



A TRACTARIAN SYSTEM OF OBJECTS

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One of the prominent formal reconstructions of Ludwig Wittgenstein’s *Tractatus Logico-Philosophicus* was devised by the Polish logician Roman Suszko (1919–1979). In accordance with the basic ontological categories of the Tractarian ontology, Suszko’s formal system contains an ontology of situations called the “*s*-ontology,” and an outline of an ontology of objects called the “*o*-ontology” (see Suszko 1968). The former is a Boolean algebraic system of situations, whereas the latter is spelled out in set-theoretical terms. This paper will focus on Suszko’s *o*-ontology.¹

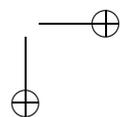
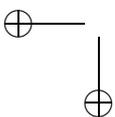
According to the *Tractatus* a state of affairs is a configuration of objects (particulars). The primary objective of the *o*-ontology is to capture this thesis. Whereas a situation was taken as the undefined primitive term of the *s*-ontology, an object is the undefined primitive term of the *o*-ontology. However, the configurations of objects that constitute the structures of states of affairs are explained by employing abstract objects (universals). I will begin by presenting the main axioms, definitions and theorems of the *o*-ontology. This will prepare the ground for examining the adequacy of the *o*-ontology as a model for the *Tractatus*. Although the *o*-ontology clarifies the central notions pertaining to configurations of objects, Suszko’s set-theoretical path will be shown to be very limited. A nominalistic alternative to the *o*-ontology, however, will be pointed out.

1. *The O-Ontology*

Like many systems of classical logic, the system of *o*-ontology includes the identity predicate, which is introduced by the axiom

$$(1) \quad \forall x(x = x).$$

¹ For a detailed discussion of the *s*-ontology see Berber (2007) and Berber (2008).



Additional axioms for the predicate of identity follow from the scheme of axioms

$$(2) \quad x = y \rightarrow (\varphi(x) \leftrightarrow \varphi(y)).$$

The definition for negating identity

$$(3) \quad (x \neq y) = N(x = y)$$

is included for abbreviation. An additional predicate introduced into the formal language of the *o*-ontology is the monadic predicate of object. Its definition is

$$(4) \quad Ox = (x = x).$$

The sentential formula Ox simply means that x is an object. The predicate of being an object is a universal predicate. This is captured by the theorem

$$(5) \quad \forall xOx.$$

Configurations of objects, according to the Tractarian terminology, should be identified with states of affairs, namely atomic situations. The configurations considered in the *o*-ontology consist of a finite number of objects. Since there may be different possible configurations of objects, say x_1, \dots, x_n , Suszko infers that the notion of configuration must contain a hidden parameter. The parameter is revealed by using a nominal variable R that makes it possible to distinguish between the different configurations. Thus, the R -configuration of objects x_1, \dots, x_n is the holding of the corresponding n -ary relation among the objects x_1, \dots, x_n , formalized as $R * x_1, \dots, x_n$.²

The corresponding definition in the *o*-ontology is then

$$(6) \quad \text{the } R\text{-configuration of } x_1, \dots, x_n = R * x_1, \dots, x_n.$$

A peculiar aspect of the formal language is that in addition to the identity predicate it also includes a sentential identity connective. That is, if p, q are sentential formulas, then $p = q$ is a sentential formula. Accordingly, the identity between the simplest kind of situations, namely states of affairs and

² Suszko uses the asterisk $*$ as a syntactically ambiguous symbol. Namely, it is an operator that forms either a sentential or a nominal formula $\psi_0 * \psi_1, \dots, \psi_m, \varphi_1, \dots, \varphi_n$ together with $m + 1$ nominal formulas and n sentential formulas for any natural number m, n such that $m + n \neq 0$. In particular, if $n = 0$ then $*$ is either an $(m + 1)$ -ary predicate or an $(m + 1)$ -ary functor.

configurations of objects is captured by the formula

$$(7) \quad SAp \leftrightarrow \exists R \exists x_1 \dots \exists x_n (p = R * x_1, \dots, x_n),$$

where SA is the sentential connective of state of affairs. This formula states that a situation p is a state of affairs if and only if p consists in a certain relation holding between some objects. Although this formula should be assumed as an axiom of the o -ontology, Suszko enumerates several reasons for its inadequacy. Before considering these reasons, however, note that with formula (7) the structure of states of affairs could be easily formulated.

Let R, S be n -ary and m -ary relations, respectively. And let $x_1, \dots, x_n, x_{n+1}, \dots, x_{n+m}$ be arbitrary objects. Consider the states of affairs $R * x_1, \dots, x_n$ and $S * x_{n+1}, \dots, x_{n+m}$. If $n \neq m$ then the structures of these states of affairs are different. On the other hand, if $n = m$ then the states of affairs $R * x_1, \dots, x_n$ and $S * x_{n+1}, \dots, x_{n+m}$ have the same structure in a weak sense, that is, they simply have the same number of objects. In order to capture a stronger sense of structural similarity between states of affairs, Suszko uses the notion of isomorphism. Let C be a correspondence between the domain of R and the domain of S , assigning to the elements x, y of the domain of R certain objects $C * x$ and $C * y$ in the domain of S . If, in addition, the conditions $x \neq y \rightarrow C * x \neq C * y$ and $R * x_1, \dots, x_n \leftrightarrow S * (C * x_1), \dots, (C * x_n)$ hold, then the correspondence C is an isomorphism between R and S . This makes it possible for Suszko to spell out the stronger sense of structural similarity. Namely, the states of affairs $R * x_1, \dots, x_n$ and $S * x_{n+1}, \dots, x_{n+m}$ have the same structure in the strong sense with respect to correspondence C if and only if C is an isomorphism between R and S and $x_{n+k} = C * x_k$ for $k = 1, \dots, n$.

The objects of the *Tractatus* are given nominalistic interpretation in the o -ontology, that is, they are considered particulars or individuals as opposed to universals or abstract objects. A different question, however, is whether the Tractarian ontology also accepts the existence of abstract objects in addition to these objects. Indeed, the proposed interpretation of configurations of objects results in a realistic formal ontology, for the revealed parameter R represents relations that are, in turn, abstract objects. Of course, the adequacy of both of these assumptions concerning the Tractarian ontology must be examined.

2. Objects

In assessing the adequacy of the o -ontology as a model for the *Tractatus* it would be instructive to allude to Bertrand Russell. Explaining his definition

of a particular (individual) in *The Philosophy of Logical Atomism* Russell says that

In order to understand the definition it is not necessary to know beforehand 'This is a particular' or 'That is a particular'. It remains to be investigated what particulars you can find in the world, if any. The whole question of what particulars you actually find in the real world is a purely empirical one which does not interest the logician as such. (Russell, 1985: 60)

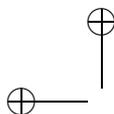
The characterization of a particular in a logical rather than empirical context clearly parallels Wittgenstein's view as reported, for example, by Norman Malcolm:

I asked Wittgenstein whether, when he wrote the *Tractatus*, he had ever decided upon anything as an *example* of a 'simple object'. His reply was that at that time his thought had been that he was a *logician*; and that it was not his business, as a logician, to try to decide whether this thing or that was a simple thing or a complex thing, that being a purely *empirical* matter! (Malcolm, 1984: 70)

Putting empirical considerations aside then, the appropriate question concerning Russell's particulars or Wittgenstein's objects is their corresponding logical characterizations. For Russell (1985: 60) the definition of a particular is "Particulars=terms of relations in atomic facts. Df." In other words, particulars are explained in the context of relations. However, an object for Wittgenstein is not explained in the context of a relation but simply, using Russell's terminology, as any term occurring in an atomic fact. What "is essential to things", according to Wittgenstein, is "that they should be possible constituents of states of affairs" (TLP 2.011).³ Unlike Russell, Wittgenstein does not condition the occurrence of an object (thing) in a state of affairs by being a term of relations.

Note, however, that in the second edition of *Principia Mathematica* Russell (1963: xix–xx) says that "An 'individual' is anything that can be the subject of an atomic proposition. Given an atomic proposition $R_n(x_1, x_2, \dots, x_n)$, we shall call any of the x 's a 'constituent' of the proposition, and R_n a 'component' of the proposition." He then adds in a footnote that he takes this terminology from Wittgenstein. For Russell every atomic fact consists of one, and only one, component (called a universal) that is an element of

³ Whether or not predicates and relations are taken in the *Tractatus* as possible constituents of states of affairs will be discussed shortly.



the atomic fact relating the particulars together. While the objects in the *Tractatus* are constituents of states of affairs, there is no additional element (component) in the state of affairs that relates the objects together. Wittgenstein stresses that “In a state of affairs objects fit one another like the links of a chain” (TLP 2.03). This point is also stressed in Wittgenstein’s comments to Charles Kay Ogden on the English translation of the *Tractatus*:

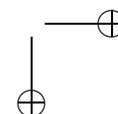
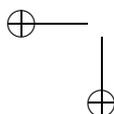
Here instead of “hang one on another” it should be “hang one in another” as the links of a chain *do*! The meaning is *that there isn’t anything third* that connects the links but that the links *themselves* make connexion with one another. So if “in” in this place is English please put it there. If one would hang *on* the other they might also be glued together. (Wittgenstein, 1973: 23)

There is then no relation that is a component of the state of affairs and that relates or “glues” the objects together. According to Wittgenstein, the way that objects fit one another is an internal feature of the objects. An object’s possibility to be configured with other objects, that is, its possibility to occur in states of affairs, depends on its “internal properties” (TLP 2.01231). Wittgenstein characterizes these possibilities by using terms such as “the nature of the object” (TLP 2.0123), and speaks about the possibility that is “written into the thing [object] itself” (TLP 2.012).⁴

Although there is no additional object, namely, a relation that relates the objects in a state of affairs, it is still an open question whether Wittgenstein takes the objects only to include individuals, or to also include universals. This is a notorious exegetical problem and I agree with Scott Soames (2006: 432) that the *Tractatus* is “inexplicit on this issue, and pulling in both directions.” Perhaps, as pointed out by Hacker (2006: 127), a later statement of Wittgenstein can resolve the issue. In particular, a case for a realistic interpretation of the objects of the *Tractatus* is given in the notes taken by Desmond Lee during the years 1930–1931 from a discussion with Wittgenstein:

2.01. “An atomic fact is a combination of objects (entities, things)”. Objects etc. is here used for such things as a colour, a point in a visual space etc: cf. also above, A word has no sense except in a proposition. “Objects” also include relations; a proposition is not two things connected by a relation. “Thing” and “relation” are on

⁴The status of this internal feature will be considered in section 4.



the same level. The objects hang as it were in a chain. (Wittgenstein, 1980: 120)

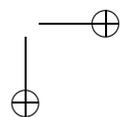
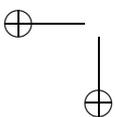
However, even Wittgenstein’s own later interpretation is not without problems. As noted by Anthony Kenny (1986: 71), taking an object as a colour misrepresents the *Tractatus*. For “objects are simple” (TLP 2.02) and “cannot be composite” (TLP 2.021), whereas colours, according to TLP 6.3751, have a logical structure.

Although unclear about the categorical status of objects, Wittgenstein is very clear about their symbolic representation. He says at TLP 3.22 that “In a proposition a name is the representative of an object” and adds that “Names are the simple symbols: I indicate them by single letters (‘x’, ‘y’, ‘z’)” (TLP 4.24). Therefore, whether objects are taken as individuals or universals they are represented by names. Since names are represented by nominal variables, it is possible to use the nominal variables in order to represent objects. From a formal point of view then the objects of the *Tractatus* can be taken to be, as Wittgenstein says, “on the same level.” Thus, the question of whether properties and relations are objects can be left open for the present discussion. Whatever the objects turn out to be, it is possible to take them as the basic category that constitutes the range of the nominal variables without distinguishing between different kinds of objects⁵ (cf. Lokhorst, 1988: 37). And indeed, this is precisely how objects are formalized in the *o*-ontology. As will be shown next, the use of nominal variables for objects turns out to be crucial for the characterization of configurations of objects.

3. Configurations

In addition to the sentential variables the language of the *o*-ontology also includes nominal variables ranging over a universe of objects. Although Suszko is not interested in the relation between language and the world in the *Tractatus*, there is a striking similarity between the formalization of configurations of objects in the *o*-ontology and the representation of states of affairs in the *Tractatus*. This can be seen by the following considerations. Note that the semantic counterpart of a state of affairs is an elementary proposition. Accordingly, Wittgenstein says that “An elementary proposition consists of names. It is a nexus, a concatenation, of names” (TLP 4.22). The correspondence between an elementary proposition and a state of affairs is guaranteed

⁵ It should be noted that Irving M. Copi (1966: 182) considers the relation between nominal variables and objects as what he calls a “symbolic evidence” for the nominalistic reading of the Tractarian objects. This view, in turn, is criticized by Merrill B. Hintikka and Jaakko Hintikka (1986: 36) where they also bring symbolic evidence for a realistic reading.



by having the same number of elements (TLP 4.04), the same configuration of elements (TLP 3.21), and the correlation between their elements: "One name stands for one thing, another for another thing, and they are combined with one another. In this way the whole group — like a tableau vivant — presents a state of affairs" (TLP 4.0311).

However, as observed by Pitcher (1964: 125–7), a concatenation of names by itself, say "*a-b-c*", does not determine a unique state of affairs. He contends that the problem is resolved in the *Tractatus* by taking elementary propositions as values of propositional functions (see TLP 3.318). To see this, note that the elementary proposition "*a-b-c*" can be the value for the arguments '*a*', '*b*', '*c*' of the propositional function "*x-y-z*". The latter can simply be written in standard notation as "*R(x, y, z)*", in accordance with TLP 4.24: "I write elementary propositions as functions of names, so that they have the form '*fx*', '*φ(x,y)*', etc." Pitcher stresses that in order to represent different configurations of a given number of objects the standard notation recommends itself, for it is possible to use different relation symbols to represent the different ways given objects are related. The language of the *o*-ontology also includes nominal variables such as *R, S* characterized as relation symbols. As noted above, these are used to reveal the hidden parameter. But the latter's *raison d'être* is to distinguish between different configurations of objects. Since configurations of objects are states of affairs, it turns out that Suszko uses the same means for formalizing states of affairs as those Wittgenstein uses for representing them. It should be stressed once again that the revealed parameter does not stand for a relation that is a component of the state of affairs, but is merely a representational device for distinguishing different configurations of objects (cf. TLP 4.242).

It is now possible to turn to the cardinal problem of the *o*-ontology, namely, capturing Wittgenstein's thesis that "The configuration of objects produces states of affairs" (TLP 2.0272). The suggested corresponding formula in the *o*-ontology is then

$$(7) \quad SAp \leftrightarrow \exists R \exists x_1 \dots \exists x_n (p = R * x_1, \dots, x_n).$$

However, Suszko (1968: 23) remarks that (7) "is not quite precise because first of all the number of existential quantifiers occurring in it is indefinite." But is there evidence in the *Tractatus* for making (7) more precise? The answer will be given in the following section.

4. Form and Structure

The structure of a state of affairs is the actual configuration of objects in the state of affairs, or in Wittgenstein's words, "The determinate way in which

objects are connected in a state of affairs" (TLP 2.032). The possible ways that objects can be configured in a state of affairs is the form of a state of affairs, and hence characterized as "the possibility of structure" (TLP 2.033). As noted earlier, the possible ways that objects can be configured in a state of affairs, that is, the form of states of affairs, depends on an internal feature of the objects and not on an additional element that relates them. In order to understand the meaning of this, note that, according to Wittgenstein, to know an object implies knowing "all its possible occurrences in states of affairs" (TLP 2.0123). And the possibility of an object to occur in states of affairs is, in turn, "the form of an object" (TLP 2.0141). Considering the latter Max Black comments that

This expression is peculiar to Wittgenstein: other writers would prefer '[logical] type' or 'syntactical category'. Wittgenstein himself used the former expression in the *Moore Notes* (e.g. at 109 (3)). He is clearly thinking of the logical form of an object as if it were a power or capacity to combine with other objects in atomic facts: objects have different logical forms when they have different liberties of association. (Black, 1964: 55)

In terms of a spatial form, for example, an object whose form is spatial can combine with other objects as they themselves have a spatial form. Generalizing this example, the form of an object determines all its logically possible combinations with other objects. Consequently, the form of a state of affairs, that is the possibility of its structure, depends on the forms of the objects (see Griffin, 1964: 72–6).

Note, however, that the form of an object, and hence the form of a state of affairs, is not known to us a priori. This is one of the points on which Wittgenstein criticizes Russell: "Russell said that there were simple relations between different numbers of things (individuals). But between what numbers? And how is this supposed to be decided? — By experience? (There is no pre-eminent number.)" (TLP 5.553). In the next proposition Wittgenstein adds that "It would be completely arbitrary to give any specific form" (TLP 5.554). Logic alone cannot determine the form or the number of objects of any state of affairs. Hence, there is no ground for establishing a hierarchy of states of affairs of the sort suggested by Russell: $R_1(x), R_2(x, y), R_3(x, y, z), R_4(x, y, z, w), \dots$ (cf. TLP 5.556). Following Wittgenstein, Ramsey too criticizes Russell's hierarchy:

... this assumes his theory as to the constitution of atomic facts, that each must contain a term of a special kind, called a universal; a theory we found to be utterly groundless. The truth is that we know and

can know nothing whatever about the forms of atomic propositions; we do not know whether some or all objects can occur in more than one form of atomic proposition; and there is obviously no way of deciding any such question. (Ramsey, 1931: 133)

In particular, there are no grounds for determining the maximal number of objects that can constitute a state of affairs. This, in turn, explains why the number of the existential quantifiers in the formula

$$(7) \quad SAp \leftrightarrow \exists R \exists x_1 \dots \exists x_n (p = R * x_1, \dots, x_n)$$

cannot be definite (cf. Skyrms, 1981: 200).

Nevertheless, it is clearly possible to give a general characterization of structures of states of affairs even if we do not know which structures are possible, namely, the forms of states of affairs (cf. TLP 5.555). Hence, although the maximal number of objects that can constitute a state of affairs is unknown to us, it is still possible to consider configurations of arbitrarily large finite numbers of objects. As noted above, this makes it possible to characterize different kinds of relations between structures, such as weak and strong sameness of structures. The former is only concerned with the number of objects, and the latter involves a function that is an isomorphism from one structure to the other. Additional consequences pertaining to structures of states of affairs will be considered next.

5. Wittgensteinean Relations

Suszko (1968: 24) calls the relations representing the possible structures that states of affairs may have “Wittgensteinean relations.” Although a positive way for determining the structures represented by the Wittgensteinean relations lies beyond our reach, formal considerations may be used to eliminate certain structures. To see this note first that from the formula

$$(7) \quad SAp \leftrightarrow \exists R \exists x_1 \dots \exists x_n (p = R * x_1, \dots, x_n)$$

follows the theorem

$$(8) \quad SA(R * x_1, \dots, x_n).$$

Proof. Assume that $NSA(R * x_1, \dots, x_n)$. It follows from (7) that $N(R * x_1, \dots, x_n = R * x_1, \dots, x_n)$. Since $\forall s (s = s)$ is an ontological axiom, it follows that $R * x_1, \dots, x_n = R * x_1, \dots, x_n$, and this is a contradiction. \square

The first structure that should be eliminated is the one represented by the relation of identity (ibid). To see this note first that aside from the connective of states of affairs, the formal language also includes modal operators of necessity L and possibility M . According to the s -ontology, the ontological axiom of state of affairs is

$$(9) \quad SAp \rightarrow Mp \wedge MNp.$$

It follows that for any state of affairs p , $p \neq 1$ (expressing the contingency of states of affairs).

Proof. Assume $SAp, p = 1$. By (9) it follows that $MN1$. But by the Boolean axiom $1 = N0$ it follows that $M0$. And hence by the modal axiom $Mr \leftrightarrow (r \neq 0)$ it follows that $0 \neq 0$. \square

In addition, the ontological theorem

$$(10) \quad L(p \rightarrow q) \rightarrow (Lp \rightarrow Lq)$$

may be easily obtained by Boolean reasoning. It is now possible to turn to the identity relation defined in the o -ontology as

$$(11) \quad (Id * x, y) = (x = y).$$

From the theorem

$$(8) \quad SA(R * x_1, \dots, x_n)$$

it immediately follows that $SA(Id * x, y)$, and hence, as shown above, it follows from the ontological axiom

$$(9) \quad SAp \rightarrow Mp \wedge MNp$$

that $(Id * x, y) \neq 1$. However, the formula

$$(12) \quad L(Id * x, x)$$

is an ontological theorem.

Proof. By the ontological definition (11) $(Id * x, y) = (x = y)$ it follows that $(Id * x, x) = (x = x)$. From the modal axiom $(p = q) \leftrightarrow L(p \leftrightarrow q)$ it follows that $L(((Id * x, x) \rightarrow (x = x)) \wedge ((x = x) \rightarrow (Id * x, x)))$. And by distributivity $L(p \wedge q) = Lp \wedge Lq$ and (10) $L(p \rightarrow q) \rightarrow (Lp \rightarrow Lq)$, it

follows that $L(x = x) \rightarrow L(Id * x, x)$. Since $x = x$ is a logical theorem, it follows by Gödel's rule that $L(x = x)$. Thus, $L(Id * x = x)$ obtains. \square

Thus, by (12) $L(Id * x, x)$ and the modal axiom $Lr \leftrightarrow (r = 1)$, it follows that $(Id * x, x) = 1$, and this is a contradiction. Therefore, the identity relation is not a Wittgensteinean relation, namely states of affairs cannot have the structure represented by the relation of identity.

Another structure that should be eliminated is the structure represented by the complement operation (ibid). Let S be the complement of the relation R for all elements x, y of some class of objects, namely $(S * x, y) = N(R * x, y)$. From the theorem

$$(8) \quad SA(R * x_1, \dots, x_n)$$

it follows that $SA(S * x, y)$ and hence, by definition, $SA(N(R * x, y))$. And from the ontological theorem

$$(13) \quad SA(Np) \rightarrow NSAp,$$

it follows that $N(SA(R * x, y))$. However, from (8) it follows that $SA(R * x, y)$, and this is a contradiction.

6. States of Affairs

According to the above considerations the class of the Wittgensteinean relations must not include the relation of identity or the complement of a Wittgensteinean relation. Indeed, the exclusion of both relations from this class is in accordance with the *Tractatus*. To see this recall that a Wittgensteinean relation is a parameter representing the determinate way objects stand to one another. However, Wittgenstein explicitly states that "It is self-evident that identity is not a relation between objects" (TLP 5.5301). Therefore, identity is not a Wittgensteinean relation either. Moreover, if the identity between an object and itself is a state of affairs, then strictly speaking it is possible for a state of affairs to be constituted by a single object. But it is at the very least strange to speak about a "configuration" (TLP 2.0272) or of a "combination" (TLP 2.01) of one object.⁷

⁶The proof is given by Suszko (1968: 20).

⁷For reasons, pertaining to Wittgenstein's picture theory, that a state of affairs must be constituted by more than one object, see Fogelin (1987: 26).

If the complement of an arbitrary Wittgensteinean relation R is not a Wittgensteinean relation, then the complement of any R -configuration is not a state of affairs. In particular, the complement of any state of affairs is not a state of affairs. Therefore, although the non-existence of a state of affairs is a negative fact, it is not a negative state of affairs (cf. Pitcher, 1964: 56). The exclusion of the complements of the Wittgensteinean relations from this class clearly corresponds to the Tractarian view that states of affairs are mutually independent, for no situation is independent of its complement (see #####, 2007: 190–2).

Aside from the relation of identity and the complement of a Wittgensteinean relation, there is no guarantee that other cases that do not cohere with the formula

$$(7) \quad Sap \leftrightarrow \exists R \exists x_1 \dots \exists x_n (p = R * x_1, \dots, x_n)$$

will not turn up. Therefore, whereas a positive way for determining the possibility of structures of states of affairs was ruled out, the negative way of excluding structures turned out to be very limited and inconclusive. Indeed, the exclusion of two relations is not a substantial contribution for defining the class of the Wittgensteinean relations.⁸ Thus, the possible structures of states of affairs that are supposed to be represented by the Wittgensteinean relations remain largely unexplained. Under these circumstances, the *o*-ontology, at least in its present form, cannot be regarded as adequately capturing the central concept of state of affairs in the *Tractatus*.

It is curious to mention Stanisław Leśniewski’s formal systems of Ontology and Protothetic in this context. As reported by Czesław Lejewski,

Ontology has been described as the most comprehensive Logic of Names because its most characteristic expressions belong to the semantical category of names, just as the most characteristic expressions of Protothetic belong to the semantical category of propositions. If, however, we take into account the contents of Ontology then it would be more appropriate to describe it as a theory of what

⁸Suszko (1968: 24) actually claims that “...only *Der liebe Gott* could define the class of Wittgenstein’s relations.” It should be noted, however, that generalizing the two cases above, Suszko suggests that the Wittgensteinean relations should not be invariant under all permutations of objects and that they should be mutually independent (ibid). Nevertheless, even if these preliminary conditions are sufficiently elaborated and accepted, they do not add much insight about the class of Wittgensteinean relations above that given by the considered excluded relations.

there is. Just as astronomy tells us something about heavenly bodies, the theses of Ontology tell us something about things, or objects if one prefers, or individuals. (Lejewski, 1958: 153)

Indeed, as might be expected, Suszko (1968: 8) compares the *s*-ontology to Leśniewski's Protothetic. On the other hand, probably because of Leśniewski's nominalism, Suszko does not refer to Leśniewski's Ontology even though the latter is an elaborated formal theory of objects.⁹ However, if the Tractarian ontology is given a nominalistic interpretation, the analysis of elementary propositions in Leśniewski's Ontology seems to fit Wittgenstein's intensions very well. Consequently, Leśniewski's Ontology can shed new light on the Tractarian states of affairs. (Examining whether Leśniewski's Ontology is a better alternative to the *o*-ontology as a model of the Tractarian ontology is of course beyond the scope of this paper but I hope to do so elsewhere.)

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⁹Note that Suszko (1968: 32) does mention Lesniewski's additional formal system, namely Mereology.

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