

Tractarian Objects in a Structural Setting

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Abstract: The aim of the paper is to argue that the ontological setting of objects in Wittgenstein's *Tractatus* is a version of structural realism. According to our plan, one of the opening statements of the *Tractatus* – *The world is the totality of facts, not of things* – introduces structuralist perspective: structures are superior to their constituents. However, structuralists use the notion 'superior' in various senses, but this paper argues that the *Tractatus* places its objects within the framework of ontic structural realism in its moderate form. That form puts structures and individuals on the same ontological footing. Such thesis contradicts traditional object-ontology that dominates *Tractarian* literature.

Keywords: L. Wittgenstein, *Tractatus Logico-philosophicus*, H. Hertz, ontology, structural realism, simples, identity conditions.

*Doesn't my lack of clarity rest on
a lack of understanding of the nature of relations?*

L. Wittgenstein, *Notebooks 1914 - 1916*

1 Introduction

The aim of this paper is to argue that the ontological setting of objects in Wittgenstein's *Tractatus* (Wittgenstein 2002, TLP hereafter) is a version of structural realism (SR). SR is a variant of scientific realism and comes in two forms – epistemic and ontic. According to epistemic SR, our theories reveal only form of the external world, its structure, but not its content. Thus epistemic SR creates a gap between what can

be known (structure, relational facts, etc.) and what there is (esp. particulars that instantiate structures and relations). Ontic SR departs from traditional object-ontology in order to deny this gap. The most radical position of ontic SR states that there is no gap between our structural knowledge and the external world, because structure is the only ontological ingredient. Within this approach, object-ontology is replaced by structure-ontology. But the departure from object-ontology needs not to be that radical. Moderate version of ontic SR maintains the category of particulars but it ascribes only structural, relational attributes to them. Hence the gap is closed again: particulars are epistemologically accessible to moderate structuralists because there are no other properties of individuals over and above their relational attributes. In contrast, traditional object-ontology views relations as ontologically unimportant. Firstly, there are independent objects (with their irreducible intrinsic properties) and then, secondly, there are relations in which they stand. Moderate form of ontic SR refutes the existence of irreducibly intrinsic properties in favor of extrinsic ones, and puts objects and relations on the same ontological footing (Esfeld and Lam 2006, 5). Although structural doctrines are generally recognized in TLP, the commentators usually prefer traditional object-ontology instead of structural.¹ The paper attempts to eliminate this inconsistency by placing *Tractarian* individuals into the framework of ontic SR. Ontic SR will be briefly introduced by J. Ladyman's list of seven principles "advocated by some defenders of ontic SR at some time" (Ladyman 2008). These principles enable us to construct several ontological packages and the task of this paper is to identify which one of them is contained in TLP. In addition to textual evidence, the paper considers contextual sources such as Wittgenstein's *Notebooks 1914 - 1916* (Wittgenstein 1979) and the influence of H. Hertz's *The Principles of Mechanics* (Hertz 2007) on early Wittgenstein. The role of classical mechanics is important to our project of linking TLP with one of the doctrines of scientific realism. Roughly stated,

¹ Consider P. Cmorej and his (1989). Cmorej's exposition of objects, their forms, internal properties and their relations to states of affairs is largely structural (Cmorej 1989, 299, 302, 306). However, his model of objects and states of affairs is built within the lines of traditional object-ontology: objects are ontologically prior, their structures are secondary (Cmorej 1989, 300).

scientific realism is a view according to which scientific theories correctly describe the nature of a mind-independent world (Chakravartty 2007, 4). As will be shown in the paper, Wittgenstein's appeal to classical mechanics in relation to TLP's ontology and the picture theory of meaning indirectly proves this thesis.²

Firstly, *Tractarian* notions of objects' internal and external properties will be exposed. These notions are important for determining an initial ontological package derivable from the principles on the Ladyman's list. The purpose of the initial ontological package is to expose some basic structural features of TLP's ontology. Secondly, a link between Hertz's material particles and Wittgenstein's objects will be followed. This link places the first ontological package into the Kantian setting and constitutes the second ontological package. Thirdly, identity conditions of TLP's objects will be discussed. As will be shown, there are three possibilities of their individuation but only two of them are acceptable to structuralists. Finally, regardless of the differences between the packages, they both confirm that early Wittgenstein refuses the principles of epistemic SR (in contrast with, for instance, B. Russell). The argument is based on TLP's principle of equal multiplicity between facts and their models – a doctrine also borrowed from H. Hertz.

2 Objects' internal and external properties

Two types of properties belong to *Tractarian* objects: internal (essential) and external (accidental). The purpose of this paragraph is to demonstrate that neither internal nor external properties, in case of TLP's objects, are *intrinsic*. TLP's objects possess only extrinsic – relational – properties (or properties reducible to relational properties), which is one of the essential ingredients of structural ontology.

The distinction between intrinsic and extrinsic is a complex one but we will follow some simple-minded views that, I believe, are sufficient for our purposes. To paraphrase D. Lewis, a thing has its intrinsic properties in virtue of the way that thing itself is, whereas extrinsic

² In my view, the commentators that admit physicalist reading of TLP's ontology (e.g. Blank 2007, 252 – 257; Bradley 1992, 78; Grasshoff 1998, 261; Lampert 2003, 285 – 289) implicitly admit the position of scientific realism.

properties may depend on something else (Lewis 1983, 111 – 112). For that reason, the property of ‘being taller than John’ is monadic but not intrinsic because it involves two things: owner of the property and John. In contrast, having a mass is both monadic and intrinsic because, in a possible world in which there is nothing but you, you still have the mass. One of the assumptions of our simple-minded approach is that polyadic properties (or properties reducible to polyadic properties) are necessarily relational and thus extrinsic. How do *Tractarian* objects fit these distinctions? Firstly, we are not interested in formal properties of TLP’s objects, properties such as ‘being a particular’ or ‘being simple’ (TLP 2.02). We are interested in non-trivial properties, properties that can’t be derived from mere definitional characteristics of objects as given in TLP 2.011 – 2.063. What are the objects’ non-trivial properties? The answer is in the distinction between internal and external properties (2.01231). There is an agreement in the literature that external properties are indeed extrinsic (e.g. Copi 1966, 185; Carruthers 1990, 87). Such properties are constituted by relations in which objects *actually* stand and not by an object alone. Thus external properties of TLP’s objects can’t be intrinsic. However, according to 2.01231, only internal (essential) properties are ontologically decisive. So, if TLP’s objects are deprived of intrinsic properties, then their internal properties must be extrinsic, in Lewisian sense, too.

If I am to know an object, though I need not know its external properties, I must know all its internal properties. (TLP 2.01231)

If I know an object I also know all its possible occurrences in states of affairs. (TLP 2.0123)

Each thing is, as it were, in a space of possible states of affairs. This space I can imagine empty, but I cannot imagine the thing without the space. (TLP 2.013)

In these paragraphs, Wittgenstein is appealing to a structuralist principle, which says that individuals must be viewed from the perspective of structures they constitute.³ Internal properties of a given *Tractarian* object correspond to its potential to fuse with other objects and

³ This idea has also its linguistic counterpart: TLP 3.3 *Only propositions have sense; only in the nexus of a proposition does a name have meaning.*

form states of affairs.⁴ Consider two *Tractarian* objects a and b that can constitute a state of affairs R (a, b). One of the internal properties of a is that it can stand in relation R to b. A list of all of such properties (defining a's potential to form fusions) discloses its essence. These properties are monadic but they are not intrinsic. Such properties necessarily involve, at least, two distinct objects and this disqualifies them from being intrinsic in Lewisian sense. If the internal properties of object a are disclosed, they are disclosed by reference to *other* objects that can fuse with a and, together, constitute states of affairs. As a result, both internal and external properties of a given *Tractarian* object can't be constituted by that object alone; neither internal nor external properties of TLP's objects are intrinsic in Lewisian sense. As will be argued in the following paragraph, this conclusion naturally leads to the moderate version of ontic SR.

3 The first ontological package

J. Ladyman lists seven varieties/principles of ontic SR:

- (1) Eliminativism: there are no individuals (but there is relational structure)
- (2) There are relations (or relational facts) that do not supervene on the intrinsic and spatio-temporal properties of their relata.
- (3) Individual objects have no intrinsic natures.
- (4) There are individual entities but they don't have any irreducible intrinsic properties.
- (5) Facts about the identity and diversity of objects are ontologically dependent on the relational structures of which they are part.
- (6) There are no subsistent objects and relational structure is ontologically subsistent.
- (7) Individual objects are constructs.

⁴ One may argue that internal properties are also formal and trivial because they shape natures of objects and thus belong to them necessarily (TLP 4.123). However, such properties differ from properties like 'being a particular' or 'being simple'. As will be said later in the paper, internal properties are one of the candidates for objects' individuators but individuation is not a trivial task.

In case of TLP, (1) doesn't hold: early Wittgenstein is not an eliminativist regarding individuals. TLP assumes the existence of individuals – objects (TLP 2.01) or things (TLP 2.011) – over and above relations.⁵ Hence Wittgenstein is not displacing object-ontology and if TLP is a version of ontic SR, it must be its moderate version – a version that, in addition to relations, also admits individuals. Principle (2) is in partial agreement with the distinction between internal and external properties: objects' relations can't supervene on intrinsic properties because objects are devoid of intrinsic properties. Whether their relations supervene on spatiotemporal relations is a different issue that will be discussed later. Principle (4) is supported by our analyses because both internal and external properties of TLP's objects are, in their nature, extrinsic/relational. The category of internal properties is also related to principles (3) and (5). (3) is plainly true of TLP's objects because they are not endowed with non-trivial intrinsic properties. On the other hand, their natures are affected by their internal properties, that is, by their possible relations with other objects. As a result, the identity of an object is ontologically dependent on the relational structures – states of affairs (TLP 2.0123) – of which it *can be* part of. This is slightly reformulated principle (5) but the individuation of TLP's objects will be discussed in a separate paragraph of the paper. The same is true of (6) and (7). As Ladyman explains, ontological subsistence means the existence which is independent of anything else (Ladyman 2008). Can TLP's objects be separated from states of affairs? Are they necessarily components of complex structures? Are states of affairs (and their fusions) the only existing entities of the external world and objects just heuristic tools? These difficult questions will turn our focus to the contextual sources, esp. on Heinrich Hertz and his *Mechanics* (Hertz 2007). As will be shown, these questions should be answered in Kantian spirit that was brought to TLP from the Hertz's book.

⁵ Obviously, there are proposals suggesting that TLP's objects are universals, although nominalistic interpretation seems to be a mainstream in today's literature. It is also assumed in this paper but the arguments are beyond its scope. However, an option for realistic approach within a structural setting will be offered in the concluding remarks.

In sum, the first ontological package includes principles (3), (4) and partly (2). (1) is excluded (it belongs to radical form of ontic SR) and (5), (6) and (7) are waiting for further elaboration.

4 Hertz's material particles

The influence of H. Hertz on early Wittgenstein is indisputable (e.g. TLP 4.04; Wittgenstein 1979, 36). However, Hertz was usually associated with TLP's picture theory (e.g. Griffin 1964, 99 – 102), rather than with its ontology. Studies exposing parallels between Hertz's views on the constitution of matter in *Book I.* of his *Mechanics* and the *Tractatus* have appeared only recently (e.g. Blank 2007; Bradley 1992; Grasshoff 1998). *The Principles of Mechanics* introduces three layers of reality. The fundamental layer is composed of material particles and the suggestion is that such entities are examples of TLP's objects:

The division of the body into material points,⁶ as we have it in physics, is nothing more than analysis into simple components.

(Wittgenstein 1979, 67)

Material particles are infinitely small volumes of mass occupying extensionless spatial points (Hertz 2007, 45 – 46). According to Hertz's definition, they are invariable and indestructible (Hertz 2007, 46). This corresponds to *Tractarian* framework of objects as indestructible simples (TLP 2.02 – 2.023). Moreover, for Hertz, connections between material particles compose material points and physics, in his case mechanics, deals with the systems of material points (Hertz 2007, 46 – 47). The parallel is obvious: Hertzian material points are examples of TLP's states of affairs and systems of material points correspond to TLP's facts (TLP 2.034) or complexes (TLP 5.5423). J. Lutzen maps Hertz's struggle to identify essential features of material particles and comes to the conclusion that the list of the particles' essential properties includes only their spatial and temporal relations (Lutzen 2005, 138). No other non-trivial property can be attributed to a single material particle. Mass volume is, by definition, infinitely small and so the particles represent 'vanishing small identical blocks of matter' (Lutzen

⁶ According to Hertz, material points are aggregates of material particles.

2005, 150). Other non-trivial properties appear only within the systems of material points and similar position is defended in TLP:

The substance of the world⁷ can only determine a form, and not any material properties. For it is only by means of propositions that material properties are represented – only by the configuration of objects that they are produced. (TLP 2.0231)

In agreement with the structural framework, intrinsically bare material particles are only bearers of spatial and temporal relations.

5 The second ontological package

Suppose that Hertzian material particles are indeed examples of TLP's objects. Would TLP's objects – as Hertzian material particles – change anything in the first ontological package? Principle (1) on the Ladyman's list is still excluded and (4) preserved. Hertzian particles are intrinsically bare relata of spatial and temporal relations and so Hertz is also committed to object-ontology of individuals with extrinsic properties. Principle (2) is, again, in partial agreement with material particles. Particles don't possess irreducible intrinsic properties and so their relations are independent of this ontological category. However, spatial and temporal relations are the only relations in which material particles can stand and thus (2) is not fully satisfied. Principles (5) and (6) will be discussed in the following paragraph because they require an analysis of identity and individuation. On the other hand, TLP's objects – as Hertzian material particles – are directly related to the principle (7). Firstly, there is textual evidence that both Hertz and Wittgenstein considered their simples given *a priori*. Hertz defines material particles in *Book I* of his *Mechanics* and that book starts with the following observation:

The subject-matter of the first book is completely independent of experience. All the assertions made are a priori judgments in Kant's sense. They are based upon the laws of the internal intuition of, and upon the logical forms followed by, the person who makes the assertions; with his external

⁷ According to TLP 2.021, the substance is composed of objects.

experience they have no other connection then these intuitions and forms may have. (Hertz 2007, 45)

Wittgenstein agrees with that:

It seems that the idea of the SIMPLE is already to be found contained in that of the complex and in the idea of analysis, and in such a way we come to this idea quite apart from any examples of simple objects, or of propositions which mention them, and we realize the existence of simple object – a priori – as a logical necessity. (Wittgenstein 1979, 60)

However, according to Lutzen, some characteristics of material particles in Hertz's *Book I* are given neither *a priori* nor *a posteriori*. He considers invariability and indestructibility (Lutzen 2005, 137). These characteristics occur in definitions that are obviously conventional. Moreover, the ontology of *Book I* also supports Hertz's program of the geometrisation of the external world (Lutzen 2005, 153). This program may also imply conventionalism in the sense that the ontology of mechanics is largely theory dependent construct:

[...] Hertz considers a plurality of systems which, if they have 'simple objects' at all, have different simple objects: he doesn't require of Newtonians or energeticists that they must recognise the existence of his 'simple objects'. (Preston 2006, 362)

To be a simple object means to serve a certain role in a given theoretical context. Wittgenstein doesn't explicitly claim this but there is implicit evidence that his simples may also appear in various contexts. The mostly discussed case is that of a division of a material body (Wittgenstein 1979, 67). However, Wittgenstein also discusses points of visual field (TLP 2.0131, 6.3751; Wittgenstein 1979, 3, 64).⁸ On the other hand, from the *Tractarian* perspective, it is not clear how important this contextual evidence is and so we may only state that TLP's simples are given *a priori* (this is explicitly said by Wittgenstein), but their theory dependence and conventional nature are open issues.

⁸ R. Bradley (Bradley 1992, 70 – 80) identifies three contexts in which Wittgenstein appeals to simples: metaphysical (division of a body into simple objects), semantical (proper names) and epistemological (points of visual field). T. Lampert provides an interesting version of TLP's ontology based on the assumption that *Tractarian* simples also include points of visual field (Lampert 2003, 297 – 298).

In sum, TLP's objects – as Hertz's material particles – are consistent with the principles (3), (4) and partly with (2) and (7). (1) is still excluded. As far as (5) and (6) are concerned, they wait for further investigation concerning identity conditions.

6 Identity conditions

There are three candidates for individuating TLP's objects: (a) primitive thisness, (b) internal properties and (c) spatiotemporal relations. In general, (b) and (c) are consistent with structural approach to individuation, whereas (a) is anti-relational and anti-structural. On the other hand, (a) and (b) have their support directly in TLP, but (c) is true provided that TLP's objects are Hertzian material particles.

(a) Primitive thisness is suggested in the following paragraph:

If two objects have the same logical form, the only distinction between them, apart from their external properties, is that they are different. (TLP 2.0233)

To share the same logical form means to share the same internal properties (TLP 2.0141). If numerically distinct objects share the same logical form, then they differ only in external properties constituted by their *current* positions within states of affairs. But these accidental facts can't ontologically distinguish the objects (TLP 2.01231). Under these circumstances, only primitive thisness can succeed. However, this suggestion poses a serious threat to our project of putting TLP's ontology into the structuralist setting. Primitive thisness fixes a given individual regardless of its actual or potential relations; relations don't play any individuating role in case of primitive thisness. Primitive thisness runs counter to the idea of structural identity conditions (principle (5) on the Ladyman's list). Within the structural framework, identity conditions of objects are set by their roles in the constitution of structures, that is, by relations they actually or potentially bear. On the other hand, Wittgenstein doesn't say that *all* of his objects share the same form and this means that primitive thisness is not necessarily a universal individuator of TLP's objects. It is endorsed only in a very limited context. As will be argued in the following lines, apart from the objects with identical forms, TLP favors structural identity conditions.

(b) The second, structuralist option to the individuation of TLP's objects are their internal (essential) properties. This assumption follows from TLP 2.01231 and TLP 2.0123. As has been explained, objects' internal properties are related to their potentials to form complex structures – states of affairs. In structural terms, the objects' individuation criteria are based on their roles in the constitution of states of affairs and, as a result, identities of TLP's objects can't be stated separately (TLP 2.0121).⁹ This is indeed a structural view of identity as expressed by Ladyman in principle (5).

(c) Identification of TLP's objects with Hertzian material particles offers another structuralist answer to individuation. When exploring contextual sources of TLP's atomism, T. Lampert raises the following point:

All that can be said about a mass-particle ¹⁰ at a certain time is that it is or is not at a certain point of space. If the statement that a mass-particle is at a certain point is true, the position of any other mass-particle cannot be inferred; if the statement is false, it does not follow that the mass-particle is at another point of space, because mass-particles at other points are different mass-particles. (Lampert 2003, 300 – 301)

Only spatial and/or temporal attributes can be predicted to material particles and such attributes easily distinguish their bearers. Similar views are defended by Grasshoff and Lutzen (Grasshoff 1998, 259; Lutzen 2005, 151). If these authors are right, then actual or potential spatial and/or temporal relations between individuals fix their identities. However, Wittgenstein doesn't explicitly mention this alternative but spatial relations play an important feature in his exposition of propositions:

The essence of a propositional sign is very clearly seen if we imagine one composed of spatial objects (such as tables, chairs, and books) instead of written signs. Then the spatial arrangement of these things will express the sense of the proposition. (TLP 3.1431)

⁹ Wittgenstein goes even further when he claims that the thing seen *sub specie aeternitatis* is the thing seen together with the whole logical space (Wittgenstein 1979, 83).

¹⁰ Lampert translates Hertz's *Massenteilchen* as 'mass-particles', but we follow the translation of Jones and Walley who render *Massenteilchen* as 'material particles' (Hertz 2007).

Instead of, 'The complex sign "aRb" says that a stands to b in the relation R', we ought to put, 'That "a" stands to "b" in a certain relation says that aRb.' (TLP 3.1432)

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)

It is difficult to say whether the objects' internal properties are exhausted by their potential spatial relations. TLP is not clear in this regard. However, this is rather marginal problem from our perspective. TLP is not clear regarding *specific* examples of relations that hold between its objects but, and this is what matters now, TLP is clear about their ontological importance to the individuation. Potential relations constitute objects' identities but we are not sure whether they are spatial. Finally, I would like to repeat that both Hertz and Wittgenstein share the same holistic ingredient in their ontologies concerning objects. Their simples can't be conceived outside their (actual or potential) fusions: TLP's objects can't be conceived outside states of affairs and Hertz's material particles outside the systems of material points. These individuals are ontologically dependent on structures they compose and this is the doctrine behind the principles (5) and (6) on Ladyman's list.

7 Epistemic structural realism excluded

Depiction of physical facts is one of the central topics of both TLP and *The Principles of Mechanics*. As has been mentioned in the beginning of the fourth paragraph, TLP's pictorial form of meaning is a variation of Hertz' mechanical description of physical reality with its principle of mathematical multiplicity:

In a proposition there must be exactly as many distinguishable parts as in the situation that it represents. The two must possess the same logical (mathematical) multiplicity. (Compare Hertz's *Mechanics* on dynamical models.) (TLP 4.04)

And this is what Hertz says about the dynamical models:

A material system is said to be a dynamical model of second system when the connections of the first can be expressed by such coordinates as to satisfy the following conditions:

- (1) That the number of coordinates of the first system is equal to the number of coordinates of the second.
- (2) That with a suitable arrangement of the coordinates for both systems the same equations of condition exist.
- (3) That by this arrangement of the coordinates the expression for the magnitude of a displacement agrees in both systems.

Any two of the coordinates so related to one another in the two systems are called corresponding coordinates. Corresponding positions, displacements, etc., are those positions, displacements, etc., in the two systems which involve similar values of the corresponding coordinates and their changes. (Hertz 2007, 175)

The idea of mathematical multiplicity, and representation based on it, goes beyond the scope of this paper. However, for our purposes, it is sufficient to state that epistemic SR violates precisely this requirement when it introduces a gap between what there is and what can be known of it – a gap between a fact and its model. Within the framework of epistemic SR, there are elements of the external world (esp. particulars) that can't be captured by structural models. According to this line of thought, theories reveal only structures but not individuals that bear them. The existence of such unknowable bearers contradicts Hertz and Wittgenstein's ideal of isomorphic representation. Their ideals of representation are not achievable within the setting of epistemic SR because, due mathematical multiplicity, every element of reality must have its counterpart in the model. This requirement includes particulars as well. On the other hand, isomorphic representation is achievable within the structural framework if that framework admits particulars. This condition is satisfied by the moderate form of ontic SR.

It is also important to emphasize that both Hertz and Wittgenstein agree with the plurality of isomorphic representations. Even mechanics doesn't imply a unique picture of the world (TLP 6.341), rather:

Mechanics is an attempt to construct according to a single plan all the true propositions that we need for the description of the world. (TLP 6.343)

Different pictures of the same objects are possible and these pictures may differ in various respects. (Hertz 2007, 2)

It follows that each correct model of reality, with its correct mathematical multiplicity, can be one of many other correct models of the same physical realm. But any correct model precludes the existence of unknowable physical elements.

8 Conclusion

According to the Ladyman's list, there are six principles that shape the doctrine of moderate version of ontic SR (the first principle belongs to radical form). As has been demonstrated in the paper, TLP's objects and their aggregates satisfy most of them. On the other hand, TLP's ontology doesn't represent structuralism in its pure form. We covered only one of its categories, objects, and even in their case some anti-structuralist features appeared (e.g. individuation of objects with identical forms by primitive thisness). However, a general tendency of TLP toward ontological structuralism is indisputable. For instance, one of the opening statements of TLP - 1.1 *The world is the totality of facts, not of things* - nicely expresses one of the principal claims of SR that structures are superior to their constituents. However, the paper explicates this claim in accordance with the moderate form of ontic SR that puts structures and their constituents on the same ontological footing.

However, a broader perspective reveals some traditional problems of moderate form of ontic SR that can be easily applied to TLP's objects too. For instance, there are two distinct ontological pictures attachable to TLP's objects within the structural setting and these pictures introduce ontological underdetermination to our conclusions. The objects can be conceived as intrinsically bare individuals in extrinsic relations (this was our choice), or they can be directly identified with the fusions of those extrinsic relations (Dorato 2006, 3). The later option leads to the bundle view: there is no need to postulate intrinsically bare particulars in extrinsic relations if extrinsic relations themselves can be the only ontological ingredients of particulars. This reading opens a way to a realistic approach to TLP's objects. However, this doesn't mean that the bundle view is a problem-free response, but the final verdict would require an account of its own.

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