

tions, though it serves to remove ambiguity in certain cases, will exhibit similar shortcomings if pressed too far. The difficulties are compounded by the desire not to have more than one alphabet of variables—not e.g. a separate alphabet of syntactical variables. Freudenthal's solution is to resort to autonomy; to disallow assertions containing free variables, and in any assertion which apparently contains free variables to understand such apparent free variables as being autonomous (and hence not variables); then further to let the distinction between autonomous and non-autonomous occurrences of symbols be determined by context. The last is partly explained. But to make it convincing that Freudenthal's method is workable, of course there is required a much more detailed treatment than is possible in this short paper.

In the discussion Gonseth and Bernays object to Freudenthal's decision to exclude indirect discourse from his artificial language and to allow only direct discourse. The ground is that it should, for the purpose, be possible to pass or translate from such an assertion in direct discourse as (1) "Monsieur Pierre m'a dit hier: il a plu hier" to the corresponding assertion in indirect discourse (2) "Monsieur Pierre m'a dit hier qu'il a plu avant-hier." Freudenthal replies that he would avoid ontology. The "ontology" in question is clearly the information that time is one-dimensional and additive, at least in regard to one-day intervals. Freudenthal seems to contradict himself later by asking in further reply why he should have more than one way of expressing the same thing in the artificial language; but this is perhaps withdrawn by his final reply to Bernays at bottom of page 93.

The reviewer would hold that at least one further piece of factual information is required for the passage from (1) to (2), namely that M. Pierre intended to speak in French and supposed that I would so understand him; and if a logical inference is called for, there are further complications arising from the fact that "intended to speak in French" itself involves something like indirect discourse. The passage from (1) alone to (2) is thus not possible. Yet Gonseth and Bernays seem to be right that Freudenthal is assuming this when he says in the body of the paper (p. 84) that there is no reason to provide for indirect discourse in the artificial language.

ALONZO CHURCH

CHARLES HARTSHORNE. *Ten ontological or modal proofs for God's existence. The logic of perfection and other essays in neoclassical metaphysics*, by Charles Hartshorne, The Open Court Publishing Company, La Salle, Illinois, 1962, pp. 28–117.

The author presents what he calls a "somewhat revised" formalization of Anselm's second ontological argument. It is essentially a derivation of (1) $N\exists x Px$ from the premisses (2) $N(\neg N\exists x Px \rightarrow N\neg N\exists x Px)$, (3) $N(\exists x Px \rightarrow N\exists x Px)$, and (4) $\neg N\neg\exists x Px$ by means of the inference rules (5) $N(\phi \rightarrow \psi), N\neg\psi, \therefore N\neg\phi$, (6) $N\phi, \therefore \phi$, and (7) tautological implication. (Here ' \rightarrow ' represents material implication. The author uses ' \rightarrow ' for strict implication.) A formal simplification is possible: The initial ' N ' can be deleted from (2), and then (6) is not needed. He interprets ' P ' as "is a perfect being" and ' $N\phi$ ' as " ϕ is analytic (L -true, true by virtue of its meaning)." He presents a notion of "perfect being" and argues that the premisses are true of this notion. These arguments will not be discussed here. He notes that his formalization does not treat existence as a predicate, and agrees with the positivists that (1), as a necessary proposition, makes no empirical difference.

PERRY SMITH

ARTHUR N. PRIOR. *Changes in events and changes in things. Papers on time and tense*, by Arthur N. Prior, Oxford at the Clarendon Press 1968, pp. 1–14. (A reprint of *The Lindley lecture*, University of Kansas, Lawrence 1962, 13 pp.)

ARTHUR N. PRIOR. *On spurious egocentricity*. *Ibid.*, pp. 15–25. (Reprinted from *Philosophy*, vol. 42 (1967), pp. 326–335.)

ARTHUR N. PRIOR. *The formalities of omniscience*. *Ibid.*, pp. 26–44. (Reprinted from *Philosophy*, vol. 37 (1962), pp. 114–129.)

ARTHUR N. PRIOR. *Contemplation and action*. *Ibid.*, pp. 45–50.

ARTHUR N. PRIOR. *The consequences of actions*. *Ibid.*, pp. 51–58. (Reprinted from *Aristotelian Society supplementary volume XXX*, London 1956, pp. 91–99.)

ARTHUR N. PRIOR. *Limited indeterminism*. *Ibid.*, pp. 59–65. (Reprinted from *The review of metaphysics*, vol. 16 no. 1 (1962), pp. 55–61.)

ARTHUR N. PRIOR. *Identifiable individuals*. Ibid., pp. 66–77. (Reprinted from *The review of metaphysics*, vol. 13, no. 4 (1960), pp. 684–696.)

ARTHUR N. PRIOR. *Time, existence, and identity*. Ibid., pp. 78–87. (Reprinted from *Proceedings of the Aristotelian Society*, n.s. vol. 66 (1965–66), pp. 183–192.)

ARTHUR N. PRIOR. *Stratified metric tense logic*. Ibid., pp. 88–97. (Reprinted from *Theoria* (Lund), vol. 33 (1967), pp. 28–38.)

ARTHUR N. PRIOR. *The logic of ending time*. Ibid., pp. 98–115.

ARTHUR N. PRIOR. *Tense logic and the logic of earlier and later*. Ibid., pp. 116–134.

ARTHUR N. PRIOR. *Quasi-propositions and quasi-individuals*. Ibid., pp. 135–144.

ARTHUR N. PRIOR. *Tense logic for non-permanent existents*. Ibid., pp. 145–160.

This collection of essays is representative of Prior's views on the nature of time and the logical-ontological significance of tense, to the clarification of which he has over the years contributed much both philosophically and logically.

The initial essay, *Changes in events and changes in things*, is preliminary for understanding the relevance of those that follow. It sets forth the thesis that some of our philosophical problems about time and change "arise from the fact that many expressions which look like nouns, i.e. names of objects, are not really nouns at all but *concealed verbs*, and many expressions which look like verbs are not really verbs but *concealed conjunctions and adverbs*" (p. 6, italics added). Thus, in 'The death of Queen Anne is past,' the phrase 'the death of Queen Anne' *looks* like a noun purporting to name an event and 'is past' *looks* like a verb, i.e., a predicate, purporting to designate a supposed property of pastness. The concealed verb here is 'is dying' and the concealed adverb is the phrase 'it was the case that' which modifies the sentence 'Queen Anne is dying.' According to Prior, "putting a verb into the past or future tense is exactly the same sort of thing as adding an adverb to the sentence" (p. 7), and thus, although as an "historical accident" we say 'Queen Anne died,' we could "in a rationalized language with uniform constructions for similar functions" (p. 8) say instead 'It was the case that Queen Anne is dying.' The explanation for this "concealment" is the fact that "it is difficult for the human mind to get beyond the simple subject-predicate or noun-verb structure, and when a sentence or thought hasn't that structure but a more complex one we try in various ways to force it into the subject-predicate pattern" (p. 10). Philosophically, especially from the point of view of ontology, the significance of exposing this "concealment" is great indeed, for "what looks like talk about events is really at bottom talk about things" and "what looks like talk about changes in events is really just slightly more complicated talk about changes in things" (p. 10f). The viability of such a point of view as this requires the formalization of a tense logic or logics and an investigation of their various properties, especially in regard to their adequacy as an "(onto)logical map" of reality.

Opposed to the ontological primacy claim of tense logic are the token-reflexive or relative-to-utterance (or thought) theories of tense. In *On spurious egocentricity* Prior argues that this "apparent egocentricity or token-reflexiveness" is *deceptive* (p. 15). Comparing his own view of the present tense with Ramsey's adverbial theory of truth, Prior remarks that they "are in a sense the same theory—in the sense that they merely assert the vacuity of one and the same phrase, 'It is the case that—' or 'It is true that—', considered against different non-vacuous contrasting phrases" (p. 21). This, however, along with calling Ramsey's theory the "no-truth" theory (p. 17), is misleading. For were bindable unary formula operator variables to be introduced—and Prior does introduce them occasionally (cf. p. 28)—the sense in which Prior's present tense and Ramsey's adverbial 'true' are the same is that in which the phrases 'It is the case that' and 'It is true that' as substituends for such a variable "represent" the same value of that variable. Other adverbial phrases, e.g. 'It is *not* the case that' or 'It *was* the case that,' "represent" different values of such a variable. The vacuity vis-à-vis the non-vacuity of which Prior speaks is at best a vacuity of notation, certainly not of a reflected reality. But the "deception" of apparent egocentricity of which Prior speaks as well as the notion of truth of which Ramsey speaks concerns reality and not merely notation. And that reality is the reality of truth as a modality rather than as a property of propositions or utterances. Prior extends Ramsey's theory to include also the reality of past and future truth as temporal modalities rather than as properties of propositions or utterances.

Also opposed to the ontological primacy of tense logic is the (first-order) theory of the earlier-later relation between instants as a special breed of individual objects. In three of the essays of this collection, viz., *Tense logic and the logic of earlier and later*, *Stratified metric tense logic*, and *The logic of ending time*, Prior examines the relationship between these two (onto)logical paradigms on the nature of time. In the first article, Prior presents through a series of calculi four grades of tense-logical involvement concerning the notion of being true at an instant. The four grades "progress from what could be regarded as a pure earlier-and-later logic to what can be regarded as a pure tense-logic" (p. 131). In the former, where instants are individuals ordered by means of the earlier-than relation, propositions whose truth-values change over time are construed as properties of those instants "at" which they are true. In the pure tense logic, on the other hand, an instant is identified with "the totality of what would ordinarily be said to be true *at* that instant," or, alternatively, with "*any* proposition which would ordinarily be said to be true at that instant only" (p. 100). In order for a proposition to be a value of an instant variable, now reconstrued as a special type of propositional variable, it must (1) be true at some time and (2), in regard to any other proposition, either *always* (materially) imply that proposition (in which case the proposition is said to be true "at" that instant-proposition) or *always* (materially) imply the negation of that proposition (in which case the proposition is said to be false "at" that instant-proposition). In addition, it is required that at any given time, some such world-state proposition is true. It is significant that quantification over propositions is required in order for the tense-logical paradigm to capture the logical powers which the earlier-later relation theory has by quantifying over instants as individuals.

Prior sees tense logic as embodying the ontological view that events and processes are "logical constructions out of persisting and acting things or continuants" (p. 86) and thus that tense logic is committed to a "substance metaphysic" (p. 64, p. 78). However, to the contrary, if instants in pure tense logic are world-state propositions it is difficult to understand how these can be "logical constructions." No doubt the ontological significance and commitment of tense logic with quantified propositional (and-or predicate and-or tense-operator) variables is other than that of tense logic with only individual variables as bindable. But that such a commitment is only to "logical constructions" certainly does not follow from this. Indeed, for some who work within the tense-logical paradigm, ontological priorities are just the other way around. From the ontological perspective of tense logic, propositions, especially world-state propositions, should not be construed as "meanings" or any other sort of intentional entity. They are perhaps better understood as events or processes or states of affairs rendered as propositional wholes. In this way, tense logic renders as "internal" (in the form of temporal modalities) what the logic of the earlier-later relation theory renders as "external" relations between individuals.

In *The formalities of omniscience*, Prior utilizes an old theological argument to motivate denying (relative always to the assumption that there is a future at all) that for each proposition either it *will* be the case or its negation *will* be the case. For Prior, the only alternative to the denial is determinism. Fundamental to Prior's argument is the understanding of God's omniscience as being expressed by 'For each proposition *p*, if *p*, then God knows that *p*,' where 'knows' is understood here to be in the present tense—and thus God's knowing, like ours, is understood to be "in" and not "outside of" time. The argument is straightforward and utilizes the additional premiss that what is presently the case is now unpreventable in its being the case. Prior apparently accepts the conclusion, viz., that what will-be unpreventably-will-be, and opts to avoid this variant of determinism by rendering its antecedent vacuous. Thus, according to Prior, "nothing can be said to be truly 'going-to-happen' (*futurum*) until it is so 'present in its causes' as to be beyond stopping; until that happens, neither 'It will be the case that *p*' nor 'It will be the case that not *p*' is strictly speaking true" (p. 38).

Alternative options are of course denying the contingency of an omniscient knower in this sense and-or agreeing with Aquinas that God's omniscience is not to be construed as knowledge "in" time of whatever is the case (at that time). In addition, there is some question regarding the shift from the denial of *semantical bivalence* regarding contingent future tense *sentences* to the different denial (relative to the assumption that there is a future) of *ontological bivalence* that for each *proposition* either it will be the case or its negation will be the case. The *being* or *existence* of a proposition (or state-of-affairs) is its being-the-case or its not-being-the-case. Thus,

though we might make sense of how there can exist future tense sentences that are neither true nor false (e.g. where semantics is relativized to presuppositional contexts), it seems dubious that we can sensibly posit the existence of future tense propositions, i.e., propositions with futurity as their fundamental modality, that are neither the case nor not the case.

In several essays of this collection, Prior examines the notion of individual existence. In accordance with his view that propositions are ontologically dependent upon their constituents his basic position throughout is that "there are no facts about x to be stated except when x exists" (p. 147), and hence there are no relational facts about objects whose "life-spans" do not overlap. In *Tense logic for non-permanent existents* Prior attempts, by developing a system with a special operator for permanent or necessary stability, to explain how stability figures in the nature of propositions. In what sense of existence propositions may exist that are not permanently stable is not explained. In what sense of stability stable propositions are not intentional entities is similarly left unexplained, and, though the question of the stability of world-state propositions is raised, it is left unresolved. It is clear that much of how Prior understands tense logic as an ontological paradigm depends on this notion of stability and how it affects the ontological status of propositions.

NINO B. COCCHIARELLA

G. W. TURNER. *Time and place logic, a further discussion of A. N. Prior's 'Thank goodness that's over' (XXV 343(3))*. *Philosophy*, vol. 36 (1961), pp. 366–367.

The author makes some comments related to Prior's XXV 343(3) and notes the different devices for indicating tense in natural languages. He also observes that distinctions of place (e.g. near, far, further) are predominant in some languages. This leads him to suggest that "place logic" is just as possible as tense logic and that perhaps both might be treated as special cases of a general "present/absent" distinction.

ANTHONY ANDERSON

NICHOLAS RESCHER. *A version of the "master argument" of Diodorus*. *The journal of philosophy*, vol. 63 (1966), pp. 438–445.

HERBERT GUERRY. *Rescher's master argument*. *Ibid.*, vol. 64 (1967), pp. 310–312.

Rescher writes $Tt(p)$ for " p is true at the time t ," $Pt(p)$ for " p is possible at the time t ," and $Nt(p)$ for " p is necessary at the time t ," where " p " is assumed to be a temporally definite statement. His attempted reconstruction of the master argument consists in pointing out the incompatibility of the following four assumptions: A version of the principle of Excluded Middle (E.M.), $(\forall t)[Tt(p) \vee Tt(\sim p)]$; (1a) $(\forall t)(\forall t')[\{Tt(p) \& t < t'\} \rightarrow Nt'(p)]$; (2) $(\forall t)(\forall t')\{Pt(p) \& t < t'\} \rightarrow Pt'(p)$; (3) $Pn(p_0) \& (\forall t)[n < t \rightarrow \sim Tt(p_0)]$ for some p_0 (where $n = \text{now}$).

Of these, the last three are calculated to match Diodorus's triple of inconsistent assumptions. Instead of giving up any member of the triple (as the ancients did in different combinations), Rescher recommends rejecting E.M. Guerry points out, correctly, that the deterministic conclusion follows from (1a) and (2) without E.M. on non-problematic supplementary assumptions. He goes on to remark that E.M. is nevertheless incompatible with future contingencies, expressed by $(\forall t)((t < t_0) \rightarrow (\sim Tt(p_0)))$ for suitable t_0 and p_0 . (So far so good. But notice that in the ancient dispute the applicability of E.M. had no role because Diodorus's Stoic critics believed in it. For Stoic criticism see *Epictetus, The discourses as reported by Arrian, the manual, and the fragments*, vol. 1, Loeb Classical Library, London 1926, pp. 358–363; for Stoic defense of E.M. see page 28 of Mates's *Stoic logic* (XIX 71).)

Rescher does not claim full historical authenticity for his reconstruction of the master argument. He nevertheless tells us that it stays "within the orbit of recognizable Diodorean ideas." Hence it is perhaps in order to try to distinguish between what is Diodorean in this version and what is not.

Rescher's version is predicated on the assumption that the substitution-values of " p " are chronologically definite. This is very improbable historically. To the standard counter-evidence we may add a little-known passage of Sextus: "at the point of time that is midway in the throw, the proposition 'the ball touches the roof' is false . . . But when it has touched the roof the pret-