ROCZNIKI FILOZOFICZNE
Tom LXVI, numer 4 – 2018
ENGLISH ONLINE VERSION
DOI: http://dx.doi.org/10.18290/rf.2018.66.4-10en

JAN WOLEŃSKI

IS THE PAST DETERMINED (NECESSARY)?

Marcin Tkaczyk analyzes in his writings the so-called antinomy (cf. TKACZYK 2015; TKACZYK 2018) of future contingents. The antinomy consists, generally speaking, in that the following arrangement of propositions is inconsistent (earlier version — TKACZYK 2015, 5):

(A) There is no way to change the past;
(B) The future can be influenced at least in part;
(C) Every proposition is either a true or false;

Proposition (B) implies that some events are contingent, while propositions (A) and (C) lead to the conclusion that there are no such events (I will analyze more closely one of the versions of the antinomy of future contingents in a later part of this paper).

The assumptions in TKACZYK 2018 are as follows:

(D) Every past state of affairs is determined;
(E) At least some future states of affairs are contingent;
(F) Every state of affairs can be represented at any time.

Further on, I will consider a combination of both these groups in the following form:

(1) Every past state of affairs is determined;
(2) At least some future states of affairs are contingent;
(3) Every proposition is either true or false (the principle of bivalence).

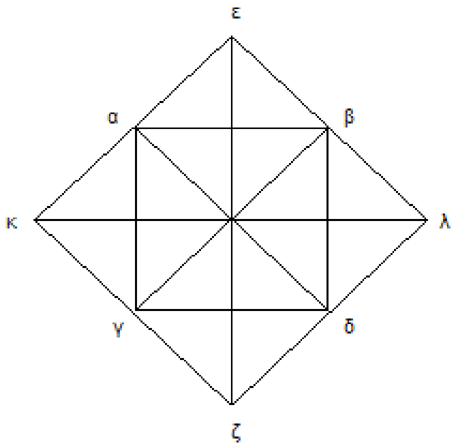
The claims (1)–(3) seem to me better fitted for logical analysis than (A)–(C) or (D)–(F). The problem with the first group is excessive anthropologism, i.e. assuming that something can be influenced or not. When it comes to the se-

Prof. dr hab. JAN WOLEŃSKI — Professor Emeritus Uniwersytetu Jagiellońskiego, obecnie Katedra Nauk Społecznych, Wydział Administracji i Nauk Społecznych, Wyższa Szkoła Informatyki i Zarządzania z siedzibą w Rzeszowie; adres do korespondencji — e-mail: jwolenski@wsiz.rzeszow.pl. ORCID: https://orcid.org/0000-0001-7676-7839.

cond group, it is not clear what it means that every state of affairs can be represented, since the question "By whom?" arises immediately — as well as the question what is the logical (or cognitive) value of nonexistent states of affairs. (1)–(3), on the other hand, are free from abovementioned difficulties. I should add that I am not discussing the problem of equivalence, e.g. of (F) and (3).

My analysis focuses in the first place on (1) and (2). I will argue that there are no grounds for accepting the assumption (1) in the version stating that to be determined is to be the same thing as to be necessary. If my observation is correct, the antinomy of future contingent events, e.g. in the form of Diodorus Cronus' Master Argument (further on this reasoning will be commented upon in more detail), does not arise. Even if the past is determined, it is possible to show, by means of a simple metalogical argument, that future contingent events can exist. The principle of bivalence plays a role in the whole reasoning insofar as it is its metalogical environment. I mention the consequences of rejecting this principle with reference to the problem we are discussing only incidentally. Tkaczyk thinks that the antinomy in question can be removed by limiting (1) to the statement that the past is partially open (undetermined). He is right, but in my argumentation (based on my papers: WOLEŃSKI 1996, WOLEŃSKI 2008, and WOLEŃSKI 2015) I try to show a different road to putting (1) into question.

I interpret the operator "it is determined that" so that it has a modal character. It is proposition-forming, i.e. produces propositions of the form "it is determined that *A*", is a description of a state of affairs. Because of that, a logical basis for farther analysis is provided by the diagram (**D1**) of the following form:



The first interpretation of particular points goes as follows (for convenience, I am employing a *de re* verbalization: α—A is determined ($\mathbf{D}A$); β— $\neg A$ is determined ($\mathbf{D}\ \neg A$); γ— $\neg(\neg A$ is determined) ($\neg\mathbf{D}\neg A$); δ— $\neg(A$ is determined) ($\neg\mathbf{D}A$); ε—A is determined or $\neg A$ is determined; ($\alpha \vee \beta$; $\mathbf{D}A \vee \mathbf{D}\neg A$); ζ – $\neg(\neg A$ is determined) $\wedge$ $\neg(A$ is determined) ($\gamma \wedge \delta$; $\neg\mathbf{D}\neg A \wedge \neg\mathbf{D}A$); κ – A is actual; A – an analogy with being true, since A is actual if and only if A; λ – $\neg A$ (A is not actual; $\neg A$). We have two possibilities concerning contingency, namely δ (that A is contingent means that A is undetermined) and ζ (that A is contingent means that A is not determined and $\neg A$ is not determined)). I choose the second option, immediately noting that accepting the *de re* verbalization leads to the question how it is related to the *de dicto* reading—or, more precisely, since the first way concerns states of affairs and the second way concerns propositions, what is the relation between both these interpretations. I assume that they are formally equivalent.

The logic connected to (**D1**) comprises, among other things, the following dependencies (I give verbal versions only for the two last ones, which are especially relevant):

(4) (a) $\alpha \Rightarrow \varepsilon$;
(b) $\alpha \Rightarrow \gamma$;
(c) $\beta \Rightarrow \varepsilon$;
(d) $\beta \Rightarrow \delta$;
(e) $\neg(\alpha \wedge \beta)$;
(f) $\gamma \vee \delta$;
(g) $\neg(\alpha \Leftrightarrow \delta)$ $(\neg(A \wedge \neg A))$;
(h) $\neg(\beta \Leftrightarrow \gamma)$ $(\neg(A \wedge \neg A))$;
(i) $\zeta \Rightarrow \gamma$;
(j) $\zeta \Rightarrow \delta$;
(k) $\neg(\varepsilon \Leftrightarrow \zeta)$ $((\neg(A \wedge \neg A))$;
(l) $\alpha \vee \beta \vee \zeta$;
(m) $\varepsilon \vee \zeta$;
(n) $\kappa \Rightarrow \gamma$;
(o) $\lambda \Rightarrow \delta$;
(p) $\kappa \vee \lambda$ $(A \vee \neg A)$;
(q) $\alpha \Rightarrow \kappa$ (if A is determined, then A is actual);
(r) $\beta \Rightarrow \lambda$ (if $\neg A$ is determined, then $\neg A$ is actual).

The conjunction of (g) (or (h), or (k)) and (p) results in the metalogical principle of bivalence (the product of the principle of contradiction and the principle of excluded middle) which is a thesis of metalogic in the light of the diagram (**D1**). Regularities (q) and (r) (just as the formulas $\alpha \vee \beta$ and $\gamma \wedge \delta$ are not the laws of logic).

Dependencies in (4) as well as e.g. inversions (q) and (r), insofar as they concern states of affairs, can be assumed to belong to formal ontology (in the sense of Ingarden), i.e. to an ontology which establishes the possible ontological scenarios modulo classical logic, no matter if they are realized in the real world. Thus, we can say that (**D1**) determines formal-ontological relations, though explicated by logical means. Nonetheless, the question what ontological scenario is realized in reality, e.g. whether reality is completely determined (this is a makeshift verbalization) or contains future contingents, is a metaphysical problem (again in the sense of Ingarden; I omit here his distinction between formal and material ontology). Differentiating between formal ontology and metaphysics (the name is not very relevant here) is crucial and suggests a clear distinction between two aspects of the problem of future contingent events, namely formal-logical and metaphysical aspect. As usual in such cases, the border between formal ontology and metaphysics is not always clear and sometimes, as it certainly is the case in my further remarks, both kinds of questions coexist and even interweave. One should also note that formal ontology is not limited to logic, since e.g. the rule $\kappa \Rightarrow \alpha$ is formal but extralogical, that is, it has not justificatiuon in a logicxal theorem.

The following three diagrams introduce the formal aspect. First let us consider

PAST **FUTURE**

(D2) ———————————————— ***t*** **??????????????????????**

Here **PAST** is the past, while ***t*** is the point dividing the past from the future (**FUTURE**). Question marks illustrate the way of representing the future. The following two diagrams represent appropriate possibilities (*A* is a future state of affairs; as for now, we do not assume anything more about it):

PAST **FUTURE**

(D3) ———————————————— ***t*** ———————————— *A*

PAST ———————————— *A*

(D4) ———————————————— ***t*** ▌ **FUTURE**

———————————— $\neg A$

PAST encompasses the past and the actual. (**D3**) suggests that future contingents do not exist, whilst (**D4**), on the contrary, states that at least some states of affairs are contingent.

We say that the set of propositions **X** is incomplete if and only if there are propositions *A* and ¬*A* such as neither one of them belongs to the logical consequences of the set **X**. The following metalogical theorem is connected to that (cf. ASSER 1972, 168–9):

(5) (a) The set of propositions **X** branches at the formula *A* if and only if the sets **X** ∪ {*A*} and **X** ∪ {¬*A*} are non-contradictory;
(b) The set of propositions **X** is branchable if and only if there is a formula *A* at which the set **X** branches;
(c) The set of propositions **X** is branchable if and only if it is incomplete.

If **X** branches, sets **X** ∪ {*A*}, then **X** ∪ {¬*A*} are non-contradictory. From the model-theoretical (semantic) viewpoint those sets have models. The set **X** can be supplemented with farther elements taken from the couples of the type {*A*, ¬*A*}. Lindenbaum Maximalization Theorem guarantees that such iterations leads to a maximally non-contradictory sets of propositions, i.e. such that any supplementation of them leads to a contradiction (the entire logic is included in every maximally non-contradictory set). There is an infinite number of such sets.

Since I am assuming the equivalence of the language of states of affairs and the language of propositions about them, I also assume that at least some theorems of metalogic find application in formal ontology. This is true also about (5), which is formulated for propositions but can be adapted to states of affairs (however, one should keep in mind that such an adaptation is a paraphrase of logic for philosophical purpose). Since there is no reason to assume that **PAST** is a complete set, we conclude that, since it is incomplete, it is also branchable; this is visible on the diagram (**D4**), since the two branches begin at point *t*. States of affairs at branching points are contingent. The result can be paraphrased for the purposes of formal ontology in the form of the thesis:

(6) If the past is incomplete, future contingent states of affairs exist.

The number of such states of affairs is not theoretically limitable (a conclusion from Lindenbaum Theorem). Once more, I emphasize that as far as **PAST** is concerned we only assume that it is actual and in the past.

Logic, however, cannot decide if the set **PAST** is complete or incomplete. Because of that, (6) is formulated conditionally. If this is the case, the question whether the diagram (**D3**) is (metaphysically) possible is valid and bears an obvious connection to the problem of determinism. How to define determinism (and, *a fortiori,* indeterminism)? Not through α, as it could seem at first glance, but through $\alpha \vee \beta$. Speaking more precisely (it is convenient to assume that *A* is neither a tautology nor a contradiction):

(7) (a) radical determinism (**RD**); $\forall A(\varepsilon)$, $\forall A(\alpha \vee \beta)$, $\forall A(\mathbf{D}A \vee \mathbf{D}\neg A)$;
(b) radical indeterminism (**RI**); $\forall A(\gamma \wedge \delta)$, $\forall A(\neg\mathbf{D}A \vee \neg\mathbf{D}\neg A)$;
(c) moderate determinism (**MD**); $\exists A(\alpha \vee \beta) \wedge \exists A(\gamma \wedge \delta)$;
$\exists A(\mathbf{D}A \vee \mathbf{D}\neg A) \wedge \exists A(\neg\mathbf{D}A \vee \neg\mathbf{D}\neg A)$
(d) moderate indeterminism (**MI**); $\exists((\gamma \wedge \delta) \wedge \exists A(\alpha \vee \beta)$;
$\exists A(\neg\mathbf{D}A \wedge \neg\mathbf{D}\neg A) \wedge \exists A(\mathbf{D}A \vee \mathbf{D}\neg A)$.

From the purely formal viewpoint, **MD** and **MI** are indistinguishable, but they can differ by the arrangement of what is determined and contingent. In particular, **MD** focuses on determination, while **MD** focuses on contingency.

These descriptions of determinism (and indeterminism) are formal-ontological. One of the ways of moving away from metaphysics is to discuss the relation between determination and actuality. As already noted, the former implies the latter (just like $\neg A$ being determined implies that A is not actual). Because the opposite does not take place on purely logical grounds, since A is actual, it can be either determined or contingent. This is the distinction which I will consider basic in the course of further analysis. A convenient way to read the formula located at the point γ (it is not determined that $\neg A$) is "it is possible that A". As a consequence, A being contingent is the same as A being possible and $\neg A$ being possible. One can acknowledge possibility to be an auxiliary category helpful in defining contingency. In accordance with that, the proposition "$\neg A$ is determined" means "A is impossible"; this justifies characterizing determinism by means of the notion of necessity (and, *a fortiori*, because of what has been established earlier, determination). Since actuality can be determined or contingent, the following three options are possible:

(8) (a) if A is actual, A is determined;
(b) if A is actual, A is contingent;
(c) if A is actual, A is determined or A is contingent.

It is easy to notice that (8a) corresponds to **RD**, while (8b) corresponds to **RI** and (8c) to **MD** and **MI**. This correlation shows that the analysis we have performed is somehow adequate.

The ambiguity of actuality immediately leads to the question of how to define it in a more precise way. Since it is the sum of determination and contingency, there is no chance to make a non-trivial generalization here, because the propositions "A is determined" and "A" is contingent" contradict each other. Of course, one can say, for instance, that what happens is actual, but that category calls for additional explanation. Since the notion of contingency has been defined via possibility (a way often taken), the way to explain what determinism is consists of adding necessity to the clause of determination or even identifying both notions. Such a solution is suggested by the equivalence of $\neg A$ being determined and A being impossible. Thus, the proposition "A is determined" is equivalent to the proposition "A is necessary". Dependencies enumerated in (4) remain in force for the formulas in which "is necessary" replaces "is determined". The diagram (**D1**) reflects this new interpretation of modality, employed in analyzing determinism. In particular, necessity implies actuality (the reverse connection does not hold). What is more, what is actual is either necessary or contingent. **RD** states that everything is necessary, while **RI** states that everything is contingent and **MD** and **MI** state that some states of affairs are necessary and other ones are contingent.

Formal-ontological analysis does not have to touch upon the way in which necessity is defined. It is enough to assume that it is a non-empty category, i.e. that it is possible to formulate an ontological model which includes necessary states of affairs. Optionally, one can add a restriction (a very provisional explanation of a fragment of modal semantics) that, if the proposition A is necessary in the real world, it is true in every possible world alternative to it. For instance, if we understand necessity nomologically (as determined by the set of the laws of nature in the real world) **W,** its nomological alternative (nomological possible world) is every world allowed by those laws (particular alternatives only by boundary conditions). However, this analysis is incomplete, since it does not explain the meaning of the notions of necessity and possibility employed in formal-ontological analysis. Here we enter the area of metaphysics. Radical rationalists in the vein of Leibniz will probably say that they are logical modalities. Nonetheless, if we assume (as I do) that the operator "is necessary" is to produce the true proposition "it is necessary that A", A becomes a logical tautology, deterministic necessity (to use such a modifier) cannot be logical—if only because A, as I assumed earlier, is neither a tautology nor a logical contradiction. If this is the case, the expression "is necessary" in the context of determinism expresses some necessity—metaphysical (ontological, if we do not take there to be a difference between ontology and metaphysics), real, nomological etc. We can say that: if A is logically necessary, it is metaphysically necessary (logic is satisfied in every ontological model), but not the other way around. Different ways of outlining more precisely what is extralogical necessity are known; one of them assumes the connections between the natures of things or between their essence and their existence, the nomological structure of reality (relativized to the laws of nature) or causality respecting the condition "if *A* is the cause of *B*, then, if *A* occurs, *B* has to occur too". It is well known that such explications are subject to extreme controversy, e.g. constantly repeated objections put forward by Hume and stating that causality cannot be reduced to the stable succession of events. Nonetheless, a certain amount of metaphysics (in the systematic and not pejorative sense) seems to be necessary here.

The status of the past is metaphorically described by a well-known saying "what's done is done", expressing the thought that the past cannot be changed. This is the intuitive account of the premise (D) (every past state of affairs is determined, i.e. necessary). Tkaczyk takes it to be a logically necessary proposition. This premise determines the autonomy of future contingent events, because, if the past consists solely of necessary states of affairs, it has only one continuation in **FUTURE** (the diagram (**D3**)). On the other hand, if we assume that the propositions corresponding to contingent states of affairs should be added to tautologies as theorems, it leads to a contradiction. However, this is the case only in classical propositional calculus, which is implied by its Post-completeness. Insofar as we assume—which is more justified—that predicate calculus is the logical basis, adding contingent truths to the theorems of that system does not lead to contradictions. Let us consider the argumentation of Diodorus Cronus (following TKACZYK 2018). According to him, the following three propositions cannot be jointly accepted without falling into contradiction:

(G) Every proposition about the past is necessary;
(H) Some proposition is possible but is not and will not be true;
(I) A possible proposition is not followed by an impossible proposition.
(I) States that impossible propositions (contradictions) do not follow from possible propositions (metalogical truth), (H)—that there are contingent truths, (G)—that the past is necessary (determined, closed). As a consequence, there are no contingent states of affairs, which means that everything is necessary (what is possible will sooner or later become actual).

Premise (G) is crucial here. One of the ways to justify it is assuming that a past actuality is a necessity. This leads to a substantial modification of logic following from the diagram (**D1**), which consists of the propositions (*A* is actual) (point α) and the proposition "*A* is necessary" (point κ) being logically equivalent. This corresponds to the statement that every truth is necessary and every falsity is impossible. As a result of such a modification, the points κ , λ, γ, δ and ζ disappear. There are no contingent states of affairs, and the law of excluded middle becomes the formula $\alpha \vee \beta$ (which is not the law of classical logic). There is nothing surprising here: if every truth is necessary, then every falsity is impossible. Rejecting the law of excluded middle leads, in accordance with the intuitions of Łukasiewicz, to questioning the principle of bivalence. Future contingents acquire e.g. third logical value (cf. TKACZYK 2015, Ch. 5–7)—this is the case with the propositions *A* and $\neg A$ from (**D4**). However, if we remain in the area of classical (two-valued) logic, necessity in the sense we are considering becomes a logical category. No wonder that the diagram (**D3**) gives an adequate account of the situation, since logic does not branch. However, a radical determinist does not have to be a rationalist in the vein of Leibniz: he can believe that, when he talks about radical determinism, he means that everything happens as a result of the connections of the type ⟨real antecedent, real consequent⟩ such that the first element of such a relation unambiguously (out of necessity) determines its second element. Then the diagram **PAST** is a complete set and (**D3**) can be considered an illustration of **RD**.

Tkaczyk proposes the following solution (TKACZYK 2018, 29–30) I am changing the names of the theses to the ones used in the current paper):

> It turns out that in order to solve all versions of the antinomy of future contingents it is enough to assume that events—even the present and the past ones—which represent contingent events are contingent themselves. Such an assumption makes it impossible to accept thesis (D). One can, however, accept a weaker thesis instead:
>
> Every past event which does not represent a contingent event is determined. (1′)
>
> As we can see, (1′) does not constitute a simple denial of (1), but its weakening. Limiting the scope of the thesis about the closed past concerns only one group of events, namely, the events which represent some future state of affairs, being reflections of some future event.
>
> Fortunately, weakening the premise (1) in this way solves the antinomy of future contingents. The theses (1’), (G) and (H) make up a non-contradictory set.

As noted earlier, (F) does not seem to me sufficiently clear. This extends to (1’). In my scheme the thesis in question means that every past event which is not determined (necessary) is contingent. Thus, the notion of representation is not needed. To put it differently, proposition (1’) means that there are past contingent events and is consistent with **MD** (or **MD**) with reference to the past. As it has already been mentioned, I consider Tkaczyk’s view to be accurate in terms of the ideas involved. I will argue in support of it by showing that nothing forces us to acknowledge that the past is necessary, i.e. consists solely of necessary states of affairs. If this is the case, the definition of contingency (A is contingent if and only if A is possible and $\neg A$ is possible) suggests the diagram (**D4**) as consistent with the intuition, i.e. if A belongs to future contingents, A can occur and $\neg A$ can occur. This means that the sets **PAST** $\cup \{A\}$ and **PAST** $\cup \{\neg A\}$ are non-contradictory.

The non-necessity of the past has strong intuitive grounds. Casimir III the Great could have had a male heir and a successor to the throne. The same is true about Sigismund II Augustus. If it had been the case in one of these two cases, the history of Poland would have taken a different direction. As a rule, historians avoid such speculations or, to use another jargon, counterfactual conditionals, being interested in the first place in what was actual. Nonetheless, a point t is a parameter which can be located at any point in time. When we consider things which really happened, there are metaphysical reasons, so to speak, for t to not pertain to the future. At the same time, however, one is free to consider (**D4**) as a fitting scheme for counterfactual analysis of the past. This does not change the fact that what was actual was just that, and is irreversible (maybe except for the speculations concerning a possible return to the past—which does not mean that such speculations are incoherent fictions; cf. MULLER 2018, 255–78). It should be repeated that the negation of what is actual does not have to lead to a contradiction. It would be difficult to take the proposition "Casimir III the Great had a son who became his successor" to be self-contradictory.

The argument above concerns individual states of affairs. A radical determinist can answer that they are only superficial phenomena which depend on hidden regularities, e.g. necessary causal-effectual connections. As a consequence, we have only one maximally non-contradictory set (complete, of course) extending **PAST.** This conclusion, however, is based on the metaphysics stemming from the belief that there are real necessities, e.g. those operating nomologically in the same way as logical universality. This makes the negation of what is necessarily real logically contradictory. Nonetheless, nomological contradiction is not reducible to the formula $A \wedge \neg A$. The special relativity theory of the speed of light is constant is not coherent with Newtonian mechanics but does not lead to a logical contradiction. This suggests that extralogical necessity, even if for some reason (e.g. for the purpose of the analysis of the laws of nature) desirable, should be differentiated from the logical one. One way or the other (except for the views like those of Leibniz), so-called deterministic necessities are not contingent from the viewpoint of logic. Thus, though the past cannot be changed, it is contingent *sub specie logicae.* Even if we acknowledge that the nomological structure of reality is preternal and eternal, it leaves space for future contingent states of affairs. One can optionally introduce different farther distinctions in the area of what is contingent, but that will not change the general picture. The latter is such that **MD** (or **MI**) is a proper metaphysical environment for the considerations concerning future contingent states of affairs. The assumption **RI** solves the problem in a trivial way, because, since everything is contingent, future events are contingent too. In the light of **MD** (or **MI**), the view motivated e.g., to give a couple of examples, by statistical physics, quantum mechanics or fractals, the theories which are empirical and thus refer to the real world are essentially incomplete. It is this picture that sanctions the presence of future contingents in the metaphysical view of the world.

I will finish with some theological remarks concerning the (omni)science of God, a problem with significant presence in Tkaczyk's writings—though I make them as a non-specialist. We can probably agree that the set of propositions concerning what happened in the past is true, i.e. every proposition which belongs to this set is true. Let us call this set $\mathbf{PAST}^{\mathbf{VER.}}$ It is only a fragment (a proper subset) of the set of all truths. Let the symbol $\mathbf{PAST}^{\mathbf{VER(t)}}$ mean the set of truths actualized at the moment t and pertaining to the real world **W** as a semantic model of this set (I omit here some questions connected to taking reality to be a semantic model). Along with the passage of time (actualization of the future) our initial set extends, i.e. for every $t' > t$ it is so that $\mathbf{PAST}^{\mathbf{VER(t)}} \supset \mathbf{PAST}^{\mathbf{VER(t')}}$. Let us consider the sum **VER** of all sets of the type $\mathbf{PAST}^{\mathbf{VER(t)}}$, i.e. the sum of all truths about **W**. It is a class in the set-theoretical sense (e.g. a too "large" set within the system of Zermelo--Fraenkel) expressing the knowledge *sub specie aeternitatis*—a good candidate for divine knowledge. Such a sum of truths is, of course, incomplete, and thus fulfils only the condition of uniqueness. This means that there is no difference between God's foreknowledge and his knowledge, insofar as the term "divine omniscience" is to be understood literally. In particular, the difference between **PAST** and **FUTURE** is of no significance from the viewpoint of **VER**. This, in turn, means that the set of future contingents in this situation is empty—also because divine knowledge is necessary. The problem for the theologian is that, if the world was created by God, fatalism with reference to human choices seems to be unavoidable. The difference between **PAST** and **FUTURE,** on the other hand, cannot be eliminated from the viewpoint of human knowledge. Formally speaking, for every temporal point t there is a point t' such that $\mathbf{PAST}^{\mathbf{VER(t)}} \subseteq \mathbf{PAST}^{\mathbf{VER(t')}}$, while both these sets are incomplete. The problem which arises in this connection is that future contingents can be interpreted epistemologically—as stemming from human ignorance rather than from the ontological structure of the world. Thus, a radical determinist has a reason to initiate another round of discussion. But this is something I wish to only signal here.

Translated by Sylwia Wilczewska

REFERENCES

MULLER, Richard A. 2016. *Teraz. Fizyka czasu.* Translated by Tomasz Krzysztoń. Warszawa: Prószyński i S-ka. (The English original *Now. The Physics of Time* was published in 2016 by W.W. Norton & Company.)

TKACZYK, Marcin. 2015. *Futura contingentia.* Lublin: Wydawnictwo KUL.

TKACZYK M. 2018. "The Antinomy of Future Contingent Events." Roczniki Filozoficzne 66, no. 4: 5–38 (the current volume).

WOLEŃSKI, Jan. 1996. "Kwadrat logiczny – uogólnienia, interpretacje." In *Logika & Filozofia logiczna*, edited by Jerzy Perzanowski and Andrzej Pietruszczak, 45–57. Toruń: Wydawnictwo Uniwersytetu Mikołaja Kopernika.

WOLEŃSKI, Jan. 2008. "Applications of Squares of Oppositions and Their Generalizations in Philosophical Analysis." *Logica Universalis* 2, no. 1: 13–29. (Reprinted in: Jan WOLEŃSKI. *Essays on Logic and Its Applications in Philosophy.* Frankfurt am Main: Peter Lang, 2011, 255–69).

WOLEŃSKI, Jan. 2015. "An Analysis of Logical Determinism." In *Themes from Ontology, Mind and Logic. Present and Past. Essays in Honour of Peter Simons*, edited by Sandra Lapointe, 423–42. Leiden: Brill.

IS THE PAST DETERMINED (NECESSARY)?

S u m m a r y

This paper is inspired by Marcin Tkaczyk's works and discusses the problem of the necessity of the past (is the past determined?) and its role in the analysis of future contingents. The discussion centers on the statements (accepted by Tkaczyk, but slightly paraphrased)) firstly, that every past state of affairs is determined, and, secondly, that at least some some future states of affairs are contingent. The paper argues that because the first assertion is not justified, the antinomy of future contingents does not arise. The argument uses modal and metalogical devices.

CZY PRZESZŁOŚĆ JEST ZDETERMINOWANA (KONIECZNA)?

S t r e s z c z e n i e

Praca niniejsza jest inspirowana twórczością Marcina Tkaczyka i omawia problem konieczności przeszłości (czy przeszłość jest zdeterminowana?) i jej roli w analizie przyszłych zdarzeń przygodnych. Dyskusja skupia się na stwierdzeniach (zaakceptowanych przez Tkaczyka, ale nieco sparafrazowanych): po pierwsze, że każdy dotychczasowy stan rzeczy jest ustalany, po drugie, że przynajmniej niektóre przyszłe stany są przypadkowe. Artykuł dowodzi, że ponieważ pierwsze twierdzenie nie jest uzasadnione, nie powstaje antynomia przyszłych zdarzeń przygodnych. Argument korzysta ze środków modalnych i metalogicznych.

Key words: past; future; logical square; incompleteness; bivalence.
Słowa kluczowe: przeszłość; przyszłość; kwadrat logiczny; niekompletność; biwalencja.

Information about Author: Prof. Dr hab. JAN WOLEŃSKI — Professor Emeritus of the Jagellonian University, now at Department of Social Sciences, Faculty of Administration and Social Sciences, University of Information Technology and Management in Rzeszow; address for correspondence—e-mail: jwolenski@wsiz.rzeszow.pl. ORCID: https://orcid.org/0000-0001-7676-7839.

The preparation of the English version of *Roczniki Filozoficzne* (*Annals of Philosophy*) and its publication in electronic databases was financed under contract no. 753/P-DUN/2017 from the resources of the Minister of Science and Higher Education for the popularization of science.