

A DEFENSE OF PHYSICAL BECOMING*

ABSTRACT. This paper defends physical becoming against Grünbaum's attack, by constructing three arguments in favor of physical becoming. Of the three, I rely primarily on an argument from the philosophy of language, and especially on the principle that tensed discourse involves presuppositions and commitments that Grünbaum's account of becoming cannot handle. I show that Grünbaum's analysis of becoming can provide only a very implausible reconstruction of the temporal coordination of speakers engaged in discourse.

INTRODUCTION

Adolf Grünbaum, in his writings over the past several years,¹ has presented the strongest defense yet given for the view that physical events do not become. This idea antedates him considerably, of course, since it can be traced back to Parmenides; but Grünbaum has produced the most successful modern version of it, employing interpretations of relativity mechanics, combined with a real desire to account for the appearance of becoming, to defend the view that becoming is entirely mind-dependent, and not to be found in the physical world. To defend this view, he introduces an important, and for his argument crucial, distinction between the mental and the physical. This dualism influences his interpretation of a distinction that Russell made, between mental time and physical time. Grünbaum, unlike Russell,² makes becoming essentially mental.

The distinction between mental (subjective) and physical (objective) time can be traced back to McTaggart, who, in his analysis of time, distinguished the temporal characteristics 'past', 'present' and 'future' from the relation 'later than', and argued that the relation 'later than' could only be considered a temporal relationship if it were understood in terms of the "distinctively temporal" 'past', 'present', and 'future'. According to him, later than *qua* temporal relationship was semantically dependent on pastness, presentness, and futurity. Russell made much the same distinction as did McTaggart, though he used a different terminology and avoided the semantic dependency thesis. He argued that physical time was

time which could be analyzed in terms of relations like later than alone, while subjective time was to be analyzed in terms of 'past', 'present', and 'future'. Grünbaum claims to take over Russell's version of the distinction, but actually makes a crucial modification in his use of it. He does accept Russell's view that physical time is not semantically dependent on mental time, but he also holds that his view of the mind-dependence of becoming is essential to the analysis of subjective time. Russell, by way of contrast, not only did not let becoming play a role in the distinction, but even argued in favor of (physical) becoming, as guaranteeing the irreversibility and undirectionality of time. The purpose of this paper is to argue that there is no good reason to amend Russell's distinction between subjective and objective time by making the mind-dependence of becoming an essential part of any analysis of subjective time. To show this it is sufficient to show that there is no good reason to deny physical becoming. This will permit one to make the subjective-time-objective-time distinction without relying – as Grünbaum does – on an argument for the "subjectivity" of becoming. I shall discuss this point again briefly in the conclusion.

To argue for physical becoming, I shall present three arguments in its favor, and *reconstruct* Grünbaum's responses to them. I emphasize 'reconstruct', because in some places it is necessary to extend what he says, and in others to introduce what I take to be reasonable modifications of his account, in order to join issues. To take an example, Grünbaum, as far as I can see, never directly commits himself on the issue of whether mental events become, but always speaks only of the mind-dependency of becoming. I try to force the issue by arguing that he must commit himself, and I attempt to discover what kind of answers he could give which would be consistent with his theory. All cases of extension and modification are indicated as such in the argument. The three arguments appear below, and all later references to them will be by the letters 'A', 'P', and 'I'.

A. *Asymmetry Argument*

1. Time is irreversible.
2. There must be some physical facts which explain irreversibility.
3. That physical events become best explains irreversibility.
4. Hence, it is reasonable to believe that physical events become.

P. Presupposition Argument

To accept the view that physical events become is to be able to account naturally for the truth of certain presuppositions of tensed discourse.

I. Identity Argument

1. There is evidence that some events become, in particular, that events which constitute (conscious) experience become.
2. If one adopts some sort of mental-physical identity thesis, then by transitivity of identity, at least some physical events become.
3. But then it is reasonable to believe that other physical events become.

These arguments capture several important strains in the “becoming” dispute, strains from the philosophy of science and metaphysics, the philosophy of language, and the philosophy of mind. Grünbaum focusses on A, but he says things which allow one to reconstruct his positions on P and I. He explicitly holds a revised version of A1 and A2, one can show that he ought to hold I1, and his theory commits him to an attempt to answer P. He rejects all three arguments. I shall argue that he can answer A reasonably well, if we grant him his version of the distinction between subjective time and objective time, because for many explanatory and descriptive purposes, physical becoming is an unnecessary addition. But then I shall argue that he cannot provide good answers to P or I. The problem for Grünbaum’s theory of time is that, as I shall show, it is necessary to accept P, and perhaps I. However, accepting either I, or a reasonable version of P, entails the rejection of the distinction that Grünbaum needs to answer A.

ARGUMENT A

It is possible to paraphrase A in the following way: the fact that events come-to-be or become, rather than just “occur” at certain times, is necessary and sufficient for the irreversibility of time. Many philosophers would agree that becoming provides a sufficient condition for irreversibility. As I have argued in another paper,³ if an event of type α becomes, then it is unique in the sense that even if there should come-to-be another event of

type α , it would not be the same event, but a different "token" of the same "type". There is no way to repeat any particular event of type α . Hence there is an "intrinsic order" and "direction" among any set of causally related events. Therefore, becoming is a sufficient condition of irreversibility (and of asymmetry, anisotropy, and direction). Yet it is considerably more difficult to show that becoming is a necessary condition of irreversibility, because it may well be possible to account for it in some other way. This is what Grünbaum attempts to do.

Grünbaum's account of the irreversibility of time requires several distinctions. He would like to distinguish three related properties of time, which I shall call 'asymmetry', 'anisotropy', and 'direction'. No one of these terms is equivalent to the 'irreversibility' of A. Perhaps all three taken together capture irreversibility, although, as we shall see, there are for Grünbaum difficulties in taking all three together. Grünbaum's notion of asymmetry is a formal property of the "temporal dimension", anisotropy a factual property, related to actual physical events, and direction a property of time due to "subjective time", and hence neither a formal nor factual property of "physical time". These distinctions are crucial, since if it should prove impossible to maintain them, Grünbaum cannot prove that becoming is not necessary to his purely physical version of irreversibility (asymmetry and anisotropy taken together), and argument A will, *faute de mieux*, appear correct. In effect, he must isolate "direction" from the other two properties.

Physical time on Grünbaum's account is in large measure a metric notion, a coordinatization of the temporal dimension of world lines. Because of this, an effective model for time is a Euclidean line, and it is sufficient for the purposes of clarifying the distinctions between asymmetry, anisotropy, and temporal direction to assume such a model. Now, perceived or imagined lines have at best a perceptual continuity, and Grünbaum wants his "temporal dimension" to be continuous in the way a set-theoretical continuum is continuous. A continuous line of this variety may of course be coordinatized, in such a way that the coordinatized points reflect a formal property of betweenness, so that, of "... any three elements, only one can be between the other two".⁴ Given such a coordinatization, any time points on the line determine two "time senses" which are ordinally opposite one another. Moreover, it is appropriate to talk of "time senses" here, because (to revert to a common-sense fact) spatially a

world-line can intersect itself, so a line defined formally by this sort of betweenness cannot be the model of a spatial dimension; *a fortiori* it is a model of the temporal dimension. Three aspects of this approach are important: betweenness is a formal property, coordinatization is purely conventional, and ordinal values of moments are formally ordered by betweenness. Nowhere have we introduced "facts", except to appeal to non-intersection to argue for the plausibility of this kind of reconstruction as temporal rather than spatial, and really the formally defined coordinatized line is neither spatial nor temporal as such. Nor have we introduced the notion of a direction to the line; the ordinally increasing points are no more *the* direction of time than the decreasing, since the coordinatization is conventional.

To claim that time is anisotropic is to make the further claim that the points on our formally defined asymmetric line can be assigned to physical events on world lines, where the world lines are made up of processes which do not have at least some structural duplicates in the opposite ordinal sense. This still does not define a direction to time; nor have we given any plausibility to the metaphor of temporal flow. It simply outlines the content of the notion of anisotropy.

The property of direction raises both semantic and explanatory issues. Grünbaum's discussion of direction is both compressed and obscure, and it is necessary to try to disentangle, and perhaps reconstruct, his arguments. The main problem is that it is not obvious what specific work direction is supposed to do, nor how it is to be analyzed. But at least the general aim is clear. We must give an "independent" account of direction, to isolate it from the other two properties. Grünbaum can be interpreted as attempting this in either of two ways. One appears to be an attempt to make direction into a metaphysical illusion; this is what I call his disappearance view. The second merely makes direction subjective, and removes it from the physical world. Since Grünbaum wants to "save the appearances", it is more likely to be his real position.

One theme in Grünbaum's argument seems to lead to the conclusion that to assign a direction to time is to do nothing at all:

The physicist's assertion that time has an 'arrow' discerningly codifies the empirical fact that the two ordinally opposite time senses are *structurally different* in specified respects. But in thus codifying this empirical fact, the physicist does *not* invoke the transient now to single out one of the two time senses as preferred over the other. By

contrast, the claim that the present or now shifts in the direction of the future does invoke the transient now to single out one of the two time senses and – as we are about to see – is a mere truism like ‘All bachelors are males’. Specifically, the terms ‘shift’ or ‘flow’ are used in their literal kinematic senses in such a way that the *spatial* direction of a shift or flow is specified by where the shifting object is at *later* times. Hence when we speak metaphorically of the now as ‘shifting’ temporally in a particular *temporal* direction, it is then simply a matter of definition that the now shifts or advances in the direction of the future. For this declaration tells us no more than that the nows corresponding to later times are later than those corresponding to earlier ones, which is just as uninformative as the truism that the earlier nows precede the later ones.⁵

This is puzzling, for here the direction of time seems to be merely a matter of definition, while all the interesting issues are settled by the physical predicate ‘later than’. Grünbaum makes it appear that we have only a definitional problem (“invoking” the ‘now’ only in the sense of talking about it as what shifts), by relying on the semantic facts concerning ‘later than’, arguing that to speak of the direction of time is to say *nothing more than* that “... the nows corresponding to later times are later than those corresponding to earlier ones”. This seems to make the problem of direction disappear, by eliminating any interest at all in the property of direction. ‘Later than’ is used to analyze direction, and in such a way that any non-physical issues involved in “singling out” a direction for time disappear. But if this is the case, subjective time might as well collapse into physical time, or disappear.

To account for our feeling that the direction of time is not an illusory notion, Grünbaum introduces a second argument theme, the purpose of which is to make it appear that direction (and “time flow” and related notions) is distinct from physical time *because* it is associated with becoming, which Grünbaum hopes to show is mind-dependent and thus irrelevant to physical time. This move gives the issue of “deciding which direction time flows” a measure of independence from issues which can be solved with the concepts of physical time alone. Unfortunately, Grünbaum seems to hesitate making the move as boldly as he should. Consider:

Being only a tautology, the kinematic metaphor of time flowing in the direction of the future does not itself render any empirical fact about the time of our experience. But the role played by the present in becoming is a feature of the experienced world codified by common-sense time in the following informative sense: to each of a great diversity of events which are ordered with respect to earlier and later by physical

clocks, there corresponds one or more particular experiences of the event as occurring *now*. Hence we shall say that our experience exhibits a *diversity of now-contents* of awareness which are temporally ordered with respect to each of the relations earlier and later. Thus, it is a significant feature of the experienced world codified by common-sense time that there is a sheer diversity of nows, and in that sheer diversity the role of the future is no greater than that of the past. In this *directionally-neutral* sense, therefore, it is informative to say that there is a *transiency* of the now or a coming-into-being of different events. And, of course, in the context of the respective relations of earlier and later, this flux of the present makes for events being past and future.⁶

This argument shows Grünbaum's obvious reluctance to grant becoming any explanatory force. Even apart from its phenomenological implausibility, the argument mystifies because it is not obvious how it accounts for our feeling that time does have a direction,⁷ although by granting to "nows" and subjective becoming a minor explanatory role with regard to the appearance of flow and direction it does suggest a reasonable solution. The solution is one which, if successful, isolates direction semantically from 'later than'. Consider a line of argument which Grünbaum could consistently have taken, and which we shall see later he must take, not only to account for the appearances of direction here, but also to provide an answer to how one is to understand the sufficient conditions on "being present". He could have said that, although from the point of view of physical time the issue of the direction of time is a mere illusion (as the first argument theme indicates), this illusion of direction is nevertheless traceable to the becoming of purely mental events. That is, direction is to be explained by subjective becoming. Instead, he relies on the physical relation 'later than', operating on a "sheer diversity of nows". This is not a good solution, for two reasons. First, it relies on the relationship 'later than', a relationship which *qua* relationship in physical time is supposed to be directionally neutral. And second, it is obvious that the solution he offers does not sufficiently semantically isolate direction from the physical relation 'later than'; for this he needs the metaphysical distinction between the physical and the mental. For some reason, Grünbaum avoids the obvious solution. Becoming, with its built-in "directional" character, is denied its explanatory force, even for purely mental events. That is, Grünbaum appears to deny even a mental version of argument A, although it would, granting the metaphysical distinction which he needs for other purposes anyway, offer a reasonable account of direction which is consistent with the thesis of the mind-dependence of becoming. Despite his

reluctance, we must insist on at least this much of an "explanatory role" for becoming; otherwise his attempt to isolate the property of direction either becomes incoherent and obscure, or we are left with the view that direction is, after all, simply an illusion.

Both of the argument themes discussed above suggest approaches to isolating direction from the complex of expressions used to talk about physical time. Both arguments isolate direction by making it physically illusory, though the second purports to show in what way it is illusory, in order to save the appearances. The first is straightforward: we must eschew common-sense scruple, and accept the fact that direction has nothing to do with the physical world, or our knowledge of this world, in any way (it is "uninformative"). However, Grünbaum takes common sense seriously enough to try to account for our intuitions of direction, and he can introduce a second option: make direction mind-dependent, by making it analyzable into subjective becoming, so it is at least "informative" about the mental, and about our knowledge of the world. Grünbaum wants to save the appearances, *if* they can be made consistent with his becomingless scientifically-described physical world.

It is clear that either means of isolating direction takes away the force of argument A as providing the necessary conditions for irreversibility, for both isolate physical time and asymmetry from the issue of the direction of time, and provide an opportunity for an independent account of anisotropy and asymmetry. They do so by either eliminating or placing in a subjective sphere those aspects of time which are undeniably tied up with becoming – direction, the now, and the temporal characteristics of pastness, presentness, and futurity.

I want to make two remarks before turning to arguments P and I. Because Grünbaum wants to save the appearances, he would undoubtedly choose *some* version of the subjectivist option. But if one chooses such an option, then the mental sphere to which for purposes of explanation we isolate direction and other elements of subjective time must be completely isolated from the physical. Grünbaum is a dualist, and would presumably accept this consequence. To be sure, it is not clear what his dualism amounts to (except that the mind is not in space, and he accepts secondary or mind-dependent qualities),⁸ and it is not the purpose of this paper to clarify what he means by dualism (a difficult task, given that physical events on Grünbaum's view causally affect mental events). It is only

important for our purposes to see that some strong kind of mentalistic or subjectivistic isolation is needed to properly isolate direction. P and I are attacks on this isolation.

The second remark is that, whatever notion of direction "becoming theorists" may have used (e.g., Reichenbach, Whitehead, Capek), and whatever specific version of direction Grünbaum seeks to isolate, my versions of argument A and physical becoming do not depend on the anthropomorphic version of direction built into the conception of becoming as a "concrecence" out of a set of possibilities, or on the model of the becoming actual of what are mere possibles, or any other conception which relies on *possibilia* to analyze becoming.⁹ As far as the argument is concerned, becoming can be a feature of a deterministic world. I have discussed this issue in another paper,¹⁰ so shall not dwell on it here. It is important to mention it, however, to allay fears which Grünbaum and others have that introducing becoming to the physical world is already to introduce *possibilia*, or to raise the ghost of anthropomorphism.

ARGUMENT P

P and I are not simply semantic critiques of Grünbaum's version of the distinction between physical time and subjective time, and so differ from most of the standard critiques. They are not, for instance, like McTaggart's argument that 'later' cannot be analyzed apart from 'past', 'present', and 'future', nor like my argument, discussed above, that according to one way of construing Grünbaum's argument against direction as related to physical time, he simply makes the semantic content of the notion of direction disappear. P is an argument from presuppositions, and relies on the pragmatics of discourse, and the need for an explanatory role for becoming in providing a reconstruction of discourse. It attempts to argue that it is "informative" that certain events become – that is, that sentences which state that certain events become are true – and then tries to argue that we can only have a plausible world-story if all events can be said to become. It will be shown that physical becoming provides the only plausible way to give an account of the presuppositions of tensed discourse, including scientific discourse. The argument assumes, with Grünbaum,

that there is such a thing as tensed discourse, and that tensed discourse cannot be eliminated, for we must "save the appearances", but disagrees with Grünbaum's view of how to account for the truth of the presuppositions of this discourse.

Argument P refers to presuppositions of tensed discourse, and I shall discuss these presuppositions in the context of an issue I call the coordination problem. To approach argument P *via* this route has the incidental advantage of clarifying the issues for argument I, and of showing that Grünbaum should hold $\dot{I}1$. But the focus of my argument at this stage will be on the coordination problem as it relates to argument P, and to the issue of the mind-dependence of becoming.

The coordination problem, as I see it, is not the issue of deciding, given any two physical events, whether one is in some sense simultaneous with the other. I am interested in the coordination of mental events with other mental events, and of mental events with physical events. What I shall say is as consistent with Newton and his uniquely-specifiable class of events, all of which are simultaneous with each other, as it is with a relativity framework. The coordination problem is stated with respect to events which are experiences, and events experienced (perceived, cognized) from a point of view, and physical simultaneity is of marginal importance. However, since as we shall see Grünbaum does think that simultaneity is at issue, or at least that one must use "simultaneity classes" in analyzing even the presuppositions of tensed discourse, and since I do not want to prejudice the outcome of the argument by appearing to have built into the stating of the coordination problem the solution I want, I shall insist on a sense of 'occur' which applies to all events, mental and physical, where 'occur' in my sense means *neither* 'becomes' or 'is present', *nor* (as Grünbaum wants) 'takes place at t '. That is, I shall insist on a sense of 'occur' which is neither "tensed" nor "tenseless"; and so when I ask whether two events "co-occur", I can leave it open as to whether the answer is to be given in terms of simultaneity classes and dates, or in terms of tenses and becoming, or in some other way. This argument device helps disentangle the contribution of becoming to the coordination problem from the contribution of simultaneity classes and dates.

To elucidate the coordination problem, and its relevance to the mind-dependence of becoming, one can start by discussing one of Grünbaum's crucial arguments:

That the nowness attribute of an occurrence, when ascribed non-arbitrarily to an event, is inherently mind-dependent seems to me to emerge from a consideration of the kind of information which the judgment 'It is 3 P.M., E.S.T., now' can be warrantably held to convey. Clearly such a judgment is informative, unlike the judgment 'All bachelors are males'. But if the word 'now' in the informative temporal judgment does not involve reference to a particular content of conceptualized awareness or to the linguistic utterance which renders it at the time, then there would seem to be nothing left for it to designate other than either the time of the events already identified as occurring at 3 P.M., E.S.T., or the time of those identified as occurring at some other time. In the former case, the initially informative temporal judgment 'It is 3 P.M., E.S.T., now' turns into the utter triviality that the events of 3 P.M., E.S.T. occur at 3 P.M., E.S.T.! And in the latter case, the initially informative judgment, if false in point of fact, becomes self-contradictory like 'No bachelors are males'.¹¹

The argument seems simple. We are allowed to "designate" events, both mental and physical, and properties of events. If 'It is 3 P.M., E.S.T., now' does not "designate" a particular mental event, it can only designate certain properties of events, that is, the clock times of events, both mental and physical. But if the latter, the judgment is either analytically true or self-contradictory. If the former, it can be – as it appears to be – informative. 'Now' is taken to be informative only if it designates a mental event.

The argument is puzzling when considered in relation to the ordinary, everyday contexts for a sentence such as 'It is 3 P.M., E.S.T., now', contexts which differ radically from those Grünbaum appears to presume. Sentences like these are answers to questions, *e.g.*, 'What time is it now?'. Both question and answer get translated by Grünbaum into his counterparts. So, the ordinary

- (1) What time is it now?

does not itself get considered. Instead, we have the slightly odd

- (2) Is it 3 P.M., E.S.T., now?

This question (2) gets transformed into

- (3) Is the particular percept of which I am now aware when asking this question a member of the simultaneity class of events which qualify as occurring at 3 P.M., E.S.T. on this particular day?¹²

There is a clear implication in (3) that the simultaneity class of events which is relevant to this analysis includes both physical and mental events. Grünbaum has, of course, said a great deal in his writings about

the problem of simultaneity as a relationship between physical events,¹³ and everyone is more or less familiar with these issues. But he has not said enough about the way in which we are to decide whether two mental events co-occur, nor about how we are to tell if a certain mental event co-occurs with a particular physical event. The coordination of mental and mental, and mental and physical events creates difficulties because mental events (or their "contents", where it is relevant to make this distinction) bear an "of" relationship to their "objects", and a mental event occurring at time *t* need not be of (or, in Grünbaum's terminology, 'designate') an object (in this case, event) occurring at time *t*. A mental event in the form of a judgment or a being aware that *e* occurs at time *t* does, of course, designate *e* and time *t*. But it – the awareness – need not occur at time *t*.

To focus on the problem of coordination for tensed discourse, it is useful to look at normal uses of (1) and that sentence in Grünbaum's argument –

(4) It is 3 P.M., E.S.T., now

– that sentence which he believes can only be informative if it "designates" the content of a mental event. To begin with, questions like (2) are very different from (1), though (4) can serve as an answer to either. Yet (4) functions differently in answering the two questions. We can answer (2) by the following:

(5) Yes, it is 3 P.M., E.S.T., now,

while to offer (5) as an answer to (1) would amaze. The 'yes' of (5) is puzzling in the context of an answer to (1), though not as an answer to (2). This pragmatic conflict points to deeper issues. The fact is that questions similar to (1) are like the paraphrase

(6) Where are we located in public time?

whereas (2) asks, on Grünbaum's account, whether or not a particular (mental) event belongs to the simultaneity class "already identified" as occurring at 3 P.M., E.S.T. (6), if we were to analyze it, would come out: to which relatively well-defined dated co-occurrence class do your and my *present* co-occurring mental events belong? In this reconstruction of (6) it is presupposed that there is some relevant class of events to which A and B contribute members which both agree *are present*. Failing to make this

presupposition, either speaker would fail to produce correctly sentence (1). In this sense they must appeal to some principle of coordination in order to communicate at all, and to acknowledge this appeal implies that one can answer questions about how A and B can agree that their mental events co-occur, in such a way that both are present. I shall show that simultaneity classes cannot provide adequate answers to these questions. My view is that the only way to provide coordination is to appeal to something like “becomes along with”. If I am correct, normal uses of sentences like (1) and answers like (4) presuppose a framework in which it is “informative” that speaker and hearer have events which are “becoming together”, not “taking place at the same time”.

To work towards a Grünbaumian reconstruction of (6), let us return to his (2), (3), and (4) construed as (5). The person who answers (2) with (5), whether it be the person asking (2), or another person, must already know which (mental) events belong to which simultaneity classes, where simultaneity classes are specified with respect to the referential frame of the speaker asking (2). It is important to note here that the person who answers (2) need *not* be contemporaneous with the questioner in order to search through the relevant simultaneity class(es). He can use dates to pick them out. This is true even in the case where the speaker and the hearer are the same person. The demand that both speaker and hearer be “at” the same “now” comes from our ordinary ways of construing questions like (1); in contrast, the answer to (2), given the percept or other dated mental event of (3) in question, can be given at any time. The problem with construing (2) and its analysis (3) in this way is that the answer is in effect either logically true or self-contradictory, and the “informativeness” of “nowness” is lost, even in the case where the speaker and the hearer are the same person. Grünbaum does of course try to construe the situation in a different way: answers are “informative” just in case they “designate” a particular “content of conceptualized awareness”. But this is not the issue. The “informativeness” of the answers is not an issue of the obtaining of a single event of “conceptualized awareness”; with regard to the question (3) this need not be interesting even in the case where speaker and hearer are the same. Their informativeness depends on the satisfaction of the presupposition, that the answer (taken to be a mental event, or associated with one) co-occurs (vaguely) with the percept. I doubt if Grünbaum can account for the truth of this presupposition in a natural way, while

continuing to argue that his account is an explanation of the "appearances" of temporal discourse.

(6) presents us with the problem of accounting for the truth of a presupposition of tensed discourse. This presupposition can be stated in a way that suggests the need for co-becoming to account for its truth, or in a way that makes the issue appear to be one of simultaneity classes. For the first, we have:

- (7) There is some class of events which occur together, which has as members both the present mental event(s) of A and the present mental event(s) of B.

Grünbaum's version would, I conjecture, read:

- (8) There is at time *t* a mental event of B which is a member of the simultaneity class of events picked out by a mental event of A, A's mental event is present, and A and B are (physically or causally) related as "speaker" and "hearer" (questioner and answerer).

Given that "nowness" or the becoming of a mental event is what is meant by "being present", (8) suggests that the "nowness" of A's percept is sufficient for the nowness of B's mental event, the one involved in answering.¹⁴ But there is reason to be suspicious of this. Why, after all, on Grünbaum's view of the subjectivity of becoming do we have any reason for believing that B's mental event *is now*? The mental event in question is, presumably, dated; but because of the isolation of becoming from the physical world, it need not be *present*, even if A's percept is. Dates can play no role in making events present, for the familiar reason: a dated event always has the same date, relativity questions aside. Nor can Grünbaum appeal here to some kind of pragmatic principle to answer (e.g., that, all things being equal, particularly in face-to-face conversation, what one presumes is a present event, is a present event) because he cannot in turn justify such a principle with the conceptual machinery he has available. He does not have grounds for showing a mental event is present outside of A. He can only suggest that, given the presentness of A's percept, and the inclusion of some event of B's in the simultaneity class picked out by A's percept (however this "picking out" is accomplished), there is no other physical problem to be solved. This suggestion leads however to

mentalistic privacy, as far as the presentness of mental events is concerned. This comes about because the being present of mental events is a property which *must* be sufficiently isolated from the physical causal properties of the event, if any, to guarantee that the becoming which grounds presentness has no physical basis. Failing this, the isolation with which argument A is rejected is in question. Thus we have a dilemma: If there is isolation, then there is no reason B's mental events could not be "present" elsewhere. But isolation does not allow us to account for the presuppositions of tensed discourse.

It is important to see that it does not do to respond, as Grünbaum attempts to do: "But mental events are causally dependent on physical events, and so of course the presentness of A's mental event is sufficient for the presentness of B's, if they are causally related in the way one would expect of two people engaged in conversation". The idea is to have causality serve as the explanation for coordination. Apart from the implausibility of speaking of the causal dependence of the mental on the physical in a situation where the property of presentness in question *cannot* be treated as a physical property, however, there is the difficulty that the relevant causal relations stand between tenseless dated event-specifications, and no help is to be had here for the view that B's mental event is present. Nor could other physical properties help, for they must be kept becoming-free. So it does not appear possible to provide a convincing account of why A and B, where they are mental events in different minds, co-occur. In this situation it would appear to be plausible to say that the condition which must be satisfied if one is to say that the two events co-occur is that they "become together". It should even be plausible to Grünbaum, who does agree that "being present" depends on (subjective) becoming. In sum, the purpose of (8) was to provide an account of a presupposition of tensed discourse. This requires that one be able to say that it is true that two events are both present. But Grünbaum has no grounds for saying that this is true, and so the becoming account is the reasonable one. This makes co-becoming "informative" if we, like Grünbaum, take seriously the task of accounting for tensed discourse.

Although in general Grünbaum seems to believe that it is possible to solve coordination problems with dated simultaneity classes, they cannot handle the situation where we need to account for the truth of sentences which involve coordination of mental events. This situation seems to be

central to the reconstruction of the presuppositions of tensed discourse, and cannot be ignored, for if the presuppositions of tensed discourse are not satisfied, the very notion of tensed discourse is illusory. We need to show how these presuppositions can be claimed to be true in a coherent theory of tensed discourse.

It is probably apparent now that I will suggest that if we need to speak of the becoming of events "outside ourselves", then we should surely allow physical becoming too. This suggestion is strengthened by the "one-person" case of the coordination problem. This case arises even in some of the sentences we have considered. In (2), for instance, it is not clear what would count as sufficient for the co-occurrence and presentness of one's own mental events or percepts. In question (2) the mental event involved, the percept of analysis (3), would not seem to need to be contemporaneous with the question, a situation similar to the two-person case of (1) and (6), where the presupposition is reconstructed as in (8) rather than (7). It looks like there might be a problem of coordination again, where again Grünbaum will have to appeal to dated simultaneity classes to provide a solution. But I shall try to show that using dated simultaneity classes to solve the problems of coordination in the one-person case is no more successful than in the two-person case.

To discuss the one-person case, it is necessary to first explore Grünbaum's account of the subjectivity of becoming, both to see where the coordination problem might arise, and to see what counts as sufficient for the "nowness" of a mental event.

GRÜNBAUM ON THE MIND-DEPENDENCE OF BECOMING

What qualifies a physical event at a time *t* as belonging to the present or as now is *not* some physical attribute of the event or some relation it sustains to other *purely physical* events. Instead what is *necessary* so to qualify the event is that at the time *t* at least one human or other *mind-possessing* organism *M* is conceptually aware of experiencing at that time either the event itself or another event simultaneous with it in *M*'s reference frame. And that awareness does not, in general, comprise information concerning the date and numerical clock time of the occurrence of the event. What then is the content of *M*'s conceptual awareness at time *t* that he *is experiencing* a certain event *at that time*? *M*'s experience of the event at time *t* is coupled with an awareness of the temporal coincidence of his experience of the event with a state of *knowing* that he has that experience at all. In other words, *M* experiences the event at *t* and knows that he is experiencing it. Thus, presentness or nowness of an event requires conceptual awareness of the presentational immediacy of either the experience of the

event or, if the event is itself *unperceived*, of the *experience* of another event simultaneous with it. . . . I claim that the *nowness* at a time *t* of either a physical or a mental event requires that there be an *experience* of the event or of another event simultaneous with it which satisfies the specified requirements. And by satisfying these requirements, the *experience* of a physical event qualifies at the time *t* as occurring *now*. Thus, the fulfillment of the stated requirements by the *experience* of an event at time *t* is also *sufficient* for the *nowness* of that *experience* at the time *t*.¹⁵

There are several issues one can raise here, but I shall address myself to just three: (1) What are the necessary conditions for the 'now'? (2) What are the sufficient conditions, and how do they relate to becoming and its mind-dependence? and (3) What is one to make of these necessary and sufficient conditions in relation to the sentence in this argument which is crucial for our discussion of coordination: "M's experience of the event at time *t* is coupled with an awareness of the temporal coincidence of his experience of the event with a state of *knowing* that he has that experience at all"?

The following is a reconstruction of the necessary conditions for the 'now'. In the interests of getting the simplest possible case, we may confine our attention to a single event, which I shall name '*e*', and a single experiencing of *e* by M, where this experiencing of *e* is a mental event, which I shall dub '*E*'. *E* and *e* may be identical; in the case of a pain, for instance, "... there is no difference between the event and our experience of it".¹⁶ In my reconstruction I shall not use tensed verbs, for the obvious reason that we are trying to construct the necessary conditions for tenses, and it is clearly useful to avoid either circularity or triviality. Grünbaum himself does not drop tenses, since he considers them "ineliminable". I presume he means ineliminable from his final account; here we must eliminate them for purposes of argument. Moreover, I shall drop all 'at *t*'s from event characterizations; as Grünbaum argues on the issue of awareness of events: "... that awareness does not, in general, comprise information concerning the date and numerical clock time of the occurrence".¹⁷ What we need are the necessary conditions for the truth of the sentence, '*e* be now for M'. They are,

- (a) *E* be an experience of *e*.
- (b) *E* be had by M (be a member of the set of mental events of M).
- (c) M be conceptually aware that *E* be had by M. (Call this event of conceptual awareness, '*C*').

- (d) The "content" of *C* include an awareness that *E* be coincident with *C*.

Two comments are in order. First, it is clear that if (a–d) hold, we have at best the necessary conditions for a *now* or, to introduce the use-mention distinction, we have only a set of conditions for a "mention" of the sentence, '*e* be now for *M*', but not a "use". Another way to put this is to point out that if (a–d) are true at all, they are true anytime. And second, it should be clear that condition (d) is crucial, helping to define what is distinctive about "now-awareness", and also hoping to guarantee that, unlike *e* and *E*, the event of *M*'s being conceptually aware of *E*, etc., co-occurs with *E* itself. This is the crux of the one-person case of the coordination problem. (d) is not, by the way, an event, like *e*, *E*, or *C*, but the "content" of a mental event – a content which is true just in case *E* and *C* are co-occurrent. The grounds on which one can claim this content to be true raise puzzles similar to those in the two-person case of coordination.

It is more difficult to disentangle a sufficient condition for '*e* be now for *M*' from Grünbaum's account, particularly since he seems to believe that (a–d) can be sufficient conditions too. But a close reading of his argument leads one to believe that probably what he takes to be sufficient is not what makes an event *now* (in spite of what he says in the argument), but rather what makes my "immediate" experience "present", rather than a remembered experience or an anticipation. Support for this reading is to be found in his heavy and consistent emphasis of 'experience' throughout the argument, and in what he says elsewhere: "It is to be understood . . . that the *reliving* or anticipation of an event, however vivid it may be, is *not* to be misleadingly called 'having an experience' of the event when my characterization of the now is applied to an experience".¹⁸ In effect, sufficient conditions as stated by Grünbaum are only sufficient for '*E* be had by *M* and *E* co-occur with *C*', as opposed to '*E* be had by *M* and *E* not co-occur with *C*' (a memory or an anticipation). This confuses issues. First, it confuses the issue of what the sufficient conditions are on "experiences" as opposed to memories with the question of what the sufficient conditions are on the *now*. Grünbaum, like Russell before him,¹⁹ introduces the issue of the presentness of experience by contrasting it with memory and anticipation, but neither gives a clear independent account of what he thinks a present experience is, nor ever actually tells us what is sufficient for "nowness". And second, as we shall see, this talk of

experience makes it appear that Grünbaum can offer an answer to what makes the claim in (d) true, when in fact he cannot.

What then really does count as sufficient for 'e be now for M'? There is a simple answer, and it is that *C* and perhaps *E* become. This is a legitimate answer, consistent with Grünbaum's account of the "mind-dependence" of becoming, and it has the advantage of clarifying his cheerful use of present progressives throughout the argument. Here is where one must look for the sense of tensed as opposed to tenseless occurrence. Moreover, it is difficult to imagine any other way in which to get a sufficient condition for the nowness of *C* and *E*; it is apparent that conditions (a–d), if true at some time, are always true. Note too that it is not necessary to commit oneself too strongly to any particular account of becoming, as long as it does the simple task required of it here. For present purposes, it is adequate to worry about the kinds of things that one can say become, since this is the focus of Grünbaum's critique of physical becoming.

Now it is possible to discuss necessary condition (d), which is the crucial condition for my purposes, raising the problem of temporal coordination. The question is, what makes (d) true? That is, on what grounds can one hold that *C* and *E* co-occur, or are coordinated? A start to the answer is found in the fact that (d) is in some sense token-reflexive. I should emphasize 'in *some* sense', because Grünbaum wishes *C* to be a mental event, and he is not interested in providing merely a "linguistic" reconstruction of the 'now'. But the fact remains that the "content" of *C*, and hence *C* itself, is a reflexive item, an "awareness" which "refers to itself". The discovery that *C* is reflexive helps only a little, however, since it still does not tell us whether it is true that *C* co-occurs with *E*, only that *C*, which involves reference to *E*, also involves reference to itself. Remember here that since *C* is a mental event, it can refer to or "designate" *E* at some time other than the time *C* occurs, so it cannot be claimed that the occurrence of *C* itself, nor thereby the "assertion" of the claim that *E* co-occurs with it, could by itself be sufficient for the truth of the claim. That is the point of discussing the reconstruction of the *now* without tenses (thereby avoiding surreptitiously introducing one solution to coordination) and without dates (avoiding introducing prematurely another "solution"). On what grounds can one argue that the claim which is the content of *C* is true? The difficulty here is that Grünbaum has not spoken directly to this question, primarily because he has already assumed that he has an answer.

It could be held that the content of *C*, that is, that *C* and *E* co-occur or are coordinated, is true just in case *C* and *E* occur at the same clock-time. There is, however, a very serious difficulty with this answer. As Grünbaum himself points out, knowledge of the numerical clock time of events is *not* generally a part of an awareness of events; and in fact it would be absurd to demand that, in order to correctly assert the "content" of *C* one must be able – even in principle – to compare the dates of *C* and *E*. *C* and *E* are not coordinated *because* they share a clock time; this cannot serve as an explanation. Indeed, no metric with dated moments is in any way assumed by a use of 'now', since this temporal adverbial (or nominal, on another analysis) no more requires a framework of dates than do ordinary tensed sentences. I am in effect arguing that the actual criterion for contemporaneity that Grünbaum needs to use here is something like 'becomes along with', as in the two-person case of the coordination problem. *C* and *E* are different events, which one needs to have coordinated in order for the argument about mind-dependence to make sense. The way Grünbaum should handle this, I suggest, is to assume that they are contemporaneous just in case they "become together"; and once we have to acknowledge that mental events become anyway, this is not a difficult step to take. Like the two-person case of the coordination problem, the problem of coordination in the one-person case arises because one needs to account for the truth of an assumption needed for tensed discourse to work. Here there is not the same kind of isolation as in the two-person case, but the same problem arises: coordination cannot be accomplished by dates and simultaneity classes. It seems puzzling that the problem of coordination should ever be thought to arise in the one-person case; *of course* *E* and *C* are coincident! But Grünbaum makes *C* a "conscious" event, which amounts in my reconstruction to making it into a claim (with a "content") *about* another event. In these circumstances, co-becoming serves an explanatory function like that in the two-person case. To be sure, one might argue that this is a peculiar notion of "explanation". But it is not peculiar, only unnecessary under ordinary circumstances, because the truth of the sentences tensed discourse presupposes and assumes is not usually in doubt. Furthermore, it is the kind of explanation Grünbaum himself needs for giving us reasons for placing mental (and physical) events in the same "co-occurrence" class. It is surely then an important notion of explanation. Even dates must wait upon it in these cases, insofar as their assignments can be justified.

There is one unattractive alternative open to Grünbaum to handle the one-person case. He could argue that *C* and *E* are not in fact distinct, but "one complex experience". This would still require that this complex event become (to get a sufficient condition for the now), but no coordination would be required in the one-person case. The advantage to this is that it avoids the coordination problem, or at least appears to. Yet this alternative is not consistent with what he says, for he does make *C* into a conscious event which includes in its "content" a reference to "another" mental event *E*, and so a coordination problem can arise. Moreover, it is always in principle possible to introduce some event *C'*, for which the coordination problem would arise, even if *C* and *E* were identical.

P AGAIN: A PLAUSIBILITY ARGUMENT

The point of this detailed discussion of Grünbaum's argument for the mind-dependence of becoming has been both to clarify just what the necessary and sufficient conditions of his theory do, and to point out that Grünbaum must rely after all on some sort of thesis of "co-becoming" in order to coordinate mental events in his theory of the now. That is, temporal coordination of this sort ("co-becoming") serves an explanatory function where it is unreasonable to expect dated events to coordinate. It serves a parallel function in the case discussed earlier, involving a speaker and a hearer – at least two creatures with sets of mental events included in their histories – who are communicating. Grünbaum's own account of coordination – in these two contexts, at least – provides only a Pickwickian solution. It is simply unreasonable to assume that we can solve the coordination problem by dated events. This is particularly clear in the two-person case: I have *no* reason to assume that another person *is* (in the fully-tensed sense) responding to my *present* question, unless one adopts some sort of thesis of co-becoming. I do have, on Grünbaum's account of this two-person case, my experience of him, that is, causally conditioned information of his physical events, but that is not sufficient for his *now*, much less for his *now now*, to invoke a useful barbarism.

What happened to the thesis of physical becoming? From what has been said so far, there is still a way to agree with my demand that becoming play an explanatory role, and yet save the mind-dependence of becoming. Even if in discussing the presuppositions of discourse we need

now to speak of the becoming of events "outside" ourselves, Grünbaum might argue that the events in question are still mental, though not in a single mind. This tack preserves the core of the thesis of mind-dependence, while admitting the force of the argument for temporal coordination *via* the becoming of mental events. Hence part of argument P would work on this approach, but it would not involve an admission of the becoming of physical events. The only way to attack this modified thesis of mind-dependence with the arguments now available is, I suspect, to suggest that it is extremely implausible. It does not offer a coherent account of time, and our experience of time. It is very implausible to assume that the coordination we need here – particularly in the two-person case – can be guaranteed by mental events which *just happen* to be "becoming together", without any basis or explanation in the physical constitutions of the human beings involved in discourse. If it is "informative" that two events co-occur because they "become together", then it would be puzzling if it were not, particularly in the two-person case, physically informative. One might just as well appeal to Leibniz's pre-established harmony, and his deity to guarantee it, for apart from such an appeal to some coordinating principle, the coordination is merely accidental. Physical becoming is surely less difficult to accept than this.

There is nothing in physical theory which rules out the view that physical events become,²⁰ unless it is the anthropomorphism and *possibilia* found in some views of becoming (Cf. p. 283). One can only encounter difficulty where one makes the claim that physical events become at some time *t*; but that is another issue.

ARGUMENT I

It is impossible to provide here a defense of the identity thesis on which I is based, but it is important to remark that at least with respect to becoming, the plausibility argument of P would lead one to believe that the dualist assumptions on which Grünbaum bases his argument against A are not very compelling. Beyond this, there is little one can add to I. If one accepts the premises and transitivity of identity, I's conclusion follows. In the discussion of the sufficient conditions for the *now*, I have shown that Grünbaum should accept I1, yet we have also seen that he needs a strict distinction between the mental and the physical, so he must reject I2. But if there are

good philosophical reasons for accepting some version of I2, then given the compatibility of physical theory and becoming, there are reasons to hold that physical events become.

CONCLUSION

Because the plausibility argument at the end of P works, there is little reason to maintain the strict distinction Grünbaum does between physical time and subjective or mental time, or rather, there is no reason to maintain this distinction with respect to the issue of becoming. If this is the case, and if it is true that Grünbaum needs to restrict becoming to the mental to make his response to argument A work, then argument A too becomes plausible again. Note, however, that I am not saying that there are *no* reasons for maintaining this distinction, only that it is not useful with respect to the issue of becoming. There are of course reasons for holding that the temporal characteristics 'past', 'present', and 'future', the tenses, and temporal adverbials (or nominals) like 'now' (but not the property of temporal direction) are all both "subjective" and "mental". But these reasons stem from the fact that (a) one use of 'now' often differs in temporal location from another, and (b) "purely physical" events do not say 'now'. Neither of these factors is important for the issue of physical becoming, and one should not use the subjective time – objective time distinction to push becoming out of the physical world.²¹

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REFERENCES

* I am grateful to many for comments and criticism, but particularly to an anonymous reviewer for this journal, who found several infelicities and an outright blunder in an earlier draft.

¹ The works which are particularly relevant for my purposes are *Philosophical Problems of Space and Time* (Dordrecht, 1974, second edition), the first chapter of *Modern Science and Zeno's Paradoxes* (1967), and an article entitled 'The Meaning of Time' (1971). The article is in fact a revision of the first chapter of *Modern Science and Zeno's Paradoxes*; some crucial differences appear in the updated version.

² Russell's distinction, and his defense of becoming, appear in 'On the Experience of Time', *Monist* 25 (1915), 212–233.

³ McGilvray, James, 'Becoming: A Modest Proposal', *Philosophical Studies* 30 (1976), 161–170.

⁴ Grünbaum [2], p. 10.

⁵ Grünbaum [1], pp. 202–203. This material, and that cited in references 6, 11, and 15 below, are reprinted by permission of Open Court Publishing Company, LaSalle, Illinois, U.S.A. from *Basic Issues in the Philosophy of Time*, edited by Freeman and Sellars. © 1971 by Open Court Publishing Company.

⁶ Grünbaum [1], pp. 203–204.

⁷ Memory and entropy are linked by Grünbaum in several places with the property of anisotropy, *not* direction (e.g., [3], Chs. VIII–X). Memory is no more “directional” than is entropy.

⁸ Grünbaum, [1], [2], Ch. I.

⁹ Theories of becoming which analyze it in terms of *possibilia* are not inconsistent with the argument presented here, they are just not needed.

¹⁰ ‘Becoming: A Modest Proposal’, *op. cit.*

¹¹ Grünbaum [1], p. 211.

¹² Grünbaum [1], pp. 210–211; [2], p. 19.

¹³ Grünbaum [3], Chs. I, II, XII, XX.

¹⁴ Grünbaum [1], Cf. pp. 210, 208.

¹⁵ Grünbaum [1], pp. 206–208.

¹⁶ Grünbaum [1], p. 208.

¹⁷ We of course *can* refer to mental events with dates, but we ordinarily do not. I shall argue that it would be odd to “solve” the coordination problem for the one-person case, raised by condition (d) stated below, by saying that we can do it with dates.

¹⁸ Grünbaum [1], p. 210.

¹⁹ Cf. Russell, [1] and [2].

²⁰ For a supporting view, cf. Gale, *The Language of Time*, chs. X and XI.

²¹ My argument can be read as an attempt to divorce at least some of the issues which McTaggart – and most of those who followed him – kept together in the analysis of time. Becoming may well be needed to provide a sufficient condition for the expressions ordinarily associated with subjective time – e.g., ‘now’ – but the entanglement is no stronger than this. This should have been obvious; becoming is after all introduced as an “explanatory” notion, and so has a different semantic status than these other expressions.

BIBLIOGRAPHY

Capek, Milic, ‘Relativity Theory, a Philosophy of Becoming’, in Fraser (ed.), *The Voices of Time*, New York: Braziller, 1965.

Gale, Richard M., *The Language of Time*, London: Routledge and Kegan Paul, 1968.

Grünbaum, Adolf [1], ‘The Meaning of Time’, in Freeman and Sellars (ed.) *Basic Issues in the Philosophy of Time*, LaSalle: Open Court, 1971.

Grünbaum, Adolf [2], *Modern Science and Zeno’s Paradoxes*, Middletown: Wesleyan University Press, 1967.

Grünbaum, Adolf [3], *Philosophical Problems of Space and Time*, second edition, Dordrecht: Reidel, 1974.

- McGilvray, James A., 'Becoming: A Modest Proposal'. *Philosophical Studies* **30** (1976), 161–170.
- McTaggart, John McTaggart Ellis, *The Nature of Existence*, Cambridge: Cambridge University Press, 1927.
- Reichenbach, H., *The Direction of Time*, Berkeley: UC Press, 1956.
- Russell, Bertrand [1], 'On the Experience of Time', *Monist* **25** (1915).
- Russell, Bertrand [2], 'Sensation and Imagination', *Monist* **25** (1915).
- Whitehead, A. N. W., *Process and Reality*, New York: Macmillan, 1929.

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