TRACTARIAN SCAFFOLDINGS

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1. Opening

In the *Tractatus* Wittgenstein often uses graphic metaphors: a ladder, which is to be thrown away after it has been climbed; pictures with feelers; networks with fine square meshes. Although they are illuminating, it is not always clear in exactly what sense Wittgenstein employs them. In this paper, we will try to eliminate this fuzziness with respect to the concept of *scaffolding* (*Gerüst*). Right at the beginning one should note that it is only used three times in the *Tractatus*: In 3.42 and 4.023 as *logical scaffolding*, and in 6.124 as *the material scaffolding of the world*.

2. Wittgenstein versus Russell on Logical Form

Wittgenstein's terminology of *logical scaffolding* and *scaffolding of the world* has its historical roots in Russell's programme for constructionalism. This can be seen clearly in Tractarian philology, which evidences that the word 'building' (*Bau, bauen, Gebäude, Bausteine*) is used 11 times and the word 'construction' (*Konstruktion, konstruieren*) a further 5 times in the book. The main objective of the *Tractatus* is to demonstrate how the world is built up (constructed) out of elementary building blocks.

However, there is an essential difference between the constructionalism of Russell and that of Wittgenstein. This was also noticed by David Pears, who pointed out that whereas Tractarian ontology is 'approximately Aristotelian'—in it 'the forms revealed by logic are embedded in one and only one world of facts' (Pears 1987, i. p. 23)[1]— Russell's logical atomism accepts a Platonic penetration of the autonomous world of logical forms into the autonomous world of facts.

Russell's logical constructionalism uses the metaphor of a 'logical skeleton' on which the data of experience are fleshed out. Thus in a letter of 1912 he wrote:

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[1] According to M. and J. Hintikka, the forms 'are built into Tractarian objects' (Hintikka and Hintikka 1986, p. 40).

> I feel that I really have got a method that gives more precision than there has ever been before, and more power of getting at the skeleton of the world—the framework that things are built on. (Slater 1994, pp. 47–8.)

In contrast, in the *Tractatus* Wittgenstein doesn't speak of a skeleton.[2] Instead, he introduces the concept of *logical scaffolding* and also of the *scaffolding of the world*.[3] As we are going to see in what follows, this step advanced a new type of metaphysics. Our aim here is to make this project clear.

For this purpose, we are first going to discuss Tractarian objects.

3. Tractarian Objects and Their Forms

Despite the fact that Tractarian objects are proclaimed to be simple, in fact they have a form, and many sub-forms. The sub-forms can be apprehended as faces of the objects which determine the behaviour of the latter in any state of affairs in which they occur. To be sure, since one and the same object occurs in different states of affairs, in different ways, obviously, it has a variety of sub-forms; so that when activating its different sub-forms, one and the same object partakes in different states of affairs. This point can be set out so. Despite being simple, objects are also concatenations of sub-forms, which are folded up into one form.

The conclusion from this conception is that an object both *has* a form and *is* also a variety of sub-forms. *From an epistemological perspective*, this means that we never grasp the whole object but only one of its faces. Moreover, we grasp this one face (sub-form) as the whole object: more precisely, as its only form. *From an ontological perspective*, this means that at any specific actual moment, only one (not all) of the sub-forms of the object is activated, in order to enter into a combination with sub-forms of other objects—to occur in a state of affairs. States of affairs can be seen as constituted of different faces, of different segments of objects.

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[2] Incidentally, many British philosophers of the 1950s were critical of the notion of a logical skeleton. See e.g. Strawson 1952, p. 49.

An important point in this conception is that the forms of objects in Tractarian ontology are on a different level. This is clearly seen in that they are defined in various ways.

- On the one hand, it is assumed that the form of the object is 'the possibility of its occurring in states of affairs' (2.0141). So apparently, every object has its own (one) form (see Anscombe 1995, p. 397).
- On the other hand, every idiosyncratic form of an object has, on a second level, its sub-forms, or configurations.

This interpretation can be supported by a recent argument that Tractarian objects are configured as well as unconfigured (see Page 1997). Now as long as they are unconfigured—as long as they have one form—they are the substance of the world, which is unchangeable. But there is something in the object that is changeable, and that is its configurations. More precisely, since they are changeable, the objects have many different configurations (sub-forms).

4. Objects' Stereology[4] and Topology

Since the objects are situated in logical space, they are (logically) bulky, voluminous things, with borders and faces which are in contact with the boundaries and the faces of other objects all the time. Being voluminous, they fill up the (logical) world.

The objects set up connections (*Verbindungen*) which build up states of affairs. In the state of affairs objects 'fit into one another like the links of a chain' (2.03).[5] This only means that '*there isn't anything third* that connects the links. . . . [T]he links *them-*

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[3] J. O. Urmson mistakenly asserted that both Russell (from 1905–19) and Wittgenstein in the *Tractatus* accept that logic is the skeleton of the world (see Urmson 1956, pp. 7, 12).

[4] See on this concept Lejewski 1986, pp. 196 f.

[5] This metaphor supports our interpretation that every object has many different forms, or sub-forms. To be sure, the links of the chain are connected with only one part of their 'body'—with one of their 'heels'. Now in our interpretation, this one part is one of the sub-forms of the object.

This conception did not necessarily contradict the requirement that the objects be simple. Indeed, they are simple, but have different heels which connect them in different chains.

selves make connexion with one another' (Wittgenstein 1973, p. 23). The very docking of one to another is what makes the objects stick together; this is what secures the cohesion between them. There is no 'relation' connecting them.

This is a leading idea in the *Tractatus*. It is intended to present the ultimate form of connecting of both objects and names, as well as of both facts and propositions. With the help of this conception, Wittgenstein hoped to defeat the last remnants of the old subject–predicate logic, which 'contains more convention and physics than had been realized' (Wittgenstein 1974, p. 204).

Many authors (Hintikka and Hintikka 1986, p. 42; Wedin 1990, p. 59; Simons 1992, p. 338) have insisted that Tractarian objects are unsaturated, their unsaturatedness being similar to Frege's unsaturatedness of functions and arguments. There is an important difference between Frege and Wittgenstein on this point though. Frege's conception is chemical. Indeed, according to him, the function and its argument merge into one another. In contrast, Tractarian objects are connected to one another topologically, not chemically. In the connection, they remain independent of one another.

Pictures are just as (logically) bulky as objects and states of affairs. Pictures are logical–spatial models (like that in the Paris court): they experimentally construct a new state of affairs; this either can fit into a state of affairs of reality or not, thus being, respectively, true or false.

Like the 'relation' between the object and the state of affairs in which it partakes, the 'relation' of pictures to facts is also topological. More precisely, it is not a relation but a contact. The picture 'is attached to reality; it reaches right out to it. It is laid against reality like a measure. Only the end-points of the graduating lines actually touch the object that is to be measured.' (2.15120–1.)

As we are going to see in what follows, the Tractarian doctrine of scaffolding rests on this Principle of Contact.

5. Two Tractarian Objects

What are the objects, from an ontological perspective? On the one hand, Tractarian objects are what Moore and Russell have called indefinables; they are what is given, the data. As Wittgenstein himself pointed out in *Philosophical Investigations*, § 46 (c), this

is an old category in philosophy, already discussed in Plato's *Theaetetus*. All other objects and facts are composed of these atoms.[6] Everything in the world can be viewed in terms of the nomenclature of the objects; the world can be analysed into them.

On the other hand, we can consider Wittgenstein's world as a world of ordinary objects with which we are acquainted: umbrellas, chairs, pipes, etc. More precisely, we can see ordinary objects as modifications of the Tractarian objects in the first sense.

For convenience, in this section we will call the ordinary objects 'objects', and the indefinable Tractarian objects 'Objects',[7] and their form, respectively, 'form'[8] and 'Form'. It is first to be noted that we never know the Objects as such. Indeed, you cannot discern a pure colour—an example of Object that Wittgenstein has suggested—pure blue, e.g. When you see something blue, say, a blue spot in this visual field, what you see is a blue extension of a certain size and a certain shape; that is, a certain combination of Objects (of the first level).

Objects lie in different logical spaces: those of time, tone, tactility, colour, geometry. The Objects in the logical space of colour are the four elementary colours: green, yellow, blue, red. The logical spaces themselves are also Objects.

The objects we see—chairs, umbrellas, pipes—are nothing but Objects of different logical spaces, combined in a certain *way* (a term to be discussed in § 7 ff.). This combination modifies the Objects. So the judgement 'This yellow patch is to the left of this blue patch' can be analysed to the Objects *yellow*, *blue*; and to the geometrical Objects *left* and *right*. An object like 'a chair' consists of a sum total of such Forms. It is a logical construction of them.

Despite not being in their pure Form, we know the Objects completely, so that nothing can improve this knowledge (see Waismann 1967, p. 253). The point is that Objects can also be completely known when they are modified. This is so since they are something like G. E. Moore's third type of universals.[9] Such universals, for example, pure white, are not merely presented in the particulars (in all white patches) but are identical with them (see Moore 1953, p. 344). Thus the modification of the Objects into objects is

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[6] In this sense, the *Tractatus* clearly presents a form of logical atomism.

[7] In 'Theses', Friedrich Waismann calls the Objects 'elements' (*Elemente*), to differentiate them from the other objects (*Gegenstände*). See Waismann 1967, pp. 252–60.

[8] This is nothing but the 'sub-forms' which we discussed in § 3.

not a hindrance to grasping the Objects are *per se*. What is impossible is to point to them, or to exactly describe them.

Perhaps it is most appropriate to say that Objects are *universalia in rebus*. Indeed, this means that these *are* universals that *appear* as particulars. This conception is in accordance both with the authors who accept that Objects are particulars (Anscombe 1959, Copi 1966, Ishiguro 1969, Hintikka and Hintikka 1986, Pears 1987), as well as with the authors who accept that they are universals (Kluge 1973, Fahrnkopf 1988, Wedin 1990).

6. Transition from Objects to States of Affairs

We now come to the most intriguing point in our understanding of the Tractarian objects. According to this, objects enter a state of affairs in a certain *way*. Indeed, the very term '*Sachverhalt*' (state of affairs) 'in its normal German meaning, . . . suggests not an object simpliciter but the *way in which* things stand to one another' (Simons 1992, p. 337).

The objects in the state of affairs form a configuration with the other objects; so every object enters a state of affairs as a part of the configuration of the latter. We, have, however, already used the term 'configuration' to mean the sub-forms *of the objects*. In fact, here we refer to a second, refined meaning of configuration—the actual configuration *of the states of affairs*. Wittgenstein himself made two uses of the term 'configuration'. Indeed, whereas in 2.0272 it means sub-forms of objects, in 2.0271 it means configurations of states of affairs.[10] There is no contradiction between the two types of configuration, however. The configuration of the state of affairs is made up of configurations (sub-forms) of the objects that are connected with one another.

We see the issue at hand as follows. Since the objects are bulky, they are spatial—logically spatial. Besides, the objects' definition as substances also indicates that they are qualitatively determined. Now our interpretation is that, exactly like the geometrical figures in topology, when entering particular states of affairs, the objects retain their

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[9] Incidentally, they were discussed by G. E. Moore just a few months before Wittgenstein was matriculated in Cambridge, in the Spring of 1911.

[10] On the ambiguity of the term 'configuration' in the *Tractatus* see Zheng 1999, p. 138.

qualitative properties. At the same time, however, they modify their actual sub-form to another of its sub-forms, setting out in this way a new configuration with other objects.

7. Objects as Micro-States of Affairs

So the actual states of affairs, or facts,[11] are compounds in which a number of objects are related in a certain way. This is the sense of the *Tractatus* 2.031: 'In a state of affairs objects stand in a determinate relation to one another.' They are not just a blend of objects.

This apprehension is further developed in the concept of 'general propositional form', which reads: 'The things are [related] so-and-so [*es verhält sich so und so*].' (4.5.) According to this understanding, the main function of facts, propositions and judgements is that all three reciprocally relate the objects of a whole to one another, so that they both distinguish them and also combine them into one. This explains why Wittgenstein defines the general propositional form as 'the general form of compositionality [*Zusammengesetzheit*]' (1993, i. p. 52).

This latter understanding has two important consequences.

(i) It assumes that the relations between the Tractarian actual states of affairs, as well as between its propositions, have, in a sense, the same character as the relations between the objects in states of affairs. This means simply that formations of different orders—($\forall$) objects; ($\exists$) states of affairs; (()) propositions—are connected in one and the same way: through their elements, which are hinged together like the joints of a scaffolding. The objects, for example, are (as shown in § 2) nothing but folded-up complexes, composed of sub-forms. In a sense, they can be called *micro states of affairs*.

This uniformity of composition of objects, states of affairs and propositions also explains why the 'sole logical constant' which, in fact, connects individual propositions, is nothing but the general propositional form (5.47), i.e., the general way in which every individual proposition is made up out of objects.[12]

(ii) It falsifies the assumption that every judgement has its own ontology; for example, that the three judgements: 'this rose is red', 'redness inheres in this rose', and 'this

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[11] On their identity, see § 9.

rose forms the substrate of this redness', which are based on one and the same 'factual material', have individual ontologies called 'states of affairs'.[13] In fact, the ontology of different judgements is not different from the ontology of the 'factual material' on which they are made, and for one simple reason. The factual material already contains in itself all possible logical combinations, including the ontology of every judgement that can be made about it. So the ontology of judgements is parasitic upon the ontology of facts. To be sure, the way in which the objects of the factual material are connected in the judgements has—at least according to Wittgenstein—no ontological import.

8. Possible States of Affairs: Reality

From a logical perspective, the forms of objects are nothing but the *possibilities* the objects have of occurring in states of affairs (1922, 2.0141). This point provides a decisive argument for accepting[14] that individual objects have many sub-forms, which can also be interpreted as meaning: an object has one form which, developed in different ways, is as active as many different sub-forms.

There is one over-comprehensive formation of all elementary possibilities (2.06), in which these are folded up into one another. This formation is composed of all possibilities (= sub-forms) of the objects, which touch one another. In Wittgenstein's terminology, this is *reality*, as opposed to the *actual* world. Recently, this conception of his was instructively called 'a combinatorial theory of possibility'. According to this, 'possibility just consists in rearrangement of atomic individuals, properties, and relations ['objects', in our terminology,] that have been abstracted from atomic facts' (Skyrms 1993, pp. 227–8). The result of such rearrangements are possible worlds. This conception is also called 'modal atomism' (see Bradley 1992, pp. 12 f.).

The overall ordering of the faces-of-objects into all *possible* states of affairs can be articulated in Euclidean (stereological) terms like this.[15] The objects are folded-up poly-

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[12] Incidentally, this point is in blatant contradiction to the principle of truth-functionality, declared to be central in the *Tractatus*.

[13] This conception is advanced in Smith 1987, p. 201.

[14] Such an acceptance was made in § 3.

[15] A central difficulty in investigating the Tractarian ontology is that while it is built on in non-Euclidean space, it is nevertheless spatial—stereological—of necessity. The

hedra, the faces of which are their sub-forms. The sum total of all possible states of affairs can be presented as consisting of the sum total of all folded-up *grapes* (states of affairs) of polyhedra (objects), in which the faces (sub-forms) of every polyhedron (object) touch the faces of other polyhedron–objects. Every object borders—on all its sides—upon other objects. Objects have no vacant face (or surface, or sub-form)—that is, no face (surface, sub-form)—which does not border on another sub-form. Besides, the faces of objects touch one another so that the edges of one form fits exactly with the edges of the others. There is no vacuum between them.

Since (α) the sub-forms of objects are rigid; (β) the objects touch one another in such a way that the edges of one sub-form fit exactly together with the edges of others, so that they determine the order of their configuration; and since also (γ) there is no 'logical vacuum', the sub-forms determine all the possible states of affairs in which the objects can occur.

The ontology of the *Tractatus* thus understood makes it possible to apprehend reality as a constructed formation, which has what could be termed a crystalline character. This formation is atomistic in the sense that it is built around solid segment-atoms—the Tractarian objects. There is no void between these atoms; 'no such entities as properties and relations' (Smirnova 1997, p. 245). Indeed, Wittgenstein accepted that not only substances but also individual relations and properties are objects (see 1979, p. 61; 1980, p. 120).

Ontologically, the importance of atoms–objects arises from the fact that they are, as Russell used to express it, the 'nomenclature of the world'. All other things and facts are composed of some of these atoms. That is why everything in the world can be viewed in terms of these indefinables. According to this conception, and in apparent contradiction to the ontology of the *Tractatus* 1.1, the reality is the totality of the objects. They are 'the substance of the world'.

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space in which it is, is a logical space, which is ineffable. The logical space, however, is to be apprehended and described in Euclidean terms.

9. Actual States of Affairs (Facts)

Since Wittgenstein's subject of investigation was language, he apprehended the world as that which can satisfy propositions (pictures).[16] More precisely, he advanced the conception that the actual world is the tip of the iceberg of the reality of possible states of affairs.[17] The whole iceberg is the storehouse of all the possible (folded-up) states of affairs. Its tip consists of the states of affairs that are actualised now, at this moment. In other words, the existing states of affairs (the actual world) are nothing but an actualisation of all possible combinations of the (sub-)forms. In this one actualisation, a number of sub-forms cools down to configurations of actual states of affairs.

There are two forces that pick up implicit (folded-up) states of affairs from this storage.

(i) *Nature*. A change in the material world is brought about when a new configuration, made up of configurations (of sub-forms) of objects, is actually constructed. Thus a new actual state of affairs is set up. Such new configurations—the emergence of a new state of affairs—is produced by clicking the actual forms of the objects under consideration into new forms (until this moment they were implicit); or, by clicking the actual—face—configuration of the objects of a state of affairs into a new configuration. This explains how the substance of the world, which is one, is rigid and constant, nevertheless produces ever new states of affairs. They are rigid too, but only at one (at their) moment.

(ii) *The knowing subject*. When we speak, i.e. communicate facts, we construct ever new pictures. Indeed, 'a picture depicts reality by representing a possibility of existence and non-existence of states of affairs' (2.201). These possible (real) states of affairs are compared with the states of affairs of the world; only those which fit into the states of affairs in the world are accepted as true (2.1).

But how is this fitting of possible and actual state of affairs achieved?

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[16] This conception gave rise to the theory of truth-making. For its history see Milkov 1997.

[17] In this sense, the neo-Fregean interpreters of the *Tractatus* (Anscombe 1959, Ishiguro 1969, McGuinness 1981) are right when insist that Wittgenstein's philosophy of language determines his ontology.

10. The Principle of Representing

A leading idea in the *Tractatus* is that *propositions* are facts which represent facts, and that *thoughts*, in a sense, are also facts. Because of this, they can represent and be represented—and also be communicated and expressed. This 'Principle of Representing' (4.0312; trans. mine) is only effective because of the identity between the structures of the two matching formations: the two formations have the same (identical) logical form. What is different in the isomorphic formations is only their content.

According to this conception, a formation can be represented by any other formation of the same form.[18] Conversely, a formation of any kind can be represented by another formation having the same multiplicity (form), without any loss of information. In representing structure, there is no priority: the copied structure can also be copying. On this point Wittgenstein followed Heinrich Hertz's theory of 'dynamic modelling', according to which 'if one structure is a model of a second, then, conversely, the second is also a model of the first' (Hertz 1894, § 419).

In accordance with this conception, picture theory assumes that by operating with propositions, instead of certain words, we can pose a picture 'and proceed further'.

> [W]e don't have to translate such pictures into realistic ones in order to 'understand' them, any more than we ever translate photographs or film pictures into coloured pictures, although black-and-white men or plants in reality would strike us as unspeakably strange and frightful. . . . [Conclusion:] A sentence in a story gives us the same satisfaction as a picture. (1974, § 123.)

At one level of representing, the substitution is by way of pictures. At the next, ontological level of representing, words in a proposition are substituted by way of material pieces. Indeed, 'instead of a picture one might have considered a slice of material reality' (ibid., § 114). According to the Principle of Representing, 'it can never be essential that a symbolic phenomenon occurs in the mind and not on paper so that others can see it' (ibid., § 59a)—or even in reality.

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[18] D. Davidson called this 'one-to-one mapping of every object on to another' 'a permutation of the universe' (Davidson 1984, p. 229).

Now, the theory of objects that we have developed so far suggests that the contact between two formations has always the form of a touch, which is similar to the touch between two objects in a state of affairs. Indeed, the touch between two formations is realised in the configuration which is common to the two formations. This common configuration, or the intersection between the two formations, is the element on which they quasi 'hinge' onto one another.[19]

11. Two Types of Scaffolding

The analysis of the Tractarian objects and states of affairs made so far allows us to set out exactly what the Tractarian term 'scaffolding' means. As noted at the beginning of the paper, there are two types of scaffolding: logical scaffolding, and scaffolding of the world.

(i) Logical Scaffolding. Fortunately, we have Wittgenstein's notes on this expression, set out in a letter to C. K. Ogden, commenting the English translation of the *Tractatus*. They explain *Tractatus* 3.42—'The logical scaffolding surrounding a picture determines the logical space. The picture reaches through the whole logical space'.[20]

> [This] means that the scaffolding is as big as the logical space. You could imagine a house with such a big scaffolding round it that by its length, breadth and width it filled the whole space. (Though 'filling' wouldn't be the right expression. I think to 'reach through space' is what I mean.) (Wittgenstein 1973, p. 25.)

Apparently, logical scaffoldings are constructions, organised as described in § 8. They are set up with possible objects–polyhedra, and more precisely, with their implicit formal faces.

According to this conception, every possible (implicit) state of affairs is (implicitly) surrounded by all other possible states of affairs that its objects can produce. In this

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[19] It is true that in 2.1514–15 Wittgenstein sets out that 'the correlations of the picture's elements with things . . . are, as it were, the feelers of the picture's elements, with which the picture touches reality;' i.e. they are a third element that mediates between the two sides. Later, however, he told his friends that at this place 'he had confused the "method of projection" with the "lines of projection"' (Winch 1969, p. 12).

[20] Here I quote my translation from German.

way, it has the whole possible reality as a scaffolding. This scaffolding is something like a whole-reality embracing plaster cast, the core of which is the state of affairs (the formation) under scrutiny.

It is of utmost importance that—as explained in § 4—the objects in the possible state of affairs under scrutiny are connected with the help of their topology alone. It is not the logical scaffolding that makes them stick together. It only facilitates the states of affair's (formation's) build-up.

It is best to call this formal surrounding of the possible states of affairs 'logical *scaffolding*', since it quasi supports the build-up of the formation. Besides, the term 'logical *scaffoldings*' suggests that the supporting logical possibilities (forms) are extensions, which are exactly as large as the actual segments (objects) are. This is a point on which Wittgenstein insisted. The connectives of this type of scaffolding, too, are exactly as bulky as the segments they connect are. Its only difference to real scaffolding, known to us from building sites, is that the logical scaffolding has faces—it is not only a network of supporting poles.

Language. Logical scaffolding is used in language-processing: speaking, understanding sentences, etc. Indeed, according to the early Wittgenstein, language is nothing but an experimental arrangement of possible sub-forms with the help of a logical scaffolding: 'In the proposition we—so to speak—arrange [in expression] things *experimentally*' (1979, p. 13b; see also 1922, 4.0311): in a bold effort to replicate reality. Incidentally, this is the way in which such practices as that in court when 'a motor-car accident is represented by means of dolls, etc.' also function (p. 7c). It is important that thanks to the Principle of Representing (discussed in § 10), such 'fake facts' can accomplish the same job as is accomplished by real facts: they are understood ultimately.

The whole peculiarity of Wittgenstein's philosophy of language arises from the assumption that such non-intuitive sampling with the aim of testing, made in a form of *expression*, is only possible in language (the motor-car accident *modelling* is not an expression at all). According to the early Wittgenstein, precisely this is what makes language unique. All other forms of representing reality in expression—for example, music, or painting—have a totally different structure. They do not try to express (articulate) fake facts. What is more, they do not express facts at all, but feelings.

Now if it happens that what this experimental arrangement stands for what really exists, then the proposition is true and the fake fact, constructed with the help of the logical scaffolding, is identical with the worldly scaffolding (a concept to be discussed in (ii)) of the fact that renders the proposition true. Thus is to be understood 4.023e: 'A proposition constructs a world with the help of a logical scaffolding, so that one can actually see from the proposition how everything stands logically *if* it is true.'

More precisely, in language we knit together sub-forms of objects into chains. The formation brought about in this way is a proposition, made up with the help of a logical scaffolding which organizes its individuals from outside. Indeed, without it, the objects scatter away so that we literally cannot *grasp* them in the formation they now make.

This operation is possible since when we come to know the existing, actual world, we become acquainted with the forms (sub-forms) of the objects and of the facts. Furthermore, once acquainted with only some of them, we come to implicitly know all their variants and possible combinations. We are thus in a position to construct new worlds which can, in principle, present facts of the real world.

In contrast, in logic and science we do not construct new worlds but rather follow (mirror, describe) the world. But how do we do this?

(ii) The Scaffolding of the World. Networks. When the folded up polyhedra of the real world are clicked onto a scene in the actual world, then some of the polyhedra harden to a cellular structure, similar to that of the honeycomb. Its formal faces make up 'the scaffolding of the [actual] world' (6.124)—the world of science.

The scaffolding of the *real world* is precisely what is presented by the propositions of logic; the latter make up 'an infinitely fine network' (5.511). Other propositions which have the form of a network are those of science. In short, these can be defined as logical propositions of the *actual world*.

The difference between the logical scaffolding and the scaffolding of the world can be put like this. Whereas the logical scaffolding is build around (outside) the propositions of the language, the logical and scientific networks—representing the scaffolding of the world—are situated *within* the propositions which they support. Their networks are an intrinsic part of the propositions; they function as their inner framework. As we are going to see in what follows, the difference between the logical network and the

scientific network is that whereas the former is—in Wittgenstein's terminology—of the real world, the latter is of the actual world.

Science. According to the early Wittgenstein, the role of science is to organize the facts under analysis by way of a logical network. An exemplar of such a network 'imposes a united form of description on the world' (1922, 6.341). With its help, the facts under scrutiny appear as if 'tamed', in order to be 'grasped'. The possibility of fitting the logical net of science into the facts of the actual world is raised by the identity in nature of the parts of the logical propositions with the objects out of which the states of affairs are composed. Indeed, the objects are formal (logical), since they are nothing but concatenations of sub-forms.

The form of the logical net of science is optional—its choice is contingent. So one and the same setting of facts can be described equally well, i.e. completely, by different nets: 'I could have achieved the same result by using a net with a triangular or hexagonal mesh.' (6.341.) The net must meet one condition only: it must have a sufficiently small mesh, so that no fact can run off it.[21]

Thus science emerges in a radical link between indefinable matter (content) and a formal network. On the one hand, because it investigates the matter, it is natural; on the other hand, since it puts pieces of matter into a logical network—in order to describe it,—science is also formal.[22]

Logic. The same is valid of the propositions of logic. However, inasmuch as the logical propositions describe the scaffolding of the (real) *world*, they have no ontological import; they are parasitic upon the world. More precisely, the propositions of logic ad-

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[21] Some authors characterised this position as 'a radical conventionalism about science' (Zemach 1993, p. 204). Wittgenstein himself acknowledges that here he follows Whitehead's 'Conventions' which 'are definitions with *a certain generality of form*' (1979, p. 70a).

[22] From this point, the following conclusion was made. Since the only way to organise the objects (their sub-forms) in some theoretical construction is by way of some logical network, 'all deductions are made a priori'—the scientific too (5.133). So 'the only necessity that exists is *logical* necessity' (6.37). Thus many scientific laws, such as the 'law of least action', the 'law of continuity in nature and of the least effort in nature etc. etc.—all these are a priori insights about the forms in which the propositions of science can cast' (6.34). That is why already before their formulation, people have surmised that there are such laws. What natural science actually does is to advance networks of optional (contingent) form, by way of which we comprehensively describe the facts under scrutiny.

vance a mirror-picture of the world (6.13). Indeed, they are only optical means for recognizing the structure of the (real) world: The 'proof in logic is merely a mechanical expedient to facilitate the recognition of tautologies in complicated cases'. (6.1262). Propositions of logic are tautologies (6.1).

12. Criticism of the Alternative Conceptions

It is of importance that both the (constructed) logical scaffolding of language, and the (mirrored) logical and scientific network, which articulate the scaffolding of the (actual and real) world, have a bulky (stereological) character. There is no void between the elements (the cells) of these formations. In this sense, Wittgenstein's philosophy was Aristotelian, not Platonic.

Here are two alternative conceptions which accept that there is a void between the atoms–objects.

- According to David Pears, Tractarian ontology has the form of a 'grid'. 'The objects are nodal points' in the grid (Pears 1987, i. p. 28).
- According to B. Wolniewicz, the ontology of the *Tractatus* lies on 'a lattice of elementary situations. Of these, maximal ones are possible worlds, constituting logical space; minimal ones are logical atoms, partitioned into its dimensions.' (Wolniewicz 1982, p. 381.)

Our point against these interpretations is that they fail to specify what the material that fleshes out the ontological skeleton that they postulate is. Russell, who followed a Platonic type of constructivism, and thus accepted a skeleton-cum-content programme, advanced the latter in two onsets. First, in *Principia Mathematica* he made a mathematical–logical reconstruction of the skeleton. Later, starting from 1911, he investigated the ontological flesh of this skeleton. In contrast, Wittgenstein's Aristotelian constructivism, which dispenses with skeletons, was advanced in one step. There is nothing surprising about this, since his *Aufbau*-programme was monolithic.

13. The Fate of the Concept of Scaffolding (*Gerüst*) in Wittgenstein's Later Works

It is well-known that Wittgenstein scarcely ever abandoned terms once he had introduced them into philosophical discourse. In this sense, more than a quarter of a century ago, J. K. Hintikka noted with justification that in his writings after 1922, the term 'picture' was not abandoned; it just faded away (see Hintikka 1976, p. 110). It is easy to see that the same is also true of the term '*Gerüst*' (scaffolding).

Now despite not being abandoned, the use of the term '*Gerüst*' in Wittgenstein's later writings is sporadic. We meet it in: MS 106, p. 72; MS 108, p. 7; 1953, § 240; 1956 *II*, § 12, V § 2. The reason for this is, apparently, that after 1929, Wittgenstein cast off the *Aufbau*-approach to the world; so he stopped believing that there is *Gerüst* in the (actual and real) world, in the sense of a honeycomb-network, to which the logically organised networks of logic and science correspond.

This explains why, overall, where the expression *Gerüst* is used by Wittgenstein after January 1929, it is used in the sense of *logical* scaffolding. It organises propositions, or geometrical procedures, or equations with numbers, or new techniques of calculation—from the outside (see 1956 *II*, § 12). Our whole language is organised through such a scaffolding (1953, § 240).

There is an important difference between Wittgenstein's conception of logical scaffolding before and after 1929 though. Whereas in the *Tractatus* the logical scaffolding is a necessary means for *constructing* models, pictures, propositions, etc., after 1929 Wittgenstein gradually reached the conclusion that the scaffolding in this sense has only camouflage functions. It is only an 'unimportant construction', similar to the ladder with the help of which we reach something, after which it becomes irrelevant (see MS106, p. 72). Indeed, now he started to believe that pictures, propositions, or geometrical procedures, or equations with numbers, or new techniques of calculation are given, or invented, not constructed.

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