

Some problems of TRACTATUS  
LOGICO-PHILOSOPHICUS from the point of view  
of modern logic\*

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**0.** As far as I am not a historian of philosophy and it is my first attempt to appear in this role it is worthwhile to set forth my understanding of philosophy and of what is (in my opinion) the main purpose of a historian of philosophy.

**1.** I understand philosophy as an aspiration for absolute knowledge [8]. The man who seeks for absolute knowledge is a sage (wiseman). Absolute knowledge about the world is unattainable. I comprehend “knowledge” even as denial of cognizability of the world, i. e., in a certain sense, as an ignorance.

Absolute knowledge of the world consists of two parts.

**1.1.** *The first one:* philosophy explains separate sides of the world, which are not amenable to the methods of concrete sciences at some particular period of their development. This explanation is hypothetical and sometimes even merely speculative, i.e. such an explanation doesn't rest upon concrete scientific data. Thus, first part of philosophy is an absolute knowledge of separate fields of reality.

**1.2.** *The second one:* philosophy explains the world as a whole, creating, so to say, an entire (integral) picture of the world, which can not be constructed by means of concrete sciences. The latter explanation is, in its own turn, hypothetical, sometimes speculative.

**1.3.** As the scientific knowledge progressing, the field of philosophical “knowledge” becomes restricted by concrete sciences, but on the other hand acquires new broadening from the unknown.

**2.** What kind of problems does the historian of philosophy survey?

**2.1.** Historian of philosophy finds out what the investigated philosophical school or philosopher “guessed” rightly or falsely from the point of view of contemporary (modern) science.

**2.2.1.** Researcher (historian) explains the correctness of solution of certain problems, advanced by philosophical school or philosopher, on the ground of achievements of contemporary science.

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**2.2.2.** Historian demonstrates, how on the ground of modern science can be rightly solved problems, that were misinterpreted or solved erroneously by investigated philosophical school or philosopher.

**2.2.3.** Researcher picks out problems, which hypothetical solution can neither be verified nor falsified by contemporary science.

**2.2.4.** The researcher maintains some new problems, which appear in the modern period of development of science and philosophy and are not amenable to scientific treatment. Besides, he advances some hypothetical solutions of these problems.

**3.** It makes sense to single out the main idea of the doctrine of the investigated philosopher.

**3.1.** My comprehension of the fundamental idea, which underlies formulation of some problems in TRACTATUS is as follows:

Wittgenstein elucidates the concept of the world from the logical point of view, i.e. what in principle can be said of the reality, considering logic only. Moreover, he means logic as one presented in “Principia Mathematica”.

**3.2.** The world consists of objects (things) (Gegenstände) and of their combinations and relations between them (Sachverhalten). It is impossible to say anything of the objects on their own, although they may be distinguished (differed) from each other. However, it is not quite clear, how exactly they can be distinguished.

*“2.01.21. ... there is no object that we can imagine excluded from the possibility of combining with others. If I can imagine objects combined in states of affairs, I cannot imagine them excluded from the possibility of such combinations”.*

The set (multifold) of objects (things) is a possible domain of interpretation of the language of predicate logic. If we deal with the language of the predicate logic and its intuitive semantics and don't know anything else of the world, then, indeed, we can say nothing of the objects, constituting one of the domains of interpretations, besides that have already been said by Wittgenstein.

**3.2.1.** The symbols, designating objects (things) are names. Individual names are individual constants. General names are individual variables.

*“3.22. In a proposition a name is the representative of an object.”*

*“3.314. All variables can be construed as propositional variables. (Even variable names.)”*

**3.2.2.** Individual variables are formal notions (concepts).

*“4.1271. Every variable is the sign for a formal concept.”*

**4.** The world consists of facts. Facts divide into relations between objects (things – Sachverhalten). A relation between things is a connection of objects (things). Any object can stand in any relation to other one. Therefore, Sachverhalt is a possible intuitive set-theoretical interpretation of atomic formula of the

language of classical predicate logic. For example, formula  $R^2(a, b)$  of the language of predicate logic doesn't designate any specific proposition before the use of language as one of applied theory; it doesn't say what concrete objects  $a$  and  $b$  in some particular relation on  $R^2$ .

The individual constants  $a$  and  $b$  don't imply specific information of objects they designate, except that such objects exist and may be differed from each other or identified with one another.

The formula  $R^2(a, b)$  contains certain information, namely, it asserts certain binary relation between objects.

**4.1.** Molecular (complex) propositions are truth functions of their elementary parts – i.e. of atomic propositions they contain. The basic logical terms, representing connections between propositions are:  $\sim$  (negation),  $\cdot$  (conjunction),  $\vee$  (disjunction),  $\supset$  (implication). Definitions of these terms rest upon the logical principles of bivalency, consistency, identity and excluded middle.

**4.2.** The laws of logic don't contain information of the world.

*“6.1. The propositions of logic say nothing”*

**5.** Wittgenstein looks upon the world through the conceptual net, that is, in fact classical predicate logic, as it presented in “Principia Mathematica”.

**6.** So let us try to look over the world through the net of modern logic.

**6.1.** What do I mean saying (uttering) “modern logic”? I mean formal logic, i.e. science of forms of thinking, formal logical laws and other connections and relations between thoughts based on their logical forms. The use of symbolic method in studying of formal relations between thoughts differs contemporary logic from the traditional one. Modern logic includes all problems and achievements of traditional one and solves great number of new problems. In connection with such understanding of modern logic I refer its rise to the twenties of 19th century. Modern logic began its forming after “Principia Mathematica” had been published. Thus I don't identify the whole of modern logic with symbolic one only. I also refer to modern logic some further investigations proceeding right up to the present. Besides, I distinguish two branches in the multitude of contemporary logical investigations: logic in the strict sense (logic itself) and imitation of logic. The subject of the logic in the strict sense consists in studying of the forms of thoughts. Haskell B. Curry called such kind of logic “philosophical logic”. Imitation of logic is a certain system – e.g. an algebraic one – which resembles philosophical one some respects (such resemblance may consist in the use of special symbols merely). Any real connections with forms of the thoughts are not required of imitation of logic. In the further account I consider modern logic as philosophical one.

**6.2.** Logic consists of three parts: logical anthropology, logical ontology and pure logic.

**6.2.1.** *Logical anthropology.* Some premises conditioned by “human factor” are assumed. It is the supposition of the existence of things (objects) which can be distinguished from one another, and sets of things (objects). Object is something that can be singled out and named in some way. Sets consists of objects, which can be distinguished in some way from objects not-included in

a certain set. In language objects and sets are represented by individual and general names. Individual and general names designate objects (an individual name designates single object, general name refers to more than one object), but they don't necessarily contain an information of objects. Objects may be singled out on the basis of sense data. This is the reason why (for this reason) names don't express thoughts necessarily.

Objects possess of some properties and stand to one another in certain relations.

**6.2.2. Logical ontology.** It consists in the knowledge of the world that grounds the investigations of thoughts and processes of thinking. Wittgenstein's definitions of these follow as principles of bivalency, of consistency, of excluded middle, of identity, of "functionality" (logical terms must be interpreted as functions), an acceptance of logical (physical) independence between objects and situations; assertion that there is not such "thing" in the world as causal nexus.

*"Superstition is the belief in the causal nexus."*

The use of certain logical terms and their interpretation (in TRACTATUS there are  $\sim$ ,  $\cdot$ ,  $\vee$ ,  $\supset$ , quantifiers etc).

**6.2.3.** Pure logic consists in definitions of logical inference (between propositions and predicates) on the basis of informational connection between them (and definition of other relations between propositions by means of logical inference):

$$A \models B \iff I(B, M) \text{ is a part of } I(A, M) \iff M_A \subseteq M_B.$$

$I(B, M)$  is: information of  $B$  about all (possible) state-descriptions  $M$ .  $I(A, M)$  is: information on  $A$  about all (possible) state-descriptions  $M$ .  $M_A$  and  $M_B$  are all state-descriptions in which  $A$  (respectively  $B$ ) has designated value.  $A \models B$  means that  $B$  follows from  $A$  (See [7]).

**7.** The world from the point of view of modern logic also consists of three parts.

**7.1. The world from the point of view of logical anthropology.** There are objects in the world, sets of objects, properties of objects and relations between them. We cannot say anything about objects, properties and relations, except their existence and differences.

**7.2. The world from the point of view of logical ontology.** First of all, I would like to say a few words of main principles, making the foundations of logic, so then of properties of the world. Classical logic (propositional and predicate) rests upon the principles of truth-bivalency (propositions take values from the domain  $\{t(\text{truth}), f(\text{falsity})\}$ ), of consistency (a proposition can not have both the values); of excluded middle (a proposition necessarily has some of these values), of identity (in a complex proposition, a system of propositions, an argument one and the same proposition has one and the same value), the principle of specifying the truth value of a complex proposition by truth values of elementary propositions constituting it (in propositional logic this principle acts as a matrix principle – logical connectives are defined by matrices, in

predicate logic it shows up in the interpretation of logical terms and predicates as truth functions).

Acceptance of above-mentioned principles forces upon the following picture of the world to admit: the world is regarded as if it stands still in time, i.e. the synchronous “cut” of the world is taken into consideration; each state of affairs either exists or doesn’t exist in reality, i.e. we know that simultaneous presence and absence of the one and the same state of affairs is impossible, as well as the situation when neither of the possibilities take place is impossible too; complex proposition are construed from atomic ones by mean of certain connectives. So looking upon the world through the “net” of classical logic, we of course can not see any casual relations or factual necessity in the world, and even logical necessity appears to be “cut off” (See [6]).

What does the world from the point of view of modern logic look like? To clear this question up let’s compare the principles of classical logic with that of modal one.

<b>Classical logic</b>	<b>Logical modalities</b>	<b>Factual modalities</b>
(1) the principle of <i>bivalency</i> : propositions take values from the domain $\{t, f\}$	the principle of <i>fourvalency</i> : $\{t^T, t^I, f^I, f^F\}$	the principle of <i>fourvalency</i> : $\{t^n, t^c, f^c, f^i\}$
(2) the principle of <i>consistency</i> : a proposition can not have both the values	<i>consistency</i> : can not have more than one value from $\{t^T, t^I, f^I, f^F\}$	<i>consistency</i> : can not have more than one value from $\{t^n, t^c, f^c, f^i\}$
(3) the principle of <i>excluded middle</i> : a proposition necessarily has some of these values	the principle of <i>excluded fifth</i>	the principle of <i>excluded fifth</i>
(4) the principle of <i>identity</i> : in a complex proposition, a system of propositions, an argument the same proposition has one and the same value from the domain $\{t, f\}$	<i>identity</i> : from the domain $\{t^T, t^I, f^I, f^F\}$	<i>identity</i> : from the domain $\{t^n, t^c, f^c, f^i\}$
(5) the principle of specifying the truth value of a complex proposition by truth values of atomic propositions constituting it (in propositional logic this principle acts as a <i>matrix</i> principle: logical connectives are defined by matrices, in predicate logic it shows up in the interpretation of logical terms and predicates as truth functions)	logical terms are defined by <i>restricted sets of state descriptions</i>	the <i>quasi-matrix</i> principle (logical terms are interpreted as quasi-functions)

**Note.** The principle of fourvalency: proposition takes value from the domain  $\{t, f\}$  and if it takes the value  $t$ , then it also takes value from the domain

$\{T, I\}$  (if logical modalities are under consideration;  $T$  and  $I$  mean “logically true” and “logically indeterminate”, respectively), or from the domain  $\{n, c\}$  (if factual modalities are under consideration;  $n$  and  $c$  mean “factually determinate” and “factually indeterminate situation and absence of situation”, respectively) and if it takes the value  $f$ , then it also takes value from the domain  $\{I, F\}$  (if logical modalities are under consideration;  $F$  means “logically false”) or from the domain  $\{c, i\}$  (if factual modalities are under consideration; and  $i$  means “factually determinate absence of situation”) i.e. according to this principle a proposition takes value from the domain  $\{t^T, t^I, f^I, f^F\}$  or from  $\{t^n, t^c, f^c, f^i\}$ .

The world that has been seen through the net of modal logic become expanded by the exhaustive definitions of logical modalities, admission of physical (factual) modalities and strict determination of state of affairs.

**7.3.** *The world from the point of view of pure logic.* Pure logic becomes extended by the use of modal propositions and the other non-assertoric propositions. Pure logic is logic of relevance. From the point of view of pure logic no one (not a single) law of the kind “ $\models B$ ” can be admitted. Only relations of logical inference such as “ $A_1, \dots, A_n \models B$ ”, expressing an informational connections between propositions, can be admitted. Therefore, *the laws of classical logic and its extensions contain an information of the world, i.e. they are not tautologies.*

The world from the point of view of expanded pure logic is the multitude of the connections between situations, corresponding to the relevant logical inference and connections between the relations of relevant inference.

The correlations of principles of non-relevant logic of factual modalities and those of relevant (pure) logic of factual modalities follows as:

<b>Classical logic</b>	<b>Factual modalities</b>	<b>Relevant logic of factual modalities</b>
(1) the principle of <i>bivalency</i> : propositions take values from the domain $\{t, f\}$	the principle of <i>fourvalency</i> : $\{t^T, t^I, f^I, f^F\}$	the principle of <i>fourvalency</i> : $\{t^n, t^c, f^c, f^i\}$
(2) the principle of <i>consistency</i> : a proposition can not have both the values	<i>consistency</i> : can not have more than one value from $\{t^T, t^I, f^I, f^F\}$	— can have more than one value from $\{t^n, t^c, f^c, f^i\}$
(3) the principle of <i>excluded middle</i> : a proposition necessarily has some of these values	the principle of <i>excluded fifth</i>	—
(4) the principle of <i>identity</i> : in a complex proposition, a system of propositions, an argument the same proposition has one and the same value from the domain $\{t, f\}$	<i>identity</i> : from the domain $\{t^n, t^c, f^c, f^i\}$	—

(5) the principle of specifying the truth value of a complex proposition by truth values of atomic propositions constituting it (in propositional logic this principle acts as a <i>matrix</i> principle: logical connectives are defined by matrices, in predicate logic it shows up in the interpretation of logical terms and predicates as truth functions)	the <i>quasi-matrix</i> principle (logical terms are interpreted as quasi-functions)	the <i>quasi-matrix</i> principle (logical terms are interpreted as quasi-functions)
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In conclusion I have to emphasize the fact that only few problems maintained in Wittgenstein's TRACTATUS for the first time, were taken about. They will be elaborated in a more subtle way in "Secundus Tractatus Logico-Philosophicus", which I intend to write.

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