M' cannot simply *mean* undecidable and yet be a *semantical* concept on a par with 'true' and 'false.' This makes it clear that there is no simple connection between *the existence of in principle undecidable statements*, and *the problem of three-valued logics*. For in a three-valued language, to *decide* would be to decide whether S is Φ or S is not Φ or

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S is Φ , and *only because of this* to decide *whether* 'S is Φ ' is *true* or 'S is Φ ' is *false* or 'S is Φ ' is *middle*. It is just as radical a mistake to suppose that 'true' and 'false' would have *exactly* their ordinary meanings (in our two-valued language), as to suppose that 'not' and 'or' would be anything but cousins of these terms as we use them.