Summaries

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Zdzisław Augustynek
Spacetime relations
The author distinguishes and defines main types of spacetime relations and examines their ontical nature. He shows that almost all other spacetime objects can be defined by them. A very important part of the paper is devoted to pointing out many aspects of the relations concerned and a research about connections among them (e.g. definitional connections) is made. Finally, connections between spacetime relations and some other («external», «physical») relations are discussed.

Jan Czerniawski
Reality of relativistic effects
This is a defence of some kind of reality of relativistic effects, against the thesis that they are mere kinematic appearances or deceptions.

Maciej Gos
Mathematical models of spacetime in modern physics and basic issues of ontology of spacetime
Assuming that formulation of General Theory of Relativity gave rise to the attempts to formulate uniform field theory of matter, it must be emphasised that the work that inquired most deeply into its consequences for spacetime ontology and, morover, for general ontology of physics that resulted from analysis of new physical theories, was H. Weyl's *Space Time Matter*.

The most important ontological consequence of the field image of matter is a return to the Cartesian, purely geometrical definition of matter (the world of physical events) since all events which constitute the physical world are merely manifestations of disturbances of metric field identical with 3 + 1 dimensional manifold (spacetime), which has the structure of pseudo-Riemann's space. Mathematical structure of metric field (spacetime) is described by means of metric tensor of this field, which, therefore, includes — according to the field theory of matter — all the information about physical world. The same metric tensor leads immediately to associations with Plato's *Timaios*, where the

surface structure of the world — events — was defined by deep geometric structure: systems of platonic bodies. Therefore one can separate a tendency in ontology of physics consisting in an aspiration for full geometrization of physics and the notion of matter and physical event; a tendency represented by Plato, Descartes, H. Weyl and R. Thom.

General Theory of Relativity binding inseparably distribution of energy - momentum (of events) with metric structure of spacetime became, to a high degree, a final solution of the famous dispute between Leibniz and Newton's follower Clarke concerning ontological status of spacetime. First, General Theory of Relativity seemed to confirm Leibniz's position, however so called „empty solution" of Einstein-Hilbert's equation given by de Sitter which describes world without matter-energy (empty), having however well defined geometrical structure of spacetime, seems to establish some compromise between positions of both opponents.

In addition the relationship between the structure of spacetime and physical events is also emphasized by the physical theory referring to the world of subatomic events — quantum theory of the field or, strictly speaking, quantum electrodynamics being a part of this theory. The very notion of quantum field as nonnumerable set of quantum oscillators and definition of the vacuum as not excited quantum field makes it impossible to regard vacuum as empty spacetime, totally independent from distribution of matter-energy. It results from the uncertainty principle.

Moreover, the latest researches concerning the structure of physical spacetime conducted by physicists as well as mathematicians also reveal important consequences in the domain of ontology of physics. The structure of spacetime of classical mechanics i.e. 3-dimensional Euclidean space with time and 4-dimensional Minkowski spacetime, proves the existence of the structure which is basic in relation to them — the space of spinors, which has complex dimension 2 (Manin, Penrose).

The first important conclusion is the fact that the discovery of this structure (holomorphic differentiable manifold) makes it possible to regard the stipulation of homogeneity of spacetime as more scientific one and not only metaphysical one as it was before. Global analysis of holomorphic differentiable manifolds enables us to move from what is local (observable so belonging to the sphere of science) to the thesis which gains global, which means ontological, status.

Summing up, it must be noticed that the discoveries of Manin and Penrose in their defining the fundamental structure (complex) of spacetime also refer over the centuries to the geometrized ontology of physics from Plato's Timaios. The complex structure (space of spinors or twistors) corresponds to geometric substance of Plato's world — i.e. triangles and their sets — Plato's bodies, while Euclidean space with time and Minkowski spacetime as the structures in the frames of which one can make definite physical measurement correspond to the surface structure of Plato's world — events, which are the manifestation of geometrical substance of nature.

Ryszard Kleszcz
Logical rationality
The author presents an argument that the notion of rationality of beliefs must not be so restrictive as it is according to usual definitions. I.a. the postulate of effective elimination of all contradictory beliefs should be withdrawn because nobody has the possibility to derive and examine all the consequences of his beliefs. The final author's proposal is to enclose a kind of merely potential mechanism of elimination of contradictory beliefs into the notion concerned.

Pascal Engel, Fréderic Nef
Identity, vagueness and essence of objects (translated from French by Mariusz Kowalski)
The authors analyze some kinds of soritical, modal and temporal paradoxes and examine different ways of solving them. They reject the assumption that it is the essence of object that may cause a paradox due to its vagueness; we shall not abandon classical logic as well. The explanations and solutions for paradoxes can be found in vagueness of modal logic rather or in usual (and vague) way we use our language.

Kazimierz Twardowski
The theory of judgements
This paper is a part of a series of lectures on logic delivered by Kazimierz Twardowski in the John Casimir University in Lvov during the first semester of the academic year 1902-1903. This publication of the paper is a hommage to the founder of Lvov-Warsaw School in the centenary of his first lecture in Lvov University.