I l k k a   N i i n i l u o t o

Kotarbiński's Semantic Reism

1. Kotarbiński's Career

Tadeusz Kotarbiński (1886–1981) was a prominent member of the Lvov-
-Warsaw School[1]. He studied in Lwów in 1907–1912 as a student of Kazimierz
Twardowski and served as Professor of Philosophy at the University of Warsaw
in 1919–1960, where his colleagues included the logicians Jan Łukasiewicz and
Stanisław Leśniewski. Their most celebrated student was Alfred Tarski.

Kotarbiński is internationally best known as the founder of praxeology. His
main work on "the sciences of efficient action" was published in English in
1965. His main area of academic teaching was logic in the broad sense, which
includes ontology, philosophy of language, and philosophy of science[2]. Kotar-
biński announced his own ontological-semantic theory of "reism" in *Elementy
teorii poznania, logiki formalnej i metodologii nauk* [Elements of the theory of
cognition, formal logic and the methodology of sciences] (1929), which was at
the same time a textbook for students and a demanding scholarly study. In
preparing this work he received "invaluable help" from Dina Sztejnbarg, who
after the Word War II became his wife, Janina Kotarbińska. A critical review of
Elementy was published by Kazimierz Ajdukiewicz in 1930. The 1961 revised

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[1] For the development of this school, see Woleński (1989).
[2] For studies on Kotarbiński's work, see Woleński (1990). For my own study of Kotarbiń-
ski, see Niiniluoto (2002).

and expanded Polish edition was translated into English as *Gnosiology: The Scientific Approach to the Theory of Knowledge* (1966). Its main parts deal with language, gnosiology (theory of knowledge), formal logic, general methodology of science, and special branches of science. It also includes Ajdukiewicz's review as an appendix and a selection of Kotarbiński's own writings from the years 1937–1958.

2. Semantic Reism

Gnosiology (hereinafter: *G*) starts with three chapters on language. Basic semantical notions like expression and denotation are introduced, but debates on the reference of proper names by John Stuart Mill and Gottlob Frege are not discussed.

Kotarbiński's main project was to distinguish semantically meaningful and meaningless linguistic expressions. This is achieved by checking whether a statement is reducible to a form which contains only concrete terms (*G*, p. 422). Such *concrete terms* may be singular (e.g. "King Jan Sobieski"), general (e.g. "whale", "white") or empty (e.g. "chimera"). They are thus nouns and adjectives which "name" things or persons. Concrete terms are contrasted to *apparent terms* or *onomatoids*, which are not names of things[3]. Such apparent terms are as such meaningless, but can be allowed in statements if their use is reducible to a concrete form. Thus, Kotarbiński's *semantic reism* can be conveyed by the thesis:

(SR) To be semantically meaningful, a statement has to contain only concrete terms or to be reducible to such a form.

For example, the statement "Whiteness is a property of snow" is equivalent to "Snow is white", and "The relation of seniority holds between John and Peter" is equivalent to "John is older than Peter", so that the onomatoids "property", "relation", "whiteness", and "seniority" are eliminable.

Kotarbiński's list of onomatoids includes names of abstract objects ("property", "relation", "state of affairs", "fact", "event", "concept", "meaning"). Set or class in the distributive meaning studied in set theory is an onomatoid (e.g. "the set of planets"), while set in the collective meaning studied in Leśniewski's mereology is concrete (e.g. "a heap of sand") (*G*, p. 12). But "Mars belongs to the set of planets" is reducible to "Mars is one of the planets of the solar system". In the chapters and supplements on methodology, Kotarbiński gives further examples of apparent terms: hypostases in science

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[3] The term "onomatoid" for apparent terms was introduced in 1951 (see *G*, p. 401).

("matter", "space", "time") and the humanities ("literary work", "legal code"). Yet, Kotarbiński allows theoretical terms in science if they name unobservable concrete things (e.g. "electron", "proton", "magnetic field", "microbe") (*G*, pp. 331, 481)[4].

3. Ontological Reism

Ajdukiewicz noted in his review that Kotarbiński should distinguish his semantic reism (given by the principle SR) from real (ontological, material) reism (*G*, p. 518). Indeed, it is clear that Kotarbiński's semantic reduction is based on the ontological assumption that there are no objects such as whiteness or sets. Thus, *ontological reism* can be formulated using the following thesis (see *G*, p. 55):

(OR)   There are no other objects than things.

When Adjukiewicz objected that it is tautological to claim that all objects are things, Kotarbiński replied that things have to be understood as concrete individuals located in space and time with physical characteristics (*G*, p. 434). Later, he called this view *concretism*[5]. In his *pansomatism*, Kotarbiński further argued that all sentient beings with a psyche are physical objects, so that there are no mental entities, in opposition to Brentano's dualist reism and Leibniz's spiritualist reism (*G*, pp. 427–428). Kotarbiński's ontological reism is thus an extreme form of *nominalism* and reductive *physicalism* (cf. Woleński 1989, p. 242).

Ajdukiewicz also objected that negative theses like "Properties do not exist" are meaningless by the reist's own standards. Kotarbiński replied that such theses are not negations in the ordinary sense, but indicate the nonsensical nature of claims like "Properties exist" (*G*, p. 433).

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[4] In this respect, Kotarbiński's position can be classified as a form of scientific realism (see Niiniluoto 2002).

[5] Simons (1993, p. 221) notes that the definition of concretism should be paraphrased without using pseudo-names like "space", "time", and "characteristic". His proposal is "Everything is an object which is somewhere, somewhen, and physically somehow or other".

4. Leśniewski's Ontology

In his chapter on formal logic, Kotarbiński relied on Leśniewski's Ontology (calculus of names)[6]. Leśniewski was a nominalist[7], and Kotarbiński highly admired his logic. In this system, the basic form of judgement is "*A* is *B*", where the copula "is" connects the subject *A* and the subjective complement *B* (*G*, p. 190). This judgement is *true* if the object denoted by *A* is the object denoted by *B*; in this way Leśniewski avoids phrases like "The object denoted by *A* has the property connoted by *B*", which are not acceptable for a reist (*G*, p. 430)[8].

Leśniewski's axiom gives an interpretation for reading "*A* is *B*". It states that there is one and only one *x* that is *A* and for any *x*, if *x* is *A* then *x* is *B* (*G*, p. 191). It follows that if *A* is empty, "*A* is *B*" is false. For singular terms *A* and *B*, this judgement "*A* is *B*" is an identity statement, and its truth means that the objects denoted by *A* and *B* are the same individual (e.g. "King Jan Sobieski is the deliverer of Vienna"). For singular *A* and general *B*, where *B* as a common noun denotes separately several designata, the preferred reading is "*A* is one of the *B*s" (*G*, pp. 10–12). Similar treatment of predication is needed when *A* and *B* are both general, since then "*A* is *B*" is interpreted as "Every *A* is *B*", i.e. for every *x*, if *x* is *A* then *x* is *B*, and there is *x* such that *x* is *A* (*G*, p. 194).

Woleński (1986) concludes that, from the viewpoint of the nominalist program, Leśniewski's Ontology has some advantages over the standard set--theoretical semantics of predicate logic. But does this calculus of names really succeed to give truth conditions for predication without using problematic notions such as property? To say that *A* is one of the *B*s works well if *B* is closed, so that its interpretation can be given by a fixed finite list. "Poland is a member of the EU" means that "Poland is one of 27 members of EU", which reduces this statement to a disjunction with 27 disjuncts. But if *B* has an open-ended and historically changing extension (e.g. white, philosopher), a reist needs an explanation of what is common to the *B*s without using unacceptable onomatoids such as properties or universals (e.g. whiteness)[9]. This leads to hard philosophical problems of nominalism, of which David Armstrong (1978) gives a classical account. *Predicate nominalism* simply claims that some

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[6] Kotarbiński's summary is much easier to read than Leśniewski's (1992) technical presentation. See also Woleński (1986).

[7] However, Simons (1993) argues that Leśniewski was committed to the existence of mental images and an infinite hierarchy of abstract entities.

[8] In Carnap's (1942) logical semantics, predicates are taken to designate properties or relations, but he does not discuss the ontological status of properties.

[9] Platonist or Aristotelean universals are not acceptable to nominalists.

objects are white, because we apply the predicate "white" to them, but this fails to explain why this predicate is applied to snow but not, e.g., to blueberries. *Class nominalism* states that *B* defines a class as its extension, but this answer is not available to Kotarbiński, who rejected sets and classes in his ontology. *Resemblance nominalism* states that the *B*s are similar to each other, but this would require the existence of the resemblance relation, which also is rejected in reism. If predication is left without analysis, the resulting *ostrich nominalism* is philosophically idle or question-begging. Unfortunately, Kotarbiński never solved these issues, and so his position seems to be closest to ostrich nominalism (see Niiniluoto 2002, 2004). Peter Simons (1993, p. 224), agrees that reism cannot provide an adequate account of simple predication, and suggests that we should invoke entities like "individual accidents" or "moments"[10].

Another problem for Kotarbiński is that his account of Leśniewski's system does not handle relational statements like "John is older than Peter" or "Warsaw is between Helsinki and Cracow", and it may be difficult to give a separate treatment of such sentences in the calculus of names.

5. Kotarbiński on Truth

Following Twardowski's tradition, truth is objective and absolute for Kotarbiński. As a nominalist, he applied the notions of truth and falsity to indicative sentences. He argued against the pragmatist or utilitarian conception and against the relativisation of truth to persons (*G*, pp. 106–113). He also rejected the redundancy theory of truth. The classical doctrine that truth is "accordance with reality" is correct and can be expressed by the following (*G*, p. 107):

(T) John thinks truly if and only if John thinks that things are so and so, and things in fact are so and so.

This defence of the correspondence theory of truth was historically significant, since Tarski referred to Kotarbiński as his starting point in his 1933 monograph and in his 1944 paper on the semantic conception of truth (see Tarski 1956, 1944). Indeed, Tarski declared that, in writing his classical exposition in 1933, he repeatedly consulted Kotarbiński's *Elementy* and followed its terminology (see Tarski 1956, p. 153), and in 1956 Tarski even dedicated his *Logic, Semantics, Metamathematics* to his teacher Kotarbiński.

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[10] This alternative, which is not discussed by Kotarbiński, is the theory of tropes or property-instances. In 1923, G.E. Stout called them "abstract particulars". According to this theory, concrete objects are mereological sums of tropes, and properties are classes of similar tropes. Thus, an object is red if it has a red-instance as its part. See Niiniluoto (2012).

The formulation (T) looks very much like Tarski's T-equivalence, which was his adequacy condition for any definition of truth. (T) does not presuppose the existence of facts as an ontological category, and similarly Tarski systematically avoided the use of facts or states of affairs in his theory: the semantic definition is given by reference to the class of "all individuals" rather than facts, even though already in 1935 Tarski defined the concept of "truth in a structure" (see Niiniluoto 2004) and his later model theory in the 1950s uses the set-theoretical framework[11].

6. The Rise of Semantics

To see Kotarbiński's place in the rise of semantics, one may note how earlier approaches to truth disagreed with reism. Bertrand Russell (1912) formulated the correspondence theory of truth in terms of universals, and Ludwig Wittgenstein in his *Tractatus logico-philosophicus* (1922) asserted that "The world is the totality of facts, not of things" (1.1), while sentences are isomorphic pictures of facts.

In the Vienna Circle, which published its *Manisfesto* in favour of the scientific world view in 1929, the phenomenalists gave a verificationist account of truth as a relation between statements and perceptual phenomena (Moritz Schlick, Friedrich Waismann), while the physicalists (Otto Neurath, Carl G. Hempel) advocated the coherence theory of truth (see Niiniluoto 1999)[12].

Kotarbiński combined the correspondence theory of truth with physicalism already in 1929. Carnap visited Warsaw in November 1930 and met Kotarbiński, and some months later "converted" from the phenomenalist basis of his constitution system to physicalism: the language of unified science is physical (see Carnap 1963, pp. 29–31). But, as Woleński (1989, p. 300) notes, ontological reism (OR) as a form of physicalism is expressed in the material mode (rather than in the formal mode used in SR), so that it is "metaphysical" by Carnap's standards.

Carnap met Tarski in Vienna in 1935 and was convinced about the possibility of expressing semantics in metalanguage (see Carnap 1963, p. 60–61).

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[11] A referee of this paper points out that Tarski had difficulties in reconciling the potential infinity of the class of all objects with the hypothesis of materialism. Indeed, Tarski presented in his Warsaw seminar in 1928 what is later called the "upward Löwenheim-Skolem theorem": if a set of sentences has an infinite model, then it has a nondenumerable model (Vaught 1974, p. 160). So the application of the concept of truth to mathematical theories (e.g. Peano arithmetic) leads to classes with higher infinite powers. These results should worry nominalists like Kotarbiński, who rejected all sets in his ontology, but they were accepted in the later set-theoretical programme of model theory.

[12] For translations of classical articles, see Ayer (1959).

With his lecture on truth in the Paris conference in 1935, Tarski was successful in converting also Hempel and Karl Popper to accepting the objective account of semantic truth.

7. Conclusion

As a philosopher in the Lvov-Warsaw School, Kotarbiński influenced the development of semantics via his student Tarski. The combination of correspondence truth and physicalism was ahead of its time in 1929. Ontological reism shares philosophical difficulties of nominalism; especially the rejection of sets is problematic for the foundations of mathematics and for model--theoretical semantics. Semantic reism is still relevant as a healthy programme of eliminating excessive metaphysical terminology.

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I l k k a   N i i n i l u o t o

Kotarbiński's Semantic Reism

Tadeusz Kotarbiński (1886–1981) was a prominent member of the Lvov-Warsaw School. He is most famous as the founder of praxiology, but his contribution to ontology and semantics was significant as well. Kotarbiński introduced the doctrine of reism (in *Elementy* [Elements], in 1929). Ontological reism is a radical form of nominalism; it claims that there are no other objects than things or concrete individuals. Semantic reism claims that meaningful statements have to contain only concrete terms (names of things). Other terms are apparent or "onomatoids", and they should be eliminable from meaningful statements. In his doctrine, Kotarbiński appealed to Leśniewski's Ontology (calculus of names). He also advocated a version of the classical correspondence theory of truth (without assuming the existence of facts, states of affairs, and sets). He combined this view with his reism, which accepts physicalism (all psychic beings are physical objects). This position differed from the Vienna Circle, where the correspondence theorists (Moritz Schlick) were phenomenalists and the physicalists (Otto Neurath) supported the coherence theory.