# Abstracts

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**Karol Polcyn, Objects, Their Parts, and Essences**

According to some philosophical views, parts of objects (either three-dimensional or four-dimensional) and whole objects are distinct entities. This raises the question of how to identify objects and their parts across possible worlds. By the principle of the necessity of diversity, the distinctness of objects and their parts must be preserved across possible worlds and this, paradoxically, seems to imply that in other possible worlds objects cannot be temporally or spatially different from what they actually are. For example, it seems that if Descartes and his temporal part are two distinct objects, Descartes could not have lived any shorter than he actually did. I argue that we can avoid this paradoxical conclusion once we realize that no temporal part of Descartes can be identified in other possible worlds with an independently existing person. In general, the view I defend is that parts of objects are not identical with independently existing objects across possible worlds.

*Keywords*: parts of objects, essential properties, trans-world identity

**Tomasz Rzepiński, Empirical Evidence in a Process of Clinical Decision Making**

The subject of this article is to discuss epistemological issues related to the process of obtaining empirical evidence in medicine. This paper will present how N. Cartwright, J. Worrall and P. Urbach describe the function of the randomisation procedure in this process. Based on these findings, it will be possible to define an alternative method of obtaining empirical evidence for the purpose of making clinical decisions. This method involves data analysis using the Rough Set Theory proposed by Z. Pawlak. By applying this method, a deterministic algorithm for making clinical decisions can be formulated. Being an interesting alternative to statistical approaches that dominate in medicine, the RST method generates specific epistemological prob-

lems. Therefore, it seems to constitute an interesting subject of analysis for philosophers of science.

*Keywords*: epistemology, empirical evidence, clinical decision, causal relation, randomization

**Piotr Warzoszczak, The Later Carnap and Contemporary Metaphysical Debates. Part I, The Later Carnap Views on Ontology and Fictionalism**

In the paper I consider the prospects of interpreting late Carnap view on ontology as being in part a sort of fictionalism. More precisely, I argue that the theses he maintained in the volume of *The Library of Living Philosophers* devoted to his philosophy, in which he concerned with semantics in general and the confirmation of existential claims, make his account of an ontologically uncommittal acceptance of existential claims, as presented in his *Empiricism, Semantics, and Ontology*, unsatisfying. In this work, he claimed that — to put it roughly — one can accept existential claims as true relatively to rules that constitue the linguistic framework in which these claims are formulated and that from the truth relative to these rules one can't derive any conclusion about the objective truth of these existential claims. But in the volume of *The Library of Living Philosophers* he adopted a new view on the nature of semantic values and took them to be extralinguistic entities. This change forced him to redefine the notion of being true relative to rules of the liguistic framework in terms of being true in admissible models of this language, where a model is an admissible model of a given language, if all meaning postulates of this language are satisfied in that model. This change of the view calls for an explanation of how it is possible to take some existential claims to be true in a model without accepting the existence of entities in the domain of that model. Following S. Yablo's view expressed in his *Does Ontology Rest on Mistake*, I suggest that one can accept the thesis that existential claims are satisfied by some extralinguistic entities in some model in a spirit of make-believe in which one makes supposition that there are such entities and that they satisfy these existential claims. I also argue against propositions of interpreting Carnap as a *quasi*-realist on the ground that this kind of interpretation doesn't give a justice to the distinction between internal existential claims and pragmatic external existential claims, i.e. those claims that should be treated as claims about pragmatic values of a given linguistic framework.

*Keywords*: ontology, metaontology, deflationism, Carnap, fictionalism, quasi-realism

**Iwo Zmyślony, Tacit Knowledge — Typical Ways of Interpretation**

How the idea of tacit knowledge is being understood typically? The article reconstructs interpretations in context of three different disciplines: (1) linguistics, (2) cognitive psychology and (3) sociology of knowledge. Furthermore, it proposes (4) definitional criteria for a general notion of tacit knowledge.

Within philosophical interpretation of N. Chomsky's generative grammar, the term refers to knowledge of linguistic universals and grammar rules. This knowledge is tacit, since it manifests only through ability to (a) recognize grammar proprieties of expressions in natural language, as well as to (b) generate and understand practically infinite number of them. According to J. Fodor it can be identified with ability to speak (making verbal utterances), hence cannot be substantially distinguished from any other forms of embodied or habitual knowledge. According to alternative interpretation this kind of tacit knowledge (a) has propositional status, (b) is innate and (c) enable all possible grammar forms to be deduced from it.

Within context of cognitive psychology tacit knowledge is understood habitually, i.e. as knowledge that manifest itself only through skilful action and cannot be linguistically verbalised. This idea derives form distinction between declarative and procedural memory, inspired by G. Ryle's distinction between *knowing how* and *knowing that*. Habitual knowledge is (a) completely unaware or almost unaware, (b) cannot be fully made aware nor verbalised, is (c) person-related and (d) context-specific.

Third way of understanding was proposed by Harry Collins, who has recently (2010) introduced three own types of tacit knowledge — (a) somatic, (b) relational and (c) collective. According to his idea knowledge has basically tacit character, since it circulates „throughout the universe" as physically understood information („pattern") inscribed on different physical carries („strings"). Relational tacit knowledge can be fully verbalized and implemented in human body or any physical automaton. Somatic tacit knowledge cannot be fully verbalised, since – apart of its *quasi*-mechanical dimension – it also includes improvisatory (ever-adaptive) aspect of human skills, it can be however transferred to animals (like riding a bike). Collective tacit knowledge cannot be verbalised at all – it is specific exclusively to social dimension of cognitive activities (like driving a car), i.e. cannot be transferred to any sort of animals or automata.

Apart of descriptive reconstruction of listed ideas, the article propose four general criteria to define an idea of tacit knowledge *sensu largo*. According to author's stand, the term „tacit knowledge" designates (a) all kinds of non-propositional knowledge or unaware propositional knowledge; (b) all kinds of *a priori* knowledge; (c) dispositional knowledge (skills; competence); (d) knowledge conceived as information acquired by any organic system through permanent interaction with environment.

*Keywords*: tacit knowledge, somatic tacit knowledge, collective tacit knowledge, embodied knowledge, habitual knowledge, procedural knowledge, non-propositional knowledge, knowledge by acquaintance, know-how, knowing how, skills, epistemic skills, linguistic skills, competence, cognitive scheme, scientific intuition

**Roman Duda, Remarks on Mathematical Matter and the Role of Mathematical Notions**

Primary object of interest of mathematicians can be identified as a „mathematical matter", the concept analogous to „physical matter" or „biological matter". The „mathematical matter" is the soil upon which mathematics grows. One can distinguish three levels of it: some abstract but not necessarily clear conceptions, operational notions (like number) but not necessarily openly defined, theories not necessarily axiomatic. The „mathematical matter" originates in the abstract reflection upon events and forms in time and space. Its important elements are notions formed mostly in the process of idealization and/or abstraction. Once formed, notions usually evolve being, e.g., simplified or complexified. Mathematics is a mirror of the world, most abstract and therefore fundamental. Although it is a free activity of human mind, mathematics reflects some deep ideas (beauty, simplicity etc.) while most interesting notions come up in tension fields between pairs of poles: the notion of a function can be seen as a bridge connecting variability and immutability, while that of a limit — connecting finiteness and infinity. A fusion of freedom and internal restrictions leads to mathematics which is simple, beautiful and effective.

*Keywords*: mathematical matter, notions, deep ideas, tension fields

**Jerzy Dadaczyński, Arithmetic at the Origin of Hilbert's Abstract Conception of Geometry**

In 1891, Hilbert came to the conclusion that geometry is not a science of the physical space but is an abstract science. Hilbert's new position was repeated in the introduction to *Grundlagen der Geometrie* in 1899. The aim of this paper is to show the sources of change of Hilbert's position in 1891. We showed that the direct source of the change was having heard a lecture by Wiener on projective geometry. Wiener presented there a project of geometry as a science of abstract objects i.e. objects as sets of minimal number of — only relational — properties. We showed that this idea was derived by Wiener from Dedekind's arithmetic of natural numbers, presented in 1888 in *Was sind und was sollen die Zahlen?* Thus — and this is the essential thesis of our paper — the original source of Hilbert's idea of geometry as a abstract science is included in Dedekind's concept of arithmetic.

*Keywords*: Hilbert's geometry, Wiener H., Dedekind's arithmetic, Dedekind's algebra

**Paweł Stacewicz, What Connects the Mind with the Theory of Numbers?**

According to the methodology of cognitive science we consider a hypothesis (justified partially by cognitive applications of computer science), that the mind functions similarly to a computer. Philosophical consequences of this thesis are as follows: (1) there exists a mental code (similar to the code of computer program); (2) this code can be represented as one unique number; (3) this number can be computable or non-computable.

If the number representing mental code is computable (by Turing machine), then it is theoretically possible to implement the mind (all cognitive processes) by means of digital techniques of data processing (because digital computers are equivalent in a theory to Turing machines). If the „mental number" belongs to a class of non-computable numbers, however, it is highly possible that only other techniques (for example, analog or partially random ones) can guarantee an overall computer implementation of human cognition.

*Keywords*: coding, mental code, computable number, non-computable number, Turing machine, data processing

**Agnieszka Mycka, Jerzy Mycka, Is Music Embodied Mathematics? Case Study of the *Statuit* Introit**

The article starts with various definitions of music and its components (taken especially from medieval sources). Then the *Statuit* introit is presented as the main example useful for mathematical analysis in the paper. We discuss the distinction between a musical work and its performance and give a review of possible representations/ notations of music with their short mathematical characteristics. The next point is devoted to the concept of modality, Gregorian scales and selected theories linking musical experience with mathematics. We use the *Statuit* introit as the illustration for the construction of its statistical analysis (for notes, intervals and progresses). The results of this analysis serve as a reference point to indicate the connection between the process of musical composition and the apparatus of mathematical linguistics. Based on the above considerations we suggest that the pattern analysis could be useful as a tool unifying some aspects of music and mathematics and explaining the perception of musical works.

*Keywords*: mathematical aspects of music, Gregorian chant, musical composition and linguistic patterns