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NOTE ON RESCHER'S FORMALIZATION OF ARISTOTELIAN INDETERMINISM

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The recently developed tense-logics take, naturally enough, present-tensed statements as their atomic propositions and adjoin to these modal-like operators meaning "it is future that" and "it is past that".[1] One of the motives for the development of these logics is the view that only in such systems can indeterminism be satisfactorily reflected (roughly on the grounds that it is only propositions about the future that can be indeterminate). In the light of this it seems to me very odd that, so far as I know, there has been no discussion in the literature of a certain argument of Professor Nicholas Rescher's[2] since, were this argument correct it would make the construction of tense logics largely superfluous. What Rescher claims to have done is to combine Aristotle's contingency operator with *tenseless* definitions of "possibility" and "necessity" and *tenseless propositions containing dates* in a logic with three truth-values, **I** (indeterminate), **T** (true) and **F** (false), but *without* any tense-operators. If this succeeds it seems to me to be of considerable importance for it would mean that the principle reason for working on the calculus of tenses was quite misconceived, that all we need to depict indeterminism in a formal system is a third truth-value. What I try to show in this note is that Rescher's system really does contain tenses and that these should be explicitly symbolized to bring out the point of the system; otherwise it simply cannot be interpreted in the way he claims.

First of all, however, I think I should try to summarize the argument that a logic which takes indeterminism seriously (as Prior puts it) must contain tense-operators.

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1. See, for instance, A. N. Prior's books *Time and Modality*, Oxford (1957) and *Past, Present and Future*, Oxford (1967).

2. Nicholas Rescher, "Truth and Necessity in Temporal Perspective," in Richard M. Gale, ed., *The Philosophy of Time*, pp. 183-220, Section II, B.

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The fact that some natural laws "governing" human behaviour are irreducibly statistical may be a necessary condition for genuinely intentional behaviour, but it is not sufficient. One of the reasons it is not sufficient (the only reason we need consider here but probably not the most important one) is that we can only affect or effect supposed future events. Thus a symbolical system which reflects the sort of indeterminism necessary to human "freedom" must, on the fact of it, contain tense and/or modal operators of the sort that Aristotle sometimes discusses, e.g., a necessity-operator which attaches only to propositions about the past and a contingency-operator which only attaches to propositions about the future. That the indeterminacy of scientific laws will not do the job required here is clear from the fact that a *past* event may be "indeterminate" in the sense of having a probability less than one. (Not only is this formally awkward, but it may even be "unscientific" if it is really true that modern science suggests that the distinction between past, present and future is "mind-dependent" or in some other way non-objective.)

Rescher seems to avoid tenses but preserve a symbolism reflecting indeterminism in the following way. Looking at the whole time-series there are four possibilities for any given proposition on Rescher's scheme. (The line at the bottom represents the times at which a proposition can have one of the truth-values.)

(1) All **T**'s = necessity
(2) All **F**'s = impossibility
(3) **IIIITTTT** (indeterminate and then true) } = contingent (neither nec-
(4) **IIIIFFFF** (indeterminate and then false) } essary nor impossible)

TIME $\rightarrow$ $t_{-3}t_{-2}t_{-1}t_0t_1t_2$

This appears to provide an exact means of expressing indeterminism without having to introduce tense-operators (or the mysterious dictum, "The past is necessary, the future 'open'"): a contingent proposition qt_0, for instance, is simply described as indeterminate at any time prior to t_0 and true or false at any time thereafter (and this description apparently involves no use of tenses and/or temporal indexical expressions). But I think this fails for the following reason. *If the propositions which putatively satisfy (3) or (4) are genuinely tenseless as they are supposed to be, then there is no reason whatever for saying that they are indeterminate prior to a certain time: a tenseless proposition containing a date if true at any time is true at every other time.* What makes Rescher's counter-proposal *seem* plausible is connected with the fact that at t_2 no one could *know* the truth-value of qt_0. But if we attempt to treat this as a criterion of *having* a truth-value, i.e., q has X truth-value means, someone knows or could *now* know q's truth-value, not only have we tacitly introduced tenses, but the whole point of Aristotle's distinctions as an expression of indeterminism has been lost because *every* proposition becomes contingent, on the grounds that no-one can now know that any (non-mathematical) proposition is always true or always false. One might attempt to save Rescher's position by replacing this criterion of having a truth-value, (can be *now* known to have such-and-such a truth-value) with, can (tenseless "can") be known to

have X truth-value. But this also fails since one can in that sense know at t_{-2} qt_0's truth-value: one *can* simply wait until t_0. The picture that renders a schema like Rescher's intelligible is the idea of seeing the whole time-series at once; so that one knows which propositions are true at which times, but a logician in such a preternatural position would clearly have no use for indeterminate truth-values. Lastly suppose that t_0 in the above diagram is (speciously) thought of as the *present time* (unconsciously doing this would be another way of making Rescher's scheme look correct). Then the only grounds for saying that qt_2, for instance, is indeterminate at t_{-2} but true at t_2 is that "at" t_{-2}, t_2 *was future*; so (on this interpretation) the propositions are really understood as tensed, *and it is this which gives them their various modalities*. In general it appears that the only way of preserving Aristotle's results is through the somewhat logically odd method of preserving his sense of "necessary" in which it only applies to propositions genuinely about the past (and not just in a past tense) and his sense of "contingent" in which it only applies to propositions about the future. Thus tensed operators would also be required, explicitly, or tacitly understood as in one reading of Rescher's scheme.

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