SPECIAL RELATIVITY AND PRESENT TRUTH

By D. H. MELLOR

SUPPOSE a man near Sirius wants to know, at some local time *t*, what day of the week it then is in London. In classical physics his question is factual, with an answer that is unique even if practically hard to discover. Special relativity denies this. Sirius being some light-years away, his answer will vary according to the "frame of reference" he chooses. And according to special relativity, choosing a frame of reference is a matter to be settled by arbitrary convention, not by fact. (An "observer", in the technical sense of special relativity, takes himself to be at rest in his frame of reference; but that assumption is no less arbitrary than any other.)

Suppose now it rains in London on Monday, 1 October 1973, and is fine all the next day. Suppose further that the Sirian time *t* is neither absolutely earlier nor absolutely later than either of these London days. Then special relativity makes it a conventional, not a factual, matter whether the tenseless statement,

(1) It rains in London at Sirian time *t*

or the present tense statement, uttered near Sirius at *t*,

(2) It is raining in London

is true or false.

It seems to me that this consequence of special relativity calls in question the general concept of present truth and its underlying Augustinian ontology. It thus calls in question the use of tense-logic (e.g. Prior 1967; von Wright 1971), which takes present (as opposed to timeless) truth as its primitive notion. (Past or future truth is just what has been or will be present truth.)

The point of not replacing (2), said on 1 October 1973, with the tenseless

(3) It rains in London on 1 October 1973

is to deny the latter's appearance of timeless truth. But truth goes with existence; present truth with present existence, and timeless truth with timeless existence. It is the present existence of rain in London that makes (2) true now. The timeless existence of rain in London on 1 October 1973 would make (3) timelessly true. The whole point of tense-logic is to deny this, and so it denies timeless existence. Before and after 1 October 1973, the rain in London on that day is not present and so does not exist. This is Saint Augustine's ontology (*Confessions,* see e.g. Smart 1964,

pp. 61–2): to be is to be present, and what is past and future does not exist.

Now special relativity makes it conventional what is simultaneous with a given event at a distance. It thus makes it conventional what, at any time, is present at a distance. For Augustinians, therefore, it becomes conventional what exists at any time, and hence, for tense-logic, it becomes conventional what is presently true. Can tense-logic tolerate or evade this uncomfortable conclusion?

(If ontology were our chief concern we should no doubt distinguish the occurrence of distant events from the existence of distant people and things. The latter, being reidentifiable from time to time, can survive greater ambiguity in temporal reference. London remains present to a Sirian, whatever day of the week he takes it now to be. But temporal persistence in things is no guarantee of temporal persistence in truths about them. London's invariant presence is quite compatible with its very changeable weather. Its presence does nothing to preserve the truth of (2) against conventional changes in Sirian frames of reference, which is what tense-logic requires. Present truth, rather than present existence, being our immediate concern, things and events are on a par. So in what follows I feel free to ignore the distinction and refer for simplicity chiefly to events. The force of the argument is not thereby weakened.)

I can think of three ways one might try adapting Augustinian ontology to special relativity in the interests of preserving tense-logic, and none works.

(i) Take as present all events not absolutely past or absolutely future. That is, all events I can now neither affect nor be affected by count as present to me. Let us say these events "coexist" with me now. The trouble is that coexistence, so defined, is not transitive. Events an hour apart on Sirius can both coexist with me now, but not with each other, since one will be absolutely later than the other. But the present existence of an event can surely not depend on which of two other coexistent events it is compared with.

Present truth fares worse even than present existence on this scheme. London's successive fine and rainy days come out equally within the Sirian present; so there (2) comes out both true and false at the same time.

(ii) Take as present only events that are present in every acceptable frame of reference. The trouble is that the only such events are not only now but also here. There will be a "specious hereabouts" proportional in linear extent to the specious present. If the present is an instant, here becomes a point; so that no spatially extended object can be said to exist at any instant of time. While on Sirius, (2) never comes out true, whatever happens in London.

(iii) Arbitrarily choose one frame of reference to define simultaneity and hence present existence and truth at any time. This at best trivializes the Augustinian thesis, which was meant to relate existence and truth to an independently understood concept of the present. Now we are picking out a present merely to preserve the Augustinian account of existence and truth. Special relativity allows no more than a conventional distinction between one such possible present and any other. But the distinction between what exists and what does not is surely more than conventional, at least in matters of weather; and the same goes for the distinction between truth and falsity in these matters.

I conclude that tense-logic cannot accommodate special relativity. That goes in particular for Prior's (1967, Appendix B, §5) tense-logic for special relativity: 'In special relativity', he says, 'we have the theorem that whatever is the case anywhere in space-time will have been the case' (p. 205). But special relativity deprives present tense expressions like 'whatever is the case' of the power to refer unambiguously to distant space-time points, and hence deprives the theorem itself of clear sense. Prior indeed suspects trouble with relativity, as he observes in the previous section: 'To raise [the question as to the uniqueness of the time-series] as a genuine question is . . . to suggest that there are truths about time which are not tense-logically expressible. . . . I am sure that these observations have some bearing on . . . tense-logic in the theories of relativity; I wish I were clearer as to what that bearing is' (pp. 199–200). If I am right, the bearing is that special relativity leaves no room for tense-logic.

Quine (1960, §36) and others take past and future events and things to exist timelessly, on a par with present ones. Existence and truth are taken to be independent of temporal presence. It does not matter to the tenseless logic that naturally deals with such timeless truths if what is present at any time is partly or wholly a conventional question. Quine's timeless world does not require special relativity, but at least special relativity is readily accommodated in it. One may jib at Quine's price of failing totally to account for an objective present and so of failing to account for temporal change and becoming. But one has also then to jib at special relativity.

Special relativity may be false. There may after all be facts that settle questions of distant simultaneity (*cf.* Swinburne 1968, Chapter 11). *Pace* Geach (1965, p. 312), *distant* simultaneity at least is a matter of physics, not logic. But then tense-logic has physical presuppositions, which contradict those of special relativity. That seems to me rash, to say the least.

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Besides these works, I am indebted to those who have commented on earlier versions of this paper, especially those present when the first version was given as a ten-minute paper to the Cambridge University Moral Sciences Club on 23 May 1973.

IFS AND HOOKS: A REJOINDER

By MICHAEL CLARK

IN ANALYSIS 32.2 I criticized the arguments used by Professor Strawson[1] and David Mitchell in support of the view that ordinary non-counterfactual conditionals of the form 'if p then q' standardly differ in meaning, or in their truth-conditions, from material conditionals. In ANALYSIS 33.2 John J. Young has attempted to defend some of those arguments, but not, I shall argue, with any success.

1. In Section 3 of my paper I attacked an argument which depends on a principle formulated by Young as follows:

> (P_4) Although the pair of material conditionals '$p \supset q$' and '$p \supset \sim q$' are compatible, the pair of "factual" conditionals 'If p then q' and 'If p then $\sim q$' are *not* compatible. (P. 57.)

He challenges the most controversial step in my argument against (P_4), namely that

> (C) The match won't be cancelled

entails

> (F) If it rains, the match won't be cancelled.

[1] *Introduction to Logical Theory* (London, 1952), pp. 82–90. Similar arguments are presented by Mitchell in his *Introduction to Logic* (London, 1962), pp. 61–68, though he doubts whether differences between 'if' and '$\supset$' are 'of *logical* relevance' and it looks as if he may be prepared, for some purposes, to "read" the hook as 'if', despite what I said on p. 36 of my original article. Since I wrote that article L. Jonathan Cohen has drawn my attention to his paper 'Some Remarks on Grice's Views about the Logical Particles of Natural Language', in *Pragmatics of Natural Language*, ed. by Y. Bar-Hillel (Dordrecht-Holland, 1971). Cohen gives a much better defence of the orthodox view than Young and wisely does not rely on any of the arguments I criticized: whether all of Cohen's arguments can be met satisfactorily I am not sure. In the present reply I am mainly concerned with defending my claim that the Strawson-Mitchell arguments are unsatisfactory.