

**Sorin Costreie  
Mircea Dumitru**

**Editors**

**Meaning and Truth**



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## Introduction

This collection is the result of the research and collaboration of the members of the eleventh research team within the framework of the project SOP HRD/159/1.5/S/133675 “Innovation and development in structuring and representing knowledge through doctoral and postdoctoral fellowships (IDSRC – doc postdoc)”. Our common goal was to pursue a philosophical investigation of meaning and truth. This theme was tackled from many angles, and using many methods, yet what reunites us is this interest in seeking to better understand the connection between meaning and truth.

Constantin Brîncuș argues in his paper that valid inferences have epistemic significance, i.e., they can be used by an agent to enlarge his knowledge, and this significance can be accounted in model-theoretic terms. Brîncuș explains this epistemic significance starting from Carnap’s semantic theory of meaning and Tarski’s notion of satisfaction, and in this way he counters Dag Prawitz’s claim that a truth-conditional theory of meaning is not able to account for the legitimacy of valid inferences, i.e., their epistemic significance.

Sorin Costreie argues against Gideon Makin’s claim that Frege’s and Russell’s accounts of logic and language have in common a consistent overlapping portion. Makin takes as identical Frege’s distinction between sense and reference and Russell’s distinction between a denoting concept and its denotation. Exactly the investigation of this parallelism will constitute the purpose of his paper, and Costreie argues that Makin is wrong in maintaining this identification.

Oana Culache, in the context of multimodal communication, proposes a more comprehensive model of translation based on Aguiar and Queiroz’s work. This model can be found useful by semioticians interested in the meaning-making process within the multimodal framework. In Culache’s view, multimodality is a more active player in intersemiotic translation, and she proposes a more complex model for intersemiotic translation. The main conclusion of her paper is that multimodality can be used by scholars to better understand the meaning-making and translation process across different sets of signs or modes.

## Introduction

Mircea Dumitru discusses a new semantic framework, viz. semantic relationism, which is due to Kit Fine. This framework is a novel understanding of meaning through a representational semantics which takes into consideration the relations between linguistic items in addition to the semantic values that each item can be separately and independently assigned by the semantics of that language. The paper addresses the issue of a subtle distinction between compositionality and intrinsicity, endorsing the former and rejecting the latter. The whole program shows new, unexpected, and very profound connections between meaning, reference, truth, and mental content.

Crăița Florescu shows in her paper why, how and against which objections it can be said that Frege's understanding of truth never abandoned the basic intuition according to which “a statement is true only if there is something in the world in virtue of which it is true”. Crăița Florescu was formally not part of the group, yet she participated at the workshops organized by our research team, and informally she participated at many of our meetings.

Victor Gelan shows that, according to the Husserlian approach, the way in which the (psychical) act is conceived and defined as a *lived, intentional* experience plays an essential role in clarifying the distinction between the empirical-psychological level of consciousness and its eidetic or ideal level. He argues that the notion of act conceived in this manner had influenced and decisively determined the development of the entire Husserlian phenomenology and theory of knowledge. Another distinction he discussed in this paper is that between the descriptive and intentional contents of the act.

Mihai Hîncu defends in his paper a perspectivalist semantic theory for sentences with predicates of personal taste in whose surface syntax the perspectival information is not profiled. After carving up the logical space of the main semantic theories, he discusses the relation between the context-sensitivity of the sentences in which predicates of personal taste occur, and the composition operation of their meanings. He shows that the natural language fragment containing subjective predicates does not threaten the principle of compositionality and that, in order to capture the context-sensitivity, more complex versions of this principle can be formulated.

Adrian Ludușan discusses one of the specific semantic proposals of *ante rem* structuralism, namely that mathematical discourse is to be taken at

face value. Specifically, he focuses on explaining the mechanism of reference for singular terms in mathematical sentences. He argues that Shapiro's account is in conflict with the literal interpretation of mathematical sentences.

Horia-Roman Patapievici presents in his paper the discovery of the physics of the Middle Ages, the complex and complicated manner in which this discovery was integrated into the historiography of science, and the failure of our cultural framework to integrate it.

Adrian Radu discusses some contemporary theories of freedom and attempts to find new ways to improve them by offering a new theoretical foundation.

Mihai Rusu's paper examines Lowe's arguments that aim to establish the basic incoherence of conceptualism, and shows why they are not conclusive. His analysis focuses on various ways conceptualist theories could be or have been developed. The paper also raises serious doubts about the viability of Lowe's variant of essentialism, both as a metaphysical and an epistemological account of modality.



# The Epistemic Significance of Valid Inference – A Model-Theoretic Approach\*

Constantin C. Brîncuş

## 1. Introduction

The problem analysed in this paper is whether we can gain knowledge by using valid inferences, and how we can explain this process from a model-theoretic perspective. According to the *paradox of inference* (Cohen & Nagel 1936/1998, 173), it is logically impossible for an inference to be both valid and its conclusion to possess novelty with respect to the premises. I argue in this paper that valid inference has an epistemic significance, i.e., it can be used by an agent to enlarge his knowledge, and this significance can be accounted in model-theoretic terms. I will argue first that the paradox is based on an equivocation, namely, it arises because logical containment, i.e., logical implication, is identified with epistemological containment, i.e., the knowledge of the premises entails the knowledge of the conclusion. Second, I will argue that a truth-conditional theory of meaning has the necessary resources to explain the epistemic significance of valid inferences. I will explain this epistemic significance starting from Carnap's semantic theory of meaning and Tarski's notion of satisfaction. In this way I will counter (Prawitz 2012b)'s claim that a truth-conditional theory of meaning is not able to account the legitimacy of valid inferences, i.e., their epistemic significance.

The paper has five sections. I will start by presenting the paradox of inference, according to which a valid inference has no epistemic usefulness, and I will argue that we can dismiss it once we realize that it is based on an equivocation. In the second section I will show why we can gain knowledge

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by performing valid inferences, and I will argue following (Prawitz 2012a) that we should make a distinction between stating an argument and performing an inference. In the third section, I will present Prawitz's constructivist account to the legitimacy of valid inference, i.e., to their epistemic significance, and his arguments for the idea that a truth-conditional theory of meaning does not have the necessary resources to account this epistemic significance. Starting from Carnap's semantic views on meaning, I will show in the fourth section how we can explain the epistemic significance of valid inference from a model-theoretic perspective, and more precisely, by using a truth-conditional theory of meaning. In the fifth section, by introducing Tarski's notion of satisfaction, I will briefly indicate why the account is also sound for the inferences involving quantifiers. Finally, I will conclude by stating the conditions under which an agent can gain knowledge by using valid inferences, and by arguing that, in order to acquire the piece of knowledge expressed by the conclusion of an inference, an agent should know that the inference performed by him is valid.

## **2. The *Paradox of Inference***

An explicit presentation of the so-called *paradox of inference* can be found in M. Cohen & E. Nagel's book *An Introduction to Logic and Scientific Method*, namely:

If in an inference the conclusion is not contained in the premise, it cannot be valid; and if the conclusion is not different from the premises, it is useless; but the conclusion cannot be contained in the premises and also possess novelty; hence inferences cannot be both valid and useful (Cohen & Nagel 1936/1998, 173).

If we translate the conclusion of this paradox in modal terms, what it tells us is that it is *logically impossible* for an inference to be valid and useful

in the same time. We may obtain a clear-cut representation of this idea if we reconstruct the argument in a slightly different way, as follows:

P1. If an inference is valid then the conclusion is *contained* in the premises.

P2. If an inference is useful then the conclusion is *different* from the premises.

P3. The conclusion cannot be *contained* in the premises and also *different* from them.

C. Inferences cannot be both valid and useful.

The paradox is meant to be a criticism to the value of formal logic, but, as Cohen and Nagel mention, it is based upon several confusions<sup>1</sup>. What does it mean to say that the conclusion “is contained” in the premises, or that it possesses “novelty” with respect to the premises? Clearly, as the authors emphasize, for a certain person, “a conclusion may be surprising or unexpected even though it is correctly implied by the premises” (Idem, 174). For instance, a theorem in Euclidean geometry may have no novelty for a teacher who has proved it several times before, but, certainly, a student who approaches the subject for the first time, by proving it, may encounter a psychological novelty, i.e., “a feeling of novelty” (Idem, 176). Nevertheless, this feature has nothing to do with the validity of an inference. The theorem in question necessarily follows from the axioms independently from the persons who inquire Euclidean geometry. This fact shows us that psychological novelty and logical novelty, i.e., logical independence among propositions<sup>2</sup>, should be distinguished. Moreover, the term “containment” is taken by the authors, correctly I think, to denote the relation of logical implication, and, since in a valid argument the conclusion is implied by the premises, the conclusion cannot possess logical novelty with respect to the premises, i.e., it is not logically independent from them. In addition, since the relation of implication is an objective relation that is established among propositions, it follows that implications can only be discovered. As a

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<sup>1</sup> For this discussion you may also read the section “Deduction and Novelty” from (Cohen 1944/1965, 25-28).

<sup>2</sup> Two propositions are logically independent if, and only if, the truth-value of one of them in no way determines or limits the truth-value of the other. (see also Cohen & Nagel 1936/1998, 52-57).

consequence, logical novelty, in contradistinction to psychological novelty, is also an objective feature of a proposition with respect to others. Cohen and Nagel consider that psychological novelty, the mark of usefulness, arises because the *conventional*<sup>3</sup> meaning of a proposition, implied by a set of propositions, may not be present to the reasoner's mind, although, from an objective point of view the propositions are logically connected. Consequently, the conclusion of the paradox may be dismissed.

Although I agree that the terms "containment", "novelty", and "usefulness" are used in a quite vague manner in the original formulation of the paradox, given the fact that valid inferences are essentially used in epistemic contexts, I think that we should take the terms "novelty" and "usefulness" as aiming to epistemic novelty and epistemic usefulness. In addition, since an inferred theorem may be new not just for a particular person but for the entire scientific community, the concept of novelty must be thought of as an epistemological concept. Moreover, and most importantly, by making an inference we are expecting to get a *justification* for the inferred proposition, which, no doubt, is an essential feature of epistemic contexts. Therefore, the main point of the argument is that the conclusion of a valid inference cannot possess epistemic novelty with respect to its premises, and, consequently, inferences do not have any epistemic usefulness.

In order to have a clear-cut understanding of the so-called paradox of inference, I consider that it is necessary to offer explicit definitions of the central terms involved in its formulation. Namely, we should clearly distinguish between logical containment and epistemological containment, and between logical novelty and epistemological novelty. In order to make explicit these concepts I propose the following four definitions:

**Definition 1** *Logical Containment*: A proposition P is logically contained in a set of propositions  $\Gamma$  if and only if  $\Gamma$  logically implies P.

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<sup>3</sup> The authors distinguish between the conventional meaning of a proposition and the propositions it implies. The conventional meaning is defined as "that minimum of meaning which is required if a group of inquirers can be said to address themselves to the *same* proposition" (Idem, 176). The conventional meaning of a proposition enlarges when we discover a new logical consequence of this proposition. Initially, the meaning of this new proposition was not part of the conventional meaning of the initial proposition. Given my interpretation of the paradox, I think that this conventional meaning should be identified with the *known associated meaning* with a sentence, at a certain moment of time.

Definition 2 <sup>Logical Novelty</sup>: A proposition P has logical novelty with respect to a set of propositions  $\Gamma$  if and only if  $\Gamma$  and P are logically independent.

Definition 3 <sup>Epistemological Containment</sup>: A proposition P is epistemologically contained<sup>4</sup> in a set of propositions  $\Gamma$ , relative to a person A if and only if by knowing  $\Gamma$  then the person, *ipso facto*, knows P.

Definition 4 <sup>Epistemological Novelty</sup>: A proposition P has epistemological novelty for a person A relative to a set of propositions  $\Gamma$ , if, and only if, A knows  $\Gamma$  without knowing, *ipso facto*, P.

These definitions allow us to understand more clearly why an inference can be both valid and useful or, in other words, to see why logical containment and epistemological novelty are compatible. The compatibility becomes evident once we realize that the paradox, as I strongly believe, is based on an equivocation, namely, logical containment is identified with epistemological containment. This compatibility can be easily made explicit, in several steps of reasoning, in the following manner: if logical containment implies epistemological containment, then a person who knows a proposition also knows all its consequences. However, it is a fact that a real person may know a proposition without knowing all its consequences. Hence, logical containment does not imply epistemological containment. Moreover, epistemological containment is equivalent to epistemological non-novelty. This means that logical containment does not imply epistemological non-novelty. Therefore, logical containment and epistemological novelty are logically compatible.

If we want, for precision, we may represent more explicitly this reasoning as follows:

- (A) If logical containment implies epistemological containment, then a person who knows a proposition also knows all its consequences.  
(Def.1 and Def.4)

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<sup>4</sup> If we want, we may label the concept of epistemological containment with the term of “epistemological consequence”, i.e., a proposition is an epistemological consequence of a set of propositions, relative to an agent state of knowledge, if it is epistemologically contained in them. Of course, according to definition 3,  $\Gamma$  may logically imply P, or it may not imply it.

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- (B) A person may know a proposition without knowing all its consequences. (Description of a fact.)
- (C) Logical containment does not imply epistemological containment. (MT –A, B)
- (D) Epistemological containment is equivalent to epistemological non-novelty. (Def.3 and Def.4)
- (E) Logical containment does not imply epistemological non-novelty. (C, D)
- (F) Logical containment and epistemological novelty are compatible. (E)

The distinction between logical novelty and epistemological novelty is also important. The generally accepted idea is that we can obtain a new piece of knowledge only from experience. However, this is not necessarily the case. Of course, if a proposition has empirical content and is logically independent from what we already know, we cannot infer it from what we know. In this case we may obtain a justification for it only by appealing to experience. Nevertheless, we may also gain new knowledge by way of deductive thinking, as I will argue below. Therefore, not all that is epistemologically novel is logically novel.

With these distinctions in mind we can now defuse the so-called *paradox of inference*: if an inference is valid then the conclusion is *logically contained* in the premises. If an inference is useful then the conclusion must have *epistemological novelty* with respect to the premises. But, the conclusion can be *logically contained* in the premises and also possess *epistemological novelty*. Consequently, inferences can be both valid and useful, i.e., it is logically possible for an inference to be both valid and useful.

The distinction formulated above between logical containment, i.e., logical implication, and epistemological containment, i.e., epistemological consequence, can be found in a slightly different way in (Fine 2007, 47-48). K. Fine distinguishes between classical consequence and manifest consequence. The point is that although a proposition may be a classical consequence of a set of propositions it is not necessarily a manifest consequence of them. According to Fine's definition, a proposition  $q$  is a manifest consequence of other propositions  $p_1, p_2, \dots, p_n$  if it is a classical consequence of them and if, in addition, it would be manifest to any ideal cognizer who knew the propositions  $p_1, p_2, \dots, p_n$ , that  $q$  was indeed a classical consequence of those propositions.

The fact that these two concepts do not overlap is indicated by K. Fine by way of a very simple example. We can imagine an ideal cognitive agent who is perfectly competent in drawing consequences from what he knows, and we may ask ourselves if he will know every classical consequence of what he already knows. More precisely, let us consider the agent A who knows that Paderewski is a brilliant pianist (having heard him at a concert), and who also knows that he is a charismatic statesman (having heard him at a political rally), but who does not realize that is the same person who is both. Therefore, the agent A knows that  $p$  is  $P$ , and he also knows, from another context, that  $p$  is  $S$ , but the agent A is not in the position to know that  $p$  is both  $P$  and  $S$ . In other words, although  $(\exists x)(Px \ \& \ Sx)$  is a classical consequence of  $Pp$  and  $Sp$ , the agent knows  $Pp$  and  $Sp$  without knowing  $(\exists x)(Px \ \& \ Sx)$ . If we use the epistemic operator ‘ $K_A$ ’, i.e., A knows \_, and let the sign “ $\vdash$ ” denote the relation of manifest consequence, we may write:

$$K_A Pp, K_A Sp \not\vdash K_A(\exists x)(Px \ \& \ Sx)$$

Having in mind this example, we may believe that, in order to know the conclusion, the agent must have some extra, empirical, knowledge. However, this is not necessarily the case. For instance, what the agent may need is simply coordinating his thoughts in order to realize that Paderewski the pianist is the same person with Paderewski the statesman. Of course, this example may raise further questions, but they lie beyond the scope of the present paper. We can make a clear-cut distinction between logical containment and epistemological containment without entering in mental considerations, as we will see below.

### **3. Knowledge Through Inference**

The idea that logical containment, i.e., logical implication, and epistemological containment do not overlap can be illustrated by more simple and frequent situations. For instance, let us consider the following argument for which we assume that the premises are in fact true:

If the safe was opened, it must have been opened by Smith, with the assistance of Brown or Robinson. None of these

three could have been involved unless he was absent from the meeting. But we know that either Smith or Brown was present at the meeting. So since the safe was opened, it must have been Robinson who helped open it. (Forbes 1994, 86)

No doubt, this argument is logically valid, i.e., the premises logically imply the conclusion, but, certainly, an *untrained detective* may know that each premise in part is true without recognizing, *ipso facto*, the truth of the conclusion. Speaking more generally, when there is an epistemic gap, sufficiently wide, between the premises and the conclusion of a valid argument, the person in question must make an *epistemic effort* – which remains to be explained – in order to be able to assert the conclusion. Probably the best example which enforces the distinction between logical containment and epistemological containment is that of an argument which has as premises the axioms of a theory and as conclusion a certain theorem of that theory<sup>5</sup>. In this case, although the conclusion follows from the axioms, certainly we may not be able to infer it. If this would not be so, then a person who knows the axioms of a theory will also know, *ipso facto*, each theorem of that theory. But certainly, this is not the case. Logical omniscience is not a feature of the actual human minds.

If we introduce again the epistemic operator ‘ $K_A$ ’ we may consider the following two propositions (Rescher 2005, 14-15):

- (A) If  $K_A p$  and  $K_A (p \vdash q)$ , then  $K_A q$ .
- (B) If  $K_A p$  and  $p \vdash q$ , then  $K_A q$ , or, equivalently, if  $p \vdash q$ , then  $K_A p \vdash K_A q$ ,

I think that we all agree that although the proposition (A) is true, proposition (B) needs a supplementary condition in the antecedent in order to be true, i.e.: (B’) If  $K_A p$  and  $p \vdash q$ , and ..., then  $K_A q$ . I think that the additional condition that should be introduced is the following: agent A infers<sup>6</sup>  $q$  from  $p$ . In this case, if we reconsider the argument stated above, in

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<sup>5</sup> This example is also used by Dag Prawitz (2012a, 890; 2012b, 11) in order to illustrate that the Tarskian semantic notion of validity is insufficient for explaining the epistemic significance of valid inferences.

<sup>6</sup> By “agent A infers  $q$  from  $p$ ” I mean “agent A correctly (or validly) infers  $q$  from  $p$ ” since, as far as I understand these terms, an agent who does not correctly infer a proposition from a set of propositions, basically, he does not infer it.

order to get in possession of the piece of knowledge expressed by the conclusion, an agent must infer the conclusion from the premises. In other words, he must supplement the premises with the following steps of inference (I<sub>1</sub>, I<sub>4</sub>):

P<sub>1</sub>. If the safe was opened, it must have been opened by Smith, with the assistance of Brown or Robinson.

P<sub>2</sub>. None of these three could have been involved unless he was absent from the meeting.

P<sub>3</sub>. Either Smith or Brown was present at the meeting.

P<sub>4</sub>. The safe was opened.

I<sub>1</sub>. Smith opened the safe and either Brown or Robinson helped. (from P<sub>4</sub> and P<sub>1</sub>)

I<sub>2</sub>. Smith was absent from the meeting. (from I<sub>1</sub> and P<sub>2</sub>)

I<sub>3</sub>. Brown was present at the meeting. (from I<sub>2</sub> and P<sub>3</sub>)

I<sub>4</sub>. Brown did not help to open the safe. (from I<sub>3</sub> and P<sub>2</sub>)

C. Robinson helped open the safe. (from I<sub>4</sub> and I<sub>1</sub>). (see also Forbes 1994, 87)

In sum, the agent gets a justification for asserting the proposition expressed by the conclusion *only if* he performs the inferences I<sub>1</sub>-I<sub>4</sub>. By simply asserting P<sub>1</sub> –P<sub>4</sub> and then C, the agent does not have any real justification in order to assert the proposition expressed by the conclusion C. Generalizing from this individual case, we can say that although a proposition is logically implied by a set of true propositions, i.e., it is logically contained in them, an agent does not know the proposition expressed by the conclusion if he is not able to infer it from the premises. We can say, following (Prawitz 2012a), that stating an argument and making an inference are two quite different things. To make an inference means to assert the premises and then to infer the conclusion from the premises. To state an argument means just to assert the premises and the conclusion, and claiming the existence of a certain relation between them (A, B. Hence C.).

Returning to our initial problem, i.e., whether we can gain knowledge through valid inferences, now we can definitely give an affirmative answer. As we saw, a proposition may be logically implied by a set of propositions without entailing, by itself, that an agent who knows that set of propositions, *ipso facto*, knows each proposition logically implied by them, i.e., in our

initial terms, logical containment does not entail epistemological containment. In order to entail epistemological containment, logical containment must be supplemented with the condition imposed on a real agent, namely, to realize the necessary acts of inference. The epistemic effort that we have mentioned above consists precisely in performing these acts.

In the following sections it remains to explain why the relation of logical implication in addition with the acts of inference may entail epistemological containment. Dag Prawitz (2012a) proposed an explanation of the epistemic significance of valid inferences from a constructivist point of view, and he argued (in Prawitz 2012b) that a truth-conditional theory of meaning does not have the necessary resources to explain the legitimacy of inferences, i.e., their epistemic significance. The main aim of the next sections is to account for the epistemic significance of valid inferences from a model-theoretic point of view, and more precisely, by using a truth-conditional theory of meaning.

#### 4. The Legitimacy of Inferences

The problem of accounting for the epistemic significance of valid inferences presupposes an explanation of the fact that an agent who knows<sup>7</sup> the true propositions expressed by the premises of a valid argument, and performs a chain of inferences from the premises that leads him to the conclusion, will, *ipso facto*, know the proposition expressed by the conclusion. A necessary condition for grasping the piece of knowledge expressed by the conclusion is, of course, that the agent understands the meanings of the sentences involved in the stated argument, i.e., the propositions that they express. Consequently, for explaining the proposed problem we must state an adequate theory of meaning which allows us to explain how an agent may gain sometimes new knowledge by using valid inferences. This fact indicates us the real importance of a theory of meaning and its central place in philosophical approaches.

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<sup>7</sup> The concept of knowledge engaged in this approach is such that an agent knows a proposition if that proposition is true and the agent has a justification that guarantees the truth of that proposition.

One of the most important philosophers who vividly recognized the importance of the theory of meaning in analysing philosophical issues was Rudolf Carnap. Although he initially reduced philosophy to the logic of science, and more precisely to the syntax of the language of science (Carnap 1937, 277-280), he soon realized that

many philosophers and scientists interested in the logical analysis of science have become aware that we need, in addition to a purely formal analysis of language, an analysis of the signifying function of language – in other words, a theory of meaning and interpretation. (Carnap 1942, v).

Consequently, he redefined the task of philosophy as consisting in semiotic analysis. i.e., syntactic, *semantic* and pragmatic analyses. (Carnap 1942, 250). The theory of meaning developed by Carnap, as we will see below, is a *truth-conditional theory of meaning*.

Michael Dummett is another important philosopher who recognized the importance of a theory of meaning in philosophy. He considered that a meaning-theoretical investigation is the only way that we can clarify, roughly speaking, philosophical problems. In fact, he turned this idea into a general philosophical program meant to settle the debate between Realism and Anti-realism (see also Prawitz 2012b). However, the theory of meaning developed by Dummett, in relative opposition to the truth-conditional theory of meaning as I will try to argue below, is a *proof-conditional theory of meaning*.

The main assumption of Dummett's meaning-theoretical approach is that an adequate theory of meaning should account for all the features of the use of expressions that depend on knowing their meaning. Of course, as we indicated in the first part of this article, a main use of sentences which depends on knowing their meaning is their use in valid inferences and arguments. Therefore, an adequate theory of meaning must be able to account for this important use of sentences. In addition, since an important, and probably the most important, use of valid inferences is in expanding the knowledge of an agent or of a community, an adequate theory of meaning must explain this epistemic significance of valid inferences – in Prawitz's words, their legitimacy.

Dag Prawitz considers that a truth-conditional theory of meaning is not able to account for the legitimacy of inferences, and, consequently, it is not an adequate theory of meaning. His general argument may be represented in the following manner:

As. A theory of meaning should account for all features of the use of expressions that depend on knowing their meaning.

P\_P1. A deductive inference is legitimate if it can be used to obtain knowledge, i.e., to get a conclusive ground for an assertion.

P\_P2. The legitimacy of a deductive inference is part of our use of language and depends on knowing the meaning of the sentences involved.

P\_P3. A meaning theory must give an account of the legitimacy of deductive inference. (from As., P\_P2.)

P\_P4. Legitimacy is not explained by a truth-conditional theory of meaning (T.-C.T.M.)

P\_C. A T.-C.T.M. is an inadequate theory of meaning. (Prawitz 2012)

Prawitz's main arguments against a truth-conditional theory of meaning are stated in support for the fourth premise. However, before exposing these specific arguments let us briefly analyse his explanation for the legitimacy of inferences. The main concept in his theory of meaning, used to explain the legitimacy of arguments, appears in the general argument presented above in the first premise, namely, the concept of ground. Shortly, an inference is legitimate if it offers to the agent who has grounds for the premises, and performs that inference, a ground for the conclusion.

Essentially, in this new theory of meaning,

the sense of a sentence is given in terms of how it is established as true, in other words, in terms of what is required to be justified in asserting the sentence *or to have a ground for the assertion*. (Prawitz, 2012b, 12).

The concept of ground is defined as “something that one gets in possession of by doing certain things”. (When he speaks about grounds, Prawitz refers only to conclusive grounds, i.e., grounds that guarantee truth

(Prawitz 2012a, 890)). The real content of the term “ground” is given relative to the type of sentences that we analyse. A ground for an empirical sentence is obtained by doing an empirical action, i.e., an adequate observation. A ground for a non-empirical sentence is obtained by performing a mental action, namely, for a mathematical sentence a ground is obtained by performing a relevant calculation, and for a logically compound sentence a ground is obtained by operating on grounds for asserting its constituents. (Prawitz 2012a, 893). These grounds are “abstract entities that can be constructed in the mind” or

we may think of a ground for a judgement as just a representation of the state of our mind when we have justified a judgement (Prawitz 2009, 195).

By using the notion of ground, and the primitive notion of grounding operation, Prawitz redefines an inference as a quadruple containing premises, grounds for premises, a grounding operation, and conclusion. To make an inference means exactly to apply the grounding operation to the grounds for the premises. By applying the grounding operation to the grounds for the premises an agent obtains, *ipso facto*, a new ground for the conclusion and thereby is justified in asserting the conclusion. As a general remark, this theory follows Gentzen’s idea that the introduction inferences – or canonical inferences, in Prawitz’s terms – determine the meaning of the logical constants. The main difference is that the introduction inferences are seen as having attached grounding operations. These grounding operations operate on the grounds for the premises to which they are applied and transform them in a ground, a new ground, for the conclusion.

To take a simple example, if a person understands the meaning of conjunction and has grounds for each of its conjuncts, then, in virtue of the meaning of conjunction, she will also have, *ipso facto*, a ground for the compound conjunctive sentence. The meaning of conjunction is explained as being determined by what counts as a ground for it. Of course, having a ground for each of its conjuncts is a necessary and sufficient condition for having a ground for the conjunctive sentence. More specifically, this new ground for the conjunctive sentence  $\&G(\alpha, \beta)$  is obtained by applying the conjunctive grounding operation  $\&G$  to the grounds  $\alpha$  and  $\beta$  for each conjunct. *Mutatis mutandis* for the other sentences formed by Gentzen’s introduction rules.

Now we may return to analyse Prawitz's arguments for P\_P4, i.e., "legitimacy is not explained by the T.-C.T.M". I think that these arguments are essentially two, one regarding the Tarskian model-theoretic notion of validity, and the other regarding the idea of determining the meaning of a sentence by its truth-conditions.

The first argument runs as follows: the model-theoretic notion of validity is defined as truth-preservation under all assignments of meaning to the non-logical terms from the sentences involved in an inference. However, an inference which has as premises the axioms of a theory and as conclusion an arbitrary theorem of the theory, although it is valid, if there is a sufficiently wide epistemic gap between the premises and the conclusion, then it does not offer to the agent that performs it the knowledge expressed by the conclusion. Therefore, validity is not a sufficient condition for legitimacy, and, consequently, legitimacy is not explained by a T.-C.T.M.

The second argument emphasizes the idea that

truth-conditions contain too little information to allow us to infer that a person who knows the meaning of a sentence also knows what counts as ground for asserting the sentence (Prawitz 2012a, 12).

More specifically, the argument may also be represented as a *modus tollens*, namely: an adequate theory of meaning must show how an agent who (1) knows the meaning of the sentences involved in an inference, (2) is justified in asserting its premises, and (3) performs the inference is, *ipso facto*, justified in asserting the conclusion. Nevertheless, if the meaning of the sentences is given by truth-conditions then the criteria (1), (2), and (3) are not satisfied because an agent will not know that the proposition expressed by the conclusion is true without making additional inferences. Consequently, legitimacy is not explained by a T.-C.T.M.

The first argument, I think, could be easily resisted. Certainly, we must agree that validity by itself is not a sufficient condition for legitimacy. In fact, this idea was implicit in our analysis of the paradox of inference when we distinguished logical containment from epistemological containment. Without supplementing the idea of logical implication with the condition of inferring the conclusion of a valid argument from its premises, an agent could not get a justification for asserting the conclusion. However,

this does not imply that a T.-C.T.M. cannot explain this entire process. What remains to be done is to explain in truth-conditional terms why an agent who understands truth-conditionally the meanings of the sentences of an argument, knows that the premises are true, and infers the conclusion from them will get a justification for asserting the conclusion. Basically, we must explain in terms of truth-conditions why an agent who infers a conclusion from certain premises already known obtains a justification for the conclusion. This will be explained after I will introduce some insightful ideas from Carnap's truth-conditional theory of meaning. In this way I think that we will also be able to resist Prawitz's second argument according to which a truth-conditional theory of meaning is not a good candidate for explaining the legitimacy of inferences.

## **5. Inference and Meaning *via* Truth-Conditions**

The idea that the meaning of a sentence is determined by its truth-conditions has a long standing philosophical tradition. Gottlob Frege was the first philosopher who systematically defined the meaning of a sentence in this way. Of course, this definition of meaning presupposes a primary understanding of the concept of truth. Nevertheless, after Alfred Tarski had succeeded in offering a materially adequate and formally correct definition of truth for a certain formal language, the truth-conditional definition of meaning received a powerful foundation.

Tarski was sceptical regarding the extension of his theory of truth to natural languages, but Donald Davidson emphasized that the T-clauses from the theory of truth for a certain language could also serve as definitions for the meaning of the sentences from that language. In particular,

the definition works by giving necessary and sufficient conditions for the truth of every sentence, and to give truth conditions is a way of giving the meaning of a sentence. To know the semantic concept of truth for a language is to know what it is for a sentence – any sentence – to be true, and this amounts, in one good sense we can give to the phrase, to understand the language (Davidson 1967, 310).

However, long before Davidson, Rudolf Carnap, strongly influenced by Tarski's work in semantics, had recognized the importance of Tarski's definition of the semantic concept of truth for the theory of meaning. In his 1942 book, *Introduction to Semantics*, Carnap makes the following assertions:

By a semantical system (or interpreted system) we understand a system of rules, formulated in a metalanguage and referring to an object language, of such a kind that the rules determine a truth-condition for every sentence of the object language, i.e. a sufficient and necessary condition for its truth. In this way the sentences are *interpreted* by the rules, i.e., made understandable, because to understand a sentence, to know what is asserted by it, is the same as to know under what conditions it would be true. To formulate it in still another way: the rules determine the *meaning* or *sense* of the sentences. Truth and falsity are called truth-values of sentences. To know the truth-conditions of a sentence is (in most cases) much less than to know its truth-value, but it is a necessary starting point for finding out its truth-value (Carnap 1942, 22).

In this passage we find again the basic idea of a truth-conditional theory of meaning, i.e., meaning is given by truth-conditions, and we also discover, as we should, that the knowledge of the truth-conditions for a sentence, i.e., of its meaning, is (in most cases) only a necessary condition for determining its truth-value. Moreover, Carnap details this general description by way of a very simple and useful example:

Suppose that Pierre says: 'Mon crayon est noir' (S). Then, if we know French, we understand the sentence S, although we may not know its truth value. Our understanding of S consists in our knowledge of its truth-condition; we know that S is true if and only if a certain object, Pierre's pencil, has a certain color, black. This knowledge of the truth-condition for S tells us what we must do in order to determine the truth-value of S, i.e. to find out whether S is true or false, what we must do in this case is to observe the color of Pierre's pencil (Idem, 22-23).

Although we may not be justified in generalizing from this particular example, what is interesting is that Carnap believes that the knowledge of the meaning of a sentence tells us what *we must do* in order to determine the truth-value of that sentence. It is interesting because this idea allows us to make an analogy to Prawitz's definition of ground, i.e., "something that one gets in possession of *by doing* certain things". This would mean that by knowing the truth-conditions for a sentence, i.e., its meaning, a person will also know what she must do in order to obtain a ground or justification for that sentence, or for the assertion of the proposition expressed by that sentence. Of course, being an empirical sentence, "Mon crayon est noir", what a person must do is to perform an adequate observation – as Prawitz also emphasizes when he speaks about grounds for empirical sentences. Nevertheless, I do not think that by knowing the truth-conditions for a sentence we will also know what counts as a ground for it. We may understand very well a sentence without knowing exactly what would constitute a ground for asserting it. For instance, we understand Goldbach's conjecture but we do not know what *specifically* we must do in order to obtain a ground for it. As a consequence, we may have doubts regarding Prawitz's idea that to understand a sentence means to know what counts as a ground for asserting it.

Going further, what do the truth-conditions for a logically compound sentence tell us? To answer this question, it is helpful to briefly analyse Carnap's semantic view for the logical operators. In this respect, we can take into account a short description from Carnap's 1958 book, *Introduction to Symbolic Logic and Its Applications*, namely:

What the truth table of a connective gives is primarily a necessary and sufficient condition for the truth of a compound so connected, in terms of the truth-values of its members. Suppose that a person knows the sense of the sentences 'A' and 'B', where perhaps 'A' says that it is (now, in Paris) snowing and 'B' says that it is raining; and suppose that no translation of ' $\vee$ ' has been given him, but only the truth-table. Can the person comprehend the meaning of the sentence ' $A \vee B$ ' so that (a) he knows when it is permissible to assert this compound on the basis of his factual information; and (b) he can extract from a communication

having the form of this compound the factual information being communicated? The answer is: he can. Perceiving from the NTT that the compound holds in the first three cases but not in the last, our subject knows precisely the conditions under which the compound sentence may be asserted and he knows precisely what information it conveys as a communication. [...] He knows that the compound may not be asserted if indications are it is neither snowing nor raining. [...] The remarks support a general statement: a knowledge of the truth-conditions of a sentence is identical with an understanding of its meaning (Carnap 1958, 14-15).

The problem to which I think that Prawitz hints when he says that the “truth-conditions contain too little information to allow us to infer that a person who knows the meaning of a sentence also knows what counts as ground for asserting the sentence” is the problem of justification. A person who understands the premises of an inference, knows that they are true, and correctly infers a certain conclusion from them, will know that the conclusion is also true – logical consequence being necessarily truth-preserving. But, is the person justified in asserting the truth of the proposition expressed by the conclusion?

Prawitz’s proposal – which I find very interesting – was to reconsider and to enlarge the definition of an inference by adding to its structure two new elements, namely, grounds and a grounding operation *corresponding* to Gentzen’s introduction inferences (Prawitz 2009, 195). Nevertheless, do we really need these new elements in order to explain the preservation of justification when passing correctly from the premises to the conclusion of an inference? I think that they are not necessary, and that a truth-conditional theory of meaning handles the situation. Since inferences are valid in virtue of the meanings of the logical constants from their structure, I think that *there must be a connection between the meaning of the logical constants and justification*, and this is why the ideas expressed by Carnap are very useful regarding this issue.

Essentially, one main idea here is that the meaning of the logical operators is what makes an inference valid<sup>8</sup>. An inference is necessarily

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<sup>8</sup> The converse relation, that the rules of inference –or certain rules of inference– determine the meanings of the logical operators, i.e., the inferentialist thesis, is not engaged in this approach.

truth-preserving in virtue of the invariant meanings of the logical operators in all the valuations of the non-logical expressions of that inference, i.e., the meaning of the logical operators indicates us a necessary and sufficient condition for the truth-value of the compound sentences formed with their help, and this is an essential feature for explaining the preservation of truth. For instance, let us consider the inferences from Gentzen's natural deduction system for propositional logic, which is sound and complete. Gentzen considers the introduction inferences as determining the meaning of the logical operators. However, if we do not conceive the introduction inferences as evidently valid, and ask why the introduction inferences are valid, the intuitive answer that we may give is that these rules are valid in virtue of the meanings of the logical operators that they introduce. In general, a formal system of logic – or a logical calculus – is meant to formalize, or to represent, a system of logic, i.e. a semantic system. This is precisely why a full formalization of logic consists in constructing a formal system which formalizes, in addition to logical truth and logical consequence, all the logical properties of the logical operators (Carnap 1943, 96).

Since the meaning of a propositional logical operator indicates -as Carnap emphasizes- a necessary and sufficient condition for the truth-value of the compound sentences formed with its help, this means that a person who knows the truth-values of the simple sentences and understands the meaning of the logical operators, will also know the truth-value of a compound sentence inferred by using the rules of inference that introduce its operators. Of course, in order to know the truth-values of the simple sentences from which a compound sentence is inferred, a person must possess a justification that guarantees the truth-value of those simple sentences. But, again, is a person who knows the premises of a valid argument and infers a conclusion from them, justified in asserting that conclusion?

I think that she is justified. One main feature of the truth-conditional theory of meaning that is also implicitly present in Carnap's description is compositionality, i.e., the meaning of a compound sentence is given by the meanings of its constituents (together with the structure of the sentence). More specifically, if an agent knows the truth-conditions for the simple sentences that form a compound sentence and understands the meaning of the logical operators – as they are given by the normal truth-tables (NTT) – then he will also know the truth-conditions for the compound sentence

formed by those operators. As a consequence, and this is the main idea, by knowing the truth conditions for the logically compound sentence, the agent will *know in which conditions it is permissible to assert* the compound sentence, i.e., he will know when he *is justified* in asserting the proposition expressed by the compound sentence. Hence, the knowledge of the truth of the premises, i.e., of the fulfilment of their truth conditions, together with the knowledge of the meaning of the logical constants are necessary and sufficient conditions for an agent to be *justified* in asserting the proposition in question. This is what I think that Carnap refers to when he says that the agent “knows when it is permissible to assert” the compound sentence on the basis of the factual information from which he/she infers it.

The idea that there is a strong connection between truth-conditions and justification was implicitly present also in Frege’s approach to inferences. Frege believed that the transitions between the premises and conclusion in derivations must have three properties, namely: (a) the transitions must be truth-preserving, (b) *the premises must justify the conclusion*, and (c) each transition must be immediately evident (Peacocke 1992, 799-800). Frege did not develop a detailed philosophical account to the relation of justification but Peacocke considers that in the Fregean conception the following account seems natural:

one formula of *Grundgesetze* justifies a second if the truth-conditions for first, as determined by Frege’s stipulations, guarantees fulfilment of the truth conditions for the second, as determined by stipulations (Peacocke 1992, 799-800).

To sum up, and to answer the proposed question, by knowing the truth-conditions for the logically compound sentences, an agent will know in which conditions it is justified to assert the proposition expressed by that compound sentence. In addition, if the agent has justifications which guarantee the truth of the propositions expressed by the sentences from which the compound sentence is inferred<sup>9</sup>, then he will also have a justification for asserting the proposition expressed by the compound

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<sup>9</sup> It is important to emphasize that an inference is not necessarily a proof-theoretical instrument. To perform an inference means to transform some propositions into another proposition according to certain rules of inference.

sentence. More specifically, if a person (1) knows truth-conditionally the meaning of the sentences involved in an inference, (2) is justified in asserting its premises, and (3) performs the inference then he/she is, *ipso facto*, justified in asserting the conclusion. The validity of this argument will be explicitly explained in the last section.

## 6. Inferences Involving Quantifiers

The idea that an act of inference may have an epistemic function, which can be explained in truth-conditional terms, could also be instantiated on the inferences involving quantifiers. What we must show is that the meaning of a sentence involving quantifiers is compositional, and that by inferring quantified sentences from sentences for which we have justifications we get in possession of a justification for the inferred sentence. The central notion that allows us to see why these two conditions are fulfilled is the notion of *satisfaction*. This is the central notion of the Tarskian semantics for the predicate language. Since we cannot directly assign a truth-value to the atomic sentences containing free variables from the predicate logic, a quantified sentence is not a truth function of the truth-values of its components. Nevertheless, with the help of the notion of satisfaction we can define the truth-value for this sentences. Without entering in details, roughly, an open sentence with n-free variables is true if and only if it is satisfied by a sequence of objects. This propositional function is satisfied by a sequence of objects if and only if the first n-objects from the sequence instantiate the property expressed by the predicate<sup>10</sup>.

Having in mind these features, we may now analyse the two quantified sentences inferred from atomic sentences with the help of two basic introduction inferences from Gentzen's natural deduction system for predicate calculus. If we know the satisfaction conditions for the premises and we understand the meaning of the logical quantifiers, then we also know the satisfaction conditions for the quantified sentences. Furthermore, in addition to the understanding of the meaning of the atomic sentences and quantifiers, if we know that the propositional function is in fact satisfied,

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<sup>10</sup> For some basic insight of the Tarskian semantics the reading of (Taylor 1998, 113-145) could be useful.

then we will also know that the quantified sentence inferred from it is satisfied. In essence, if we understand the meaning of the quantifiers and we are justified in asserting the propositional functions to which they apply, then we will also be justified in asserting the quantified sentences formed by applying the quantifiers to the propositional functions. The knowledge of the meanings of the quantifiers tells us in which conditions we are justified to assert a quantified sentence. We can simply describe the situation as follows:

- |                   |                   |
|-------------------|-------------------|
| a) $A(t)$         | b) $A(t)$         |
| $(\forall x)A(x)$ | $(\exists x)A(x)$ |

a) If we know the satisfaction-conditions (S-C) for the propositional function  $A(x_1)$ , and we know that the propositional function is satisfied, then, in virtue of the meaning of ‘ $\forall$ ’, we will also know that the proposition  $(\forall x)A(x_1)$  is satisfied. The propositional function  $A(x_1)$  is satisfied (SAT) by a sequence of objects  $(\Sigma) \langle a_1, a_2, \dots, a_n \rangle$  iff  $a_1$  satisfies  $x_1$ .

SAT  $[\Sigma, A(x_1)]$  iff  $a_1$  has the property A.

SAT  $[\Sigma, (\forall x)A(x)]$  iff (for any sequence  $\Sigma^* \sim_i \Sigma$ )<sup>11</sup> (SAT  $[\Sigma^*, A(x_1)]$ )

b) If we know the satisfaction-conditions (S-C) for the propositional function  $A(x_1)$  and we know that the propositional function is satisfied, then, in virtue of the meaning of ‘ $\exists$ ’, we will also know the S-C for  $(\exists x)A(x_1)$ . The propositional function  $A(x_1)$  is satisfied by a sequence of objects  $\langle a_1, a_2, \dots, a_n \rangle$  iff  $a_1$  satisfies  $x_1$ .

SAT  $[\Sigma, A(x_1)]$  iff  $a_1$  has the property A.

SAT  $[\Sigma, (\exists x)A(x_1)]$  iff (there is a sequence  $\Sigma^* \sim_i \Sigma$ ) (SAT  $[\Sigma^*, A(x_1)]$ )

The idea that these inferences are legitimate, i.e., they have an epistemic function, is explained by D. Prawitz in the same manner as for the propositional inferences, with the help of the notions of ground and grounding operations, and, in addition, as for the inferences involving assumptions, by operating the distinction between saturated and unsaturated grounds. You may find below a short exemplification but for more details see (Prawitz 2009, 193-194).

- |                   |                   |
|-------------------|-------------------|
| a) $A(t)$         | b) $A(t)$         |
| $(\forall x)A(x)$ | $(\exists x)A(x)$ |

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<sup>11</sup> For any sequence of objects  $\Sigma^*$  differing from  $\Sigma$  in at most the  $i$ -th place.

a) If we have a ground for the propositional function  $A(x_1, x_2, \dots, x_n)$ , then, in virtue of the meaning of ‘ $\forall$ ’, we will also have a ground for  $(\forall x_1, x_2, \dots, x_n) A(x_1, x_2, \dots, x_n)$ . A ground for propositional function  $A(x_1, x_2, \dots, x_n)$  is an unsaturated ground  $\alpha(x_1, x_2, \dots, x_n)$  such that for individuals  $a_1, a_2, \dots, a_n$  in the domain in question  $\alpha(a_1, a_2, \dots, a_n)$  is a ground for the assertion  $A(t_1, t_2, \dots, t_n)$ , where  $t_i$  denotes  $a_i$ . The ground for  $(\forall x)A(x)$  is formed by applying the grounding operation  $\forall G$  to the ground  $\alpha(x)$ .

b) If we have a ground for the propositional function  $A(x_1)$ , then, in virtue of the meaning of ‘ $\exists$ ’, we will also have a ground for  $(\exists x_1)A(x_1)$ . A ground for propositional function  $A(x_1)$  is an unsaturated ground  $\alpha(x_1)$  such that for individuals  $a_1, a_2, \dots, a_n$  in the domain in question  $\alpha(a_i)$  is a ground for the assertion  $A(t_1, t_2, \dots, t_n)$ , where  $t_i$  denotes  $a_i$ . The ground for  $(\exists x)A(x)$  is formed by applying the grounding operation  $\exists G$  to the ground  $\alpha(x)$ .

## **7. Final Remarks**

I have argued that valid inferences have an epistemic function, and that this function can be explained in model-theoretic terms, and more precisely, in truth-conditional terms. As we have seen before, by performing a valid inference from premises for which an agent already has justifications which guarantee their truth, the agent may obtain a justification for the truth of the proposition expressed by the conclusion of the performed inference. The argument which endorses the epistemic significance of valid inferences can be expressed as follows:

ES\_P1: There is a valid inference from  $P_1, P_2, \dots, P_n$  to  $C$ .

ES\_P2: The agent  $A$  has justifications for the premises  $P_1, P_2, \dots, P_n$ .

ES\_P3: The agent performs the inference, and knows that it is valid.

ES\_C: The agent obtains a justification for asserting the proposition expressed by  $C$ .

The explication of the validity of this argument may run as follows: since  $C$  is logically implied by  $P_1, P_2, \dots, P_n$ , i.e., is a logical consequence of them, the truth of the premises – by definition – is a necessary and sufficient condition for the truth of the conclusion, i.e., it guarantees the truth of  $C$ . In addition, by inferring  $C$  from  $P_1, P_2, \dots, P_n$  by means of valid inferences,

known by the agent to be valid, the agent knows that  $C$  is a logical consequence of  $P_1, P_2, \dots, P_n$ . Consequently, he will know that if  $P_1, P_2, \dots, P_n$  are true then  $C$  is also true, i.e., the truth of the premises guarantees the truth of the conclusion. Of course, the agent may know that the truth of  $P_1, P_2, \dots, P_n$  guarantees the truth of  $C$  without having actually any justification for  $P_1, P_2, \dots, P_n$ . Nevertheless, if  $P_1, P_2, \dots, P_n$  are true then so is  $C$ . As a consequence, if the agent obtains a justification which guarantees the truth of the premises, then the knowledge of the truth of the premises and of the meanings of the logical constants from the inference performed, will justify the agent in asserting the truth of the conclusion.

The second conjunct of the premise 3, i.e., the agent knows that the inference is valid, is declined by Dag Prawitz as a necessary condition for explaining the legitimacy of valid inferences because “we do not normally establish the validity of an inference before we use it” (Prawitz 2009, 184). If this condition would be necessary, Prawitz argues, then a regress would result, namely, in order to establish the validity of the inference we would need an argument which establishes its validity, and then another argument for the validity of the previous argument and so on. However, I think that we can stop this regress because, as we have seen in section four, we know the validity of inferences in virtue of the meaning of the logical operators from their structure.

According to Prawitz, an agent gets a ground for the conclusion of an inference by performing it – in the sense defined in section 3 –, and “if the inference she has made is valid, then she is in fact in possession of a ground for her judgement, and this is exactly what is needed [...] to know that the affirmed proposition is true” (Prawitz 2009, 199). In addition – Prawitz continues – although this is not necessary, “reflecting on the inference she has made the agent can prove that the inference is valid” (Idem). I think that if the agent did not know that the inference is valid, then we could not say that he really has a ground for the conclusion. For instance, someone may possess a ground for a certain proposition without being aware of the fact that it is indeed a ground for that proposition. (Think of a person who has made certain observations in the chemistry laboratory, but does not know for what propositions these observations may serve as grounds). *Mutatis mutandis*, a mathematician who infers a proposition by means of some inferences whose validity is unknown to him, cannot be considered justified in asserting the truth of that proposition, even though the proposition is in

fact true. This is why I think that the knowledge of the validity of the inference is a necessary condition for obtaining a justification for its conclusion. Therefore, if the stated conditions are satisfied, then valid inferences may provide us with valuable knowledge.<sup>12</sup>

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# Is Frege's *Sinn* identical with Russell's *Denoting* Concept?\*

Sorin Costreie

In a recent book<sup>1</sup>, Gideon Makin holds that Frege's and Russell's accounts of logic and language have in common a consistent overlapping portion and, especially, that the "differences between them are more matters of emphasis than of principle"<sup>2</sup>. His view is based on two fundamental claims. The first is that Frege and Russell were mainly metaphysicians, endorsing a peculiarly metaphysical view of logic and thus their interest in language is just a peripheral preoccupation and not, as it is usually thought, a steady point of concern. The second claim is that Frege's view in *Über Sinn und Bedeutung* is essentially the same as Russell's view in *The Principles of Mathematics*. Thus, Makin takes as identical Frege's distinction between sense and reference and Russell's distinction between a denoting concept and its denotation. Exactly the investigation of this parallelism will constitute the purpose of my paper and I will argue that Makin is wrong in maintaining this identification.

My strategy has three main steps:

- (1) to show the differences between Frege's distinctions between sense and reference and, respectively, between concept and object;
- (2) to show the similarities between Frege's view on concepts and objects and Russell's view on concepts and things;
- (3) to logically deduce from (1) and (2) that Makin's identification is totally mistaken, and to further analyze his contention that senses are (denoting) concepts.

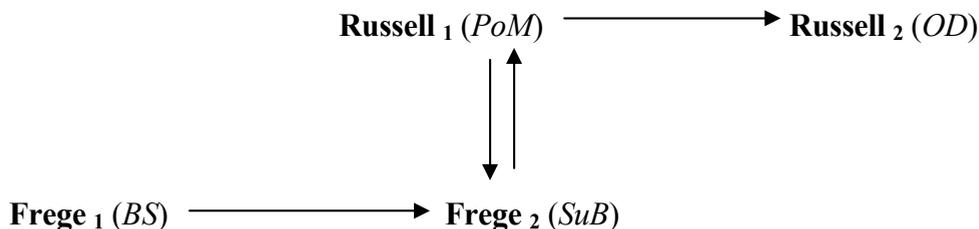
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<sup>1</sup> Makin 2000.

<sup>2</sup> Makin 2000, 142.

Makin acknowledges two different theories for both Frege and Russell: Frege’s as found in the *Begriffsschrift* and in *Über Sinn und Bedeutung*; and Russell’s in *The Principles of Mathematics* and in *On Denoting*. Makin identification is between Frege’s second account and Russell’s first, and thus the scheme underlying his conception would seem to be the following:



Central to this conception is Makin’s claim that Frege’s sense-reference distinction is essentially the same as Russell’s denoting concept-denotation distinction:

The similarity between Frege’s notion of a name’s sense and Russell’s denoting concepts (of ‘the’-phrases) seems so obvious that I feel free to waive the need for a distinct notion of generic sense, and simply use ‘sense’ to cover both the Fregean and the Russellian notions – though not Fregean thoughts.<sup>3</sup>

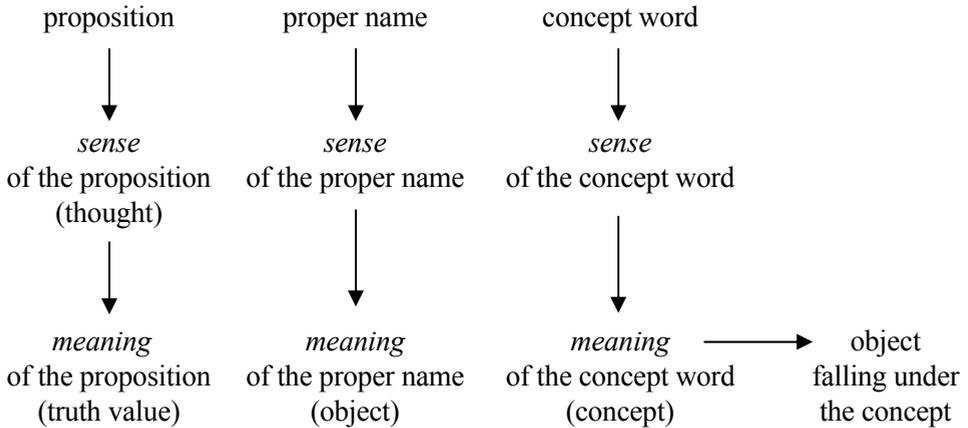
Should we make this identification? The answer I believe is ‘no’, and the following will make evident why.

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<sup>3</sup> This last remark should have been more carefully considered by Makin and would have saved him thus from stating his incorrect identification; for Frege, thoughts are senses and thus they fall under the same category as the senses of proper names, and since certainly it is strange to identify thoughts with Russellian denoting concepts, then it is also unclear to what extent we can identify senses with denoting concepts.

**Frege's Sense-Reference and Concept-Object Distinctions**

In a letter to Husserl, Frege drew the following diagram<sup>4</sup>:



It is clear that from this schema one may subtract the idea that for Frege both objects and concepts are to be found at the same level, namely at the level of references (*Bedeutungen*). Thus we must distinguish between the sense-reference and object-concept. Another consideration, which forces us to consider them separately, is the fact that the most natural way of making this parallelism work is to identify senses with concepts and references with objects. But are senses really concepts? I would say no, because recall that concepts are Fregean functions and thus they are incomplete and/or unsaturated. On the other hand, senses are ‘the modes of presentation’ of the references, or better said, the objective and unique *routes* from proper names to their referents. But then, if the senses were concepts and thus ‘incomplete routes’, how could we reach the semantic target, namely the referents of proper names?

Frege is quite clear about this point, and this kind of consideration is not singular in his work. Consider the following passage from “Comments on Sense and Meaning”:

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<sup>4</sup> Frege 1980, 63; here, the Fregean terms *Sinn* and *Bedeutung* are translated by ‘sense’ and ‘meaning’, respectively. I will translate *Bedeutung* as ‘reference’

In an article ('Über Sinn und Bedeutung') I distinguished between sense and meaning in the first instance only for the case of proper names (or, if one prefers, singular terms). The same distinction can also be drawn for concept-words. *Now it is easy to become unclear about this by confounding the division into concepts and objects with the distinction between sense and meaning, so that we run together sense and concept on the one hand and meaning and object on the other.* To every concept-word or proper name, there corresponds as a rule a sense and a meaning, as I use these words.<sup>5</sup>

Therefore, the moral of this is more than suggestive and it shows clearly that we should not identify senses with concepts. Another argument supporting this claim is found in "Thoughts", in which thoughts are the senses of declarative sentences and constitute a third realm of objects, and since we should "never to lose sight of the distinction between concept and object" (*Grundlagen's* third fundamental principle) then surely senses should not be regarded as concepts<sup>6</sup>.

### **Frege's Concept-Object Distinction and Russell's View on Concepts and Things**

For Frege, the most fundamental distinction in his system is between functions and objects. Functions are fundamentally incomplete or unsaturated, whereas objects are complete and saturated entities which can serve as the arguments of functions. In the case of (declarative) sentences we have basically two ingredients: proper names and concept-words. Proper names stand for objects and concept words for concepts. Thus, concepts are a special kind of functions; relations are a different type yet still functions. Moreover, concepts are essentially predicative and thus they stand for

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<sup>5</sup> Frege 1979, 118; my emphasis in the original text.

<sup>6</sup> See Wiggins 1993a 311:

in showing that the concept is never the sense but always the reference, it explodes a myth about Frege still lurking in the departments of philosophy heavily influenced by memories of Rudolf Carnap's lectures on semantics or by Alonzo Church's 'Logic of sense and denotation'.

properties of objects, properties which are indicated in natural languages by adjectives. So, for Frege, we have that everything is either a function or an object, and in the realm of functions we can further distinguish between concepts and relations.

Let us turn now to Russell:

Whatever may be an object of thought, or may occur in any true or false proposition, or can be counted as *one*, I call a *term*. This, then, is the widest word in the philosophical vocabulary. I shall use it as synonymous with it the words unit, individual, and entity. (...) A man, a moment, a number, a class, a relation, a chimera, or anything else that can be mentioned, is sure to be a term.

Among terms, it is possible to distinguish two kinds, which I shall call respectively *things* and *concepts*. The former are the terms indicated by proper names, the latter those indicated by all other words. (...) Among concepts, again, two kinds at least must be distinguished, namely those indicated by adjectives and those indicated by verbs. The former kind will often be called predicates or class-concepts; the later are always or almost always relations<sup>7</sup>.

It is clear now that the similarity of view<sup>8</sup> between them is more than striking, and Makin is right to maintain an identification between their ontological views. But the identification is not, as Makin holds, between Frege's sense and reference, and Russell's denoting concept and denotations, respectively. Rather, we should identify Frege's distinction between concept and object with Russell's distinction between concept and thing. The only difference in this case is terminological, Frege's 'functions' are identical to concepts in Russell's 'concepts'.

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<sup>7</sup> Russell 1903, 43-4.

<sup>8</sup> The view is in fact quite 'classical' and follows the traditional Aristotelian view of a substance and its attributes.

## Frege's Sense-Reference and Russell's Denoting Concept-Denotation Distinctions

Given the above considerations we deduce that, since Frege's distinctions between sense and reference and, respectively, between concept and object are quite different, and since also Frege's view on concepts and objects is (almost) identical with Russell's view on concepts and things, then there is no way to logically identify, as Makin certainly does, Frege's sense-reference distinction with Russell's distinction between a denoting concept and its corresponding denotation.

What does this argument show? It shows that Frege and Russell articulate two different views on denoting, whereas their metaphysical views about the components of the world are very similar. A problem still remains: why and how are their views on denoting *really* different? If a Russellian denoting concept is not a Fregean sense, then what is it? The answer to these questions, I think, arises from their different views on language, or, better said, their distinct views concerning the relation between language and the (real) world.

The most important aspect of the problem is the connection between the objects of the world and their counterparts in (natural) language: the relation between objects and proper names. A proper name refers to or denotes an object, an object which is consequently called the name's reference or denotation. So far, so good, since both Frege and Russell accept this relation. The real problem (and difference!) is that for Frege the relation is mediated by the sense of the respective name, whereas for Russell proper names are regarded as simple linguistic labels of the corresponding objects and thus the relation for them is direct and unmediated by anything.

For Russell there is the following logico-linguistic tripartition: proper names (which have only denotation), concepts (which generally have only meaning) and a special kind of concepts, denoting concepts (which have both meaning and denotation):

A proper name, such as *Arthur Balfour*, is destitute of *meaning*, but *denotes* an individual. On the other hand, verbs and adjectives have meaning, but no denotation. (...) *Table*, by itself, is like an adjective: it means, without denoting; but

*the table* (with an unexpressed addendum of the kind giving definiteness, such as ‘in that corner’, ‘at which we dined last night’, etc.) both means and denotes.<sup>9</sup>

On the other hand, as we have already seen, for Frege there is no such division. Any word is supposed to have, in principle, both meaning and denotation, or in his terms, *sense* and *reference*. This difference between Frege’s and Russell’s views is more than notable and thus any characterization of their views on names as similar should be dismissed from the very beginning. Moreover, Frege, by introducing this distinction, is attacking in fact the Millian view of proper names. For John Stuart Mill *proper names*, such as ‘Dartmouth’, denote objects without connoting any properties: “Proper names are not connotative; they denote the individuals who are called by them; but they do not indicate or imply any attributes as belonging to those individuals.”<sup>10</sup> The Millian terms ‘connotation’ and ‘denotation’ correspond respectively to what Russell calls meaning and denotation, but not to the Fregean *sense* and *reference*, as many commentators maintain<sup>11</sup>. These distinctions pertain to the same domain but they express and are the result of different views.

It is my contention that (Mill and Russell, on one hand, and Frege, on the other hand) are employing different paradigms concerning denoting and that this is why their views are somehow incommensurable. As Cartwright

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<sup>9</sup> See ‘On the meaning and denotation of phrases’, in Russell 1994, 284.

<sup>10</sup> Mill 1959, 20.

<sup>11</sup> My attention was drawn to this by Peter Geach’s paper “Class and Concept”, where he says explicitly that:

a good many philosophers, following Carnap, take both the Fregean distinction between sense and reference, and that between a concept and its extension, to be pretty much the same as the traditional distinction between intension and extension. This interpretation can, I think, be decisively refuted. First, Frege held a purely extensional view of concepts. (...) Secondly, the Fregean distinction of sense and reference is founded on quite a different feature of language from that used in old-fashioned discussions about intension and extension (as also by Carnap), viz., the contrasting pairs of concrete and abstract nouns. (...) thirdly, we can show that a concept is not, for Frege, the name of the corresponding class (Sluga 1993b, 47).

states, they “are not even in the same ballpark”<sup>12</sup>. That Frege’s view is directly opposed to Mill’s is not contentious, and it is clear that *Frege’s puzzle*<sup>13</sup> is directed exactly against Mill’s conception of names. What needs perhaps now to be shown in greater detail is that Russell and Mill share the same view, making the Russellian view incompatible with Frege’s.

It is strikingly clear that Russell’s tripartition is following in fact Mill’s dual partition of names into connotative and denotative names, supplemented with a third category of names, which have both connotation and denotation.

Proper names are attached to the objects themselves and are not dependent on the continuance of any attribute of the object.

But there is another kind of names, which although they are individual names, that is, predicable only of one object, are really connotative. (...)

‘The sun’ is a name of this description; ‘God’, when used by a monotheist, is another. These, however, are scarcely examples of what we are now attempting to illustrate, being, in strictness of language, general, not individual names: for, however they may be *in fact* predicable only of one object, there is nothing in the meaning of the words themselves which implies this.<sup>14</sup>

Concerning this third special category of concepts, which have both denotation and connotation, Russell is quite explicit in his characterization and it is clear that he is embracing a very strict Millian view of language:

But such concepts as *a man* have meaning in another sense: they are, so to speak, symbolic in their own logical nature, because they have the property which I call *denoting*. That is to say, when a man occurs in a proposition (e.g. ‘I met a man

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<sup>12</sup> Cartwright 1987, p. 105.

<sup>13</sup> See Lycan 1999, p. 14.

<sup>14</sup> Mill 1959, 20.

in the street'), the proposition is not about the concept *a man*, but about something quite different, some actual biped denoted by the concept. Thus concepts of this kind have meaning in a non-psychological sense<sup>15</sup>.

For Russell, we have therefore a logico-linguistic gap between proper names and definite descriptions<sup>16</sup>. Semantically, they are different linguistic devices, depending on whether they convey meaning or not. On the other hand, for Frege there is no such distinction and he regarded in fact both individual names and definite descriptions as fulfilling the same function (to refer uniquely to a certain particular object) and thus as falling into the same category as 'proper names' (*Eigennamen*):

In the sentence 'The morning star is Venus', we have two proper names, 'morning star' and 'Venus', for the same object. In the sentence 'the morning star is a planet' we have a proper name, 'the morning star', and a concept-word, 'planet'<sup>17</sup>.

For Frege, all well-formed linguistic expressions are regarded as having sense and reference, and all of them (names, definite descriptions, concept-words, sentences) are semantically modelled upon proper names. This relation between a name and its designated referent is really fundamental in his system and thus any substantial change toward some different view marks in fact a fundamental change of perspective.

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<sup>15</sup> Russell 1903, 47.

<sup>16</sup> Even though it is somehow improper to assimilate denoting concepts to definite descriptions, since 'denoting concepts' are the meanings of 'denoting phrases' and, in Russell's later views, 'definite descriptions' do not have any meaning in isolation, for the sake of the present argument I use interchangeably 'denoting concepts' with 'definite descriptions'.

<sup>17</sup> Frege 1984, 183.

## Final Remarks

Therefore, we have a conception where names and definite descriptions are regarded as different linguistic devices, although both are used to pick out individuals; here names have no meaning, but only denotation, and definite descriptions have both meaning and denotation. On the other hand, we have a conception where both names and definite descriptions are treated as identical devices, having both sense and reference. Are they similar conceptions? Certainly not, and it is a mistake to treat Frege and early Russell as sharing the same view, as is commonly<sup>18</sup> done.

This misconception is based essentially on two incorrect representations about their common ground: firstly, that the Fregean sense is exhausted by a (bunch of) definite description(s) and, secondly, that names are in fact disguised definite descriptions. In response to the first point, for Frege, the sense of a proper name is *definite, unique* and *objective* and thus cannot be replaced by any definite description or combination of definite descriptions, which are subjective and may vary from speaker to speaker. The second point is known in the literature as Russell's Name Claim<sup>19</sup> and is a later<sup>20</sup> and independent<sup>21</sup> claim, and definitely does not characterize either Frege<sub>2</sub>, or Russell<sub>1</sub><sup>22</sup>.

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<sup>18</sup> Kripke says explicitly in the beginning of *Naming and Necessity* that:

Frege and Russell both thought, and seemed to arrive at these conclusions independently of each other, that Mill was wrong in a very strong sense: really a proper name, properly used, simply was a definite description abbreviated or disguised (Kripke 1980, 27).

<sup>19</sup> The claim is that everyday proper names are not really names, at least not genuine Millian names. (...) Russell maintains, they are equivalent to definite descriptions. Indeed he says they 'abbreviate' descriptions, and he seems to mean that fairly literally (Lycan 1999, 38).

<sup>20</sup> Russell 1918, 200-1:

The names that we commonly use, like 'Socrates', are really abbreviations for descriptions; not only that, but what they describe are not particulars but complicated systems of classes or series.

<sup>21</sup> It is important to see that the Name Claim is entirely independent of the Theory of Descriptions itself. (...) (O)ne might accept either doctrine while rejecting the other: some theorists hold the Theory of descriptions as a theory of definite descriptions themselves, while rejecting the Name Claim entirely; less commonly, one could embrace the Name Claim but hold a theory of descriptions different from Russell's (Lycan 1999, 39).

<sup>22</sup> The Name Claim does not even characterize Russell<sub>2</sub>, but Russell's later conceptions in *The problems of philosophy / The philosophy of logical atomism*.

I should mention now that by ‘definite descriptions’ I understand in the previous passages ‘the’ phrases like ‘the morning star’ or ‘the author of *Begriffsschrift*’, viz. expressions which contain a so-and-so description of a certain individual. As I said, for Frege<sub>2</sub>, they are treated as singular terms and are thus assimilated to proper names. For Russell<sub>1</sub>, they are called ‘denoting phrases’ and it is said that they have a meaning (denoting concept) and a reference (denotation). On the other hand, for Russell<sub>2</sub> they are destitute of meaning and, moreover, he holds that “the whole distinction of meaning and denotation has been wrongly conceived”<sup>23</sup>.

Thus, as an *inside* question, as a question which has to be addressed only in the limits of Frege<sub>2</sub>’s system, we should say that yes, ‘denoting phrases’ have the same semantic role as proper names, and thus their meanings (‘denoting concepts’) may be similar to the meaning of Fregean proper names, i.e. their *senses*. But, even though they have similar semantic roles, they are not identical, for Fregean senses are not exhausted by any (set of) description(s). On the other hand, the whole question stated in these terms is somehow meaningless, since strictly inside Frege’s system ‘denoting concepts’ would be treated differently, losing their theoretical content specific to Russell<sub>1</sub>’s account. This discussion belongs, I think, to a more general problem: how and in what sense can we extract different terms, specifically defined in a certain conceptual framework, and discuss them in a different system? Would we thus preserve the initial meaning of them? Is the content of these terms not context dependent and thus any such transfer irremediably erroneous?

On the other hand, as an *outside* question, as a question in which we assume that there is sufficient common ground to secure the transfer of a term from a system to another, the entire enterprise is jeopardized by the lack of a coherent system within the two can be treated. This problem (“the absence of a neutral conceptual framework within which to conduct the comparison”) is acknowledged by Makin himself and thus his strategy will be to try to find points of convergence between Frege<sub>2</sub> and Russell<sub>1</sub>. One such important point of convergence is the similarity between ‘grasping a sense’ and ‘being acquainted with an object’. This claim acts as a basis for his identification between senses and denoting concepts and is stated as

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<sup>23</sup> Russell 1994, 422.

follows: “the direct relation which, on Frege’s view, a subject bears to a sense he grasps, and that which, on Russell’s view, a subject bears to an object he is acquainted with, is to all intents and purposes the very same relation.”<sup>24</sup> But is grasping a sense or a thought the very same thing as being acquainted with an object? The answer seems to be that even though they appear as similar relations, surely they are not identical. Why? For Frege the “sense of a proper name is grasped by everybody who is sufficiently familiar with the language or totality of designations to which it belongs”<sup>25</sup>. But to be familiar with a language in this sense presupposes to know the reference of your words, viz., in Russell’s terminology, requires to be acquainted with the denotations of your phrases. Thus, ‘acquaintance’ appears more likely as an (epistemological) condition for grasping a Fregean sense, than as identical with grasping a sense. It is unclear in what respect they are identical, since the reverse relation does not hold. I do not have to grasp a sense in order to be acquainted with an object. On the contrary, only after being acquainted with an object can I grasp a sense involving this object and this is the sense of Russell’s so called *principle of acquaintance*<sup>26</sup>. For Russell, we cannot be acquainted, strictly speaking, with objects, but only with ‘the sense-data that make up the appearance’ of the respective object<sup>27</sup>. Moreover, if Fregean senses correspond to Russellian denoting concepts, which are in fact definite descriptions, then the whole Russellian distinction between ‘knowledge by acquaintance’ and ‘knowledge by description’ would certainly collapse. For, in this case, ‘grasping a description’ would be identical with ‘being acquainted with an object’ and thus it is totally unclear how ‘knowledge by acquaintance’ could still be the epistemological basis for ‘knowledge by descriptions’, as Russell emphatically holds.

With regard to this point I would add further that *grasping* a sense of a proper name and being *acquainted* with the object, which is the referent of

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<sup>24</sup> Makin 2000, 146.

<sup>25</sup> Geach and Black 1952, 57-8.

<sup>26</sup> By this I mean the principle expressed in *On Denoting* that in every proposition that we can apprehend (i.e. not only in those whose truth or falsehood we can judge of, but in all that we can think about), all the constituents are really entities with which we have immediate acquaintance (Russell 1994, 427).

<sup>27</sup> “My knowledge of the table is of the kind which we shall call ‘knowledge by description’” (Russell 1912, 26).

that particular name, belong to two semantic levels. For grasping a sense means that we can correctly employ the name in the fabric of language, but in order to accurately use this name, we have initially to introduce it into language, and thus firstly to baptize that particular individual with a specific proper name. Thus *introducing* a name is a pre-semantic condition for *using* it.

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By way of concluding, the moral of this story would be thus that we have here two separate conceptions, which are like different houses built up from the same materials but in different ways. They share the same metaphysical building blocks, yet the structure of their logico-linguistic constructions is quite different. Russell<sub>1</sub> is working in the old Millian paradigm, whereas Frege<sub>2</sub>'s view on logic and language is quite revolutionary and induces a change of the whole framework, approaching the same things in a different manner.

Therefore, Makin's identification between Frege's sense-reference distinction and Russell's denoting concept-denotation is mistaken and, moreover, they are not even similar since these distinctions pertain to different paradigms concerning reference and, more generally, the logico-semantic connection between natural languages and the world.

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# **Semiotic Study on Translating Modes within Multimodal Messages: Developing a Comparative Analysis Model of Transduced Meanings\***

Oana Culache

## **1. Introduction**

The diversity of channels that can be used in communication has led to a recent interest on the part of researchers and practitioners in investigating the semiotic resources that can be deployed to convey a message and their possibilities of adaptation to various contexts.

Considering the expansion of communication channels, varying from face-to-face discussions to online conversations, it has become extremely important for specialists to understand the best ways to create messages, and especially how they can be translated across different communication channels. In the literature there are studies that propose models of translation between different semiotic resources (Gorlée 2005; Queiroz and El-Hani 2006; 2004).

The aim of this paper is to propose a more comprehensive model of translation based on Aguiar and Queiroz's (2012; 2013) work, in the context of multimodal communication. This model can be found useful by semioticians interested in the meaning-making process within the multimodal framework. Whereas in the late century social semiotics came across an evolution from monomodality to multimodality (Kress and van Leeuwen 2001), in this paper, we argue that intersemiotic translation should take into consideration the multimodal context that exerts a great influence on the interpretation of meanings. We build our argument based on the social semiotic perspective, that introduced the multimodal approach, and

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we believe that the translation of semiotic resources is highly determined by their interaction when creating meaning.

First, we refer to multimodality and its mechanisms that contribute to sign translation, and we distinguish the main forms of translation, with an emphasis on intersemiosis. Second, after a critical literature review, we address Aguiar and Queiroz's model of intersemiotic translation. In their studies, they argued that there is a strong correlation between Peirce's triadic relation of signification and intersemiotic translation. Thus, they concluded that intersemiotic translation is a triadic process, and that translation across different sign systems always engenders different meanings. In our view, multimodality is a more active player in intersemiotic translation and we propose a more complex model for intersemiotic translation, in order to outline multimodality's importance and its implications in this process. The main conclusion of our paper is that multimodality can be used by scholars to better understand the meaning-making and translation process across different sets of signs or modes. Finally, further research directions are discussed.

## **2. Background**

Drawing from social semiotic studies carried by Halliday (1978) on language and contextualized signs, a relatively recent field of application has developed in the literature, namely multimodality, by "describing and explaining the processes and structures through which meaning is constituted" (Hodge and Kress 1980, 2). Social semiotics assumes that the representation of ideas always implies a combination of semiotic resources, whose interaction contributes to meaning-making. In this respect, its object consists in studying modes, that are defined as socially, historically and culturally shaped sets of signs organized so that to create meaning (Bezemer and Jewitt 2010, 183). Kress (2010) nominated images, writing, layout, music, gesture, speech, moving images, soundtrack, colors, and 3D objects as modes.

For a better representation of an object or entity, Kress argued that in messages, there are always several modes used together, creating "modal ensembles" (2010). As scholars considered that co-present modes cooperate and interweave (Bezemer and Jewitt 2010, 184) in order to engender meaning, they became interested in this process of making meaning by interacting modes - that is multimodality.

Multimodality focuses on people's choices of modes (Halliday, 1978) from a variety of modes that can be used, so that the messages would better express the intended meaning. Every mode has a specific meaning potential, determined by the codes and channels that are suitable for it. As modes have different "affordances", described as "what is possible to express and represent easily in a mode" (Bezemer and Jewitt 2010, 184), messages are always created by using different modes simultaneously, orchestrated in 'multimodal ensembles' (Bezemer and Jewitt 2010, 185). As a result, we could define *multimodality as a social semiotic practice of strategically designing a message, by using at least two complementary sets of signs what co-work in order to engender a particular meaning.*

Whereas scholars' efforts join to reach a deeper level of understanding of the multimodal field of study (López Rodríguez, Prieto Velasco and Sánchez 2013; Bezemer and Jewitt 2010; Kress 2010; Bateman 2008; Kress and van Leeuwen 2006; O'Halloran 2004; Lim 2004; Lemke 1998), the social semiotic approach to multimodality is still at an early stage of development, with much yet to be established, including the practices of transcription, as Bezemer and Jewitt (2010, 194) concluded. In the next section, we briefly review the main studies in the literature and discuss the manner in which signs can be translated across different modes, by taking into account the multimodal framework.

### **3. Intersemiosis as a Multimodal Mechanism**

Theorization of multimodality determined the study of multisemiotic mechanisms that take place at an intrasemiotic and intersemiotic level. *Intrasemiosis* regards the meanings within one semiotic resource – that is the *grammatical* systems corresponding to one particular semiotic resource (O'Halloran 2005, 16). Whereas intrasemiosis is interested in processes that take place on a single mode's territory, *intersemiosis* studies meaning across multiple modes, which makes it important to the understanding of multimodality.

Multimodality's definitions argue that the modes used in multimodal texts are complementary in terms of affordances, and not redundant. In this

context, Royce (1998) discussed the “Intersemiotic Complementarity” of the sign systems. The “semiotic harmony” (Kress 2010) created around interwoven modes necessarily implies drawing together otherwise disparate elements and relating them as a meaningful whole (Ravelli 2008, 30). This will determine a “co-ordination of semiosis across different sign systems” (Ravelli 2000, 508), so that they are perceived as *one artifact consisting of merged interacting elements*. This coordination, also known as *intersemiosis* (Ravelli 2006), functions according to the “resource integration principle” (Baldry and Thibault 2006, 18–19), which ensures a cooperation between meanings that are “essentially different in nature” (Bateman 2008, 54) in order to create a “semiotic hybrid” (Lemke 1998, 87).

In this context, scholars developed the theory of interaction and integration between semiotic resources used in the same message (Lim 2004) in order to explain the way modes interrelate and engender meaning within messages. Iedema (2003, 30) refers to these cases as ‘resemioticization’ and defines them as “the analytical means for ... tracing how semiotics are translated from one into another as social processes unfold”. O’Halloran names them “semantic reconstruals” (1999), that is shifting from a code to another. The process of translation that implies this shift between different codes is also known as “transduction” (Kress 2010) or “intersemiotic translation” (Aguilar and Queiroz 2012; 2013) and it was first introduced by Jakobson, who also named it ‘intersemiotic transmutation’ and defined it as “an interpretation of verbal signs by means of signs of nonverbal sign systems” (1959, 114). This concept has been later extended to other codes, so that we nowadays discuss ‘intersemiotic translations’ or conversions of books into: films, plays, music, dance, drawings, or photographs.

Intersemiotic translation may appear within the very same message – when a picture and the text in a document support each other’s message (complementary) or across different messages – when a message is re-created and conveyed via a different channel (a print advertisement transposed in the form of a commercial). Especially in the second case, there are some questions that scholars tried to answer, namely how modes interact (Lim 2004) and how intersemiotic translation happens (Aguilar and Queiroz 2012; 2013).

#### 4. Exploring the intersemiotic translation challenges

Intersemiosis is defined as “the way meanings across instantiations of various semiotic resources interact with one another to give a new meaning or set of meanings” (Chiew 2004, 155). As a result, scholars concluded that different semiotic resources, linguistic or non-linguistic, are not identical, because they have in themselves different meaning-making systems (Chiew 2004, 157). Lemke (1998) also stated this, by emphasizing that different semiotic resources cannot engender the same meaning, and various representations of a concept cannot be compared in one-to-one correspondence, because it is the *joint co-deployment* that makes the semantic difference, as explained below:

... semiotic modalities (e.g. language, depiction) are essentially *incommensurable*: no verbal text can construct the same meaning as a picture, no mathematical graph carries the same meaning as an equation, no verbal description makes the same sense as an action performed [...] meanings are not determined entirely by [the] correspondences with one another, but also by their relations to other forms within their own semiotic (picture to picture, and word to word; cf. Saussure’s *valeur* principle), even what they mean *within* these correspondences adds specificity of meaning in each semiotic modality beyond the common meaning shared across modalities (Lemke 1998, 109).

Scholars tried to surpass this incommensurability of semiotic modes, by exploring the common elements between linguistic and non-linguistic semiotic resources, such as language and visual images. In his research, Royce (1998) discussed Intersemiotic Complementarity and proposed a Model of Multimodal Sense Relations to integrate language and visual images.

Lim (2004) proposed another model that refers to text levels, by suggesting that two modes work together at each level in order to ensure cohesion. He used the Integrative Multi-Semiotic Model as a meta-model that brings together the expression, content and communicative planes of language and visual images (Lim 2004, 220). The model consists of three planes (Expression, Content, and Context) divided into various strata. At

their intersection, Lim introduces the concept of “Space of Integration”, defined as “a theoretical platform where intersemiosis occurs through contextualizing relations”, a space that indicates the semantic expansions resulting from the interaction and negotiation between semiotic resources (Lim 2004, 223). Although it only covers two semiotic resources (language and visual images), the Integrative Multi-Semiotic Model is a first step to demonstrate the “complex multifaceted nature of meaning made in a multi-semiotic text” (Lim 2004, 222), and Lim’s contribution is relevant to the understanding of the way meaning is made in a multimodal context.

Kress and van Leeuwen (2006, 177) later identified three compositional principles of modes: Information Value, Saliency, and Frame. Drawing from Kress and van Leeuwen’s research on message scanning (2006), O’Halloran and Liu (2009) argued that the grammatical approach is inappropriate, due to its unidirectionality. As a result, they developed a discourse-based system of analysis, containing the following relations: Comparison, Addition, Consequence, and Time and managed to prove that both of the linguistic and visual modes can reformulate each other at different levels of abstractization and generality.

In spite of the fact that Liu and O’Halloran’s research was conducted for the linguistic and visual mode exclusively, we find their conclusion important, as this might be a premise for mode translation across different sign systems (mode transduction or transmutation). If they were able to prove that modes have the capacity of replacement by using different types of modes, then transduction might be possible.

## **5. Modeling Intersemiotic Translation**

In order to understand the process of transduction, Aguiar and Queiroz (2012; 2013) ran some studies and proposed a model for intersemiotic translation on the basis of Peirce’s model of signification. According to the authors,

an approach to the intersemiotic translation phenomena cannot be viable if is dissociated from a general theory of sign, which should provide (i) a model of semiotic processes and (ii) a classification of semiotic morphological variety (Aguiar and Queiroz 2013, 291).

The model they built contains the three peircean elements that define the semiosis and whose cooperation is mandatory in order to ensure communication: sign, object, and interpretant (Peirce 1931-1935, 5.484).

First, they built their argument on two main principles from the literature: *intersemiotic translation is fundamentally a semiotic operation process (semiosis)*, according to Peirce's ideas, and *semiosis is a multi-layered process* (Aguiar and Queiroz 2012, 338). They identified that the main problem in intersemiotic translation was to create an analogous relation between two different systems, such as language (in speaking) and body movements (in dance). Whereas within a mode we can use the same categories (we can replace phonetic elements with phonetic elements, semantic elements with semantic elements, etc.), when dealing with different modes, it is difficult to identify the perfect match to convey the very same meaning.

In this context, Aguiar and Queiroz (2012, 339) found that it was more helpful to understand that intersemiotic translation operates on different levels, and that the layers are coordinated in terms of mutual constraints, selecting relevant aspects from the source and re-creating them into the target. Drawing from Peirce's model of signification, they proposed two competing models to explain how intersemiotic translation takes place. According to the process the authors described, the sign communicates a different 'form' to the interpretant, in each version. The first analytical model (Aguiar and Queiroz 2012, 340) is composed of three main elements, namely (i) the sign referring to the translated work, (ii) the object of the translated sign, and (iii) the interpretant as the translator sign. The triad is defined by a set of relations. By considering the hierarchy in the triadic process, in the first analytical version, the sign (semiotic-source) mediates the way the object (the semiotic-source's object) determines the interpretant (semiotic-target).

The perspective changes on the reader's part in the second analytical version (Aguiar and Queiroz 2012, 341). In the second triad, the interpretant (the effect produced on the interpreter) is determined by the object of the sign (translated work), through the sign represented by the semiotic-target. Irrespective of the analytical version, the authors concluded that translation creates a different 'form' to convey. More important, the main consequence of the study conducted by Aguiar and Queiroz (2013, 286) is that translation is not a dyadic-bilateral relation, but a triadic one (sign, object, interpretant).

## **6. Toward a Model for Transduction and Meaning Interpretation in Multimodality**

Aguiar and Queiroz's model represents a useful frame of explanation for the intersemiotic translation, by providing a clear picture of the influence between sign, object, and interpretant. Nonetheless, considering the multimodal context that defines the process, we believe that this model should be extended, to show the complexity of the interactions between elements during intersemiotic translation. As such, based on Lim's (2004) Integrative Multi-Semiotic Model, we are able to build a more comprehensive model that could encompass more elements, so that to better express the multifaceted nature of the interactions within the multimodal framework.

The analytical versions proposed by Aguiar and Queiroz (2012) indicate that mediating relations connect the sign, the object and the interpretant within the process of intersemiotic translation. In our view, the interpretation process is even more complex. Supposing there is a work to be interpreted (e.g. a television commercial) – that we shall call 'Sign 1', that particular sign must have an Object or reference (e.g. a product such as a perfume). When making the advertisement, the advertising agency creates a multimodal message in the form of a television commercial that can encompass various modes adapted to the selected medium of distribution, so that it would better express the intended meaning (e.g. written text, image of the product, music, gesture and speech of a character, moving images, soundtrack, and colors). We can name these modes M1, M2, M3, ..., Mn. These meaningful modes interact and together they create a conglomerate of meanings that merge and form a unitary meaning. Inspired by Lim's (2004, 225) "Space of Integration", we shall name it *Merging Space*, the place where a semantic expansion occurs in the sense that the interaction and integration between the semiotic resources engender a total meaning that is more than the sum of its parts represented by modalities.

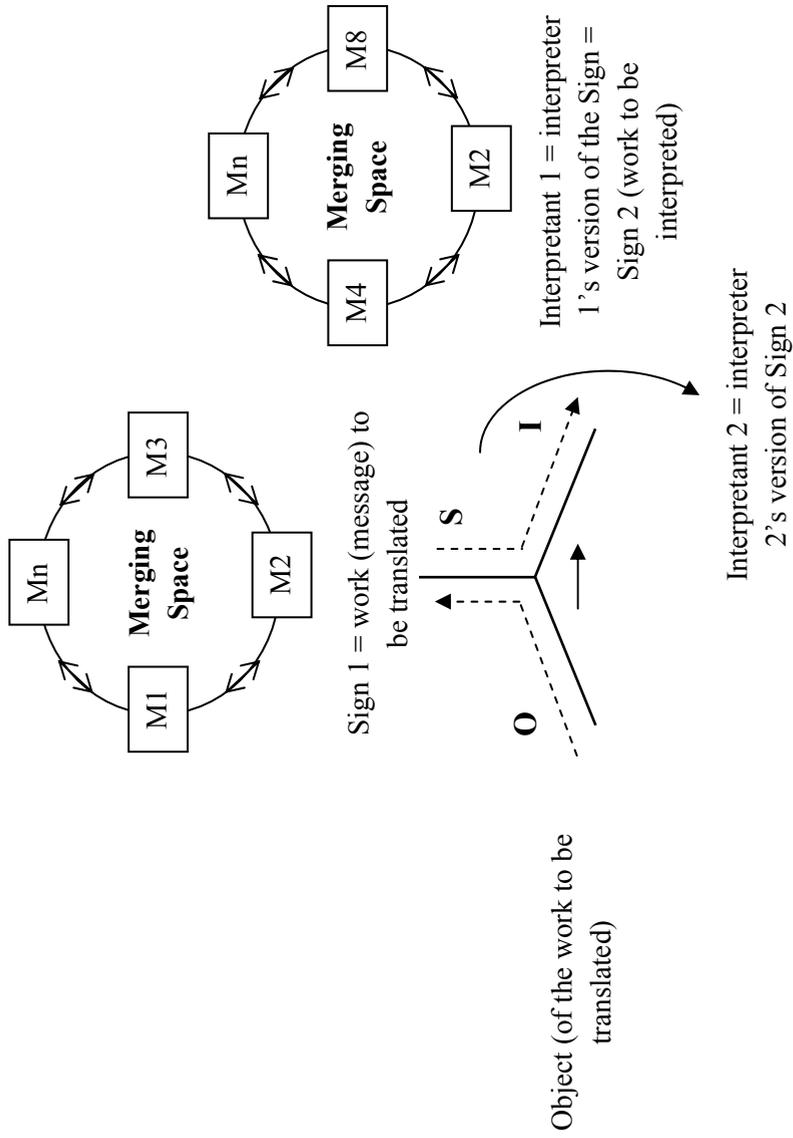


Figure 1 – Proposed model of transacted meanings in multimodal communication

When an agent (Interpreter 1) translates Sign 1 into Sign 2, for example the television commercial into a magazine advertisement, she does not translate individually each composing modality. On the contrary, the integrated meaning of the message is interpreted and then translated into a new sign. It is possible that the new sign might preserve some of the modalities that composed Sign 1 and bring into frame new modalities, depending on the channel of distribution. In our example, the magazine advertisement can keep written text, image of the product, gesture of a character, and colors as modalities. It can also deploy new modalities, such as layout. Instead, it has to give up the sound. In other cases, modalities can change almost entirely when translation occurs, depending on the signs and the channels of distribution. In consequence, the modalities that compose Sign 2 are noted  $M_1, M_2, M_3, \dots, M_n$ , as we cannot foresee a pattern for keeping or changing modes across different channels. In this newly created sign, modalities interact and integrate in a new conglomerate of meanings, and they finally create a new sign, according to interpreter's perspective.

This process can go on and on, provided that new interpretations and translations occur, by changing interpretants into new signs and so on *ad infinitum*, just as Peirce noted (1931-1935, 2.303). The shift of roles is shown in the modes by the circular arrow that indicates the transmutation of semiotic elements (object, sign and interpretant).

## 7. Conclusion

In this paper we argue that multimodality represents a framework of study with relevant implications regarding the process of intersemiotic translation. Multimodality is mainly considered as the combination of multiple types of semiotic resources into a message that is able to convey a unitary meaning. By accepting that multimodality relies on the integration of meanings, we automatically assume that any message created within its framework is subject to a complex process of meaning creation and, implicitly, meaning re-creation, in the case of intersemiotic translation. The interaction between modes has an impact on the way the message is interpreted and then translated. In this respect, we consider that multimodality represents an important framework, that influences the way translation occurs across different semiotic modes.

Aguiar and Queiroz's work (2012; 2013) is a very solid base to start the analysis of intersemiotic translation. The triadic relation they identified between the sign, the object of the sign and the interpretant represents a relevant framework of explanation that opened the path to further analyses on the topic of intersemiotic translation. Taking into consideration the studies in social semiotics, we can notice the multimodal implications were insufficiently brought into attention, when discussing the translation of messages across different semiotic resources. The multimodal context implies that the Sign is in fact a conglomerate of sets of signs, containing at least two meaningful modes that interact and engender a unitary meaning of the Sign, which we have referred to as the Merging Space. As a result, intersemiotic translation in the multimodal framework becomes a set of operations where the package of meanings becomes one integrated meaning that we aim to rephrase by deploying different semiotic resources.

In our view, translation of multimodal works or messages implies the creation of a new message, incapable of fully mirroring the original meaning of the message, considering that (i) different modes are deployed, (ii) every mode has its own affordances, (iii) there is no perfect match between different modes in terms of meaning, and (iv) the Merging Space engenders a unique integrated meaning for each combination of modes, both when creating or re-creating a message.

## **8. Limitations of the Study and Further Research Directions**

This study has also limitations. First, this paper is purely conceptual and the model we propose should be deeply analyzed in future semiotic studies. Second, due to the complex nature of multimodal messages, some difficulties might interfere in the research process, when trying to better define the integrative meaning and the correspondence between translated messages and the original ones. Third, the incommensurability of modalities represents a potential problem in any attempt to compare an original message with its translation. In this case, the Merging Space creates an even more complex structure, by reuniting incommensurable modes into a unique mix of meanings.

However, the importance of future research is unquestionable, considering the need for a better understanding of the intersemiotic translation process. This issue is currently of great interest, especially in the context of a continuous expansion of communication channels, which requires a better picture of the proper ways to create and re-create meanings across complex sets of signs.

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## **New Perspectives on Compositionality. Kit Fine's Semantic Relationist Approach to Meaning\***

Mircea Dumitru

This paper is part of a project which is work in progress. The upshot of the research is a thorough assessment of a key topic for the understanding of the semantics of language and mind, viz. compositionality. What I aim at is a more profound and a subtler view on the compositionality of the meaning of propositions and of the mental contents. Having in view this goal I shall examine some of the main classic proposals which contributed to our understanding of this topic. Two major classic contributions are due to the work of Gottlob Frege and Richard Montague (the latter, through his celebrated Montague Grammar, which has received increasing attention lately). One very new crucial contribution, which according to my own understanding is a real breakthrough in the domains of philosophical logic and philosophy of language, is Kit Fine's semantic relationist approach to meaning. This approach, among many other virtues that I shall present and discuss, has the merit of disentangling and disambiguating several distinct layers of the compositionality that have been conflated and thought of as a unitary phenomenon. This view is deepening our conception about how the meanings of propositions and of mental contents depend of the meanings of their well-formed parts, plus the syntactic parsing of the bearers of those meanings. In the process, richer relationist syntax and relationist semantics are emerging paying attention not only to the semantic features and roles of each separate meaningful unit in a complex but also to the relations that those units hold to each other.

This first paper in the project is a rather truncated expository essay of Fine's views about meaning, taking this relationist stance about the meaning

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of individual variables under assignments and of names within this relationist extension of the syntax and of the semantics of a first-order language with identity.

The essay is articulated around the following three leading notions: (i) the problems which the relationist program deals with; (ii) the semantic relationist view on names and variables (Kit Fine's views); (iii) the semantic relationist diagnosis and solution to the problems.

The purpose of the whole program is to explain how this idea of 'semantic relationism' gives a solution to deep puzzles in philosophy of language and mind – Russell's antinomy of the variable, Frege's puzzle, and Kripke's puzzle about belief. All the same, the program defends 'referentialism' in philosophy of language; Fine holds that semantic relations that have to be added to the assigned intrinsic values in our semantic theory, especially the relation which he calls 'coordination', can do much of the work of (Fregean) sense. A relationist referentialism 'can secure many of the advantages of the Fregean position without being committed to the existence of sense' (Fine 2009, 5).

The main idea of the view is the following:

The fact that two utterances say the same thing is not entirely a matter of their intrinsic semantic feature; it may also turn on semantic relationships among the utterances or their parts which are not reducible to those features (Fine 2009, 3).

To get a clear view of the motivation of introducing semantic relationism, let's consider a version of Frege's puzzle concerning identity sentences. Take two coreferential names – say "Cicero" and "Tully", and consider the identity-sentences

(i) Cicero = Cicero

and

(ii) Cicero = Tully.

Now, Frege's puzzle emerges from the following (semi-intuitive) considerations:

There is an intuitive semantic difference between the two identity sentences considered above: (i) Cicero = Cicero and (ii) Cicero = Tully.

(2) If there is a semantic difference between (i) and (ii), then there is a semantic difference between the names “Cicero” and “Tully”.

(3) If there is a semantic difference between the names “Cicero” and “Tully”, then there is a referential difference between the names.

(4) Yet, there is no referential difference! (Cf. Fine 2009, 34-37)

The semantic puzzle of identity-sentences is based upon the following assumptions:

1a *Cognitive Difference*: The two identity sentences are cognitively different;

1b *Cognitive Link*: If the sentences are cognitively different, then they are semantically different; [1 *Semantic difference*: The two identity sentences are semantically different.]

2 *Compositionality*: If the sentences are semantically different, then the names “Cicero” and “Tully” are semantically different;

3 *Referential Link*: If the names “Cicero” and “Tully” are semantically different, then they are referentially different;

4 *Referential Identity*: The names “Cicero” and “Tully” are not referentially different. (Cf. Fine 2009, *ibid.*)

Therefore, what the puzzle indicates is that the four assumptions are jointly inconsistent, and we should give up at least one of them. Of course, the challenge is: Which one? Why?

In the literature, there have been two main responses to the puzzle, viz.

A. the Fregean response; and

B. the Referentialist response.

Both responses accept Compositionality and Referential Identity.

The Fregeans accept Semantic Difference between (i) and (ii); they reject Referential Link through the distinction between *sense* and *reference*:

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if two names are semantically different it doesn't follow that they are referentially different.

The Referentialists accept Referential Link; they reject Semantic Difference: there is no semantic difference between (i) and (ii).

Nobody doubts (4) – the Referential Identity.

Current philosophical thinking on Frege's puzzle has reached an impasse, for the dialectics of the arguments support a set of strong arguments and Fregean intuitions in favor of *Semantic Difference*, and nevertheless some other argumentative strategy supports another set of strong intuitive arguments in favor of *Referential Link*. And fact is that there is no apparent way to choose between them.

This is why I believe that finding a solution to this conflict, and giving an account for both sets of intuitions in a sort of unified way, is the main task of a general semantic theory.

Kit Fine's novel views on meaning, called *semantic relationism* and articulated in Fine 2009, seem to be that kind of approach that we need here. Its basic view consists in the idea that there may be *irreducible* semantical or representational relationships between expressions or elements of thought, ones that are not reducible to the intrinsic semantic features of the expressions or elements of thought themselves between which they hold.

Semantic relationism motivates the view that we should give up (2); this means that we should dispense with (a crude version of) compositionality. In general, this is perceived as a huge price to pay. However, Fine convincingly argues that there is also a benefit if we make this move, which is that Semantic Relationism takes on board the sets of intuitions that separate Fregeans from Referentialists; for then, in dealing with Frege's puzzle of identity sentences we can retain cognitive difference (as Fregeans do) and the referential link (as the Referentialists do).

But what rejection of Compositionality amounts to? It amounts to supporting the view that there is a semantic difference between the two identity sentences, even though there is no semantic difference between coreferential names. So, after all, we do not reject the general idea of a compositional semantics. What fails is the so-called intrinsicist component of Compositionality, whose requirement is that *there be no difference in semantic relationship without a difference in semantic feature*. In the

end of the day, Semantic Relationism rejects intrinsicism, and not compositionality *per se*.

Let me give you, now, some details of how all this is going to work. Semantic relationists accept (with Fregeans) that there is a semantic difference between identity sentences. They block the inference licensed by Compositionality, which has it that since there is a semantic difference between the sentences, it should also be a semantic difference between the names. Instead, the inference that one can validly draw from here is that there is a semantic difference between the *pairs* of names “Cicero”, “Cicero”, and “Cicero”, “Tully”.

Is there a more profound rationale for supporting this view of the meaning of names? At this juncture, it is worth taking a look at a similar semantic phenomenon which involves the variables of a first-order language. Here we have an analogy with Russell’s puzzle of the variable. This puzzle emerges from the following considerations: the semantic role of two distinct variables in two distinct expressions, viz. “ $x > 0$ ” and “ $y > 0$ ”, is the same; whereas, the semantic role of the two variables within one expression, viz. “ $x > y$ ”, is different, since “ $x > x$ ” would be a very different statement.

Fine’s puts this diagnosis for the situation:

Indeed, it would appear to be essential to the semantic role of the expression as a whole that it contains two distinct variables, not two occurrences of the same variable, and presumably this is because the roles of the distinct variables are not the same. (Fine 2009, 7)

What is Fine’s response in this regard? He rejects the adequacy of several semantics (‘instantial’, ‘algebraic’, and Tarskian approaches) for predicate logic, and finds a way to allow that any two variables  $x$  and  $y$  have the same semantic role, and to deny that the *pairs*  $(x,x)$  and  $(x,y)$  always have the same semantic role.

The idea of this relationist semantics is this: the semantic role of the individual variable is given by the range of values the variable can take; however, this is not going to settle the issue of whether several variables can take any value *together*. That requires an independent specification. While *each* of  $x$  and  $y$  can take any value from the domain, it might or might not be that *both* can take any particular value simultaneously.

So, how are we going to fix the problem?

We must allow that any two variables will be semantically the same, even though pairs of identical and of distinct variables are semantically different; and we should, in general, be open to the possibility that the meaning of the expressions of a language is to be given in terms of their semantic relationship to one another. (Fine 2009, 24)

Against this background explanation, it emerges that on Fine's account, the following two theses are compatible: (Semantic Sameness) there is no cross-contextual difference in semantic role between the variables  $x$  and  $y$ ; (Semantic Difference) there is a cross-contextual difference in semantic role between the pair of variables  $(x, y)$  and the pair  $(x, x)$ .

But then, the question is: shouldn't it be a difference in the cross contextual sense between 'x' and 'y'? And the answer is yes, but only if the so-called doctrine of "semantical intrinsicism" holds for variables, as well. According to this point of view, there can be no difference in intrinsic semantic relationship without a difference in intrinsic semantic feature. All differences in meaning must be attributable to intrinsic differences. Nevertheless, Fine rejects semantical intrinsicism for variables as well.

Thus, in addition to specifying the values each single variable can range over, if taken on its own, one should also specify which values several variables can take, if taken together. So, one core tenet of semantic relationism is that from the specification of a range of values for individual variables it does not follow which values the variables can simultaneously take.

But if this is so, then it is clear that the intrinsicist doctrine, viz. *no difference in semantic relationship without a difference in semantic feature*, will fail. For the intrinsic semantic features of any two variables will be the same – it will in effect be given by the specification of their range, whereas the intrinsic semantic features of the pairs  $(x_1, x_2)$ , say, and  $(x_1, x_1)$  will be different, since the former will assume *any* pair of values from the given range while the latter will only assume *identical* pairs of values. If we are merely informed of the intrinsic semantic features of two variables, we cannot, therefore, tell whether they assume their values independently of one another (should they be distinct) or whether they always assume the same value (should they be the same) (Fine 2009, 24).

The overall relationist – and anti-intrinsicalist – moral that emerges from this analysis is that it is only by giving up the intrinsicalist doctrine, plausible as it initially appears to be, that Russell’s antinomy of the variable is to be solved. Hence, we must allow that any two variables will be semantically the same, even though pairs of identical and of distinct variables are semantically different; and we should, in general, be open to the possibility that the meaning of the expressions of a language is to be given in terms of their semantic relationship to one another (Fine 2009, 24). There are situations in which things can only be distinguished in terms of their relations to one another, and not only in terms of their intrinsic features.

This semantic and philosophical discussion brings along a new relational view of variables, and a new relational semantics for the language of first-order logic. The aim of the semantics, as standardly conceived, is to assign a semantic value to each (meaningful) expression of the language under consideration. The aim of a relational semantics: assign a semantic connection to each sequence of expressions.

The connection is meant to encapsulate (i) the semantic features of each individual expression and (ii) the semantic relationships between the expressions. The semantic connections replace the semantic values as the principal objects of semantic enquiry. This notion of a semantic connection is a generalization of the notion of a value range for a variable, that is of the set of values the variable can take.

The new approach calls for some fundamental revisions in the formulation of the syntax and the semantics:

- (1) The syntactic object that we evaluate is a coordinated sequence of expressions; we need a coordination scheme which indicates when two free occurrences of the same variable are to be coordinated.
- (2) The syntactic readjustment has consequences on the semantic level: instead of requiring that all occurrences of the same variable should receive the same value, we should only require that they receive the same value when they are coordinated.

Thus, coordination should be defined both at the syntactic and at the semantic level.

One crucial consequence of this fundamental revision is that tokens of the same type variable which are not coordinated may get different semantic values under an evaluation – variables which are coordinated get the same value, whereas other occurrences of the same type of variable, if any, which are not coordinated with the former may get different values.

Now, after this analogy between names and variables the issue is: can we make use of the semantic relationist view on variables as an analogy for developing a semantics for names, as well?

In passing from variables to names there is one major obstacle, though! There is a crucial difference between variables and names: in the case of variables “*x*” and “*x*” take coordinated values; the variables “*x*” and “*y*” take their values independently of each other. On the other hand, in the case of names, however, the semantic role of each coreferential name is already fixed, and so “coordination” or “independence” is not appropriate here.

If there is a way in which Semantic Relationism works for names, then in that case we should have the following situation: the referentialist assumption, i.e. *there is no semantic difference between “Cicero” and “Tully”*, is compatible with there existing a *semantic difference between the pairs of names “Cicero”, “Cicero”, and “Cicero”, “Tully”*.

To come up with an explanation for this, semantic relationists will have to reject a crude principle of Compositionality, that one which incorporates Intrinsicity, and consequently to argue that a semantic difference between the pairs of names *need not* imply a semantic difference between the names themselves.

But what would be the rationale for that rejection? For the difference in meaning between the two identity sentences to exist, there should exist a semantic relationship between “Cicero” and “Cicero” that does not hold between “Cicero” and “Tully”. And what is noteworthy is that this property of the semantic relationship *per se* be not grounded in an intrinsic difference between the names themselves.

Fine’s suggestion: differentiate between the pair of names “Cicero”, “Cicero”, and the pair “Cicero”, “Tully” along the following lines: (i) in the former case, the pair of names represents the object both *as being the same*, and *as the same*; (ii) in the latter case, the pair of names represents the object only *as being the same* and not *as the same*.

Now, when a pair of names represent the object *as the same*? The answer seems to be that in the first case, as opposed to the second, it is part

of how the names represent their objects that the object should be the same. In the first case, it is a strong semantic requirement that “Cicero” and “Cicero” are coreferential. In the second case, however, it is just a fact that “Cicero” and “Tully” corefer.

The former case is stronger than the latter. The suggestion is that a pair of names represents the object *as the same* when the relationship that holds between the two names in the pair is such that they *strictly* corefer (a semantic requirement that their reference should be the same). So, for two names to represent an object *as the same* is for them strictly to corefer. Two names *strictly* corefer, if it is a semantic fact that they corefer.

To sum up this, two expressions will represent an object as the same, if it is a *semantic fact* that they represent the same object.

Now, we have a semantic relationist explanation of Frege’s puzzle: in general, there is an incompatibility between representing objects informatively *as being the same* and representing them *as the same*. Even though there is no semantic difference between “Cicero” and “Tully”, there is a semantic difference between the pairs of names “Cicero”, “Cicero”, and “Cicero”, “Tully”. Only in the first pair the names strictly corefer, in virtue of a semantic fact, whereas in the second pair they corefer in virtue of just how things are.

In this paper I have been concerned with the relational aspects of representation within language. However, Semantic Relationism is a general framework, for just as there are semantical relationships between expressions that are not to be understood in terms of their intrinsic semantical features, so there are representational relationships between the constituents of thought that are not to be understood in terms of intrinsic representational features.

The Semantic Relationist apparatus of coordinated content is equally applicable within the realm of thought – to belief, knowledge, intention, and the like – as it is within the realm of language. Only by going relational the puzzles can be solved within a referentialist framework.

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# Meaningful Truth in Frege

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It is well-known that Gottlob Frege did not develop a proper *theory of truth*, although he approached the issue many times throughout his semantic inquiries. In itself, truth was not one of his main concerns, serving mostly as an instrument for developing and testing his theories on identity and number, his method for conceptual analysis, his function-argument structure, his concept of *thought* and subsequent rejection of both formalism<sup>1</sup> and psychologism. The German logician presented multiple angles and pieces of relevant information throughout his various publications and posthumous writings, but without an explicit systematization.

According to Michael Dummett, although “we have nowadays abandoned the correspondence theory of truth”, it nevertheless “expresses one important feature of the concept of truth [...]: that a statement is true only if there is something in the world in virtue of which it is true” (Dummett 1959, 14). In the following, I will argue that, in spite of his own criticism against it, Gottlob Frege’s conception of truth never really abandoned this basic intuition about truth.

## 1. Interpretations of Frege’s Truth

Because of this very reluctance to clearly put out a theory of truth, Frege has been interpreted and reinterpreted in a whole variety of manners. Some of Frege’s arguments regarding his notion of truth need to be pieced together, and the big picture needs some reconstruction, but this reconstruction has been performed very differently from one commentator to the next, each such interpretation catching some aspects and missing others from Frege’s philosophy.

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<sup>1</sup> For a detailed explanation of the connection between Frege’s sense-reference distinction and his rejection of formalism, see Costreie 2013.

### 1.1. Initial Correspondence-Theoretical Reading

First of all, Frege has been interpreted as a correspondence-theorist, because of his realism and because of the manner in which he fixes the reference of expressions and the connections between them. This reading seems to fail, however, due to Frege's own criticism of correspondence, rejection of the truth predicate and insistence that adding *truth* to a thought brings no change to that thought.

### 1.2. Deflationary Reading

Secondly, and considering said criticism, Frege was interpreted as the grandfather of deflationism (Horwich 1990). However, this reading fails as well.

Turning truth into an *object* is not exactly a deflationary thing to do – and indeed, Frege's rejection of the truth *predicate* is based on the substantial issue that one does not simply stick references into thoughts, which is what predicating truth – a reference – about a thought would accomplish. According to Frege himself,

Subject and predicate [...] stand on the same level for knowledge. By combining subject and predicate, one reaches only a thought, never passes from sense to reference, never from a thought to its truth value. One moves at the same level but never advances from one level to the next. A truth value cannot be a part of a thought, any more than, say, the Sun can, *for it is not a sense but an object* [my emphasis] (Frege 1960b, 64[35]<sup>2</sup>).

In addition, Frege's sharp distinction between the content stroke<sup>3</sup> and the judgement stroke is something that goes directly against the basic

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<sup>2</sup> Here and in the following, if present, the page numbers in square brackets are from the original edition, noted on the page margins of the cited edition. For a more in-depth analysis of this part of the argument, see Florescu 2014.

<sup>3</sup> After the sense/reference split, he simply called it "horizontal". See Frege 1960a, 34[21].

principles of deflationism. Apart from the distinct notation, — and |— have *different syntactic roles*: the first one is a function, while the second one

cannot be used to construct a functional expression, for it does not serve, in conjunction with other signs, to designate an object. |— does not designate (*bezeichnet*) anything, it asserts something (Frege 1960a, 34[21], fn G).

The two symbols also *express different things*. — reads as “the circumstance that”, “the proposition that”. It is the stroke that “binds the symbols that follow into a whole”, and “serves generally to relate any symbol to the whole formed by the symbols that follow the stroke” (Frege 1997a, 53[2]). On the other hand, |—, whereby we’re not just writing down a truth value, but also saying that it is the True” (Frege 1960a, 34[21]). Furthermore, as we see in “Thoughts”, this is not just a formal operation (of disquotation):

We distinguish:

- (1) the grasp of a thought – thinking
- (2) the acknowledgement of the truth of a thought – the act of judgment
- (3) the manifestation of this judgment – assertion.

We have already performed the first act when we form a propositional question. An advance in science usually takes place in this way: first a thought is grasped, and thus may perhaps be expressed in a propositional question; after appropriate investigations, this thought is finally recognized to be true. We express acknowledgement of truth in the form of an assertoric sentence. (Frege 1984, 355-356[62-63])

The clear distinction between the steps (1) and (2) goes *precisely* against the core principles of deflationism<sup>4</sup>.

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<sup>4</sup> The fragment quoted above *does* continue with “We do not need the word ‚true’ for this”. But this insistence, according to Jamin Asay, shows at most that Frege held a deflationary attitude towards the word ‚true’ and the property *truth* [...]: though adding the word ‚true’ to our utterances

### 1.3. Identity-Theoretical Reading

Frege has also been seen as a proponent of the Russellian identity theory of truth – among other things, due to his assessment that “A fact is a thought that is true” (Frege 1984, 368[74]), or, more recently, as a proponent of the reworked identity theory due to the quoted assessment and to his notion of “content (re)carving” (see Linsky 1992, as well as the whole dispute that started with Hale 1999 – Potter and Smiley 2001).

This interpretation also fails, whether we read the term *fact* from the troublesome sentence above as *slice of the world* or as a newly introduced term. In the first case (fact as a slice of the world), the statement challenges Frege’s repeated claims that thoughts do *not* belong on the “outer realm”<sup>5</sup> (see Frege 1984, 363[69]) and that adding *true* to something makes no substantial change to that something – while, in this case, adding *true* to *thought* would do nothing less than move an inhabitant of the “third realm” of the senses to the “outer realm”. So we are forced to stick with a much more modest reading of *fact*, as in “France does not have a king and that’s a fact”, where we simply decide to call a true thought *a fact*, and no deeper philosophical insight is expected out of this quasi-definition.

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typically does not do anything to change what thought is being expressed, the *concept* of truth remains an important, explanatorily potent concept that is foundational in our conceptual scheme (Asay 2013, 49).

Elsewhere, the same Jamin Asay concludes that

Frege [...] upholds linguistic deflationism, but rejects conceptual deflationism (and probably metaphysical deflationism, too, depending upon how it’s construed) (Asay 2011, 130).

It is clear that the adoption of linguistic deflationary principles can hardly make a conception of truth insubstantial.

<sup>5</sup> This is precisely the conclusion reached by Hans Sluga (in Sluga 2007, 8), after taking Frege’s statement from “Thoughts” very seriously:

Facts are, on this view, evidently, not what thoughts are about but are themselves thoughts. While we tend to speak of thoughts as correlates of possible facts such correlates would be, in Frege’s terms, at best ideas or representations. But these are, as we have seen, unsuitable as truth-bearers not only because they are subjective but also because they are strictly speaking incommunicable. Fregean thoughts, on the other hand, constitute the world instead of being its representation.

#### 1.4. Tarskian Reading

While a correspondence-theoretical reading has been apparently rejected by the German logician himself, his theory has been alternatively understood as a semantic theory of truth, in the vein of Alfred Tarski's conception, making use of Tarski's own name for this notion of truth (Heck and May forthcoming).

Indeed, Frege's and Tarski's truth share several features, such as the claim that truth is supposed to constitute the basis for mathematics and science, although truth is supposed to bring nothing new when predicated of a sentence.

However, this reading fails because the two theories are actually quite different. Tarski's formulates his theory in an explicit metalanguage (Frege may have hinted towards a metalanguage at best), in order to deal with the Liar's paradox (which was no concern of Frege's<sup>6</sup>). Tarski aims to give a definition of truth, while Frege states that truth is undefinable. Finally, Tarski's truth is a predicate, while Frege's truth is an object.

As a further interesting aspect, Tarski defines his truth in terms of satisfaction, while Frege typically goes (or claims to go, as we shall see) the other way around – although, besides contextualism, he does nod towards compositionality as well, quite explicitly in his posthumously published “Logic in Mathematics”.

So is Frege's theory of truth indeed a singularity? I will argue that it is not. A big question remains: *where do Frege's realism together with strict correspondence (senses corresponding to and strictly distinct from references) go when we move from names and concept-words to sentences?* However, if we adopt a correspondence-theoretical reading, how can it

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<sup>6</sup> According to Richard Heck, for this very reason, and since “there's no reason to think that [Frege's] semantics was not ‚serious‘, [...] Begriffsschrift is inconsistent. Again.” (Heck 2007, 59). Of course, considering the other differences between Frege's and Tarski's semantic perspectives, this conclusion should not be accepted, if it were acceptable at all, without a very serious investigation of Heck's argument. Such an investigation would lead us too far from the current purpose, but let's just say for now that, considering several statements from the posthumously published “Negation”, Frege might well have simply considered the Liar as an empty thought.

survive after Frege's claim that truth is primitive together with his criticism of correspondence and reluctance to define truth? In the following, I will attempt to sketch an answer to these questions.

## 2. Correspondence

### 2.1. Principles of Correspondence

The correspondence theory of truth is included by Richard Kirkham (Kirkham 1995) in the metaphysical project, a project that attempts to identify what truth *consists in*, what it is *for a truth-bearer to be true*. Within this larger framework, the core of any correspondence theory is the idea that a statement is true if and only if it *corresponds to* or *matches* reality. After exploring what he considers to be the two main branches of this theory, Kirkham comes up with the following general schema:

$$(t)(t \text{ is true iff } (\exists x)[(tRx) \ \& \ (x \text{ obtains})])$$

(Kirkham's schema C)

where  $t$  is the truth bearer (the thing that can receive a truth value),  $R$  is the *connection* between bearer and maker (the thing that determines whether the bearer is true or false, the portion of reality that corresponds to the bearer), and  $x$  ranges over the set of truth makers.

According to Marian David, a correspondence theory is usually expected to give us the following: (1) some principle that connects the bearers with the makers; (2) a refinement of this principle, that binds *specific* bearers with *specific* makers; (3) an idea about the nature of the truth makers (see David 2013) – and, obviously, (0) an account of the truth bearers it employs.

### 2.2. Frege's Semantics

Now, the philosophical background of Frege's semantic theory is a typical realist standpoint. In "Thoughts" (Frege 1984, 339-341[71-73]), he even constructs a brief Cartesian argument that clarifies his realistic metaphysical perspective.

Further on, Frege explains his famous notions of *sense* and *reference* by analysing them for his basic types of expressions – *proper names* (or singular terms, or names of objects), *sentences*, and *concept words*. Thus, the reference of a *proper name* is the designated object, while its sense is the mode of presentation of this reference. The reference of a *concept word* is the respective concept (conceived by Frege as an unsaturated entity, a special case of function that leads from objects to truth values), while the sense is the *intension* of this concept, under its classical understanding. Under the same understanding, the *extension* of the concept is given by the objects that are characterized by it (to Frege, concepts are also the properties of the objects that fall under them). In the case of *sentences*, the references are the truth-values themselves, and the senses are the thoughts expressed by sentences.

Furthermore, in several places, such as “Comments on Sense and Reference”, we are being told the following:

If we complete the name of a concept with a proper name, we obtain a sentence whose sense is a thought; and this sentence has a truth-value as its reference. To acknowledge this reference as that of the True (as the True) is to judge that the object which is taken as the argument falls under the concept. (Frege 1997c, 174)

This connection between “falling under a concept” and “truth” can be read in two ways – and Frege himself understood it in two manners, first as contextualism (the whole determines its parts, the truth value of a sentence determines whether its object falls under its concept or not, and truth is primitive) and, secondly, as compositionality (whereby the parts determine the whole and the truth-value of a sentence is determined by checking out whether its object does or does not fall under its concept).

### 2.3. Frege’s *Correspondence-Theoretical* Semantics<sup>7</sup>

If we take Frege’s compositional understanding of his semantics (clearly expressed in his posthumously published “Logic in Mathematics”),

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<sup>7</sup> An alternative layout of this story can be found in Florescu 2014.

the immediate question is the following one: *how can the correspondence involved in the relation between names / concept-words, and objects / extensions disappear once we have reached the sentences?* Let us take the basic example of a sentence composed of a proper name and a concept word: *Paul's eyes are blue*. It would appear that, once we saturate a concept (*blue*) with an object (*Paul's eyes*), instead of obtaining some kind of fact or state of affairs, the semantic shapes and colours “fade to white” or “fade to black”, and we only get *true* or *false*. However, a sentence comes into existence when a concept-word becomes saturated by a singular term, which generates a white/black reference indeed, but only *after determining whether the reference of the singular term falls under the concept* denoted by the concept-word, and if the result is affirmative, then the sentence refers to the Truth, otherwise its reference is the False.

Now, for Frege, a true sentence does not correspond to a proper *fact* in reality. However, as long as *truth* and *falling under a concept* are connected through a statement like the one from “Comments on Sense and Reference” quoted above, the reference of any sentence is, somehow, *essentially* linked to the correspondence-theoretical references of its components. Ultimately, the fragment, together with the fragment from “Thoughts” quoted a few pages earlier, provides us with an answer to questions such as “*why* is the sentence ‘Paul's eyes are blue’ true?”, which is much more than what an insubstantial theory of truth should do.

It is clear now that a sentence (or thought) is *made true* by certain aspects of the “outer world”, which can be observed if we dissect the sentence and check the semantic behaviour of its components.

Now let us go back to the basic requirements for a correspondence theory of truth. The recipe includes the following essential ingredients:

(0) truth bearers: Frege's bearers are the thoughts, the senses of sentences.

(1) some principle that connects the bearers with the makers. Do we have a principle that bridges the bearers with the makers? Sure, we have the sense itself, and the fact that names in the declarative genuine discourse seem to have embedded a referential presupposition, regardless of whether this presupposition is justified or not. These names *are supposed to refer to some objects in the world*.

(2) a refinement of this principle, that binds *specific* bearers with *specific* makers; for Frege, embedded in names is not just a generic

referentiality. If I say “the Moon” and I point to Venus, then I have referred to the wrong object, or I have used the name wrongly. *Sinn* is built as a vehicle of a correspondence so straight that it borders on identity. According to Peter Ludlow, Frege’s *senses* could be characterized as “abstract objects that *fix* the referents of these expressions” (see Ludlow 2013), while Yiannis Moschovakis understands the sense as an algorithm that produces the denotation (see Moschovakis 1993).

(3) an idea about the nature of the truth makers. Is there something in the world that *makes* the bearers true? Initially, Frege’s answer would be “no”, for there is nothing that corresponds in the world to thoughts other than the truth values themselves. However, singular terms clearly refer to something, and have a, what we could call, “reference-maker”. Therefore it seems that, while “readily-made” facts do not agree with Frege, *semantically constructed facts*, consisting of objects falling under concepts, are fine. So, what is it that makes the truth-bearers true or false? It is the very construction that results after the compositional semantics has been set in motion.

And so, here is how we could rephrase Frege’s conception of truth in agreement with Kirkham’s Schema C:

$(C(n))(C(n) \text{ is true iff } \& (\exists x)(\exists Y)[(x \text{ refers to } n) \& (Y \text{ refers to } C) \& (x \text{ falls under } Y)])$

(Kirkham’s schema C for Frege)

where the truth bearer  $t$  is replaced by  $C(n)$  (a sense of a concept saturated by the sense of a proper noun),  $R$ , the *connection* between bearer and maker, consists mostly of Frege’s reference, while  $x$ ’s relation to  $Y$  constitutes the truth maker, and “falling under a concept” marks Kirkham’s “obtain”.

### 3. Problems and Solutions

#### 3.1. Frege’s Criticism of Correspondence

The first problem that arises has been anticipated since the beginning of this paper: Frege’s own dismissal of a correspondence theory of truth.

The first answer to this objection has also been anticipated with the quote from “Thoughts” from section 1.2. Frege describes an advancement in science in the following manner:

first a thought is grasped, and thus may perhaps be expressed in a propositional question; after appropriate investigations, this thought is finally recognized to be true.

This fragment is clearly saying two things: (1) that recognizing something as true is an obviously essential step in a scientific enterprise, (2) that this recognition is possibly, i.e. that there is such a thing as a truthmaker. Of course, keeping with one of Frege’s important claims, this does not actually bring anything new to the *thought* itself – *Snow is white* is the same thought, whether it be recognized as true or not. However, being recognized as true *makes it work in a different way*, which leads to the situation that we cannot move forward in science without this recognition. In addition, most importantly, *the recognition is possible*. Considering Frege’s stance in both science, and semantics, it is clear that this recognition can only be made by employing the referential powers of names and concept-words (more exactly, of their senses), which are clearly corespondential.

As a side-note of this argument we have the already-mentioned distinction between — and |—, which shows that whatever substance Frege was trying to show as not-existent in truth itself found its way back into his system, through the distinction between thought / circumstance / proposition / supposition, and judgement.

Moving on to the second argument, we seem to have a stand-off between two perspectives. In one corner, there is (Frege 1984, 353[60]), saying that

A correspondence, moreover, can only be perfect if the corresponding things coincide and so just are not different things. [...] But this is not at all what people intend when they define truth as the correspondence of an idea with something real. For in this case it is essential precisely that the reality shall be distinct from the idea. But then there can be no complete correspondence, no complete truth. So

nothing at all would be true. (followed by the well-known circularity argument).

In the other corner, we have (Frege 1960b, 58[27]):

The regular connection between a sign, its sense and its *Bedeutung* is of such a kind that to the sign there corresponds a definite sense and to that in turn a definite *Bedeutung*.

Is there anything to do about this situation? Are we really forced to think that Frege tolerated correspondence about reference, but completely disconnected it from his notion of truth? Let us take a look at the German words used by Frege in the two cases. Interestingly enough, they are slightly different. Whenever he criticizes correspondence, he employs for it the term *Übereinstimmung*. On the other hand, whenever he uses the verb “to correspond” in his semantics (whether in the above-quoted fragment from “Sense and Reference”, in *Begriffsschrift*, in “Function and Concept” and so on), the German verb employed is *entsprechen*. The two terms are relatively similar, they both signify some sort of correlation between (at least) two things; but where the first one underlines a sense of *agreement* between two parts, the second one goes for a more *functional* understanding, one of the two correlated elements being the *counterpart* of the other one. And this functional aspect seems to agree quite well with Frege’s take on many other themes of his philosophy. When one thing is associated with another in the manner suggested by *entsprechen*, the two play similar roles in their respective networks, there is some function that marks the transition from one network to another, and the second thing is the value of this function when it takes the first one as an argument. Which is exactly the image suggested by Frege’s referential truth consisting of the reference of a name falling under the reference of a concept-word. A thought does not have truth as a property, but it does refer to it, under the specified conditions for its concept-sense and name-sense.

And so, the typical relational nature of truth is hereby taken over by reference. Whether reference could have a *rigorously* functional nature for Frege, and whether the theory thus resulted is still *of truth*, are a different story; for now, we can still conclude that Frege’s criticism of correspondence-as-*Übereinstimmung* did not preclude him from practising correspondence-as-*Entsprechung*.

### 3.2. Contextuality versus Compositionality

The second problem has been waiting for an answer since the beginning of section 2.3: it is the matter of compositionality versus contextuality. I have based my whole argument from section 2 on compositionality, whereas Frege's most typical statement about the logical seniority between a whole and its parts goes the other way around: he usually maintains that the meaning of the whole determines the meaning of the parts. Of course, this would nullify most of the demonstration given above, and Frege's correspondential reference could no longer inflict its nature upon Frege's truth.

But let us take a closer look at what happens when Frege's truth is considered as the primitive notion, and "falling under a concept" is defined according to it. Let us assume that names are still firmly related to their senses and references, but that concepts can only be characterized as a set of objects they project into "the true". Let us take a random set of objects:

$$U = \{\text{Paul's eyes, snow, sheet of paper, grass, blood}\}.$$

Since a concept is nothing but a function that projects these objects into one of the two truth values, then let us pick "mysterious function 1" (*mfl* for short), whose only feature is that its value range is the following one:

$$\text{Range}_{mfl} = \{\langle \text{Paul's eyes, F} \rangle; \langle \text{snow, T} \rangle; \langle \text{sheet of paper, T} \rangle; \langle \text{grass, F} \rangle; \langle \text{blood, F} \rangle\}$$

This will mean that the extension of *mfl* is given by the following set of objects that fall under it:

$$\text{Ext}_{mfl} = \{\text{snow, sheet of paper}\}$$

Now, is there anything in this whole story that connects *mfl* with *is white*? Well, we might think that *white* is the *property* that is common to all objects falling under *mfl*. But, as we remember, the properties of an object are the set of concepts it falls under. Let us add to our rudimentary example a list of concepts. Of course, given that a concept is just a function that

projects objects into truth values, we'd have to call all of them “mysterious function”, which will give us, for instance, the set:

$$\text{Function}_U = \{mf1, mf2, mf3, mf4, mf5\}$$

Each of them will be characterized as follows:

$$\text{Ext}_{mf1} = \{\text{snow, sheet of paper}\}$$

$$\text{Ext}_{mf2} = \{\text{blood}\}$$

$$\text{Ext}_{mf3} = \{\text{Paul's eyes}\}$$

$$\text{Ext}_{mf4} = \{\text{grass}\}$$

$$\text{Ext}_{mf5} = \{\text{snow, grass}\}$$

Consequently, an object from  $U$  such as *snow* will have the following set of properties:  $\{mf1, mf5\}$ . And consequently, the common property shared by the objects that form the extension of *mf1* is – well, *mf1*. Even if we added the property of *white* to our rudimentary language, there would still be no natural way of connecting *white* with *mf1*.

And thus, the consequence of taking truth as a primitive is that the concepts are deflated way past Frege's actual understanding of them. For Frege, a concept is not just a featureless function that generates truth values, any more than normal functions are to him simple sets of pairs of arguments and values. This was to be expected, considering the mathematical background of the whole story. In mathematics,  $+$  is not a simple mapping between numbers. We actually know what  $+$  means, and as a result of that we can say that it maps the pair  $\langle 2, 3 \rangle$  into 5. The same thing can be said about Frege's concepts: *white* is not something that simply maps *snow* into *true*, but it does this mapping as a result of its meaning. Nor is this a simple matter of epistemology: functions are not arbitrary, they reach their values in virtue of their defining features.

And thus, the way has been cleared for the substantiality argument from section 2 of this paper. Frege's theory is still relatively odd, it still does not respect the tropes of a correspondence theory of truth ad litteram. However, its substantiality is undeniable, and this substantiality can only be of a correspondence-theoretical nature.

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# **The Signification of the Concept of Consciousness in Husserl's *Fifth Logical Investigation* and Its Relevance for Knowledge \***

Victor Eugen Gelan

In his fifth *Logical Investigation*, which bears the very suggestive title *On intentional experiences and their "contents"*, Husserl intensely scrutinizes three possible significations of the concept of consciousness. In these analyses, he also strives to clearly delineate between two types of consciousness: psychological and phenomenological. The goal of this paper is to show that the way in which the (psychical) act is conceived and defined, according to the Husserlian approach, as a *lived, intentional* experience plays an essential role in clarifying the distinction between the empirical-psychological level of consciousness (where the act as a lived experience manifests itself) and its eidetic or ideal level (wherein any type of objectivity is constituted as such). Moreover, I shall try to argue that the notion of act conceived in this manner had influenced and decisively determined the development of the entire Husserlian phenomenology and theory of knowledge exactly because it explains how knowledge in general is constituted from an objective point of view. Another highly relevant distinction that needs to be dealt with in this context is the difference that Husserl establishes between the descriptive and intentional contents of the act. I shall try to show that this distinction presupposes in fact a previous conceptual determination of the noema (undertaken jointly with the analysis of the noetical components of consciousness at this level), and that the way in which the relationship between these two strands of consciousness is

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described determines further and in a fundamental manner the development of the idea of intentionality itself.

I shall start by enumerating the foremost concepts of consciousness approached by Husserl in his analysis, and then I shall enrich them in detail and signification with regard to knowledge.

### I. Three Concepts of Consciousness

There are, according to Husserl, three meanings possible for the term of consciousness:

1. Consciousness “as the entire, real (*reell*)<sup>1</sup> phenomenological being (*der gesamte Bestand*) of the empirical ego” or “as the interweaving of psychic experiences” in the unified stream of experiences;

2. Consciousness “as inner awareness<sup>2</sup> (*inneres Gewahrwerden*) of one’s own psychic experiences”, and

3. Consciousness “as comprehensive designation for ‘mental acts’, or ‘intentional experiences’, of all sorts” (Husserl 1984, 356; 2001, 81).

1. The first meaning of the concept of consciousness tackled by Husserl is *consciousness as the entire, real (reell) phenomenological being*

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<sup>1</sup> In this context, a distinction must be made between the following terms that Husserl employs regarding the rapport established between consciousness and the object of knowledge: *real*, *reell* and *wirklich*. *Real* refers to what is transcendent as such, to the still not reduced transcendent level which holds the rank of reality within the natural attitude or, in short, to what exists in the outer world, independently of consciousness (Husserl 1976, § 1, 10-11). *Reell* designates the material component of the act, the lived content within consciousness: for example, what one calls perception in a perceiving act (in contradistinction to which in perception is perceived as such and which is the noematic content) (Husserl 1976, § 38, 79). *Wirklich* indicates that which is actually and effectively given, and is used by Husserl especially for characterising the relation between the object as such and that which, in an appresentative act, renders present the appresented content as sense: noema (see, for example, Husserl 1976, § 90, 206-209). For the distinction *real-reell*, see also Husserl 2012, 219, note „a”. In this paper, where the term *real* is used with the meaning of *reell*, I shall put into parentheses the German expression *reell* in order to single out this semantic difference and to not create confusion between the two levels.

<sup>2</sup> I translated *inneres Gewahrwerden* by *inner awareness* and not *inner perception* in order to distinguish this term from *innere Wahrnehmung* which will be translated as *inner perception* (and to which corresponds *die äußere Wahrnehmung – the outer perception*).

of the ego's own experiences and it therefore presupposes a strong connection with the meaning of the concept of lived experience. At the beginning of his argument, Husserl remarks that the way in which modern psychology defines its own status as science implies using a certain concept of consciousness (in a particular sense) and correlatively specific concepts of lived experience and content. These concepts are put to work in modern psychology such as to indicate "real occurrences or events" (*reale Vorkommnisse*) which determine "the real unity of consciousness" of a psychic individual. For example, perceptions, representative imagining, acts of conceptual thinking, suppositions, doubts, etc. are consciously manifest as lived experiences or contents of consciousness. Modern psychology had designated by these concepts both psychic acts and their objects without a clear distinction between the two.

But Husserl shows that the concept of lived experience may be approached from a pure phenomenological perspective according to which any relationship with the empirical level, with the "real empirical being" should be cut off. In this way, the psychological-descriptive concept of lived experience becomes one of the key concepts of pure phenomenology. This excluding procedure, based on our free decision, clearly anticipates the *phenomenological reduction* and the passage from the natural attitude to the transcendental one from *Ideen I* (Husserl 1976, 56-135). Through such a methodological device of exclusion, the descriptive, psychological discoveries are taken into account in a pure sense and understood in an a priori manner as "pure, a priori insights into essence" (Husserl 2001, 82; *reine Wesenseinsichten*). The possibility of this analytical approach is inscribed in the sphere of eidetic or essential (a priori) relationships and not in the domain of psychological facticity because it does not imply an empirical generalization<sup>3</sup>. On the contrary, this particular approach is concretely carried out through a procedure called *ideation* (*Ideation*)<sup>4</sup>: it obtains the act or the intentional lived experience (in a phenomenological

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<sup>3</sup> It is important to underline the fact that Husserl makes a distinction between empirical generalization and ideation. In *Erfahrung und Urteil*, for example, this differentiation operated between *empirical, general concepts* and *pure, general concepts* (Husserl 1939, 398, 409 and 419).

<sup>4</sup> For a synthetic presentation of the theme of ideation in Husserl's phenomenology, see Gander 2010, 144-147. For another interesting, critical discussion in this sense, Patočka 1991, 515-534.

sense) through the analysis of certain exemplary, singular cases of such experiences with regard only to their real (*reell*), phenomenological content, after the exclusion of the psychological or empirical apperception (Husserl 1984, 382). The fact that through ideation one gains access to the generic idea of intentional lived experience in its phenomenological purity already entails to put out of action (to parantheseize) the empirical, psychological datum, and especially those psychic acts conceived in an empirical manner as acts of a real-empirical ego. This means, moreover, to trace a clean boundary between the psychological-empirical level of consciousness and its eidetic or ideal counterpart.

Husserl criticises the modern psychology of his time for not drawing a clear distinction between the object as such and the way in which it appears to consciousness. In the latter's flawed conception, Husserl argues, to perceive a coloured object means that its colour and its subjective lived experience are one and the same. From a subjective or psychological point of view, there is the sensation of colour, whereas from an objective or physical perspective there is the colouring as such, as a property of the outer, external thing. In Husserl's own terms, the "colour-sensation" (*die Farbenempfindung*) or the "qualitatively determinate phenomenological colour-aspect" (*das qualitativ bestimmte phänomenologische Farbenmoment*) (that is the appearing of the colour through different degrees of adumbration – *Abschattung*: the act) and "the object's objective colouring" (*objektive Farbigeit des Gegenstandes*) (as an object's surface uniformly perceived: what is given through the act of perceiving) are in fact the two sides involved in perceiving a thing which are confused here (Husserl 2001, 83). The presenting through adumbrations/nuances is a necessary and indubitable character of the act of perceiving and not of the object itself. The difference mentioned above holds for all kinds of objective properties (of objects) and for all sensational complexes which corresponds to the former (and which belong to consciousness).

Therefore, from a phenomenological point of view, the conception according to which the difference between the conscious content in perception and the external object perceived through it would designate two manners of engaging with one and the same *appearance*, in two different contexts (subjective and objective) stands as false. This confusion is fed, argues Husserl, by the equivocations of the term appearance (*Erscheinung*)

which derive from the fact that the name *appearance* is given not only to the lived experience in which the object's appearance becomes manifest, but also to the object which appears. In order to clear up this entanglement Husserl sustains that "the appearing of the thing (the experience) is not the thing which appears (that seems to stand before us *in propria persona*)" (Husserl 1984, 359; 2001, 83). In this sense, appearances belong to the level of consciousness, whereas the things which appear to us, that we perceive, belong to the phenomenal world. This is equal to saying that "the appearing of the things does not itself appear to us, we live through it" (Husserl 1984, 360; 2001, 83).

Stating that the thing's appearance is not the same as the thing itself which appears, Husserl seems to have embraced, in this context, the Kantian distinction between "the thing in itself" and "the phenomenon". But this differentiation is not legitimate from the point of view of Husserl's phenomenology because it designates something else than an old Kantianism: the rigorous distinction between the real, transcendent object, its meaning (noema) and the real (*reell*) component of consciousness wherein the object is given/appears (the lived experience as such or the noesis). At any rate, a critical examination of the possible connection between the Kantian and Husserlian distinctions is worth deepening.

Taken in its empirical-psychological sense, the ego maintains certain real (*real*) relationships with the objects around itself. This relation between ego and object must be, according to Husserl, decisively distinguished from the relation between the content of consciousness (understood as lived experience) and consciousness as such, as unity of these contents. If in the first case, there is a relationship between two realities (similar to the Cartesian conception), in the second case there is a relationship between a sole act and a unitary ensemble of acts which demands a different kind of analysis than in the first instance. Moreover, the act or the lived experience in itself are not the same with what is presented within it as object because the determinations of the predicates of the appearance itself are not the same with the determinations or the predicates of what appears within or through the appearance. In other words, the appearance itself (*Erscheinung*) belongs to the real (*reell*) part of consciousness, whereas what appears (*das Erscheinende*), the object which appears, indicate the intentional way of its givenness.

This kind of fundamental distinctions (demanded eidetically) as those previously analysed for perception are equally necessary for other acts (such as, representative imagining, judgements, suppositions, etc.) in order to emphasize clearly the difference between what constitutes, for a certain act, its *lived experience* (what intrinsically – *reell* – constitutes it) and what is given or present, in an intentional sense, within this particular act.

2. The second meaning of the concept of consciousness: consciousness as inner awareness (*inneres Gewährwerden*) of one's own psychic experiences or "'inner' consciousness" (*das innere Bewusstsein*) as "inner perception" (*die innere Wahrnehmung*).

Consciousness in the sense of inner consciousness designates the inner perception which accompanies actually present lived experiences. The correct understanding of this concept demands a clarification of the way in which one talks about *inner perception* versus *outer perception*, as well as about *adequate perception* versus *inadequate perception*. Husserl deems false the opposition between inner perception (as adequate perception) and outer perception (as inadequate perception), an opposition that had high currency in his time, both in psychology and in the theory of knowledge (in Brentano's too). Therefore, Husserl proposes another distinction more appropriate to his own purposes: between inner perception as a general perception of one's own lived experiences and adequate or evident perception. The inner perception, in a psychological sense, is not necessarily an adequate perception; its adequacy or evidence depend on whether "the object in it is itself actually present, and in the strictest sense present *in propria persona* (*leibhafti*), is exhaustively apprehended as that which it is" (Husserl 1984, 365; 2001, 86). As such, one can speak of adequate perception also for what psychology calls outer perception (the perception directed towards the transcendent object).

Although this meaning of the concept of consciousness is rather ambiguous in the *Fifth Logical Investigation* (see Smith 1977, 484), Husserl tries to show by its treatment that the immanent components of consciousness are adequately perceived in the framework of what he calls *inner consciousness* (*das innere Bewusstsein*). In this sense, the sentence *cogito, ergo sum* holds the same legitimate force as the evidence of the fact that the given object is given to the ego in inner perception in exactly the

way it is envisaged and that the ego perceives it as such in exactly the way the object is itself. Nevertheless, the ego in discussion is not the empirical one, but the ego reduced to its content which can be phenomenologically attested and apprehended. Husserl underscores the conceptual passage from lived experience as inner perception (what is internally perceived) to consciousness as “phenomenological I” (*das phänomenologische Ich*), wherein the empirical I is constituted. Anyway, consciousness in the sense of inner perception does not entail, in Husserl’s analysis, some sort of special kind of knowledge, an “intuitive knowing” in the ordinary meaning of the word.

3. The third meaning of the concept of consciousness: consciousness as lived intentional experience.

The theme of consciousness as lived intentional experience is analysed by Husserl in close connection with an important concept from Brentano’s philosophy: “the psychical phenomenon”. Husserl’s starting point in this sense is, therefore, the meaning of the Brentanian definition of psychical phenomena and of the distinction he draws between these and the physical ones. Through this division, Brentano tries to exhaustively classify all phenomena so that the domains of psychology and natural science can be rigorously separated and their research field may be neatly delineated. Even though psychology might be considered the science of psychical phenomena, leaving the natural sciences to tackle with physical phenomena, Brentano’s distinction does not entirely comply with this classification because psychical phenomena, from a psychological angle, are not completely the same with what Brentano calls *psychical phenomena* (*psychische Phänomene*), that is psychical acts (*psychische Akte*); on the other hand, many of the so called *physical phenomena* are in fact, from Husserl’s point of view, still psychical phenomena. Nevertheless, Brentano’s differentiation and his theory of psychical phenomena keep their validity philosophically because psychical phenomena constitute a class of lived experiences clearly circumscribed which plays an essential role in the elaboration of a definition with regard to the psychical or conscious being (*psychisches, bewusstes Dasein*). A being deprived of such lived experiences, as well of the capacity to interpret the simple sensational acts or to represent perceived objects and to reflect on them could not be deemed a

psychical being. Psychical lived experiences gain a tremendous relevance philosophically because, taken in their phenomenological purity, they open the way towards the fundamental concepts that heavily and systematically bear on normative sciences (disciplines like logic, ethics or aesthetics) and upon which the ideal laws of these disciplines are built.

To properly understand the acts that Brentano calls *psychical phenomena* is, at this level of analysis, essential because upon it depends the successful delimitation of the concept of consciousness as lived intentional experience. For Brentano, psychical phenomena are those that contain an object and that direct themselves to an object. What the Viennese philosopher leaves in obscurity is the specificity of the relationship between the immanent object and the object towards which the act is oriented. According to Husserl, a clean-cut distinction must be made between the two because the object the act is aimed at does not belong to the act as such (in the sense of being a part of its internal constitution), but it is only intended by the act (therefore, it gives/presents itself intentionally in the act). The connection between the act and the object it is aimed at is carried through what Husserl calls the act's character (or act-character) which corresponds generally to apperception<sup>5</sup>. Exactly through apperception does the object appear to consciousness. Without it, one cannot speak in general of an intentional relation or of an intentional consciousness.

From among all the characteristics attributed by Brentano to psychical phenomena (six) (Brentano 1874, 101-130 or Tănăsescu, 2002, 52-55), Husserl will deem worthy of analysis only two: 1. aiming at an object, and 2. the idea that psychical phenomena are presentations or have as their basis presentations.

The first trait indicates what one could call the essence of the Brentanian psychical phenomenon or the essence of the *act*: to be always directed to an object. The relationship with the object constitutes a fundamental characteristic of the act itself (of the *psychical phenomenon* in Brentano's sense) and Husserl will develop it further so much so that it will become one of the heavily invested, key concepts of phenomenology under

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<sup>5</sup> In order to designate this act-character, Husserl employs in fact several terms: *Auffassung*, *Apperzeption*, *Deutung*, but all of them are meant to express the same idea – the process or the modality in which the object appears to consciousness, as well as the fact of endowing sensational contents with an objective meaning.

the name of *intentionality*. In his work, *Psychologie vom empirischen Standpunkt*, Brentano states with regard to this essential aspect of the act: “Every psychological phenomenon is characterized by what every mediaeval schoolmen called the intentional (or mental) inexistence of an object, and by what we, not without ambiguity, call the relation to a content, the direction to an object (by which a reality is not to be understood) or an immanent objectivity” (Brentano 1874, 115). Another remark of Brentano that Husserl will capitalize on for the development of the concept of intentionality is the following: each psychological phenomenon “contains something as object in itself, though not all in the same manner” (Brentano 1874, 115). This difference in the manner of aiming at an object is expressed by probing different acts of consciousness: in presentation, the object is referred to in a presentative way; in judgement in a judicative manner, in fantasy in an imaginary or fantasy-like way etc.

Husserl singles out this remark of Brentano because he is interested in the possibility of the consciousness to rapport itself in multiple, diverse ways to a certain content and this constitutes in fact the essential feature of the *intentional relationship* or of *intention*: “Only one point has importance for us: that there are essential, specific differences of intentional relation or intention (the generic descriptive character of ‘act’)” (Husserl 1984, 380-381; 2001, 96). For example, the same matter of fact can be envisaged or intended in the way of an affirmative or negative judgement, of surmise, interrogation, desire, practical decision etc. Dealing with complex acts implies dealing with complex intentions. And if we analytically decompose complex acts and their corresponding intuitions, it yields in the end certain “primitive intentional<sup>6</sup> characters” (*primitive intentionale Charaktere*) which are further indecomposable and which, hence, are irreducible to other acts or lived experiences.

Starting with the Brentanian definition of psychological phenomena that contain within themselves an object, Husserl lays stress on the fact that this definition is essential phenomenologically and that it allows us to seize

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<sup>6</sup> The intentional characters to which Husserl refers in this context of the *Fifth Logical Investigation*, point in the most general fashion to that essential property of acts or of lived experiences to be intentions of a certain kind. The character and the matter of the act form together the intentional essence of the act. See in this sense also Husserl 2012, 254, note (a).

evidently that the intentional relationship (between act and object) is a fundamental eidetic characteristic of acts. However, not all lived experiences partake in this essential character of the intentional relation, not all are intentional lived experiences. The most appropriate example in this case is represented by sensations and sensational complexes.

The second trait of psychical phenomena, that Husserl borrows from Brentano while modifying its meaning, points to the presentations that sustain them. According to Brentano, psychical phenomena are “either presentations, or founded upon presentations”<sup>7</sup> (Brentano 1874, 111). By “presentation” (*Vorstellung*) one must understand, in this context, according to Husserl, the act as such, the act of presentation and not the presented object. Seeing the equivocations which endanger the clarity of this concept, Husserl will try to elaborate a new concept of presentation and for doing so he chooses as starting point a detailed analysis of the *act*. From amongst the four concepts of presentation tackled by Husserl, just one of them is deemed appropriate to his own phenomenological goals (Smith 1977, 487): presentation conceived as an *objectifying act*. The acts founded upon these objectifying acts would be designated as non-objectifying acts (for example, the act-character of desiring, wanting, loving etc. which can appear only on the basis of objectifying acts). It follows that Brentano’s sentence just mentioned should be reformulated in this way: every intentional lived experiences is either an objectifying act or is founded upon an objectifying act.

Husserl raises a bundle of objections against Brentano’s conception, many of which are related to the terminology employed by his old professor correlatively to the expression “psychical phenomenon”. Husserl considers this term inadequate for phenomenology. At the same time, he criticizes Brentano’s assumption that every intentional lived experience can be in its turn the object of another intentional lived experience (the psychical phenomenon being for Brentano an object of the inner consciousness) because it implies in fact a regression to infinite. Brentano states, for example, that perceived objects “enter consciousness” (*ins Bewusstsein treten*) or that they are “registered in consciousness” (*ins Bewusstsein*

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<sup>7</sup> In this sense, see the following paragraph: „Nothing can be judged about, nothing can likewise be desired, nothing can be hoped or feared, if it is not presented”/ „Nichts kann beurteilt, nichts kann aber auch begehrt, nichts kann gehofft und gefürchtet werden, wenn es nicht vorgestellt wird” (Brentano 1874, 104).

*aufgenommen werden*) or that intentional lived experiences “contain in them something like an object” (*etwas als Objekt in sich enthalten*) etc. (Husserl 1984, 385). This type of terminology is appreciated by Husserl as being not only inappropriate, but also error strewn and deceiving. It is necessary, henceforth, to overcome this outdated vocabulary and to coin other expressions more suitable phenomenologically; and this is possible only at the pace of concrete and very difficult descriptive-phenomenological analyses of consciousness, discarding or resisting the temptation to resort to facile and completely new terminological inventions, more or less arbitrary.

Brentano’s language choices when defining psychical phenomena incites, in Husserl’s view, at least two erroneous interpretations: firstly, that there is a real process (*realer Vorgang*), a real relation (*reale Beziehung*) between consciousness and the object envisaged in its acts; and secondly, that there are in consciousness in a real (*reell*) way two things (the act and the intentional object).

## II. Descriptive content versus intentional content

The distinction between the real (*reell*) and the intentional content of an act is very important because it generates the entire subsequent development of the problem of intentionality and of the noetic-noematic correlations (Husserl 1976, 225-294) which will bear the “responsibility” for the constitution of the noematic meaning and of the objectivity of knowledge. If in the *Fifth Logical Investigation* Husserl accentuates the noetic aspect, the analysis of the act as such, starting with *Ideen I* the accent shifts to the noematic side which takes into account in detail the constitutive process of the intentional object (Husserl 1976, 295-313). Alongside this enrichment of the noematic motive, the analyses from *Ideen I* bring about, on the one hand, a new perspective on the noetic theme as such, and on the other they continue to amply explicate the noetic-noematic structures from *Logical Investigations*, where they were approached only at an incipient level (the entire and complex theory of the noema was not still elaborated) and mostly as a foreshadowing of the later, numerous, and rewarding themes of the Husserlian philosophical thinking. But exactly by this explicit marking off between the descriptive and the intentional content of an act, Husserl traces in fact the first boundaries (even though, still very general) of

the noema because the intentional content leads exactly to that which, in and within the act (and in contrast with its “internal” structure) will constitute later an intentional object and its noematic meaning.

Regarding the way in which Husserl conceives the real (*reell*) content of the act in the analytical framework of the fifth *Logical Investigation*, it is worth quoting his phrase in full: “By the real [*reell*] phenomenological content of an act we mean the sum total of its concrete or abstract parts, in other words, the sum total of the *partial experiences* [*Teilerlebnisse*] that really constitute it” (Husserl 1984, 411; 2001, 112). Consequently, the real content points to the composition of the act as such, to that which at an empirical level would correspond to the psychical act as such, whereas at a phenomenological level to its essential constitution, taken in its eidetic, purely phenomenological validity. This passage from a descriptive-psychological analysis to a descriptive-phenomenological one entails in fact a re-orientation of seeing which anticipates, in a rudimentary fashion, the use of the phenomenological reduction from the later period of transcendental phenomenology.

On the other hand, the intentional content indicates the specificity of the intentional lived experience, the character of the lived experience to be an experience *of* something, in which something is given (or is presented) as object. In this context, Husserl distinguishes three meanings of the concept of intentional content. Firstly, the *intentional content* (*der intentionale Inhalt*) may refer to the intentional object of the act. Secondly, it may concern the intentional matter (*intentionale Materie*) of the act which is different from its intentional quality (*intentionale Qualität*). And thirdly, it may envisage what Husserl calls “the intentional essence” (*intentionales Wesen*) of the act.

The distinction between the real (*reell*) and intentional content of consciousness commands analytical attention because it traces, in a general manner, the demarcation line between the real (*reell*) sphere of lived experience (the act level), the ireal or ideal sphere (the intentional content level), and the real (*real*) sphere in the sense of the real transcendent object (the real object of nature<sup>8</sup>). Therefore, this triple differentiation sheds light on

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<sup>8</sup> Husserl emphasizes that he uses the term *real* (*real*) in order to designate the transcendent character of the object of nature precisely because this notion points, in the context of his analysis, to something thing-like. See Husserl 1984, 413, note.

the domain of ideality and frees the way for consciousness to access the general laws which determine and rule over it. Even if Husserl does not spend long enough time and does not enter fully in this region in his *Logical Investigations*, he still takes the pain to delineate it with some clarity. Or, the constitution of the noematic sense depends just on this eidetic domain. That's why I have asserted above that Husserl carries out here a first, very general delimitation or a broad determination of what he would later call *noema*.

In what follows, I shall try to clarify the three meanings of the intentional content mentioned above. The first one pointed to the intentional content as *intentional object* (*der intentionale Gegenstand*). Simply put, when, for example, we have the presentation of a tree, the intentional object is exactly the tree in question which is presented (irrespective of the fact that it exists as such in transcendent reality or not). Certainly, another lived experience can be likewise an intentional object when it is envisaged and analyzed as such. This suggests that the intentional object cannot be identified with the real (*reell*) content of the act (even if, in certain cases, they can partially overlap – when the intention is directed upon that which is actually lived in the intentional act), and, moreover, that there is a difference of principle between “the object as it is intended” (*der Gegenstand, so wie er intendiert ist*) and “the object (period) which is intended” (*der Gegenstand, welcher intendiert ist*) (Husserl 1984, 414; 2001, 113).

In this sense, the *intentional content* refers directly to the intentional correlate of the act (which will be later called *noematic correlate*). On the other hand, if we take into account the total act of compound acts, then one should say that its intentional correlate, seized in its turn in its totality (beyond the simple acts that compose it), is not a simple object, but a state of affairs; that state of affairs towards which is directed the intention of the complete act. Irrespective of the fact that the act is simple or compound, it engages intentionally a certain objectivity which is particular to it and which allows for a new distinction to emerge: between “the objective reference of the act taken in its entirety” and “the objects to which different part-acts<sup>9</sup> or

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<sup>9</sup> I translated the German term *Teilakte* by part-acts, but it might also be rendered by *parts of the acts which are themselves acts* or by *acts that are parts (of other acts)*. These part-acts are parts of certain compound acts (constituting in this way the total act which directs itself towards the total objectivity corresponding to it), but they are also themselves acts as such (case in which they themselves are directed upon certain corresponding objects). (See Husserl 1984, 415)

its various partial, constituent acts refer” (Husserl 1984, 415). For example, in the case of a judgement, the objectivity at which a total or compound act aims is that *state of affairs* which is envisaged through the judgement in question. “The knife is on the table” – to use Husserl’s concrete example, has as (total) object or objectivity the state of affairs meant (judged), that is exactly the fact that knife is on the table. Things become clearer if we approach the modality of questioning or interrogation. In this case, we shall ask: “is the knife on the table”, and its aimed at objectivity is whether the knife is on the table or not; it does not refer to the knife or table as such.

Simple acts can be parts of other acts. The latter are compound acts. Simple act or part-acts (*Teilakte*) have their intentional relations with corresponding objects, and by their union a compound or total act emerges which presents itself a sole intentional relation with the envisaged objectivity. However, this objectivity is referred to exactly through the unity established between the intentional relations of the diverse part-acts which make out the compound act because, as Husserl underlines, “the object of this total act could not appear as it does, unless the partial acts presented their objects in their fashion” (Husserl 1984, 417; 2001, 115). In this sense, part-acts carry out the function of presentation in rapport with the envisaged objects. At the same time, there are moments of the act which constitute what Husserl calls “the qualitative aspect” (*das Qualitative*) of part-acts.

All that was said before is necessary in order to better emphasize and clearly highlight the relationship between founding and founded acts. If, as Husserl insists in the third *Logical Investigation* “that which truly unifies are founding rapports” (Husserl 2012, 101), then this relation is a fundamental one because “between the founding and the founded acts there is a unity which allows for the understanding of the way in which the new act-characters, which envisage state of affairs or idealities, can appear” (Schérer 1967, 270). As an example, I shall analyse the state of affairs on which a particular feeling of joy is founded; that is the joy which refers to exactly the state of affairs as it is (as enjoyment of the state of affairs in question). A judgement about a certain state of affairs is made and its result is correct. This estimation is accompanied by a feeling of joy, lived not externally as if the judgement were firstly excuted and then joy were to come along later. On the contrary, the joy itself is founded on that particular judgement which determines the joy’s content as such. Without judgement,

no joy – that’s why the judgement in question is a founding act, whereas the feeling of joy is a founded one.

The second meaning of the concept of intentional content points to the matter of the act, and more specifically to what Husserl calls *the intentional matter* (*intentionale Materie*) of the act. Light can be thrown on the matter of the act only by a constant rapport with the quality of the act, which is, in its turn, intentional (*intentionale Qualität*). Therefore, the difference between the quality and the matter of an act, analyzed by Husserl in § 20 of the *Fifth Logical Investigation*, is fundamental because it buttresses the possibility to go further and deeper with the phenomenological investigations of the noetic side of pure consciousness. Furthermore, according to Schérer, the way in which Husserl conceives the matter of the act indicates also a prefiguration of the phenomenological reduction (Schérer 1967, 272). Husserl draws the distinction between the quality and the matter of the act starting with the differentiation between “the general character of the act” (*der allgemeine Charakter des Aktes*) and its “content” (*Inhalt*). The general character of the act consists precisely in its quality, while its “content” is named in this context (and in order to be equally distinguished from other meanings of this concept) its matter. To grasp more clearly this difference, I shall take as example two sentences: “It rains outside” and “Socrates is mortal”. Both assertions have something in commun: both are judgements, but, at the same time, both contain a specific difference: they have a different content. The commun element of both sentences is designated by Husserl by the term of quality belonging to the act in question (in this case to the judicative act), whereas their different content is called *matter*.

It is important to stress in this context that the matter of the act represents “a component of the concrete act-experience” (Husserl 1984, 426; 2001, 120), which means that a lived experience can share a matter with other acts, even though their quality is different. For example, the same matter (content) may belong to a perception, presentation, judgement, desire or interrogation. These kinds of acts refer or point to the one and the same state of affairs, which is in fact the same intentional objectivity. An essential law can be deduced, therefore, with universal validity: the intentional act is always directed upon something particular, upon a certain objectivity which it envisages as its own objectivity. In other words, the aimed at object is in fact the intentional object, or it is referred to in a determined fashion by an

intention of the act. Through this general characteristic of the act to take up a rapport with an object, Husserl introduces a fundamental determination of this peculiar type of lived experiences (which will be essential for the later theme of the noetic-noematic structures) which he calls “intentional lived experiences”<sup>10</sup> (Husserl 1984, 427).

The act’s rapport to a certain objectivity presupposes the possibility of the variation of the objective relation as such (of the way in which the act refers to an object) and which entails a certain independence from the quality of the act. According to Husserl, quality determines only the manner in which an object is present, specifically whether it is intentionally present or not as object which appears in perception, judgement, desire, interrogation etc. Consequently, that which determines entirely the relation of the act with objectivity (that is not only with the objectivity *per se*, but also with the modality in which this is envisaged by the act) is precisely its matter. If two such matters are alike, then they cannot be conducive to different objective relations, but will signal on the contrary the same objective relation. On the other hand, there is the possibility that different matters may establish an identical objective relation.

It is important to note in this context that what Husserl calls *the quality of the act* is an abstract moment of the act and that it cannot be conceived as it is when its connection with matter is missing. But likewise, the matter cannot be understood independently of any presentation, judgement, interrogation, desire etc. that is independently of the quality of the act. In consequence, the modality of the objective relation entails different ways of the act-quality, as well as different ways of its matter.

The third meaning of the intentional content points to what Husserl calls *the intentional essence* (*das intentionale Wesen*). In § 21 from the fifth *Logical Investigation*, Husserl distinguishes between the intentional essence and the semantic essence (*das bedeutungsmäßige Wesen*), underscoring the fact that this new signification of the concept of intentional content must not be confused with the “complete descriptive content” of the act. The act’s matter and quality, which I approached previously, make up together *the intentional essence* of the act. Nevertheless, the intentional essence is not the

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<sup>10</sup> Husserl uses in this context the terms of *intentional lived experience* and *act* as synonyms, but they are clearly distinguished in *Ideen I*. See, for example, Husserl 1976, 73-74.

same with the complete act. It must be differentiated, therefore, from another essence that plays a role in the functioning of acts and that determines the signification of expressions: the semantic essence of the act. When in ordinary language we refer to something like “the same perception”, “the same judgement”, “the same presentation”, what is envisaged here is the identity of the object concerned and not in the least the identity of the act. This means that we have a presentation of the object in question ”with the same interpretative or apperceptive sense [*Auffassungssinne*]’ or ‘based on the same matter’” (Husserl 1984, 432). In the case of a judgment, the semantic essence consists in the identity of the same signification to which refers diverse intentional acts. The semantic essence is, hence, the intentional essence which contains the sense of intention.

### **III. Concluding Remarks**

Husserl’s analyses conducted in the fifth *Logical Investigation* prove to have a cornerstone relevance in establishing the meanings of the concept of intentional content, the modality in which the act *per se* is conceived, and also the way in which the noematic side of consciousness will be later developed, alongside with the constitution of the noematic sense within and through the intentional lived experiences of consciousness. The relation between the real (*reell*) and intentional contents determines the manner in which the act is conceived (as intentional lived experience). This trait of the act as intentional lived experience (i.e. in a phenomenological sense) means in fact a clear delimitation of the empirical-psychological level from the eidetic one<sup>11</sup> and as well an early emphasis on the noematic content (even though the term of *noema* does not appear as such in *Logical Investigations*) which is constituted in the intentional acts of consciousness. It is a first occurrence of the problem of intentionality, such as it is understood by

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<sup>11</sup> The way in which the act is defined as intentional lived experience (that is taken in its phenomenological purity) presupposes the procedure of ideation. The manner in which, through ideation, one passes from the act in a psychological sense to that which is given in the act from the standpoint of the possibility/theory of knowledge – the act in a phenomenological sense – leads intrinsically to a clearer delimitation between the empirical-psychological level and the eidetic one.

Husserl in *Logical Investigations* after he took a critical stand against Brentano's perspective on the same problem. All these distinctions, heavily detailed by Husserl, will play a significant role in the development of the theory of intentionality and in the theme of noetic-noematic structures.

One could say that what Husserl achieves in the fifth *Logical Investigation* is in fact, at the same time, a critique and a theory of knowledge. This is an essential task because it regards the fundamental bases of knowledge, the modality in which knowledge can be generally established from an objective point of view. The Husserlian approach, therefore, stresses and battles with the conditions of the possibility of knowledge in general or of objective knowledge (of the objectivity of knowledge). In this sense, Husserl's endeavour resembles that of Kant (criticism), but he criticises more ambitious claims than those tackled by Kant because he goes beyond the sphere of the theory of knowledge towards the domain of ontology through the development of the entire transcendental phenomenology<sup>12</sup>.

In conclusion, I shall underline again the fact that the way in which the concept of act (as intentional lived experience) is defined and conceived and the delineation of the phenomenological concept of consciousness hold an essential signification for Husserl's phenomenology and theory of knowledge because they fundamentally instruct the way in which knowledge is constituted from an objective standpoint. The Husserlian analysis of the problem of consciousness, and in particular, of the relation between consciousness and its object (with regard to the constitutive process of knowledge) led to the molding of a phenomenological concept of consciousness (different from a psychological one) which is decisive for the distinction between the factual plan (empirical-psychological) and the eidetic (ideal) one – differentiation which leads in its turn to another relevant distinction in the classification of sciences: *factual* and *eidetic sciences* (*Tatsachenswissenschaften* – *Wesenswissenschaften*). These distinctions will equally be important for the manner in which the theory of intentionality will be later elaborated. And intentionality is an essential concept for the Husserlian phenomenology and theory of knowledge, but also for the entire post-Husserlian philosophy of the XXth century – at least in its continental input.

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<sup>12</sup> Some authors frame the Husserlian demarche in what Kant calls the future metaphysics which will be able to present themselves as science. See Pârnu 2004, 8.

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# Context, Compositionality, and Predicates of Personal Taste \*

Mihai Hîncu

## 1. Introduction

To consider the concept of truth as the key concept methodologically needed to explain the meaning of a declarative sentence of the natural language is a *locus communis* in the contemporary semantic theories. To this end, the meaning of a sentence is explained in terms of the truth-conditions the sentence possesses, conditions which specify how the world has to be in order for the sentence to be true. Thus, if things happen in the world in the same way in which the sentence represents them, then the truth-conditions of the sentence are satisfied and thus the sentence will be true.

There is, however, in natural languages, a class of sentences whose truth-values cannot be established based on their conformity with the facts they represent, but only based on irreducibly subjective aspects (Westerstahl 2012, 201). This class includes sentences in which occur predicates of personal taste, more precisely terms like *tasty* and *fun*. In other words, all those sentences which, given the fact that they involve irreducibly perspectival information, have truth-values which cannot be objectively determined. Even though the truth-values of sentences from this class no longer depend on objective facts in reality, the standard techniques of formal semantics are robust enough to successfully treat them. Thus, in order to explain the meanings of the sentences in which predicates of personal taste occur, the appeal to the concept of truth in the economy of the semantic explanation is methodologically still justified.

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With regard to the list of the predicates of personal taste, it should be mentioned that theorists have managed to reach a consensus only about the standard cases of *tasty* and *fun*. Herman Cappelen and John Hawthorne add to the list of predicates of personal taste terms like *delicious*, *disgusting*, *nauseating* and *spicy* (Cappelen and Hawthorne 2009, 99). Andy Egan considers terms like *beautiful*, *elegant*, *good* and *ugly* to also be predicates of personal taste (Egan 2010). In the same vein, Mark Richard extends the list of the predicates of personal taste with predicates like *boring*, *handsome*, *hip*, *perverted* and *sexy* (Richard 2008, 10). As all these predicates are subjective predicates involving perspectival information, I will also treat them as predicates of personal taste and accordingly, I will use some of them in the examples presented below.

In this paper, I will defend a perspectivalist semantic theory for bare sentences formed with predicates of personal taste, more precisely for sentences in whose surface syntax the perspectival information is not profiled. In the next section I will carve up the logical space of the main semantic theories about the natural language fragment containing predicates of personal taste. I will discuss, in the third section of the paper, the relation between the context-sensitivity of the sentences in which predicates of personal taste occur and the composition operation of their meanings. In this regard, I will show that the natural language fragment containing predicates of personal taste does not threaten the principle of compositionality and that, in order to capture their context-sensitivity, more complex and flexible versions of this principle can be formulated. In order to defend one of the two varieties of perspectivalist semantics, more precisely meaning perspectivalism, I will argue, in the fourth section, that there is compelling linguistic evidence which supports the claim advocated by meaning perspectivalism according to which the experiencer arguments of the predicates of personal taste are syntactically real. In the last section, I will present a formal result which shows that both varieties of perspectivalist semantics are equivalent theories, in the sense that they both offer the same semantic predictions concerning the truth-values of the utterances of bare sentences with predicates of personal taste, result which, together with the existing linguistic evidence, shows that meaning perspectivalism is the optimal truth-conditional semantic account of the perspectival information encoded by the subjective predicates.

## 2. The Logical Space of Semantic Theories

In order to carve up the logical space of the semantic theories, it will help to answer the question concerning the role the perspectival information plays in the semantics of bare sentences formed with predicates of personal taste. If it is considered that the perspectival information plays a role whatsoever in the semantics of the above-mentioned sentences, a semantic theory will be labelled, using the nomenclature proposed by Jonathan Schaffer, a *perspectivalist* one (Schaffer 2011, 180). A perspectivalist semantic theory comes in two varieties. According to one variety, labelled *meaning perspectivalism*, bare sentences with predicates of personal taste express, with respect to the contexts in which they are uttered, semantic contents in which the perspectival information factors in (Glanzberg 2007; Schaffer 2011; Snyder 2013; Stephenson 2007). If it is considered that the perspectival information encoded by the bare sentences formed with predicates of personal taste does not enter into their semantic contents, but instead essentially factors into the process of determining the truth-values of these very same sentences, we have another variety of perspectivalism, this time labelled *truth perspectivalism* (Kölbel 2007, 2011; Lasersohn 2005; MacFarlane 2014).

In an opposite direction, *invariantism* and *non-cognitivism* are the main alternatives between which one can choose in case it is considered that the perspectival information plays no role with respect to the semantics of the bare sentences formed with predicates of personal taste. The main exponent of a non-cognitivist theory is *expressivism*, a semantic theory according to which an utterance of the sentence

[1] Chocolate is delicious.

does not express any semantic content, for which reason it cannot have any truth-value. Since the sentence [1] has no factual meaning, a speaker who utters it in a particular context will not make an assertion but instead she will only use it to express her attitudes, more precisely her liking for a type of food (Schroeder 2008, 3; Yalcin 2011, 328). Contrariwise, the content expressed by an utterance of the sentence [1] will be raised, in an invariantist theory, to the status of assertable content. The invariantist promotes the idea

that a bare sentence formed with a predicate of personal taste, like [1] above, has the *same* content in every context in which the sentence is uttered (Borg 2012; Cappelen and Lepore 2005). According to this proposal, the semantic content expressed, relative to a context, by a bare sentence with a predicate of personal taste is a proposition whose truth-value can be determined in a completely objective way.

Insofar as only invariantism and perspectivalism adhere to the idea according to which sentences with predicates of personal taste are used in contexts to express propositions, I will deliberately leave aside, in what follows, the expressivist theory, preferring thus to present and focus in a more detailed manner on the specificities of the proposals advanced by the remaining main competitors among semantic theories.

According to invariantist semantics, a bare sentence formed with a predicate of personal taste expresses, across different contexts in which the sentence is uttered, one and the same semantic content. The invariantist theorist considers that the semantic content expressed by an utterance of a bare sentence with a predicate of personal taste is nothing but a *standard proposition*, that is, a content which is apt to be evaluated with respect to its truth-value (Borg 2012, 4). According to this semantic theory, *every* utterance of the sentence

[1] Chocolate is delicious.

will express an invariant semantic content which is equivalent to the *perspective-neutral proposition* [chocolate is delicious] (Schaffer 2011, 183). Even though the perspectival information does not constitute a part of it, the semantic content expressed by uttering in a context a sentence like [1] is considered to be a complete content.

According to invariantism, a predicate of personal taste is similar to any other predicate used to describe in a perspective-independent manner the world we live in. Hence, the predicate delicious occurring in the sentence [1] is a monadic predicate which expresses a property considered to be constant across all the contexts in which the predicate is used. Considering that  $\mu$  is an interpretation function, that  $c$  is a context of utterance and that  $\langle w, t \rangle$  is a pair of circumstances with respect to which the expressions' extensions are

determined, what the predicate occurring in the above sentence means, according to invariantism, can be represented as follows:

$$\mu(\textit{delicious})^{c, \langle w, t \rangle} = \lambda x_e. x \textit{ is delicious in } w \textit{ at } t.$$

In this theory, something is delicious in a world  $w$  and at a time  $t$  if it belongs to the set of delicious things determined by  $w$  and  $t$  (Snyder 2013, 282). Hence, the chocolate has *per se* the objective property of being delicious.

It can be seen that, in a theory like this, the semantic content of a bare sentence formed with a predicate of personal taste depends entirely on the semantic values of the sentence's subexpressions and on their syntactic order. So, in order to assign truth-conditions to sentences like [1] in which the perspectival information is not linguistically specified, the invariantist theorist recommends to take into consideration *only* the lexical information encoded by the sentences' elements and the syntactical mode in which they are put together (Borg 2012, 4).

The policy of leaving outside the semantics of sentences like [1] any other piece of information which is not lexically represented reflects the commitment of the invariantist semantics to the idea that the bare sentences formed with predicates of personal taste, when unambiguous and devoid of lexical units whose semantic values are context-dependent, are not context-sensitive. According to invariantist semantics, the class of context-sensitive expressions of a natural language includes only indexicals, demonstratives, personal pronouns and expressions whose semantic values are fixed only with respect to the contexts in which they are used, like "local", "foreign" and "native" (Cappelen and Lepore 2005, 1). All of the expressions from this class have in common that their semantic values are determined only with respect to the contexts of utterance and that these values will vary once the contexts in which the expressions are uttered are shifted. Insofar as the bare sentences with predicates of personal taste, like [1] above, express invariant semantic contents with respect to their contexts of utterance, the invariantist sees no reason to classify the predicates of personal taste as context-sensitive expressions.

The way in which the invariantist conceives the interface between semantics and pragmatics will motivate the role that the perspectival

information associated with utterances of bare sentences formed with predicates of personal taste plays in this theory. In this sense, the invariantist, who draws a strict distinction between the semantic content expressed by a sentence, like [1] above, with respect to a context of utterance, and the pragmatic speaker meaning, will consider the perspectival information as being the pragmatic information the speaker conveys by means of an utterance (Borg 2012, 19).

According to meaning perspectivalism, bare sentences with predicates of personal taste exhibit context-sensitivity (Schaffer 2011, 180). The context-sensitivity of these sentences is usually explained by the presence, in their syntactic structures, of elements that make the appeal to context mandatory from a semantic viewpoint. In this theory, the predicate of personal taste occurring in the sentence

[1] Chocolate is delicious.

is considered to be a linguistic device through which the perspectival information is encoded, hence a dyadic predicate. According to meaning perspectivalism, the above predicate expresses a relation between an object considered delicious and the contextually provided value to a parameter representing the experiencer, more precisely the agent whose perspective is relevant for considering the object in question as delicious (Snyder 2013, 282). As the value of this parameter varies according to the contexts in which the predicate of personal taste is used, the predicate will encode different relations in different contexts. What the predicate occurring in [1] means, according to meaning perspectivalism, can be represented as follows:

$$\mu(\textit{delicious})^{c, \langle w, t \rangle} = \lambda x_e. \lambda y_e. x \textit{ is delicious to } y \textit{ in } w \textit{ at } t.$$

Even though the perspectival information is not mentioned in the surface syntax of the sentence [1], this information is represented at the level of its logical form by the parameter  $y$  which demands to be contextually filled. Thus, the lexical meaning of the sentence [1] is considered to be [chocolate is delicious to  $y$ ]. Given that the context in which the sentence [1] is uttered provides a specific value to the parameter  $y$ , the perspectival information supplied by the context enters, as a legitimate part of it, into the

proposition expressed by the utterance of [1] (Stanley and Szabo 2000, 234). Such a proposition is considered to be, in meaning perspectivalism, a *perspective-specific proposition* (Schaffer 2011, 188).

In order to better grasp the idea, consider the case in which [1] is uttered in two contexts  $c_1$  and  $c_2$ . Consider also that the agent of  $c_1$  is Mihai and the agent of  $c_2$  is Irina. Since meaning perspectivalism claims that, generally, in cases in which a bare sentence containing a predicate of personal taste is uttered, the context of utterance has the role to provide the relevant perspectival information needed for determining the semantic content of the utterance, it follows that the context  $c_1$  involves Mihai's perspective while the context  $c_2$  involves Irina's. Therefore, when sentence [1] is uttered in  $c_1$  its semantic content is the proposition [chocolate is delicious to Mihai], while when uttered in  $c_2$  its semantic content will be the proposition [chocolate is delicious to Irina].

According to meaning perspectivalism, the variation in truth-values of the different utterances of a sentence like [1] is explained by means of the variation in the contents expressed in different contexts of utterance (Bianchi 2011, 65). In this theory, even though the context contributes with the perspectival information to the propositions expressed by the bare sentences with predicates of personal taste, its truth-conditional effects are traced to, and dictated by, the occurrence of a parameter at the level of their logical form (Stanley 2000, 391). It follows that the pragmatic processes involved in cases like the one mentioned above are the primary pragmatic processes of *saturation*, more precisely the only pragmatic processes that are capable, given that they are linguistically controlled, of affecting the truth-conditions of bare sentences formed with predicates of personal taste (Bianchi 2011, 56; Recanati 2004, 7).

What invariantism and meaning perspectivalism have in common is the idea according to which the semantic content expressed by an utterance of a bare sentence with a predicate of personal taste is a proposition completely determined by the lexical information of the sentence's parts and the way in which these parts are syntactically ordered (Borg 2012, 19). Where meaning perspectivalism differs from invariantism is in the amount of context-sensitivity in the natural language. Considering that a bare sentence formed with a predicate of personal taste expresses, in different contexts, different semantic contents, and that this variation in content points

in the direction of an element in the sentence's syntactic structure responsible for its context-sensitivity, meaning perspectivalism advocates the proposal of extending the class of context-sensitive expressions with the predicates of personal taste (Borg 2012, 20).

We have seen above that, according to invariantist semantics, the perspectival information associated with an utterance of a bare sentence formed with a predicate of personal taste plays only a pragmatic role. In this regard, every utterance of the sentence

[1] Chocolate is delicious.

expresses a semantic content which is constant across different contexts and is free of any perspectival information. In an opposite direction, we have seen that according to meaning perspectivalism the perspectival information enters through the context into the semantic content expressed by an utterance of a bare sentence formed with a predicate of personal taste (Schaffer 2011, 180). In this sense, an utterance of a sentence like [1] above expresses, in different contexts, different semantic contents.

Where truth perspectivalism differs from invariantism and meaning perspectivalism is in the role that the perspectival information plays in the semantics of sentences like [1] (Borg 2012, 23). According to truth perspectivalism, both previous semantic theories conflate the intuitions about the truth-values of bare sentences with predicates of personal taste with the intuitions about their truth-conditions (Bianchi 2011, 65). From this point of view, the error of invariantist semantics consists in considering that the semantic content expressed by an utterance of a bare sentence like [1] is a *proposition*, that is, a content which has *per se* a truth-value. In the same vein, the error imputed to meaning perspectivalism is that it considers the perspectival information as an ingredient of the proposition expressed by uttering [1] in a given context. According to truth perspectivalism, the perspectival information is best seen as a contextually provided value to a judge parameter located in the circumstance relative to which the semantic content expressed by an utterance of a bare sentence with predicates of personal taste is evaluated with respect to its truth-value (Borg 2012, 23-24).

Unlike meaning perspectivalism, which considers that a sentence like [1] above expresses, in different contexts, different propositions, truth perspectivalism assigns to different utterances of the sentence the same semantic content (Kölbel 2007, 2011; Lasersohn 2005; MacFarlane 2014; Stephenson 2007). Thus, the sentence [1] will express, regardless of the contexts in which it is uttered, the same perspective-neutral proposition [chocolate is delicious]. Even though the predicate of personal taste occurring in [1] is, as in invariantism, a monadic predicate, the truth perspectivalist advocates the idea that the predicate's extension varies according to the values of the parameter representing the relevant perspective for evaluation, a parameter which, this time, is placed in the context's index. What this predicate means, according to truth perspectivalism, can be represented as follows:

$$\mu(\textit{delicious})^{c, \langle w, t, j \rangle} = \lambda x_e. x \textit{ is delicious to } j \textit{ in } w \textit{ at } t.$$

Although the semantic content expressed by the different utterances of the sentence [1] is contextually invariable, the truth-value of the perspective-neutral proposition which [1] expresses is considered to vary across contexts. In this semantic theory, the variation in truth-values of the different utterances of a sentence like [1] is not explained, as in meaning perspectivalism, by means of the variation in the contents expressed in different contexts of utterance. What explains, this time, the variation in truth-values of the different utterances of a bare sentence with a predicate of personal taste, like [1] above, is the variation in the circumstances in which the sentence's semantic content is evaluated (Bianchi 2011, 65). In order to handle the variation in truth-values of the different utterances of a bare sentence with predicates of personal taste, the truth perspectivalist proposal is, as it can be seen above, to allow new parameters against which the truth-values are determined (Borg 2012, 24). What motivates this maneuver of adding a new parameter to the list of the already existent parameters, which included a possible world parameter and a time parameter, is the fact that, even though the same possible world, or time, is taken into consideration, two utterances of a bare sentence formed with a predicate of personal taste may have different truth-values with respect to different values contextually assigned to the newly introduced parameter (Bianchi

2011, 66). Insofar as the context determines the values of the parameters relative to which an utterance of the sentence [1] is true or false and the sentence is sensitive to these contextually provided parametric values, the sentence [1] exhibits context-sensitivity even though it expresses one and the same semantic content across different contexts of utterance (Borg 2012, 25).

What truth perspectivalism and invariantism have in common is the idea that an utterance of a bare sentence formed with a predicate of personal taste expresses, with respect to a context, a perspective-neutral proposition. What invariantism and meaning perspectivalism have in common is the idea according to which the circumstances with respect to which the truth-values of utterances of sentences with predicates of personal taste are determined, are classical, i.e., do not contain judge parameters. What is specific thus to meaning perspectivalism is the claim that a bare sentence formed with a predicate of personal taste expresses, relative to a context, a perspective-specific proposition, and that the perspectival information encoded by a predicate of this kind is syntactically represented by its experiencer argument. In the next sections of the present paper I will show that the semantics of the natural language fragment containing predicates of personal taste, as it is conceived by meaning perspectivalism, has a compositional design suited to capture the context-sensitivity of bare sentences formed with these predicates and that there is linguistic evidence which indicates that meaning perspectivalism is the best truth-conditional semantic account of the perspectival information encoded by the predicates of personal taste occurring in bare sentences.

### **3. Contextual Compositionality**

One of the fundamental principles of a semantic theory for a fragment of natural language is the principle of compositionality. According to this principle, in order to compute the semantic value of a complex expression of a natural language, we have to take into consideration the semantic values of its constitutive parts and the syntactic order in which they are put together. Therefore, with respect to a given natural language  $L$ , it can be said that  $L$  is compositional if and only if, for any expression  $E$  from  $L$ , the semantic value of  $E$  is determined by the semantic values of its

subexpressions  $e_1, \dots, e_n$  and by the syntactic structure of  $E$ . However, there are two ways in which the above-mentioned relation *determines* can be understood.

One way to understand it, and therefore to understand the compositionality of a natural language fragment, is to regard the composition operation as a *function*. From a more abstract viewpoint, the grammar of a natural language  $\mathbf{L}$  can be understood as an algebra  $(\mathbf{E}, \mathbf{A}, \Sigma)$ , where  $\mathbf{A}$  is the set of the atomic expressions of  $\mathbf{L}$ ,  $\Sigma$  is a set of syntactic operations and  $\mathbf{E}$  is the set whose elements are expressions resulted from applying elements from the set  $\Sigma$  to elements from the set  $\mathbf{A}$  (Pagin and Westerstahl 2010, 252). Given an  $n$ -tuple of  $\mathbf{L}$ 's expressions, where  $n \geq 1$ , a syntactic operation is conceived as a partial function  $\sigma: \mathbf{E}^n \rightarrow \mathbf{E}$  by means of which is formed an expression  $E = \sigma(e_1, \dots, e_n)$ . Considering that  $\mathbf{V}$  is the set of semantic values, a *semantics* for  $\mathbf{L}$  is understood as a partial function  $\mu: \mathbf{E} \rightarrow \mathbf{V}$  which assigns elements from  $\mathbf{V}$  to well-formed expressions from  $\mathbf{E}$ . The composition operation of semantic values can now be captured by means of a function  $f: \mathbf{V}^n \rightarrow \mathbf{V}$ . Consequently, the formal version of the principle of compositionality will have the following format:

- (C<sub>f</sub>) For every syntactic operation  $\sigma \in \Sigma$ ,  
 there is a composition operation  $f_\sigma$  such that, if  $\sigma(e_1, \dots, e_n) \in \text{dom}(\mu)$ ,  
 then  $\mu(\sigma(e_1, \dots, e_n)) = f_\sigma(\mu(e_1), \dots, \mu(e_n))$ .

Another way to understand the compositionality of a natural language is to define the composition operation of its meanings by means of the *substitution* operation (Pagin and Westerstahl 2010, 254). Accordingly, it can be considered that a language  $\mathbf{L}$  is compositional only if for any two expressions  $E$  and  $E'$  of  $\mathbf{L}$ , such that  $e_i$  is a subexpression of  $E$  and  $e'_i$  is a subexpression of  $E'$ , if it is the case that

$$\mu(e_i) = \mu(e'_i)$$

for every  $i$  such that  $1 \leq i \leq n$ , then replacing all the occurrences of  $e_i$  in  $E$  with the occurrences of  $e'_i$  guarantees that the following will hold:

$$\mu(E) = \mu(E').$$

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In order to obtain a formal version of the principle of compositionality, a new semantic equivalence relation  $\equiv_{\mu}$  on the set of expressions of  $\mathbf{L}$  will be introduced, relation which is defined as follows (Hodges 2001, 9):

$E \equiv_{\mu} E'$  if and only if  $E \in \text{dom}(\mu)$ ,  $E' \in \text{dom}(\mu)$  and  $\mu(E) = \mu(E')$ .

The principle of compositionality will have, this time, the following format:

(C<sub>s</sub>) If  $E = \sigma(e_1, \dots, e_n) \in \text{dom}(\mu)$  and  $E' = \sigma(e'_1, \dots, e'_n) \in \text{dom}(\mu)$  and if, for every  $i$ , such that  $1 \leq i \leq n$ , it is the case that  $e_i \equiv_{\mu} e'_i$ , then  $E \equiv_{\mu} E'$ .

Usually, an expression of a natural language is considered to be context-sensitive if its semantic values vary with respect to the contexts in which the expression is used. Accordingly, a context-sensitive expression will have, in different contexts, different semantic contents. In the case in which a context-sensitive expression is embedded in a sentence, the sentence's truth-conditions will vary across the contexts in which it is uttered. As we have already seen in the previous section, both meaning perspectivalism and truth perspectivalism consider that the predicates of personal taste are context-sensitive expressions. According to meaning perspectivalism, the role of the context is to contribute with the perspectival information to the semantic content expressed by a bare sentence with a predicate of personal taste *via* an occurrence of a parameter at the level of the sentence's logical form. According to truth perspectivalism, even though a bare sentence with a predicate of personal taste expresses one and the same neutral-perspective semantic content across different contexts of utterance, the sentence in question exhibits context-sensitivity. This time, the mechanism of context-sensitivity is differently explained: the context determines the values of the parameters relative to which an utterance of a sentence of this kind is true or false and the sentence is sensitive to these contextually provided parametric values (Borg 2012, 25).

If this hypothesis of the context-sensitivity of the predicates of personal taste is accepted, it can be asked how the context-dependence of the

truth-conditions associated with different utterances of a bare sentence with a predicate of personal taste is compatible with the principle of compositionality. If the contextually provided perspectival information is encoded in the syntax of a bare sentence with a predicate of personal taste at the level of the sentence's logical form, then the compositionality is preserved (Rett 2006, 542). The pragmatic processes involved in a case like this are the primary pragmatic processes of saturation. These pragmatic processes, which also intervene in the case of indexicals whose semantic values need to be contextually fixed, will affect the truth-conditions of bare sentences formed with predicates of personal taste. Insofar as the pragmatic processes of saturation are linguistically controlled, the variety of context-sensitivity involved in the case of predicates of personal taste can be handled in a compositional manner (Pagin and Pelletier 2007, 39). In this sense, the theoretical framework of Kaplanian semantics already permitted the distinction between the context-independent and context-dependent semantic values (Kaplan 1989). The context-independent semantic values, which are the *characters* associated with sentences, are conceived as functions defined on the set of contexts in which the sentences are uttered. The context-dependent semantic values are taken to correspond to the *contents* assigned to sentences in contexts. Therefore, it can be considered that in a context in which the sentence

[1] Chocolate is delicious.

is uttered, the semantic content expressed by [1] is the perspective-specific proposition outputted by a primary pragmatic process by means of which the experiencer argument of the predicate of personal taste occurring in [1] is saturated. With all this in mind, it is obvious that the natural language fragment containing predicates of personal taste does not violate the principle of compositionality. In the case of a bare sentence formed with a predicate of personal taste, the perspective-specific semantic value expressed by uttering the sentence will be determined in a bottom-up manner on the basis of the contextual semantic values which its subexpressions have in the context of utterance. In order to formally represent a composition operation of semantic values compatible with this form of context-sensitivity, a context argument can be appended to each constituent of the global semantic

value expressed by a complex expression (Pagin 2005, 313; Pagin and Pelletier 2007, 46; Pagin and Westerstahl 2010, 259). Accordingly, the formal version of this contextual compositionality will have the following format:

- (CC) For every syntactic operation  $\sigma \in \Sigma$ ,  
 there is a composition operation  $f_\sigma$  such that, for every context  $c$ ,  
 if  $\sigma(e_1, \dots, e_n)$  has a semantic value in  $c$ ,  
 then  $\mu(\sigma(e_1, \dots, e_n), c) = f_\sigma(\mu(e_1, c), \dots, \mu(e_n, c))$ .

However, this version of the principle of contextual compositionality will not hold in cases in which the semantic value of a complex expression varies across different contexts of utterance while the semantic values of its subexpressions are held constant relative to the very same contexts. Cases like these illustrate what Peter Pagin has called a *context-shift failure* (Pagin 2005, 314). For example, if it is considered that in a sentence like

[1] Chocolate is delicious.

the perspectival information is an *unarticulated constituent*, more precisely that the sentence [1] expresses a perspective-specific proposition, while none of the lexical units of [1] is perspective-sensitive, the above-mentioned principle of contextual compositionality will be violated by cases like the following:

$$\begin{aligned} \mu(\textit{chocolate}, c) &= \mu(\textit{chocolate}, c') \\ \mu(\textit{is}, c) &= \mu(\textit{is}, c') \\ \mu(\textit{delicious}, c) &= \mu(\textit{delicious}, c') \\ \mu(\textit{chocolate is delicious}, c) &\neq \mu(\textit{chocolate is delicious}, c'). \end{aligned}$$

The formal variant of the context-shifting failure to which this version of contextual compositionality is not immune has the following format (Pagin 2005, 314):

- (i)  $\mu(e_i, c) = \mu(e_i, c')$ , where  $1 \leq i \leq n$ , and  
 (ii)  $\mu(\sigma(e_1, \dots, e_n), c) \neq \mu(\sigma(e_1, \dots, e_n), c')$ .

However, in order to handle the cases of context-shift failure, a more flexible version of contextual compositionality can be formulated. In order to formally represent a composition operation of semantic values compatible with this new variety of context-dependence, a context argument will not be appended this time, as it was previously done, only to each constituent of the global semantic value expressed by a complex expression, but also to the composition operation itself (Pagin 2005, 312; Pagin and Pelletier 2007, 47; Pagin and Westerstahl 2010, 260). Accordingly, the formal version of this weaker principle of contextual compositionality will have the following format:

- (CC<sub>w</sub>) For every syntactic operation  $\sigma \in \Sigma$ ,  
there is a composition operation  $f_\sigma$  such that, for every context  $c$ ,  
if  $\sigma(e_1, \dots, e_n)$  has a semantic value in  $c$ ,  
then  $\mu(\sigma(e_1, \dots, e_n), c) = f_\sigma(\mu(e_1, c), \dots, \mu(e_n, c), c)$ .

Having understood things this way, it can be seen that the natural language fragment containing predicates of personal taste can have, after all, a compositional semantics. The stringent question is now which of the two versions of contextual compositionality captures better the context-sensitivity of predicates of personal taste. In order to decide which compositional design is optimal for the fragment of natural language containing predicates of personal taste, the linguistic data has to be taken into consideration. But, is there any linguistic evidence or criterion according to which one principle of contextual compositionality has to be preferred to the other? If the linguistic evidence supports the hypothesis advocated by meaning perspectivalism, according to which the predicates of personal taste project syntactically real experiencer arguments, it is obvious that the stronger version of the principle of contextual compositionality has to be adopted. In the next section, I will show that there is linguistic evidence for the syntactic reality of experiencer arguments in predicates of personal taste and that these data indicate that meaning perspectivalism is on the right track.

#### 4. Linguistic Evidence

As it was seen in the second section of the present paper, meaning perspectivalism advocates the claim that a bare sentence formed with a predicate of personal taste is context-sensitive. The context-sensitivity of a sentence of this kind is explained, in meaning perspectivalism, by the presence of an experiencer argument of the taste predicate in the sentence's syntactic structure. In this section, I will show that there is good linguistic evidence for experiencer arguments in bare sentences formed with predicates of personal taste and that the proposal advocated by meaning perspectivalism is legitimate.

The binding test offers compelling evidence for the existence of parameters in the logical forms of sentences. What is required, from a methodological viewpoint, is to have a bound reading of a universally quantified sentence. The bound reading of a universally quantified sentence is generated only by the presence, at the level of the sentence's logical form, of an argument which demands to be bound to the quantifier. The existence of the bound reading of a universally quantified sentence indicates that the argument bound to the quantifier is syntactically real, even though it is not profiled in the surface syntax of the sentence (Recanatì 2004; Stanley 2000; Stanley and Szabo 2000; Schaffer 2011). In order to better grasp the idea, let us consider the sentence:

[2] Every boy went to a local bar.

The unbound reading of the sentence [2] is one where all the boys went to the same bar, a bar which is local with respect to their positions or spatial coordinates. On this reading, there has to be a single bar in which all the boys went. The bound reading of [2] is one where what is local depends upon the range of the universal quantifier (Collins 2013, 62). On this reading, the interpretation of the sentence [2] proceeds as follows:

boy<sub>1</sub> went to a bar local to boy<sub>1</sub>,  
boy<sub>2</sub> went to a bar local to boy<sub>2</sub>,  
boy<sub>3</sub> went to a bar local to boy<sub>3</sub>,  
.....  
boy<sub>n</sub> went to a bar local to boy<sub>n</sub>.

On this reading there needn't be a single bar which hosts all the boys and what is considered to be *local* co-varies with the range of the universal quantifier. In this latter case, what best explains the bound reading of the sentence [2] is the presence of an argument at the level of the logical form of [2] which is responsible for the location specific information expressed by means of the lexical unit *local* (Schaffer 2011, 193).

In order to test for experiencer arguments in bare sentences formed with predicates of personal taste, the same methodology will be followed. Consider a universally quantified sentence in which a predicate of personal taste occurs, like the following:

[3] Everyone will do something funny.

The unbound reading of the sentence [3] is one where everyone will do the same thing and where doing the very same thing will be funny for all of them. On this reading, there is a single thing which everyone will do and which will be considered funny by everyone's standards. The other reading of [3] is one where what is funny depends upon the range of the universal quantifier (Collins 2013, 62; Glanzberg 2007, 10). Accordingly, the sentence [3] will be interpreted as follows:

$x_1$  will do  $y_1$  and  $y_1$  will be funny for  $x_1$ ,  
 $x_2$  will do  $y_2$  and  $y_2$  will be funny for  $x_2$ ,  
 $x_3$  will do  $y_3$  and  $y_3$  will be funny for  $x_3$ ,  
.....  
 $x_n$  will do  $y_n$  and  $y_n$  will be funny for  $x_n$ .

On the bound reading of the sentence [3], there needn't be a single thing which will be funny for all the individuals present in the quantifier's domain. The bound reading of the above sentence requires the existence of an experiencer argument at the level of the logical form of [3] which is responsible for the perspectival information provided by means of the predicate of personal taste occurring in [3] (Schaffer 2011, 193-194). Therefore, it can be considered that the results of the binding test, as it is applied to sentences formed with predicates of personal taste, support the

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idea that the experiencer arguments projected by these predicates are syntactically real.

Another way of testing the soundness of the hypothesis according to which the experiencer arguments in bare sentences formed with predicates of personal taste are syntactically real, is to see whether these sentences license experiencer phrases, more precisely, complements of the form “for NP” and “to NP” (Glanzberg 2007, 10). According to the licensing test, if a complement of this type can be appended to a predicate of personal taste occurring in a bare sentence, making thus explicit the perspectival information relevant to sentence's interpretation, then the licensing provides evidence for the presence of an experiencer argument at the level of the sentence's logical form. In this regard, all the examples displayed below obviously pass the licensing test:

[4] Chocolate is delicious to me.

[5] Chocolate is delicious to everyone.

[6] Reading philosophy books is fun for me.

[7] Reading philosophy books is fun for everybody.

Even though the above examples confirm that the predicates of personal taste license complements, theorists have not managed to reach a consensus with regard to the best way to interpret these data. In this sense, the camp of those who reject the idea that the experiencer phrases offer evidence for covert experiencer arguments, is divided between invariantists, according to whom the experiencer phrases are *adjuncts*, and truth perspectivalists, according to whom they are intensional *operators* (Schaffer 2011, 196).

One way to see whether an experiencer phrase occurring in a sentence formed with a predicate of personal taste provides an experiencer argument or merely functions as an adjunct, is to try to interpolate some linguistic material, usually an already existent adjunct, between the sentence's predicate of personal taste and the complement appended to it. Insofar as the intervention of an adjunct phrase between the sentence's predicate and one of its arguments generates an odd reading of the sentence, this maneuver can be seen as providing compelling evidence for the syntactic reality of an experiencer argument of the predicate of personal taste

(Collins 2013, 67). As it can be seen from the examples presented below, the attempts to interpose the underlined phrases, which linguistically function as adjunct phrases, between the predicates of personal taste and their respective complements, do not succeed in offering satisfactory readings:

- [8] Chocolate is delicious to me when hungry.
- [9] # Chocolate is delicious when hungry to me.
- [10] Reading philosophy books is fun for me when I am alone.
- [11] # Reading philosophy books is fun when I am alone for me.

It should also be noted that the arguments of a predicate cannot be subjected to the operation of iteration. The reason is that once the argument place of a predicate occurring in a sentence is saturated with the corresponding argument, adding another argument of the same type will make the initial sentence defective (Schaffer 2011, 198). Contrariwise, the adjunct phrases stack and the operators iterate (Collins 2013, 68; Glanzberg 2007, 11). Thus, even though the experiencer phrases appended to predicates of personal taste are interpreted in an invariantist manner, as adjunct phrases, or in the way in which the truth relativist does, conceiving them as intensional operators (Lasersohn 2005), their iteration should be licensed from a linguistic point of view. That it isn't so can be seen from the examples below, examples which indicate that the experiencer phrases are best interpreted as experiencer arguments:

- [12] # Chocolate is delicious to Irina to Stef.
- [13] # Reading philosophy books is fun  
for Irina for everyone for Stef.

Another piece of evidence in favor of the hypothesis that the experiencer arguments projected by the predicates of personal taste are syntactically real, is provided by the *strict-sloppy* reading ambiguity of the sentences in which predicates like these occur. Let us consider the following example inspired from (Snyder 2013, 286):

- [14] Mihai believes that reading philosophy books is fun  
and so does Adrian.

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The sentence [14] has a *strict* reading, according to which it basically says that:

Mihai<sub>1</sub> believes that reading philosophy books is fun for him<sub>1</sub> and  
Adrian<sub>2</sub> believes that reading philosophy books is fun for him<sub>1</sub>.

The very same sentence has also a *sloppy* reading, according to which it means that:

Mihai<sub>1</sub> believes that reading philosophy books is fun for him<sub>1</sub> and  
Adrian<sub>2</sub> believes that reading philosophy books is fun for him<sub>2</sub>.

What is constant across these two readings of the sentence [14] presented above is that, no matter what values are assigned to the pronoun, the predicate of personal taste occurring in both interpretations has a place for an experiencer argument.

The final linguistic evidence that I will consider here in support of the idea that predicates of personal taste have syntactically real experiencer arguments concerns the complements permitted by the subjective verb *find*. The subjective predicates that can be found in natural languages are grouped in two classes: one class includes vague predicates, while the other includes predicates of personal taste. Only the members of the latter class are adequate complements of the subjective matrix verb *find* (Fleisher 2013, 279). Even though the verb *consider* means, in the sentences below, the same thing as the verb *find*, only the latter verb is sensitive to the difference between the two varieties of natural language subjectivity (Fleisher 2013, 279):

[15] I find the chocolate delicious.

[16] # I find Irina old.

[17] I consider the chocolate delicious.

[18] I consider Irina old.

From the examples displayed above, it can be seen that the verb *consider* licenses complements involving not only the subjectivity encoded

by the predicates of personal taste, but also the subjectivity encoded by the vague predicates. Contrariwise, the verb *find* permits only complements related to the subjectivity encoded by the predicates of personal taste. This idiosyncratic feature of the verb *find* can be explained only if it is considered that the predicate of personal taste occurring in the complement of the sentence [15] has a syntactically real experiencer argument (Kennedy 2013, 261).

The linguistic data presented in this section show the legitimacy of the claim advocated by meaning perspectivalism according to which the experiencer arguments projected by predicates of personal taste are syntactically real. The evidence listed above indicates that only the meaning perspectivalist's explanation of the context-sensitivity of bare sentences formed with subjective predicates is correct. If, besides taking into account the above linguistic data, it can be shown that the meaning perspectivalist theory can do, with regard to the semantics of bare sentences with predicates of personal taste, the same thing as truth perspectivalism does, it should be clear that meaning perspectivalism has to be favored as the optimal truth-conditional semantic account of the perspectival information encoded by the subjective predicates. In the next section I will show that this is indeed the case.

## **5. The Theoretical Equivalence of Perspectivalism Varieties**

In this section I will argue that, with regard to the truth-values of the utterances of bare sentences formed with predicates of personal taste, the predictions offered by meaning perspectivalism and truth perspectivalism are not different. To this end, I will adopt the theoretical framework established by Kaplan for the semantic analysis of context-sensitive expressions (Kaplan 1989). Its theoretical motivation is given by the fact that in the case in which Mihai and Irina utter, in different contexts, a sentence whose syntax includes an indexical item such as

[19] I am reading.

we have the intuition that what the speakers say is identical, but also that they are speaking of different things. In Kaplanian semantics, the intuition that the speakers of sentence [19] are saying the same thing is captured by means of a function from the contexts of the utterance of an expression to the semantic contents it expresses in the contexts in which it is used. This function defines the *character* of an expression and determines, in relation to a particular context of utterance, its semantic *content* which is defined, in its turn, by a function from the circumstances in which the expression is evaluated to its extensions.

What is specific to context-sensitive expressions is explained by their character. Since these expressions have semantic contents which vary depending on the contexts in which they are used, their character is not a constant function. The example above can prove how the character of the sentence [19] determines different semantic contents. Thus, in the context in which the speaker of [19] is Mihai, the semantic content of the sentence he utters is the proposition [Mihai is reading], while in the context in which the speaker of the same sentence is Irina, the sentence expresses the proposition [Irina is reading].

With the help of the Kaplanian theoretical framework, the differences between meaning perspectivalism and truth perspectivalism, with respect to the semantics of bare sentences formed with predicates of personal taste, can be easily presented. In this sense, meaning perspectivalism applies to these sentences the same semantic treatment applied to context-sensitive expressions. Since the character of bare sentences formed with subjective taste predicates is not, in meaning perspectivalism, a constant function, these sentences will express in different contexts different semantic contents. In order to capture the sensitivity of these sentences to the contexts in which they are uttered, the meaning perspectivist appeals to the strategy of extending the context of utterance by a parameter  $P_a$  which represents the perspective of an agent, a parameter whose values are contextually provided. At the opposite end, the truth perspectivist, according to whom the truth-value of an utterance of a bare sentence formed with a predicate of personal taste varies according to circumstances in which the perspective-neutral proposition it expresses is evaluated, advocates the idea that the parameter  $P_a$  has to be introduced in the context's index.

The evolution of the semantic theories in the last years and the construction of the arguments which support them are based on the premise that there are major, even irreconcilable differences between the meaning perspectivalism's strategy to make bare sentences with predicates of personal taste depend on the contexts in which they are uttered and the truth perspectivalism's strategy to make them depend on the circumstances in which they are evaluated. Moving on, I will show that this premise is false. To this end, I will offer a different argument from the one put forth, in the same direction, by Isidora Stojanovic, who used a bi-directional translation procedure between the formal languages of both theories (Stojanovic 2007, 699). An argument in the same direction has been offered by Jonas Rogger with respect to the sentences expressing moral propositions (Rogger 2011). With reference to the semantics of predicates of personal taste, I will formulate my argument by appealing to the format of Kaplanian semantics designed by Dag Westerstahl (Westerstahl 2012, 200).

In set theory, there is a well-established correspondence between the set  $A^{B \times C}$  of functions from  $B \times C$  to the set  $A$  and the set of functions  $(A^C)^B$  from the set  $B$  to the set of functions from  $C$  to  $A$ . This correspondence can be captured by using an operation bearing the name of the American mathematician H. Curry. By *currying* the function

$$\mu: B \times C \rightarrow A$$

we obtain

$$\mu_{curry}: B \rightarrow [C \rightarrow A], \text{ where } \mu_{curry}(b)(c) = \mu(b, c).$$

In what follows, I will use the sign ‘\*’ to denote the inverse operation of *uncurrying* applied to a function  $\mu_{curry}$ , transformation by means of which the following result is obtained:

$$(\mu_{curry})^* = \mu.$$

Considering that  $E$  is the set of linguistic expressions,  $CU$  the set of contexts of utterances,  $CIRC = W \times T$  the set of the circumstances of

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evaluation and  $M$  the set of extensions, a semantics  $\mu$  can be represented as follows (Westerstahl 2012, 200):

$$\mu: E \times CU \times CIRC \rightarrow M.$$

By currying the function  $\mu$ , a function  $\mu_2$ , which corresponds to the Kaplanian semantic content, is obtained. By applying the same operation to  $\mu_2$  we obtain this time the function  $\mu_1$  which corresponds to the Kaplanian character. If it is considered that every context of utterance  $c$  in  $CU$  is a 4-tuple  $(a, w, t, l)$  which includes an agent  $a$ , a possible world  $w$  from  $W$ , a time  $t$  from  $T$  and the location  $l$  of the context, that  $circ$  is the function which determines the context's circumstance of evaluation and that  $CONT$  is the set  $[CIRC \rightarrow M]$  of functions from  $W \times T$  to  $M$ , the format of the Kaplanian semantics is the following one (Westerstahl 2012, 200):

$$\begin{aligned} \mu_1: E &\rightarrow [CU \rightarrow CONT], \text{ so that } \mu_1(e)(c)(d) = \mu(e, c, d) \\ \mu_2: E \times CU &\rightarrow CONT, \text{ so that } \mu_2(e, c)(d) = \mu(e, c, d) \\ \mu_{extension}(e, c) &= \mu_2(e, c)(circ(c)), \text{ where } circ: CU \rightarrow CIRC. \end{aligned}$$

This conceptual framework is the tool I will use in order to formulate my argument that, with regard to the truth-values of the utterances of bare sentences with predicates of personal taste, the predictions offered by the two varieties of perspectivalist semantics are not different. To this end, I will proceed as follows. I will firstly follow the meaning perspectivalism's proposal to extend the context of utterance with a parameter  $P_a$  which represents the agent's perspective. Thus the context  $c$ , in which a bare sentence containing a predicate of personal taste is uttered, will have, according to meaning perspectivalism, the following form:

$$c = (a, w, t, l, P_a).$$

By following the truth perspectivalism's proposal to introduce the parameter  $P_a$  in the circumstance of evaluation determined by the context of utterance, we will have:

$$circ(c) = (w, t, P_a).$$

Let the function  $\mu^M$  be a meaning perspectivalist semantics and the function  $\mu^T$  a truth perspectivalist semantics. By applying the uncurrying technique, we obtain the following results:

$$\begin{aligned}\mu^M_{extension}(e, c) &= \mu_2^M(e, c)(circ(c)) \\ &= \mu_2^M(e, a, w, t, l, P_a)(w, t) \\ &= \mu_2^{M*}(e, a, w, t, l, P_a, w, t) \\ &= \mu_2^{M*}(e, a, w, t, l, P_a) \\ &= \mu^M(e, a, w, t, l, P_a)\end{aligned}$$

$$\begin{aligned}\mu^T_{extension}(e, c) &= \mu_2^T(e, c)(circ(c)) \\ &= \mu_2^T(e, a, w, t, l)(w, t, P_a) \\ &= \mu_2^{T*}(e, a, w, t, l, w, t, P_a) \\ &= \mu_2^{T*}(e, a, w, t, l, P_a) \\ &= \mu^T(e, a, w, t, l, P_a).\end{aligned}$$

Since from the relations above it follows that

$$\mu^M_{extension}(e, c) = \mu^T_{extension}(e, c),$$

it becomes obvious that, with regard to the extensions of the expressions encoding perspectival information, the predictions formulated by meaning perspectivalism and truth perspectivalism are identical. In order to facilitate comprehension, let us consider a scenario according to which, in Paris, on February 1, 2015, Mihai utters the following sentence having an occurrence of the predicate of personal taste *funny*:

[20] Uncurrying functions is funny.

Considering that  $c_1$  is the context of utterance of the expression  $e_1$  which corresponds to the sentence [20], that  $w_{@}$  is the actual possible world and that  $\mu^M$  is the function corresponding to meaning perspectivalist semantics, we have the following prediction:

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$$\begin{aligned}
\mu^M_{extension}(e_1, c_1) &= \mu_2^M(e_1, c_1)(circ(c_1)) \\
&= \mu_2^M(e_1, Mihai, w_{@}, 1-02-2015, Paris, P_{Mihai})(w_{@}, 1-02-2015) \\
&= \mu_2^{M*}(e_1, Mihai, w_{@}, 1-02-2015, Paris, P_{Mihai}, w_{@}, 1-02-2015) \\
&= \mu_2^{M*}(e_1, Mihai, w_{@}, 1-02-2015, Paris, P_{Mihai}) \\
&= \mu^M(e_1, Mihai, w_{@}, 1-02-2015, Paris, P_{Mihai}) \\
&= 1.
\end{aligned}$$

considering that  $\mu^T$  is the function which defines truth perspectivalist semantics and leaving  $c$ ,  $w$  and  $e$  as above, we will have:

$$\begin{aligned}
\mu^T_{extension}(e_1, c_1) &= \mu_2^T(e_1, c_1)(circ(c_1)) \\
&= \mu_2^T(e_1, Mihai, w_{@}, 1-02-2015, Paris)(w_{@}, 1-02-2015, P_{Mihai}) \\
&= \mu_2^{T*}(e_1, Mihai, w_{@}, 1-02-2015, Paris, w_{@}, 1-02-2015, P_{Mihai}) \\
&= \mu_2^{T*}(e_1, Mihai, w_{@}, 1-02-2015, Paris, P_{Mihai}) \\
&= \mu^T(e_1, Mihai, w_{@}, 1-02-2015, Paris, P_{Mihai}) \\
&= 1.
\end{aligned}$$

Since in the scenario above it is the case that

$$\mu^M_{extension}(e_1, c_1) = \mu^T_{extension}(e_1, c_1),$$

it follows that the semantic predictions offered by meaning perspectivalism and truth perspectivalism about the truth-values of the utterances of [20] in particular, and in general, about the truth-values of any other utterances of bare sentences in which predicates of personal taste occur, are identical.

## 6. Conclusion

The formal result presented in the last section of the present paper shows that what a truth perspectivalist theory can do in matters of the semantics of bare sentences with predicates of personal taste, it also can be done in meaning perspectivalist semantics. The linguistic evidence which I have presented in the fourth section supports the claim advocated by meaning perspectivalism according to which the experiencer arguments projected by predicates of personal taste are syntactically real, and indicates thus that meaning perspectivalism correctly explains the context-sensitivity

of bare sentences formed with subjective predicates. Also, the semantics of the natural language fragment containing predicates of personal taste, as it is conceived by meaning perspectivalism, has a compositional design suited to capture the context-sensitivity of bare sentences formed with these predicates. Taking into account these data together with the previously established formal result, it is obvious that meaning perspectivalism is the optimal truth-conditional semantic account of the perspectival information encoded by the predicates of personal taste occurring in bare sentences.

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# Reference and Indiscernability in Ante Rem Structuralism\*

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Ante rem structuralism in philosophy of mathematics courageously addressed ontological, epistemological and semantic issues concerning mathematics. In the present paper I will critically assess one of the specific semantic proposals of ante rem structuralism, namely that mathematical discourse is to be taken at face value. Specifically, I will focus on the problem of explaining the mechanism of reference for singular terms in mathematical sentences. I will argue that the account proposed by Shapiro (Shapiro 2008, 2012) to explain the mechanism of reference for singular terms in non-rigid structures is in conflict with the literally interpretation of mathematical sentences.

## 1. Setting the Stage. Structuralism in Philosophy and Mathematics

One of the main proposals in the field of philosophy of mathematics is, undoubtedly, represented by a cluster of conceptions reunited under the term structuralism. Structuralism came in different flavors, but the common denominator of all of them is the thesis that the subject matter of mathematics is represented by structures<sup>1</sup>. Some structuralists think that these structures exist independently of the mathematician, or, for that matter, independently of any system which instantiates them; as a consequence, anyone who studies them has to determine the same

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<sup>1</sup> What structures are will be circumscribed in the discussion below.

properties, and, in a loosely manner of speaking, arrive at the same conclusions. As a further step, this particular form of structuralism is semantically committed to interpret mathematical discourse at face value. So, in this particular form of structuralism, structures are ontologically independent and determinate entities, epistemologically objective, and, semantically, mathematical discourse is taken at face value. The main proponent of this form of structuralism, Stewart Shapiro (Shapiro, 1997), called it *ante rem structuralism*. Now, we can distinguish two roots of structuralism as a doctrine in the philosophy of mathematics: a mathematical one, and a philosophical one. The origin of the mathematical support for structuralism can be traced back to the transformations of mathematics in the late XIX century and the beginning of the XX century; the illustrious figure of this period which elaborated a mathematical-oriented structuralist credo is Richard Dedekind:

If in the consideration of a simply infinite system  $N$  set in order by a transformation  $\varphi$  we entirely neglect the special character of the elements, simply retaining their distinguishability and taking into account only the relations to one another in which they are placed by the order-setting transformation  $\varphi$ , then are these elements called *natural numbers* or *ordinal numbers* or simply *numbers*, and the base-element 1 is called the *base-number* of the *number-series*  $N$ . With reference to this freeing the elements from every other content (abstraction) we are justified in calling numbers a free creation of the human mind (Dedekind, 1948, §73).

The philosophical tradition can be traced back to the influential paper of Paul Benacerraf, “What numbers could not be” (Benacerraf 1983). Benacerraf begins by noting that in a set-theoretical framework one can construct the natural numbers system in two equivalent but incompatible ways. The popular, if not the standard construction among set theorists involves representing 0 as  $\emptyset$ , and defining the successor function  $s_N$  as  $s_N(x) = x \cup \{x\}$ . Proceeding in this manner we obtain the following equalities:  $0 = \emptyset$ ,  $1 = \{0\} = \{\emptyset\}$ ,  $2 = \{0, 1\} = \{\emptyset, \{\emptyset\}\}$ ,  $3 = \{0, 1, 2\} = \{\emptyset, \{\emptyset\}, \{\emptyset, \{\emptyset\}\}$ .

$\{\emptyset\}\}$  and so on. As can be easily seen, in this construction each natural number  $x$  is identified with the set of all its predecessors, and, as a perk, the set corresponding to each number  $x$  contains  $x$  elements<sup>2</sup>. Next, we define  $N_N$  to be the smallest set containing 0 and closed under the successor function  $s_N$ . It can be routinely verified that the structure  $\langle N_N, 0, s_N \rangle$ , thus specified, is a model of Peano Arithmetic (PA). The recipe for this particular construction was proposed by von Neumann, and the sets identified as natural numbers are called von Neumann ordinals.

An alternative set-theoretic construction of the natural numbers was proposed by Ernest Zermelo; it begins with the same representation of the number 0 as  $\emptyset$ , but defines the successor function  $s_Z(x) = \{x\}$ ; so, in the zermelian construction,  $1 = \{\emptyset\}$  (which is identical with its counterpart in von Neumann construction),  $2 = \{\{\emptyset\}\}$ ,  $3 = \{\{\{\emptyset\}\}\}$  and so on. As in the case above, we define  $N_Z$  to be the smallest set containing 0 and closed under the successor function  $s_Z$  and leave to the reader the proof that the structure  $\langle N_Z, 0, s_Z \rangle$ , thus specified, is a model of PA.

Now, the two structures are equivalent with respect to PA, that is, the same truths of PA hold in both structures. Although the structures are equivalent modulo PA, they are obviously different: referentially, the set corresponding to 2 in  $N_N$  is different from the set corresponding to 2 in  $N_Z$ ; moreover, there are true statements, besides those of PA, which hold in one but not the other: for example,  $3 \in 4$  is true in  $\langle N_N, 0, s_N \rangle$ , but not in  $\langle N_Z, 0, s_Z \rangle$ .

Now, Benacerraf's puzzle, as it is known, may be stated simply as "Which is the right identification of numbers?" Before continuing let's address two caveats: the question regarding the identification of the natural numbers is not meant to disqualify other possible set-theoretical candidates, nor to suggest that before the emergence of set theory mathematicians failed to refer to numbers. Benacerraf's puzzle, at least as I read it, concerns the referential status of natural numbers as constructed from set-theory, or, of any theory which have foundational virtues, taking the ontology of set-theory, or of any particular foundational theory, as the ontology of all mathematics. To what sets do we refer when we speak, in set theoretic

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<sup>2</sup> Of course, this observation involves a circularity, but the goal of this presentation is not to rigorously define and construct the natural number sequence, which can be found in any introductory textbook on set theory, only to make intuitive the construction.

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terms, about natural numbers: to finite von Neumann ordinals, or to Zermelo cardinals? As mentioned above, there aren't any mathematical reasons to distinguish between the two constructions, and to propose conventionally adopting one as a solution is hilarious. After all, can we conventionally identify what set-theoretic objects numbers are?

Benacerraf's resolution of this conundrum is radical: there is no proper identification of what natural numbers are, because they are not objects to be identified with. Let us note, in passing, that another solution is available to Benacerraf, mentioned by Burgess, namely to consider natural numbers as *sui generis* objects:

There remains the possibility that natural numbers are objects *sui generis*, 'of their own kind', not to be identified with any objects not introduced as numbers, be these sets, or classes, or equivalence types conceived of as something different from sets or classes, or anything else. But Benacerraf, having eliminated so many candidates for what sorts of objects natural numbers could be, moves on quickly to suggest (though not to endorse unequivocally) the conclusion that they are not *objects* at all. (Burgess *forthcoming*, 231)

Benacerraf's way out of this puzzle is to move the focus from the objects, in our case from the natural numbers, to the structure of these objects, the structure of natural numbers. On his view, the subject matter of mathematics is represented by structures, not objects. What a mathematician determines and study are properties of different structures, so on this view the identification problem disappears: there aren't any objects with which to identify numbers simply because structures retain only the relations of its 'elements' with respect of each other but not the specific nature of these elements. Any objects that instantiate the structure are viable as a referential candidate for the elements of a structure as long as the objects have the relations that the structure ascribes. Moreover, the elements or positions of a structure are determined by the relations that each element or position has with any other element or position. As a consequence, reference to a particular position or element is uniquely determined by the element's or by the position's intrastructural relations. In Benacerraf's words:

Therefore, numbers are not objects at all, because in giving the properties ... of numbers you merely characterize an **abstract structure** - and the distinction lies in the fact that the 'elements' of the structure have no properties other than those relating them to other 'elements' of the same structure. [...] To **be** the number 3 is no more and no less than to be preceded by 2, 1, and possibly 0, and to be followed by 4, 5, and so forth. [...] **Any** object can **play the role of** 3; that is, any object can be the third element in some progression. What is peculiar to 3 is that it defines that role .... [...] Arithmetic is therefore the science that elaborates the abstract structure that all progressions have in common [...]. Why so many interpretations of number theory are possible ... becomes obvious: there is no unique set of objects that are the numbers. [...] The number words do not have single referents. Furthermore, the reason identification of numbers with objects works wholesale but fails utterly object by object is the fact that the theory is elaborating an abstract structure and not the properties of independent individuals, any one of which could be characterized without reference to its relations to the rest. Only when we are considering a particular sequence as being, not the numbers, but **of the structure of the numbers** does the question of which element is, or rather **corresponds to**, 3 begin to make any sense. (Benacerraf 1983, 291)

## **2. The Reference Problem for Ante Rem Structuralism**

In developing Benacerraf's ideas, sketched above, Stewart Shapiro (Shapiro, 1997) proposed a particular structuralist position that he called ante rem. This view promises to acceptably account three important aspects that any reasonable philosophical position regarding mathematics should address. The first aspect (in an arbitrary order) concerns the ontological status of mathematical entities, and at this point, the position articulated by the ante rem structuralism is unequivocal: mathematical structures exists

outside space and time, independent of the mathematician, or even of the particular systems that instantiate them. The second aspect is epistemological and concerns the way in which we, as finite spatial and temporal beings, can come to know these structures. I will not approach the epistemological mechanisms and explanation deployed in ante rem structuralism in order to show how mathematical knowledge is possible. The third is semantic, and it concerns the interpretation of mathematical discourse. As I mentioned at the beginning of the paper ante rem structuralism is committed to taken mathematical discourse at face value: thus, the first order variables range over places in a structure, singular terms have their usual semantic roles, that of denoting places in the structure, generally, the underlying semantics of a mathematical statement is identical to that of statements in natural language. In the present paper I will be concerned only with the last aspect, namely with the semantics of mathematical statements as developed in ante rem structuralism.

With this frugal exposition as background, the thesis that I am going to advance is that ante rem structuralism multiplies the problem of reference, precisely, ante rem structuralism have to advance two accounts of the relation between mathematical language and its objects. First, there is the problem of accounting how, by nothing but linguistic means, can the ante rem theorist assure the referential determinacy of the intended structures described by our mathematical theories<sup>3</sup>. Second, even if we grant to the ante-rem structuralist the success of describing how to referentially determine the intended structures of mathematical theories, there remains the problem of accounting how singular terms successfully refer to particular positions in structures.

I will tackle these issues in the reverse order of exposition, so I will address the problem of the mechanism of reference for singular terms and then the problem of the referential determinacy of mathematical theories and leave the problem of reference to structures to another paper.

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<sup>3</sup> Some qualification is in order here: of course, not all mathematical theories were designed to describe uniquely intended structures; such theories, called algebraic theories, are not envisaged by the above remarks.

### 3. Non-Rigid Structures and Indiscernibility

Now, in order to render a at face value reading of mathematical statements, for example of statements of the form ' $7 + 5 = 12$ ', '2 is prime', one has to assign to each singular term a particular referent, namely a position in the structure which constitutes the reference of the mathematical theory from which the statements belong. As a consequence, in ante rem structuralism there isn't any room for referential indeterminacy, as Shapiro (Shapiro 1997, 141) emphasizes:

On the *ante rem* view of structures advocated here, there is little, if any, inscrutability of reference. Once we accept the Peano axioms as an implicit definition of the natural-number structure, the numeral '27,' for example, refers to a place in this structure. There is no room for doubt or inscrutability concerning just which place this is. Start at the 0 place and begin counting. If you count correctly, you will arrive at the 27 place, and no other, at the proper moment. Of course, as noted, there is some indeterminacy or, if you like, inscrutability, when the places from *different* structures are identified. It is convenient for some purposes to locate the natural numbers in the set-theoretic hierarchy, but there is no unique best way to accomplish this. Any of several identifications will do. Nevertheless, within arithmetic – within the natural-number structure – reference is determinate and scrutable.

But the task of gluing singular terms with their purported referents, and, thus, expelling referential indeterminacy, requires further explanation. A fruitful idea is that in order to explain how singular terms manage to denote, the referents of singular terms have to be determined. In this respect, a necessary condition for referring is the distinguishability of the referent. And distinguishability implies to be able to give, at least in principle, identity conditions for elements, positions, or objects, generally, for anything that could qualify as the referents of singular terms. In discussing the idea, Øystein Linnebo (Linnebo 2009, 220) attributes it to Frege:

It is sometimes suggested that criteria of identity should play a central role in an account of our most basic ways of referring to objects. [...] For unless you have at least an implicit grasp of what is required for your intended referent to be identical with another object with which you are directly presented, you would not succeed in singling out a unique object for reference. This view goes back at least to Frege. In his *Foundations of Arithmetic*, Frege first argues that the natural numbers are abstract objects. Then Frege asks how these objects ‘are given to us’. Unlike ordinary concrete objects, we cannot have any ‘ideas or intuitions’ of the natural numbers. How then do we manage to refer to natural numbers? Frege answers as follows: ‘If we are to use the symbol  $a$  to signify an object, we must have a criterion for deciding in all cases whether  $b$  is the same as  $a$ , even if it is not always in our power to apply this criterion.’ This passage and surrounding ones show that Frege took criteria of identity to play a very important role in an account of reference to the natural numbers.

Now, if the ante rem structuralist embraces this line of reasoning, then she has to specify identity conditions at least for the referents of singular terms, that is, for certain positions in a structure. And certain passages from Stewart Shapiro do seem to suggest that ante rem structuralism is committed to a principle of identity of indiscernibles for positions in a structure. Passages like

The essence of a natural number is its *relations* to other natural numbers... The number 2, for example, is no more and no less than the second position in the natural number structure; 6 is the sixth position ... (Shapiro 1997: 72),  
Every office is characterized completely in terms of how its occupant relates to the occupants of the other offices of the structure, and any object can occupy any of its places (Shapiro 1997, 100),

where offices are bona fide objects as seen from the perspective of places-are-objects, made early reviewers, notably Burgess and Keranen, to interpret ante rem structuralism as committed to a strong principle of the identity of indiscernibles. So, it looks like ante rem structuralism is committed to:

$$(II) \forall x \forall y ((x = y) \equiv \forall \phi (\phi(x) \equiv \phi(y))),$$

where ' $\phi$ ' is taken to range over structural properties. Structural properties are those properties that can be defined in terms of the relations of the structure in discussion. For example, in PA, the properties of being an even number, or prime number, are definable in terms addition and multiplication, so these will count as structural properties.

In order to clarify and facilitate the subsequent discussion I will resume the argument advanced so far:

- (1) Mathematical language is taken at face value (feature of ante rem structuralism).
- (2) The function of a singular term is to denote an object (semantic role of singular terms in a literally reading of sentences).
- (3) Objects are places<sup>4</sup> in a structure (ante rem structuralism credo).

Now, in order for a singular term to adequately denote an object, that object has to be individuated:

- (4) (Discernibility thesis): Discernibility of objects is a necessary condition for reference (denotation).

As certain passages from Shapiro seem to suggest, discernibility of objects is taken to be assured by (II).

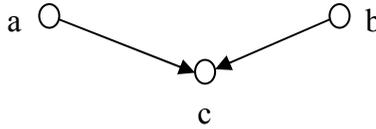
The key observation in place here is that (II) is highly problematic, precisely, it collapses mathematical distinct objects.

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<sup>4</sup> With the qualification that we assume the places-are-objects perspective.

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A short example will illuminate the above remark. Consider the directed graph bellow:



As this directed graph qualifies as a mathematical structure one who embraces (II) will have to discern the objects  $a$ ,  $b$ ,  $c$  using only structural properties. But the task at hand is unattainable, for  $a$  and  $b$  are structurally indiscernible: any structural property that  $a$  has,  $b$  has, also. Let pause for a moment and attend to identify the three objects in the graph above, using the language of first order logic with an irreflexive, asymmetric, relation symbol  $R$  representing the edge relation of the graph.

$$\begin{aligned}
 a &= \forall y(\sim Ryx) \wedge \exists z((Rxz) \wedge \forall t(Rxt \supset (t = z))) \\
 b &= \forall y(\sim Ryx) \wedge \exists z((Rxz) \wedge \forall t(Rxt \supset (t = z))) \\
 c &= \forall y(\sim Rxy) \wedge \exists z\exists w((\sim(z \\
 &= w)) \wedge (Rzx) \wedge (Rwx) \wedge \forall t(Rtx \supset (t = z)))
 \end{aligned}$$

It's obvious that  $a$  and  $b$  are structurally indistinguishable. Applying (II) to this structure, will yield the identification of  $a$  and  $b$ , although these are numerically distinct objects. So the application of (II) to the graph above will result in a collapse of distinct objects.

Generally, any structure which has non-trivial automorphisms will present at least a case of structurally indistinct objects. The technical reason is an elementary model-theoretic result: isomorphic structures are elementary equivalent. If  $f$  is an automorphism on a structure  $M$ ,  $\varphi(x_1, x_2, \dots, x_n)$  is any formula in the language used to describe the structure, then for any objects  $a_1, a_2, \dots, a_n$  in the domain  $M$  of  $M$  and any assignment  $s$  which assigns to each variable  $x_i$  the object  $a_i$  we have:  $(M, s) \models \varphi(x_1, x_2, \dots, x_n)$  if and only if  $(M, f \circ s) \models \varphi(x_1, x_2, \dots, x_n)$ , where  $f \circ s$  is an assignment which assigns to each variable  $x_i$  the value  $f(a_i)$ . The nontriviality condition<sup>5</sup> assures

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<sup>5</sup> In Shapiro 2012, 380 the condition is stated as follows 'If  $f$  is nontrivial, then there is an object  $a$  such that  $fa = a$  (sic!).

that there is at least one  $a$  such that  $a \neq f(a)$ . If the only automorphism of a structure is the trivial one, namely the identity mapping, the structure is said to be rigid. In conclusion, an elementary theorem of model theory assures us that every nonrigid structure has indiscernible places. For our graph example, the permutation  $\pi = \begin{pmatrix} a & c \\ b & c \end{pmatrix}$  is a nontrivial automorphism. This objection to ante rem structuralism was raised, as I have mentioned, by Keranen and Burgess. Since then more spectacular examples of nonrigid mathematical structures have invaded the literature, but one in particular was discussed: the structure of complex analysis. In this case, the function which sends each complex number  $(a + ib)$  to its conjugate  $(a - ib)$  is a nontrivial automorphism. As a result,  $i$  and  $-i$  are structural indiscernible, so even though they are numerically distinct, by (II) they would have to be identical. Ladyman (Ladyman 2005) proposed an amusing solution to this conundrum: he argued that (II) should be amended such that it includes, besides the structural properties, irreflexive relations. With this solution at hand,  $i$  and  $-i$  are discernible: take  $(x \neq 0 \wedge (x+y) = 0)$  as the irreflexive relation  $R$ , that is, the relation ' $x \neq 0$  and  $x$  is the additive inverse of  $y$ ' and  $i$  and  $-i$  became discernible. Now, although  $i$  and  $-i$  pass the test we should remark that the objects  $a$  and  $b$  from the graph above don't. The solution seems ad hoc, in spite of Ladyman's arguments that it is employed in physics, whatever bearing this has upon our philosophical and mathematical issue.

Shapiro's solution is a straightforwardly denial of (II). He explicitly rejects any commitment to such a principle, and, moreover, denies that an ante rem structuralist position requires it. His rejection is double-folded: such a philosophical principle is not consistent with mathematical practice, which weight more heavily than any philosophical or metaphysical principles, and, more importantly, he acknowledges that some mathematical objects escape any uniquely identifying descriptions, although their existence is guaranteed by mathematical theorems. He takes the task of providing individuations of mathematical objects as an unclear metaphysical requirement:

One motivation for the identity of indiscernibles, ..., is metaphysical. After pointing out that the complex roots of  $-1$  'are not distinguished from each other by any algebraic properties', John Burgess ... notes that, on my view, the two

roots 'are distinct, though there seems to be *nothing* to distinguish them'. The complaint here seems to involve something like the Principle of Sufficient Reason. If something is so – if there are two distinct square roots of  $-1$  – then there must be something that makes it so, or at least something that explains why it is so. If there are two distinct square roots of  $-1$ , then there must be something that distinguishes them. Frankly, I am not sure what is being demanded. The fact that it is a theorem of complex analysis that  $-1$  has two distinct square roots seems to be enough to distinguish them, or at least enough to convince us that there are two, and not just one. What else is required? Concerning the more homogeneous cardinal-four structure, what else is needed besides the stipulation that the structure has four distinct places? (Shapiro 2008, 287)

#### 4. Dedicated Parameters

However, the acknowledgement of the indiscernibility of certain mathematical objects, such as our  $a$  and  $b$  from the graph above or  $i$  and  $-i$  of complex analysis necessitates an account of how singular terms denote objects. How is it, that a term like ' $i$ ' manage to denote an object which is structural indiscernible from another object? In a number of articles, Shapiro tackles this problem, focusing on the case of complex analysis:

Without much loss of generality, we might as well keep on with our standard example: our philosopher holds that the complex numbers exist and that the square roots of  $-1$  are indiscernible. So our problem arises. He must either come up somehow with a referent for ' $i$ ', which would be to break the symmetry, or else he must describe the logico-semantic role of that term (Shapiro 2012, 388).

His solution is to reject (4) and rethink (2) by discerning another syntactical category of singular terms. Shapiro is aware that rejecting (4)

would have consequences on (2), for how can a singular term denote an object, if the denoted object is indiscernible? It seems that denying (4) would have repercussions on the semantic role of singular terms, which if (4) is false, would not denote unequivocally an object. Corroborating some linguistic data which shows pronouns and other singular terms as denoting indistinguishable object with the use of parameters in existential instantiation rule in natural deduction, Shapiro argues that the class of singular terms contains a category of permanent parameters which refers to indiscernible objects. The final step is arguing that '*i*' belongs to this special subclass of singular terms.

The linguistic data that Shapiro deploys uses the work of (Roberts 2003), which draws attention to the 'so-called problem of indistinguishable participants'. Consider the sentences:

(5) If a bishop meets another bishop, he blesses him.

(6) If a man lives with another man, he shares the housework with him.

Which is the referent of the pronoun 'he' in both sentences? With nothing but this linguistic information one cannot distinguish between the two bishops or the two men, yet the pronoun 'he' seems to refer to one of them. So, there seems to be singular terms which denote indistinguishable objects. More closely to the mathematical semantics matter at hand are the following two examples:

(7) Everyone who bought a sage plant here bought at least eight others along with it.

(8) Remember that chess set that came with an extra pawn? I could have used an extra king, but I never needed the extra pawn.

The same 'indistinguishable participants' phenomena occur in these cases also. What is the referent of 'it' in (7)? Or of the description 'the extra pawn' in (8)? There is nothing that can discern to which object the linguistic particle 'it' or the expression 'the extra pawn' refer.

Shapiro's main proposal is that we should analyze the case of singular terms referring to indiscernible mathematical objects with the tools deployed in the rule of existential instantiation. Let's state the rule, following Shapiro (Shapiro 2012, 403):

[F]rom a sentence in the form,

$(\exists x) \varphi(x),$

one can infer

$\varphi(b),$

provided that the term  $b$  does not occur previously in the deduction. The inferred formula  $\varphi(b)$  rests on whatever premises and assumptions the existential formula  $(\exists x) \varphi(x)$  rests on.

Now, Shapiro asks, what is the role of the term ' $b$ '? Syntactically, it is a constant, so we should assume that it refers to a single, distinct, object, but, if we look closely at its function in natural deduction inferences, we can observe that it behaves, in a certain sense, as a free variable.<sup>6</sup> It denotes an arbitrary object instantiating  $\varphi$ . A caveat has to be addressed here: this arbitrary object has those and only those properties that make it an instance of  $\varphi$ , so that any other name or constant such as ' $0$ ' or 'Stewart Shapiro' would not be usable, since the referents of these names have other properties besides being a  $\varphi$ . It is this special feature that distinguishes  $b$  from a name or a constant, and further, determines classifying it as a parameter. So, the point is that  $b$  has a specific character: it's a singular term used to denote an arbitrary object that instantiate  $\varphi$ . Now, what Shapiro argues is that ' $i$ ', as used in complex analysis is a dedicated or permanent parameter:

Returning to the main case at hand, I submit that we think of ' $T$ ' as a parameter, introduced into the language of complex analysis. Again, we note that in the algebraic closure of the reals, there is at least one square root of  $-1$ :

$$\exists x(x^2 = -1)$$

So we let  $i$  be one such square root, and go on from there. The difference between ' $T$ ' and more typical parameters is that it is a permanent fixture in the language of complex analysis. One might note, in line with existential elimination,

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<sup>6</sup> In passing let us note that in some natural deduction systems a free variable is used instead of a constant.

that there is nothing to be said about  $i$ , in the language of fields, that does not hold of every square root of  $-1$ . This is as it should be, since the two roots are indiscernible. (Shapiro 2012, 405)

## **5. Do Dedicated Parameters Solve the Problem of Reference?**

Now, this resolution, I think is in conflict with (1) the thesis that mathematical statements should be read at face value. First, there is the objection raised by Pettigrew (Pettigrew 2008) that, in the same vein, some other mathematical terms, like ‘ $\mathbb{N}$ ’, or ‘ $\mathbb{R}$ ’, could and should be interpreted as dedicated parameters, which will, of course, run against reading mathematical statements at face value. When an ante rem structuralist uses in a sentence the term ‘ $\mathbb{N}$ ’, she is inclined, in a literally reading of the sentence, to refer to *the* structure of natural numbers, not to denote arbitrary abstract systems instantiating such a structure.

Besides this objection, I will raise a concern which, I think, render Shapiro’s resolution inconsistent with the literally interpretation of mathematical statements. First of all, Shapiro has to provide a criterion for distinguishing the cases in which a singular term is to be interpreted as a name or as a parameter. But, as Pettigrew’s objection shows, this is not something that can be decided in principle. What non-arbitrary or non ad hoc criteria could be deployed in order to qualify ‘ $i$ ’ as a dedicated parameter but not ‘ $\mathbb{N}$ ’? It’s hard to envisage what such criteria consists of. Consequently, what should prevent us from interpreting ‘ $0$ ’ as a dedicated parameter as opposed to a proper name or a constant? Rejecting (4) and proposing the dedicated parameters theory without providing a clear demarcation between genuine uses of singular terms as names or constants used to denote objects and uses of singular terms as dedicated parameters, leads, inadvertently, to a rejection of (2), which, in turn, leads to a non-literally reading mathematical statements.

Another objection regards the character of an arbitrary object that the dedicated parameter is supposed to refer to. What kind of object is this, abstracted from all properties but the one it purportedly instantiate? And what is the mechanism of reference in this case? A rigorous investigation in

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to these matters is still expected. Meanwhile we should regard Shapiro's way out of this conundrum with suspicion. It seems that ante rem structuralism cannot address, at least as it is promoted, the problem of reference.

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# **The Discovery of the Physics of the Middle Ages by Pierre Duhem. The Fate and Meaning of A Truth\***

Horia-Roman Patapievici

“Many scientists and philosophers doubt about the propriety of conceiving the growth of science in terms of revolutions. The idea of revolutions in science seems to physicists in particular to be a very inappropriate and inexact way to characterize the growth of their science.”

I. Bernard Cohen<sup>1</sup>

“Even a tradition that is based ultimately on error may strongly affect the thinking of later historians and scientists, as we may see in the example of a Copernican revolution.”

I. Bernard Cohen<sup>2</sup>

Throughout the entire 19th century there was a solid scientific consensus on the lack of a significant scientific thinking in the Middle Ages. When Duhem discovered that there was a physics of the Middle Ages, the surprise was primarily his. Duhem's studies dedicated to the physics that

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<sup>1</sup> Cohen 1985, 219-220.

<sup>2</sup> Cohen 1987 B, 198.

preceded the physics of the 17th century have completely changed the fate of specialized historical scholarship. Duhem's great discovery was the fact that the progress of the 17th century physics must be related to the hypotheses, theorems, and theories of medieval physics (the content of this discovery is what I call the "Pierre Duhem Thesis"). Although subsequent studies have confirmed many of Duhem's findings, the historiography of science has never really incorporated them – and the history of science was institutionalized after World War II according to the paradigm of Alexandre Koyré's "scientific revolution" and against Duhem's "continuitism". The significance of this fact goes beyond the scientific disagreements regarding the importance of the scientific thought of the Middle Ages. The rejection of the "Pierre Duhem Thesis" is only apparently a rejection of a technical thesis in the history of science (e.g., the "continuitism"), it actually refers to the philosophical and ideological rejection of the Middle Ages as a substantial precursor of modernity. My thesis is that the rejection of the "Pierre Duhem Thesis" is not the consequence of its factual refutation, but the rejection of a certain truth regarding European history, that is, the role of Christianity in the creation and articulation of modern Europe.

My goal in this article is to present the discovery of the physics of the Middle Ages, the complex and complicated manner in which this discovery was integrated into the historiography of science, and the failure of our general culture to integrate it. The fact that the physics of the Middle Ages existed and the emergence of the modern science of nature, whatever its relation to it, can not be imagined without it has remained what Jean-François Revel called "une connaissance inutile".

The discoverer of the physics of the Middle Ages was Pierre Duhem (1861-1916) – physicist, philosopher, and historian of science<sup>3</sup>. Since the wondrous episode of the discovery of the physics of the Middle Ages is rarely mentioned, and the importance of the physics of the Middle Ages to the birth of modern science of nature is frequently denied, often ignored, and almost always disregarded, I will first try to sketch briefly the history of this discovery.

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<sup>3</sup> Jaki 1984; Jaki 1990; Jaki 1985-86 reproduced in: Jaki 1988 B, 173-187). For a critical appreciation of Duhem's thesis on the contribution of medieval physics to the birth of modern physics, deploring its influence on the contemporary histories of medieval philosophy and science, see Murdoch 1991, 255-302.

I.

That the Middle Ages was a scientifically fertile era was a fact nobody remembered anymore at the beginning of the 20th century. On the contrary, all the *authoritative* people were anchored in the belief that, in what regarded physics, between Archimedes and Galileo there had passed 18 centuries of darkness. This “knowledge” (actually, a pre-judgment) had imperceptibly become *opinio communis* throughout the cultivated Europe. But, considered in its origin, this 'consensus of authorities' was merely the consequence imposed by the Renaissance position. The disregard of scholasticism does not start in the 17th century. The Renaissance humanists did not see in the logicism and mathematicism of the great doctors of scholasticism anything else than the corruption of Latin, which, with their technicalities, they would have brought to resemble the “Scythian language”. The division of history into three eras (Antiquity, the Middle Ages and Modern Times) dates from the early Renaissance. This division, however, was made to mark the distance of those claiming it from what immediately preceded them, as well as their adherence to the distant past. According to these value judgments, classical antiquity was associated with bright light, the period that followed it became the 'Dark Ages', and the age of those who invented this temporal tripartition was presented as an exit out of the night, an awakening, a Renaissance<sup>4</sup>. An example is Pierre de la Ramée who, in the first three books of his work *Scholarum mathematicarum libri unus et triginta* (1596), presents a detailed account of the development of mathematics in which medieval contributions are completely absent. Was that because there hadn't been any? We know well today that they existed. Medieval contributions were absent because they *had* to be ignored: the logic of the tripartite scheme demanded that. Therefore, from Greek antiquity, Pierre de la Ramée jumps directly to the time when, according to him, there took place the 'rebirth of sciences'.<sup>5</sup>

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<sup>4</sup> On this division, see Călinescu 1995, 29 (generally, the whole chapter ‘Problema timpului: trei epoci ale istoriei occidentale’: 28-31).

<sup>5</sup> Schramm 1965, 70. For a nuanced discussion of this statement, regarding the contributions to optics which Pierre de la Ramée recommended himself for publication (the Latin version of Ibn al-Haytham's *Optics* and the compilation of Witelo), see Schramm 1965, 97-98 (note 5).

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With his incomparable propagandistic and polemic genius, Voltaire imposed the preconception that traditional Christian institutions exerted a major obscurantist influence on human progress<sup>6</sup>, while William Whewell, with the authority of the expert, denied the possibility of any form of science in the “Dark Ages” dominated by the Church, arguing that all the speculations of medieval scholars regarding nature were confused and based on fictitious notions, that natural science is an invention of the 17th century, and its only antecedents can be identified in Antiquity<sup>7</sup>. In 1788, with the supreme authority given by the most important treatise of mechanics of the century – *Mécanique Analytique* –, the great Lagrange asserted that between Archimedes and Galileo science has experienced eighteen centuries of darkness:

l’intervalle qui a séparé ces deux grands génies disparaît dans l’histoire de la Mécanique.  
(Lagrange 1853, 243)

Five years later, the Marquis de Condorcet confirmed the verdict of the eighteen centuries, and even added them two more. For the revolutionary Condorcet, who wrote *Esquisse d’un tableau historique des progrès de l’esprit humain* fleeing from Jacobin authorities who sought to arrest him, “the triumph of Christianity marked the entrance into a complete decay of philosophy and sciences,” so that between Plato and the 17th century there have passed twenty centuries of “complete unfruitfulness” for the advancement of science:

Le matelot, qu’une exacte observation de la longitude préserve du naufrage, doit sa vie à une théorie qui, par une chaîne de vérités, remonte à des découvertes faites dans l’école de Platon, et ensevelis pendant vingt siècles dans une entière inutilité.  
(Condorcet 1994, 107)

This was also Duhem's opinion until 1903. As a historian of science, Duhem wholeheartedly embraced the idea (taken in his specialty, apart from

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<sup>6</sup> Lux 1991, 25 (note 6).

<sup>7</sup> Whewell 1837, 235-236.

Lagrange, also from Dühring<sup>8</sup> and Mach<sup>9</sup>) that the medieval period was scientifically sterile and that, therefore, between the science of the Greeks (such as it was) and the 17th century (when modern science was born, almost *ex nihilo*) we are dealing with a profound discontinuity<sup>10</sup>. For example, in his first article on the history of physics – “Les Théories de l’Optique” (1894) –, Duhem states plainly that the birth of the discipline he is studying takes place in the 17th century, with Descartes as a source of the optical theories<sup>11</sup>. His argument runs as follows: except for astronomy, hydrostatics and the general principles of statics, the history of natural science in Antiquity and the Middle Ages only gives us “inconsistent or poorly observed facts”; and the truths glimpsed by men of genius are ignored by their immediate descendants. In conclusion, Duhem says in 1894, “the scientist will not find [at the Egyptians and the Greeks] a continuous evolution and a logical concatenation of the professed doctrines”; or, as in the history of science it is only this continuous and logical concatenation that interests us, one cannot speak about a history of physics prior to the 17th century.

After having given in the first four months of 1903 a detailed study on the evolution of mechanics (*L’évolution de la Mécanique*), in which he faithfully follows the view of all *informed* men of the time, namely that between Aristotle's unusable science and the geometricians of the 17th century, when “sciences are reborn”, there is only the “old scholasticism”, in its turn unusable<sup>12</sup>, Duhem begins to publish in quarterly series in *Revue des questions scientifiques*, starting with October, a long study on the origins of statics. Bound together, two years later these installments will become the book *Les Origines de la Statique* (2 volumes, 1905; 1906). The installments had to appear regularly – in January, April, July and October of each year.

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<sup>8</sup> Dühring 1873.

<sup>9</sup> Mach 1883.

<sup>10</sup> Martin 1990, 342.

<sup>11</sup> Duhem 1894, 94-125.

<sup>12</sup> Duhem 1905 A, 13; *L’évolution de la mécanique* consists of articles published between January 30 and April 30, 1903, in *Revue générale des Sciences*. After a very general overview of the “peripatetician mechanics” (Chap. I), in which Duhem illustrates the manner of explanation of natural phenomena in Aristotelian physics, the second chapter begins abruptly with this statement: „La renaissance des sciences au début du XVII<sup>e</sup> siècle fut une réaction violente contre des semblables explications”.

For Duhem, at that time already an experienced historian of science, the subject under study did not present any particular problems. Everything was predictable. Counting on Duhem's proverbial conscientiousness, the editor expected an unabated delivery. The first installment appears in the October 1903 issue, and in it Duhem writes that

Les commentaires des Scolastiques touchant les *Méchanika Problémata* d'Aristote n'ajoutèrent rien d'essentiel aux idées du Stagirite; pour voir ces idées pousser de nouveaux surgeons et donner de nouveaux fruits, il nous faut attendre le début du XVI<sup>e</sup> siècle.  
(Duhem 1905 B, 13)

The first four chapters of the first volume (all published in the October 1903 installment) pass from Aristotle to Leonardo and Cardan, without the Middle Ages being even mentioned. But for the January issue – surprise! – Duhem does not send the following chapters. He apologized to Father Julien Thirion, his editor, saying that there have had just appeared a number of supplementary readings which he had not taken into account in the original plan of the work<sup>13</sup>. Chapter 5, which appears in *Revue des questions scientifiques* in the April 1904 issue and which should have continued with the contributions in statics after Cardan (16<sup>th</sup> century), makes a sudden return (back until the 13<sup>th</sup> century). Perfectly illogical to the original plan, which did not even mention the contributions of the Middle Ages to the science of statics, Duhem informs us that, before studying “the fundamental treatise of Statics” produced by the “enigmatic” Jordanus Nemorarius, there should be collected the “debris” on this subject, scattered throughout the manuscripts left by the school of Alexandria.<sup>14</sup> Chapters 5-9 are dedicated to what the Alexandrians had received from the school of Nemorarius, subsequently detailing the contributions of this school to the development of statics. Only Chapter 10 resumes the line interrupted at the end of Volume I, i.e. in the middle of the 16<sup>th</sup> century, with Guido Ubaldi and Benedetti. Tartaglia's name, which now appears for the first time (as expressly stated in the preface to Volume I, from 21 March 1905, written

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<sup>13</sup> Martin 1976, 121.

<sup>14</sup> Duhem 1905 B, 62.

after the discovery of the statics of the Middle Ages), referred to as a plagiarist of Nemorarius, is mentioned for the merit of having broadcast in the middle of the 16<sup>th</sup> century some contributions of the 13<sup>th</sup> which otherwise would have remained completely ignored.

In conclusion, although the reference to Nemorarius was not unknown to some historians of the Middle Ages<sup>15</sup>, Duhem was the only historian of science to follow the thread of quotes on this author – referring to the original manuscripts and revealing texts which everyone had forgotten (but which the “inventors” of modern science in the 17<sup>th</sup> century still knew very well) – , the only one who knew how to historically and epistemologically evaluate the things he had discovered. The result of this work was the discovery of the vast medieval discussions about the principle of virtual velocities<sup>16</sup>, with which the great sunken continent of medieval physics began to regain the attention of scholars: first by the discovery that the principle of virtual velocities had also been known to the medieval scholars, as a principle of the demonstration of the static equilibria, and then by other findings, suggesting that the scholasticism of the 14<sup>th</sup> century had developed a dynamics completely different from the Aristotelian one. This extraordinary event – the beginning of the discovery of the physics of the Middle Ages – can be located between the summer and winter of 1903 (as the reference to Tartaglia appears only in the April 1904 installment).<sup>17</sup>

The discovery of the physics of the Middle Ages was a surprise *first of all* for Duhem. He did not make this discovery because he was Catholic (as it was said, trying to reduce his discovery to an apologetic enterprise)<sup>18</sup>,

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<sup>15</sup> Even though Jordanus Nemorarius remains unknown to the historians of physics (to Lagrange, to Mach, to Wohlwill), the historians of mathematics do mention him: Montucla and Chasles (*cf.* Martin 1976, 123; Brenner 1990, 145, note 3). Moreover, Bosmans knew the two treatises *De ponderibus* in question and anticipated that Duhem would come upon them (see Jaki 1984, 385), all the discussion with Father Thirion, sometime after October 1903, which Bosmans remembers in the evocation of Duhem (Bosmans 1921, 41).

<sup>16</sup> Jaki 1985, xv.

<sup>17</sup> Martin dates the great discovery at the end of the autumn of 1903 (Martin 1976, 120).

<sup>18</sup> See, for example, Beaujouan 1987, 425: “Vous savez tous comment, du fait de sa propre carrière scientifique et de son catholicisme militant, Pierre Duhem était idéologiquement conditionné à vouloir chercher dans la scolastique chrétienne les antécédents préparant l’éclosion de la science moderne du XVII<sup>e</sup> siècle.” Beaujouan’s statement is *factually*

but because, against his first convictions regarding the scientific nullity of the Middle Ages, Duhem behaved like a true conscientious and honest scientist: faced with the existence of new facts, he has granted them priority to his preconceptions and revised his initial theories.<sup>19</sup> His remaining life (1903 to 1916) was dedicated by Duhem to the deepening of this epochal discoveries. There have resulted out of this concern two monumental works: *Études sur Léonard de Vinci* (3 volumes, 1906, 1909, 1913) and *Le Système du Monde. Histoire des doctrines cosmologiques de Platon à Copernic* (10 volumes, 1913, 1914, 1915, 1916, 1917, 1954, 1956, 1958, 1959). *Le système du monde* should have had twelve volumes and a summary of three hundred pages, meant to synthetically rebuild the argument of the entire series. The last two volumes and the summary weren't written, and the tenth volume remained unfinished. Duhem died suddenly of a heart attack on September 14, 1916. He was only 55 years old.

The studies on Leonardo da Vinci were occasioned by the publication of his notebooks and are devoted to the assessment of his scientific thought's sources, as well as of the impact his theories had on the development of the modern science of nature. The first two volumes bear the subtitle "Ceux qu'il a lus et ceux qui l'ont lu" (written between 1905-1906 and 1907-1908, respectively), while the third and most voluminous (written between 1909-1912) is subtitled "Les précurseurs parisiens de Galilée" and is preceded by a preface which has the force of a manifesto:

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false, as demonstrated in Martin 1991, *passim*. As shown in the famous letter to Father Bulliot dated May 21, 1911, Duhem does not make apologetics with his discoveries: he asks the Catholics to understand that the *facts* he discovered prove that the anti-Catholic and anti-Christian theses regarding the Middle Ages are false, *factually* false (the text of the letter may be found in Pierre-Duhem 1936, 158-169; closer to our times, it was reproduced in Jaki 1990, 235-239 (Nr. 15: "Deux chaires catholiques pour les sciences").

<sup>19</sup> As a faithful of the Roman Catholic Church, perhaps Duhem would have liked to believe that the church had stimulated the free research, but before the *annus mirabilis* 1903 he did not have evidence that this could have happened. Therefore, as a good scientist, he allowed the Christian in himself only the exercise of faith, accepting as *factum* only what historical knowledge allowed him to accept as philosophical truth. Thus, he stated in his studies prior to the discovery of the physics of the Middle Ages exactly the opposite of what he would have perhaps liked to believe, namely that the period of maximum social development of Christianity was also an era of total scientific sterility. Therefore the discovery of the physics of the Middle Ages was not an apologist's work.

La science mécanique inaugurée par Galilée, par ses émules, par ses disciples, les Baliani, les Torricelli, les Descartes, les Beeckman, les Gassendi, n'est pas une création; l'intelligence moderne ne l'a pas produite de prime saut et de toutes pièces dès que la lecture d'Archimède lui eut révélé l'art d'appliquer la Géométrie aux effets naturels. L'habileté mathématique acquise dans le commerce des géomètres de l'Antiquité, Galilée et ses contemporains en ont usé pour préciser et développer une Science mécanique dont le Moyen-Âge chrétien avait posé les principes et formulé les propositions les plus essentielles. Cette Mécanique, les physiciens qui enseignaient, au XIV<sup>e</sup> siècle, à l'Université de Paris l'avaient substitué à la Dynamique d'Aristote [...]. Au temps de la Renaissance, l'archaïsme superstitieux, où se complaisaient également le bel esprit des Humanistes et la routine averroïste d'une Scolastique rétrograde, repoussa cette doctrine des 'Modernes'. [...] Mais à la suite des condamnations portées, en 1277, par l'évêque de Paris, Étienne Tempier, contre une foule de thèses que soutenaient 'Aristote et ceux de sa suite', voici qu'un grand nombre se dessine, qui va libérer la pensée chrétienne du joug du Péripatétisme et du Néoplatonisme, et produire ce que l'archaïsme de la Renaissance appellera la Science des 'Modernes'. [...] Cette Mécanique, à la fois céleste et terrestre, à laquelle Newton devait donner la forme que nous admirons aujourd'hui, la voici, d'ailleurs, qui, dès le XIV<sup>e</sup> siècle, tente de se constituer. [...] Cette substitution de la Physique moderne à la Physique d'Aristote a résulté d'un effort de longue durée et d'extraordinaire puissance. [...] Jusqu'à ces dernières années, la Science du Moyen-Âge était tenue pour inexistante. (Duhem 1984 B, v, vii, x, xiii)

When he was writing these lines, on the 24th of May 1913, the first volume of *Le Système du Monde* had already appeared, and the next four volumes were probably already drafted<sup>20</sup>. This history of cosmological

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<sup>20</sup> Martin 1991, 10.

doctrines from Plato to Copernicus, the crowning and final mark of the discovery from the autumn of 1903, was designed to completely change the fate of specialized historical scholarship, creating a new academic discipline and setting in a sustainable and authoritative manner its further developmental milestones<sup>21</sup>. In these volumes there are comprised in their most elaborate form all the findings and interpretations which, put together, we could call the “Pierre Duhem Thesis”.<sup>22</sup> I claim that there is an argument which encompasses all of Pierre Duhem's discoveries regarding the history of science and that this argument can be synthesized as a combination of several principles, sentences and conjectures forming a whole which I call the “Pierre Duhem Thesis”.

What is, then, the “Pierre Duhem Thesis”? Most generally, the “Pierre Duhem Thesis” states that the Latin Middle Ages had a significant and important (even decisive) contribution to the gradual progress of science, from Antiquity until the 17th century. Analyzed in its particular statements, the “Pierre Duhem Thesis” can be summed up by stating its several sub-theses:

(i) The sub-thesis “The Theological Revolution”.<sup>23</sup> In the preface to the third part of *Le Système du monde*, significantly entitled “Le

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<sup>21</sup> John E. Murdoch, a very severe critic of Duhem's thesis, acknowledges in the conclusion of an article dedicated to his contribution to the history of medieval science that „Duhem has to a great extent set the topics for subsequent historians of late medieval science. Not only have earlier investigators, like Dijksterhuis and Michalski, followed Duhem's scenario, but the same has been true to a large extent in the case of others who have addressed the history of fourteenth-century science in general, such as Maier and Clagett. Duhem's influence in this regard is, moreover, no less evident among historians of medieval philosophy than among historians of medieval science. [...] In conclusion, then, when Dana Durand claimed that all future historians would spend most of their time «working intensively the veins» Duhem had opened, he did not sufficiently appreciate that the lode ran well beyond the history of medieval science and penetrated well into the terrain of late medieval philosophy. And all that in spite of the continued successful criticism of the yield Duhem had derived from it.” (Murdoch 1991, 299; 301-302)

<sup>22</sup> What I call here “the Duhem Thesis” has nothing to do with “the Quine-Duhem thesis” (sometimes called “the Duhem-Quine thesis”, “the Duhem thesis”, or “the D-Thesis”); the Duhem Thesis I refer to is deducted directly from his writings and is not assigned to him *par méprise*, such as “the Quine-Duhem thesis,” which, as demonstrated by Robert Ariew, is *not* related with what Duhem himself advocated (*cf.* Ariew 1984, 313-325).

<sup>23</sup> Curiously enough, the notion of a “Theological Revolution”, although central in Duhem's argument, has never been analyzed in the specialized literature.

péripatétisme, les religions et la science d'observation",<sup>24</sup> Duhem advances the argument that Greek science was prevented from developing and evolving beyond a certain threshold (where it was blockaded) by its philosophical and religious premises, which were neo-platonic and "astro-biological" (the divine nature of stars, the animation of matter, etc.)<sup>25</sup>. This blockage could only be overcome by ensuring a "theological revolution" as a precondition for the adoption of the Copernican theory; through the "theological revolution" applied to the mind, it was freed from the ontological premises of Neoplatonism and astrobiology, which allowed its opening to an ontological perspective compatible with the data of existence of the modern science of nature<sup>26</sup>.

A similar argument is to be found in the second part of *Le Système du Monde*, which is entitled "L'Astronomie latine au Moyen Âge" and begins with a section called "Les Pères de l'Église et la science profane".<sup>27</sup> Duhem brings into attention that, although it is not possible to find in the works of the Church Fathers scientific contributions comparable to those of the Greek science, their views should not be ignored because "their teachings in Physics and Astronomy are the primal germs out of which medieval Christian cosmology will slowly and gradually develop."<sup>28</sup> The Church Fathers attacked from the perspective of Christian theology the principles of Greek science which happened to be exactly those which, according to Paul Tannery<sup>29</sup>, contributed the most to blocking the progress of ancient science and exhausted its fertility: the principle of the eternity of prime matter, the faith in the domination of stars over sublunary life, and the temporal cyclicity of the world. Duhem's conclusion is: "En ruinant, par ses attaques, les Cosmologies du Péripatétisme, du Stoïcisme et du Néo-Platonisme, les

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<sup>24</sup> The subject is treated in Duhem 1973, 309-320 (troisième partie: "La crue de l'aristotélisme", "Avant-propos": "Le péripatétisme, les religions et la science d'observation"). Anastasios Brenner underlines the importance of this section by fully reproducing it in Duhem 1997 B, 225-236 (with a small omission: compare Duhem 1973, 314 to Duhem 1997 B, 230).

<sup>25</sup> The term "astrobiology" was coined by René Berthelot, *La pensée de l'Asie et l'astrobiologie* (Berthelot 1938).

<sup>26</sup> Duhem 1973, 316-317.

<sup>27</sup> Duhem 1984 C, 392-408; Duhem 1997 B, 125-138.

<sup>28</sup> Duhem 1984 C, 407-408; Duhem 1997 B, 138.

<sup>29</sup> Tannery 1893, 280-281.

Pères de l'Église font place nette à la Science moderne.”<sup>30</sup> And here, even though he does not explicitly use the formula of “theological revolution”, one still basically speaks of a “theological revolution”, understood by Duhem, like in the first case, as a prior mental framework able to make possible “the reason of the believer”<sup>31</sup> – that is, the reason which, thus *positioned*, could modern-physically think of nature.

(ii) The sub-thesis “The Condemnation of 1277”. Although medieval Aristotelianism was important for the maturation and professionalization of reflection in natural philosophy, the release from its philosophical premises was the second fundamental precondition for the further development of science beyond the achievements of ancient science. The second precondition was realized by what we could conventionally call “the Condemnation of 1277”, by which the medieval mind was compelled by the exigencies of the Christian faith to think the natural world starting not from the Greek (Aristotelian) necessitarianism, as the 13<sup>th</sup>-century scholasticism did, but from the absolute power of God (*potentia Dei absoluta*). The spirit of the Condemnation is illustrated by Article 147, which condemns the opinion that it is impossible for God something suitable for nature (where the impossible did not designate the logical impossible, which was accepted, but the natural one, which was rejected). This way of seeing things removed the Aristotelian obstacles in the conception of nature and in the discourse about it (it was only thus that one could admit the plurality of worlds and the existence of vacuum, which nature such as Aristotelianism understood it rejected as impossible), and favored the thought regarding the counterfactuals by the appearance and generalization of the ratiocination by “thought experiments” (*Gedankenexperimente*).<sup>32</sup> For this reason, according to Duhem, the Condemnation of 1277 is one of the possible points that might date the “birth” of the modern science of nature.<sup>33</sup>

(iii) The sub-thesis “The Continuity”. After having discovered the statics of the Middle Ages (*annus mirabilis* 1903), Duhem became convinced that not only the selection of the hypotheses on which physical

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<sup>30</sup> Duhem 1984 C, 408; Duhem 1997 B, 138.

<sup>31</sup> Duhem 1984 C, 315; Duhem 1997 B, 231.

<sup>32</sup> Grant 1984, 537-539.

<sup>33</sup> Duhem 1984 A, 408-423; Duhem 1984 B, vii; the complete discussion of the Condemnation's consequences is in Duhem 1984 D, *passim*.

theory is built is subjected to a principle of continuity (1893)<sup>34</sup>, but also the history of science follows this principle, according to the historical observation that science progresses gradually and continuously, without rupture or revolution:

La science mécanique et physique dont s'enorgueillissent à bon droit les temps modernes découle, par une suite ininterrompue de perfectionnements à peine sensibles, des doctrines professées au sein des écoles du moyen âge ; les prétendues révolutions intellectuelles n'ont été, le plus souvent, que des évolutions lentes et longuement préparées ; les soi-disant renaissances que des réactions fréquemment injustes et stériles ; le respect de la tradition est une condition essentielle du progrès scientifique.<sup>35</sup>

The sub-thesis of continuity has therefore a double aspect: an epistemological one, when it is applied to science; a historical one, when it is applied to the history of science.

(iv) The sub-thesis “Galileo's forerunners of the 14<sup>th</sup> century” (or “Duhem's canonical voster”). Within the overall framework of the thesis of continuity, Duhem argues the exceptional importance of the contributions belonging to the scholastics of the 14<sup>th</sup> century, primarily those who taught at the University of Paris (Jean Buridan, Nicole Oresme, Albert de Saxe, Thémom Judaeus, Marsilius of Inghen), and then of those who were associated with Merton College, Oxford (Thomas Bradwardine, Roger Swineshead, William Heytesbury, Richard Kilvington, John Dumbleton).<sup>36</sup>

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<sup>34</sup> Duhem 1893.

<sup>35</sup> Duhem 1905 B, iv (the Preface is dated March 21, 1905).

<sup>36</sup> The different appraisals of the two schools, the Paris and the Oxonian ones, have two explanations: firstly, a sort of anti-English preconception and a French nationalism, argued by the taste for the elegant ratiocination (*l'esprit de finesse*) and the repulsion for (the excess of) logicism; secondly, there is an epistemological limit of understanding (see Murdoch 1991, 262-270): according to Murdoch, Duhem did not understand the exceptional epistemological value of the “sophismata” exercises, which he treated as „cette acrobatie logique [qui] était le *sport* en vogue à l'École d'Oxford” (Duhem 1956, 619): the type of ratiocination developed and refined in order to solve the *sophismata*, named by Murdoch “*secundum imaginationem* reasoning”, was in his opinion the

These contributions form “Duhem's canonical list” (or, as John E. Murdoch named it, “Duhem’s canonic roster of fourteenth-century accomplishments”).<sup>37</sup> The scientific achievements of the 14th century, which according to Duhem show the debt of Galileo and Descartes to the physics of the Middle Ages, would run as it follows (I pursue the list established by Murdoch): the correct explanation of the reason for which the motion of a projectile continues after it is not moved by an agent; the correct explanation of the uniformly accelerated motion in free fall; the development of the theory regarding the “latitude of forms”; the postulation of the possibility of existence of infinite and infinitesimal quantities, of space vacuum, of the rotation of the earth, and of the plurality of worlds; the crystallization of new and clear concepts of motion, place and time, which were non-Aristotelian.

(v) The sub-thesis “The Domingo de Soto connection”. Duhem discovered, in a treatise on Aristotle's physics written by Domingo de Soto and published in 1545, that in the scholastic tradition to which the author pertained the following theorems were well known: the free fall of bodies is a motion accelerated with respect to time; the motion of a body thrown vertically upwards is uniformly slowed; in order to calculate the space covered in both movements, one must apply the demonstrations developed by Nicole Oresme for the *uniformiter difformis* movement (or, which is the same thing, the mean speed theorem developed by the Mertonians).<sup>38</sup> “Ces lois, d’ailleurs”, says Duhem,

il n’en revendique pas l’invention; bien plutôt, il semble les donner comme vérités communément reçues; sans doute, elles étaient couramment admises par les maîtres dont, à Paris, Soto a suivi les leçons. Ainsi, de Guillaume d’Ockam à

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fundamental scientific novelty of the 14th century, a fact completely unnoticed by Duhem (Murdoch 1991, 291-292). Murdoch quotes two important authors to support his point of view (Murdoch 1991, 294, note 192): “Man möchtet beinahe sagen: Bradwardine wollte die Principia mathematica philosophie naturalis seines Jahrhunderts schreiben” (Maier 1949, 86, note 10); „[Bradwardine’s *Tractatus de proportionibus*] should be seen as at least a partial attempt to create a new mathematical science of motion” (Molland 1978, 572).

<sup>37</sup> Murdoch 1991, 258.

<sup>38</sup> Duhem 1984 B, 555-562. Duhem only refers to Oresme (561) and mentions Bradwardine in passing (557).

Dominique Soto, voyons-nous les physiciens de l'École parisienne poser tous les fondements de la Mécanique que développeront Galilée, ses contemporains et ses disciples.”<sup>39</sup>

Historiography took on this thesis of Duhem under the form of two research programs designed to solve the “two de Soto enigmas”. Koyré is the first who, in an article in the late 50s, referred to this Duhem thesis as the “enigma of Domingo de Soto”. Here we have it in his wording:

[h]ow did [Domingo de] Soto arrive to give the movement of falling as an example of uniformly accelerated motion and even to describe as something self-understood this transposition of a purely mathematical conception into physical reality, although the mathematicians and logicians of the schools in Paris and Oxford have not realized this transposition?”<sup>40</sup>.

The second “de Soto enigma” is whether and how Galileo came to know Domingo de Soto's theorems (Duhem's conjecture being that the missing link between Galileo and the 14th-century physics is Domingo de Soto).<sup>41</sup> The answer to the second enigma and the acceptance of the truth of the three theorems attributed by Duhem to Domingo de Soto represent the “Domingo de Soto connection”.

While contemplating the nature of the five special sub-theses which compose together the general “Duhem Thesis”, two implicit observations emerge.

The first observation is that, in relation to what we now call “the birth of the modern science of nature in the 17th century,” sub-theses (i) and (ii)

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<sup>39</sup> Duhem 1984 B, p. xi.

<sup>40</sup> Koyré 1971 B, 106. Koyré's question starts from the assumption that Soto, while not being “a great philosopher” and his physics being “traditional and eclectic”, surprisingly fell on an innovative and correct solution to the problem of falling and vertical projection of bodies; in the same time, Koyré wondered, “how come that from him to Galilei [Soto's solution] was not adopted by anyone?”.

<sup>41</sup> This second enigma was finally solved by William A. Wallace, who confirmed Duhem entirely (Wallace 1968, 384-401).

are of one type, while sub-theses (iv) and (v) are of another. The former have the structure of transcendental reasoning, which has the form: “in order for ‘X’ to be possible, the  $\{y_n\}$  conditions must take place”; the latter have the structure of causal reasoning, having the form: “the existence of ‘Y’ produces the existence of ‘X’”. Neither the “theological revolution”, nor the “Condemnation of 1277” do not represent *effective causes* of the emergence of the modern science of nature. We could call them transcendental “conditionalities”, in order to decidedly distinguish them from the effective causes, which alone are “causal”. The transcendental “conditionalities” create the framework which makes possible, under certain conditions, the appearance of something, but do not necessarily or directly actuate its appearance. To make possible does not effectively mean to be a cause, but rather to open a field of possibilities. If this “field of possibilities” is not opened, the occurrence of the causes which could theoretically be effective remains without effect. The effectiveness of the effective causes is conditioned by the existence of a “field of possibilities”; and the “field of possibilities” is opened only by the activation of some transcendental “conditionalities”.

The second observation is that the two aspects of sub-thesis (iii) (the thesis of “continuity”), the epistemological-methodological and the historical one, are fundamentally inseparable.

On the one hand, the thesis of continuity is a methodological principle of prescriptive nature, deeply rooted in Duhem's conception of physical theory: “The thesis of historical continuity is one part of his epistemology with which Duhem attempts to resolve the problem of the choice of hypotheses.”<sup>42</sup> The methodological principle of continuity saves from mutual incoherence the particular theories of physics and makes them advance in their historical evolution towards a “natural classification” of things which will reflect the ontological truth of the final theory.<sup>43</sup> It is

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<sup>42</sup> Maiocchi 1990, 395. Maiocchi's thesis on Duhem was extensively developed in Maiocchi 1985.

<sup>43</sup> Duhem 1987, 132-138: at pp. 134-135, Duhem speaks of the fact that the methodological principle of continuity eliminates the incoherence of the theories based on irreconcilable hypotheses; and at pp. 136-138 he speaks of the natural classification and of the perfection of the ideal theory. For natural classification, see also: Duhem 1997 A, 460. In recent literature, Sonia Maria Dion argued that “[t]he association of natural classification to the thesis of historical continuity [is] an essential condition to the possibility of assigning a goal to the evolution of physical theory” (Dion 2013, 12–19).

exactly the methodological aspect of the thesis of historical continuity that makes Duhem's epistemology to be not conventionalist or instrumentalist, but realistic in a special way (“convergent or motivational realism”).<sup>44</sup>

On the other hand, when referring to the history of science, the thesis of continuity has a contingent aspect, as Ariew and Barker noticed: “the thesis is most compelling as a contingent claim about history of science: continuity just happens to be the case; it could have been otherwise.”<sup>45</sup> Indeed, Duhem reached the thesis of “continuity” *a posteriori*, as a result of the discovery he had made, and not *a priori*, as a result of the identification of a philosophical principle that lies beyond experience and is independent of it. As such, from a historical perspective, we could say that the thesis of continuity does not function for Duhem as a philosophical or teleological principle, but as a description.

At the same time, we must note that the methodological prescription imposed on particular theories *in epistemology* has necessary consequences on the evolution of theories towards a “natural classification” (the final theory) *in history*. In fact, the *proper* functioning of epistemology creates a *certain* history and no other. That is why I said that the two aspects of sub-thesis (iii), the epistemological-methodological and the historical ones, are non-separable. And for this reason I think that the real challenge of the thesis of continuity formulated by Duhem is not in its understanding as a historical-contingent statement of the type “it may have also been different, even though it actually happened so” (the Ariew & Barker interpretation cited above), but as a strong statement of the type “it happened so, because it could only happen that way” (the Jaki thesis).<sup>46</sup> Formulated briefly, the Duhem-Jaki thesis (as Eric V. Snow names it)<sup>47</sup> argues that “the

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<sup>44</sup> The phrase “motivational realism” belongs to Karen Merikangas Darling (Darling 2003, 1125–1136); see also Ariew 2014, § 2.2.

<sup>45</sup> Ariew and Barker 1992, 323.

<sup>46</sup> The main books in which Stanley L. Jaki dealt with the conditions necessary for the birth of the modern science of nature, analyzing both the situations when science couldn't and didn't appear, although its birth seemed imminent (what he calls “the 'stillbirth' of science”), as well as the situations when science could and did appear are: Jaki 1974; Jaki 1978 A; Jaki 1978 B; Jaki 1988 A; Jaki, 2000.

<sup>47</sup> Snow 1998.

world view of Christianity was absolutely necessary for the rise of modern science”.<sup>48</sup>

These two observations allow us to more clearly evaluate the complex structure of what I call “the Pierre Duhem Thesis”. “The Pierre Duhem thesis” is, in my opinion, the central argument of Pierre Duhem's work as historian of science. “The Pierre Duhem thesis” cannot be reduced to any of its sub-theses. The five sub-theses are not independent, they do not work separately (but only as a system) and do not relate to reality separately (but only simultaneously). Their diverse theoretical status (some have a transcendental character, while some other causal, factual, or descriptive ones) makes the way in which they relate each and all together to historical reality to be particularly complex. Therefore, the factual assessment of the sub-thesis, as well as the historical judgment on the value of the overall argument advanced by Duhem must, I think, be both balanced and prudent, and the identification of the direct causalities must always be combined with the understanding of the role of transcendental “conditionalities”.

The distinction between transcendental “conditionalities” and effective causes is essential to understand the finesse of Duhem's argument. For example, Duhem never claimed that the modern science of nature is due to the Condemnation of 1277<sup>49</sup>. He referred to the Condemnation as to some

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<sup>48</sup> That does not mean, as François Mentré already warned shortly after the death of Duhem, that science is a “Christian product”: “Duhem does not say that modern science is a product of Christianity; he rather says that Christianity has been an auxiliary, and an indispensable one, to the scientific development” (Mentré 1917, 139, note). Stanley Jaki, who quotes this warning, wholly approves it: “This is an all-important point, often forgotten in sympathetic portrayals of the role of Christianity in the rise of science” (Jaki 1984, 231-232, note 36).

<sup>49</sup> This is how Alexandre Koyré chose to read Duhem's statements, and his interpretation became authoritative, *à compris* among the historians of the Middle Ages (even though he was not one): Koyré 1949 (reproduced in Koyré 1971 A, 37-45); for the effect on the historians of the Middle Ages, see the influence of this article on Marshall Clagett: “I was [...] impressed by his beautiful paper “Le Vide et l'espace infini au XIV<sup>e</sup> siècle,” and particularly by the doubt it cast on the easy generalizations of Pierre Duhem.” (“Commemoration,” *Isis*, Vol. 57, 1966, quoted in Cohen 1987 A, 60) – Clagett was mainly impressed by the way Koyré amended Duhem! It was precisely this malicious reading, which positively impressed Clagett, that the later historians of the Middle Ages would reveal as historically false (see Beaujouan 1987, 425-429; and Grant 1979, 211-244; for an overall assessment, see Grant 1996, 70-126).

transcendental “conditionalities” which opened for the physics of the 14th century a “field of possibilities”, just as the “Theological Revolution” functioned, in relation to the “astrobiology” of the Greeks, as an inhibitor of ontological representations, opening by these very inhibitions the horizon of some other representations, more capable than their antecessors to make system with principles favorable to the development of a mathematical science of nature, overcoming thus the impasse of the Greek science. At the same time, the sub-thesis of continuity must be understood both in its double epistemological- normative and historical-descriptive aspect (see discussion above), as well as in terms of the complex historical causalities: a fine interaction between transcendental “conditionalities” and effective causes.

Given the complexity of the historical argument formulated by Duhem (which I named “the Pierre Duhem Thesis”), the legacy of his findings was reportedly extremely complex. Duhem established a number of facts (the physics of the Middle Ages, the canonical roster etc.), proposed several causal links (the Domingo de Soto conjecture, implying the Collegio Romano connection etc.), argued some historical “conditionalities” of transcendental type (the Theological Revolution, the Condemnation of 1277) and advanced the great historical hypothesis of continuity (the Parisian precursors of Galileo).

## II.

Pierre Duhem's findings were epoch-making. They revealed a sunken and completely forgotten continent (the physics of the Middle Ages), put on the map the topic of the links between the modern and the medieval worlds (which seemed to be resolved by the extremist views of Petrarch in the 14th century and Voltaire in the 18th), restructured completely the contents of the history of science and of the history of medieval philosophy, and gave impetus to a deeper institutional transformation in the teaching of history and philosophy of science.

Here are some testimonials. One of the historians of the Middle Ages most critical of Duhem, John E. Murdoch, finds that Duhem's discoveries grounded the discipline called “the history of medieval science.”<sup>50</sup> Moreover, despite criticisms that have been constantly made,

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<sup>50</sup> Murdoch 1991, 254.

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“Duhem has set to a great extent the topics for subsequent historians of late medieval science”,<sup>51</sup> his research agenda asserting itself not only to the historians of science, but also to the historians of medieval philosophy.<sup>52</sup> Murdoch admits that

many of the scholars who have been critical of Duhem have at the same time insisted upon his importance in essentially founding the history of medieval science [...] and how so much later history of fourteenth-century medieval science – and fourteenth-century medieval philosophy for that matter – functioned as ‘footnotes’, yea or nay, to what he had maintained.<sup>53</sup>

With his reference to “footnotes”, Murdoch alludes to Whitehead's famous witticism,

The safest general characterization of the European philosophical tradition is that it consists of a series of footnotes to Plato.<sup>54</sup>

Similarly, Murdoch (a critic of Duhem, we must not forget that!) implies that medieval studies are a series of footnotes to Duhem.<sup>55</sup>

Two other major American medievalists express themselves in the same vein. Dana B. Durand (1941):

Duhem deserves the enormous credit of having opened a new field of scholarship. He was the first to fray an unbroken vista backward into the medieval antecedents of modern science.

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<sup>51</sup> Murdoch 1991, 299.

<sup>52</sup> Murdoch 1991, 302.

<sup>53</sup> Murdoch 1991, 254; 255.

<sup>54</sup> Whitehead 1978, 39.

<sup>55</sup> Dana B. Durand had already made this observation fifty years earlier, noting that „[f]or twenty years subsequent work on Oresme as a scientist very largely took the form of footnoting Duhem.” (Durand 1941, 171).

[...] all future work [in the history of medieval science] will consist, in large measure, in working the veins which he has opened.<sup>56</sup>

Marshall Clagett (1959):

one can say that in a sense the succeeding study of medieval mechanics has been largely devoted to an extension or a refutation of Duhem's work.<sup>57</sup>

Here is the testimony of a traditional historian of science, Henry Guerlac (1961):

if I were to single out the most notable achievement, it is the leadership of those men who have taught us how to focus upon the evolution of key scientific ideas and concepts. In this, Pierre Duhem is the acknowledged teacher of us all, whether medievalist or not.<sup>58</sup>

And Duhem's most intransigent French critic, Alexandre Koyré, said of him:

If Duhem had never made any mistakes, we would have had no great jobs to do. We have lived on his mistakes.<sup>59</sup>

We reach thus the great paradox of Duhem's posterity. Even though "Pierre Duhem is recognized universally for founding the modern historical study of medieval science", Roger Ariew observed in 1992<sup>60</sup>, "Duhem's influential contemporaries did not receive his historical work with

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<sup>56</sup> Durand 1941, 168-169.

<sup>57</sup> Clagett 1959, xxi.

<sup>58</sup> Guerlac 1963, 809.

<sup>59</sup> Cohen 1987 A, 57 (this is what Koyré replied to Cohen, when he drew his attention to an error in one of his papers).

<sup>60</sup> Ariew and Barker 1992, 323.

sympathy".<sup>61</sup> Unlike his works on the philosophy of science, which were immediately accepted by his contemporaries and embraced by subsequent generations, his works of history of science, although recognized for their importance (as we saw), were immediately rejected in their philosophical and cultural significance. This is the paradox of the posterity of the great discoveries in the history of science made by Pierre Duhem: on the one hand, the recognition of their importance; on the other hand, the refusal to give them any significance. A paradox which, of course, requires an explanation.

The first observation is that the initial posterity of Duhem's discoveries recognized them both their importance and significance. Heinrich Wieleitner (1912-1914), B. Jansen (1920), E. J. Dijksterhuis (1924), Konstantyn Michalski (1927) and Ernst Borchert (1934) belong to this initial posterity.<sup>62</sup> But this posterity did not have a posterity itself. After World War II, Duhem's successors are rare and do not set the fashion.<sup>63</sup> Historical research is conducted on the directions opened by Duhem, but the orientation of the studies is, with rare exceptions,<sup>64</sup> anti-Duhemian.

The second observation is that the posterity of Duhem was divided into two not on what regarded the *importance* of his discoveries, but on their *significance*. The importance of these findings has been virtually never questioned; but their significance has aroused the most vivid and negative emotions and was strongly contested. Two of Duhem's theses were immediately rejected: the thesis that one might speak of a medieval origin of the modern science of nature, and the thesis that the act of the Condemnation of 1277 had any significance for scientific reflection. The general philosophical argument which challenged the significance of Duhem's discoveries was the context: however close the propositional formulations of modern physics to the formulations of medieval physics' sentences, it was said, they are separated by context; and the context of the 14th century is separated from the context of the 17th century by an abyss: the abyss

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<sup>61</sup> Ariew 2014, § 3.

<sup>62</sup> The works for which we have only indicated the years are given by Murdoch 1991, 272-273. A vast cultural presentation of the posterity of Duhem's discoveries, in Jaki 1984, 406-433.

<sup>63</sup> The vast synthesis of Crombie 1952 is an exception.

<sup>64</sup> A.C. Crombie, Adriano Carugo, William A. Wallace.

between the modern world and the medieval world. Both the significances and the argument belong to the same thesis: that of continuity. Therefore, the stumbling rock which cut in two Duhem's posterity was the thesis of continuity; and the rejection of the significance of his discoveries was meant to maintain the abyss which separates the medieval world from the modern world. The posterity which denied Duhem's discoveries their significance, accepting at the same time their importance (as historical material), was the one who triumphed. And the *tone* of this posterity was given by the keepers of Galileo's memory.

In 1918, less than two years after Duhem's death (which occurred on September 14, 1916), Antonio Favaro, the editor of the magnificent edition of Galileo Galilei's works,<sup>65</sup> published an article with the suggestive title "Galileo Galilei e i Doctores Parisienses" in which he rejected in a categorical manner the thesis of continuity, formulated by Duhem in the volume *Études sur Léonard de Vinci* (troisième série, 1913), at whose subtitle, "Les précurseurs parisiens de Galilée", he was alluding in the title of his article.<sup>66</sup> Favaro's argument was that Galileo's manuscript referred to by Duhem (Ms. Gal. 46)<sup>67</sup> contained only course notes taken by Galilei in Pisa, between 1582 and 1584, while attending the courses of Francesco Bonamico (whose bulky course was to appear in 1591 under the title *De motu*). Therefore, in those pages of youth there would be nothing else than juvenile notes coming from Bonamico's *De motu*, having nothing to do with the Doctores Parisienses. This lead will be followed by Koyré in *Études galiléennes* (1939), as he believed that Bonamico was the source of Galileo's knowledge on the natural philosophy of Aristoteles. He was wrong. If he had followed Duhem, he would have taken the correct path confirmed fully by recent scholarship.<sup>68</sup>

The Galilean manuscript no. 46 (Ms. Gal. 46) contains excerpts from the courses of several Jesuit teachers from Collegio Romano, who used the Mertonian terminology in a way which suggests that the source of their teaching were the Parisian Doctors, as Duhem stated<sup>69</sup>. Moreover, the

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<sup>65</sup> *Le Opere di Galileo Galilei. Edizione Nazionale*, 20 volumes, 1890-1909.

<sup>66</sup> Favaro 1918, 3-14.

<sup>67</sup> Published by Favaro as "Juvenilia" in the first volume of the *Edizione Nazionale*.

<sup>68</sup> Wallace 1977; Wallace 1981; Crombie and A. Carugo 1983, 1-68; Drake 1986, 429-488.

<sup>69</sup> Carugo 1987, 321-333; Wallace 1987, 301-320; Crombie 1987, 87-88.

Galilean manuscript number 27 (Ms. Gal. 27), which Favaro refused to publish considering it filled with school exercises from Galileo's childhood, actually treated accurately and in detail fundamental ideas of the Aristotelian theory of scientific knowledge and demonstration, a work produced within the Jesuit culture at the end of the 16th century, in the era of Galileo's maturity.<sup>70</sup> All these show that Galileo had built his scientific reflection in an environment saturated with the references, concepts, conceptions, formulations and problematizations of the 14th-century physics, which represented the background of Collegio Romano's Jesuit education. And when he contradicted these scholars, Galileo was using their examples or counterexamples, as it can be seen from his wording and references, which closely follow theirs (sometimes surprisingly servile).<sup>71</sup> Traces of these influences can be detected until late in his works.

Recent research has confirmed both the importance of 14th-century physics, as well as its influence on Galileo. Moreover, the culture of physics' mathematization in the style of the 14th-century physicists was a commonplace among the Jesuit scholars Galilei was in contact with and constituted the dominant conception for some of the most influential ones, such as Christopher Clavius, the mathematician who realized the 1582 Gregorian reform of the calendar and claimed that

[without mathematics] physics cannot be correctly understood, particularly in the part that deals with the number and motion of celestial orbs, [...] the effects of the stars that are dependent on their various conjunctions, oppositions, and other distances between them, the division of continuous quantity to infinity, the ebb and the flow of the sea, winds, comets, rainbows, halos and other meteorological phenomena, and the ratios of motions, qualities, actions, reactions, and so on, on which the *Calculatores* have written much. (Clavius 1586)<sup>72</sup>

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<sup>70</sup> Carugo 1987, 324-325.

<sup>71</sup> Carugo 1987, 328-333 (330-333: the demonstration that Galileo's information about Hipparchus or Philopon were completely dependent on Pererius).

<sup>72</sup> Quoted by Wallace 1987, 313.

There existed an authority of mathematical sciences at the Collegio Romano, which illustrates that before the mathematization of physics in the 17th century there was a “mathematical physics in the Aristotelian sense,” which, as Duhem has understood, derived from the Merton College Calculators and reached Galileo through the style the Parisian Doctors had in doing physics.<sup>73</sup> All these facts look very much like Duhem and nothing like Koyré. This is not *exactly* Duhem, but it is surely the opposite of what his negative posterity believed and argued. However, even though he was wrong in almost all the criticism he raised against Duhem, Duhem's posterity belonged to Alexandre Koyré.

The turning point in the posterity of Duhem's discoveries was the notion of “Scientific Revolution”. It was developed by Alexandre Koyré between 1935-1937<sup>74</sup> and systematically presented for the first time in his volume of *Études galiléennes*, published in 1939, in the conferences “Entretiens sur Descartes” (1937), published in French and Arabic in Cairo in 1937, and in the article “Galileo and Plato”, published in *Journal of the History of Ideas* in October 1943.<sup>75</sup> The concept of “scientific revolution” is described by Alexandre Koyré as follows:

In his study “À l'aube de la science classique” (1935), the “Scientific revolution” is the “scientific revolution of the 17<sup>th</sup> century” and is described

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<sup>73</sup> Wallace 1987, 313-314 (especially 314: „From all these indications it would seem that the fourteenth-century work at Oxford and Paris on *calculations*, transmitted via Spain and Portugal to Rome and other centers where Jesuits had colleges, figured in the rise of mathematical physics at the beginning of the seventeenth century”).

<sup>74</sup> 1935 is the year when Koyré published in *Annales de l'Université de Paris* (10<sup>e</sup> année, 1935: 540-551; 11<sup>e</sup> année, 1936: 32-56) the study entitled “À l'aurore de la science moderne,” which expanded was to become (slightly modified and having the new title “À l'aube de la science classique”) the first part of the volume *Études galiléennes* (Koyré 1939): there he introduces for the first time the idea of Scientific Revolution as “intellectual mutation”, with no common relation with the medieval mind (Koyré 1939, 544-545); and 1937 is the year when, at Cairo, Koyré delivers and publishes his three conferences “Entretiens sur Descartes” (Koyré 1962, 163-229), where there is presented in perfectly articulated form the theory of Scientific Revolution (Koyré 1962, 184-210).

<sup>75</sup> Koyré 1939; Koyré 1962 (for the topic of the “Scientific Revolution”, see the Second “Entretien”, titled “Le Cosmos disparu”: 184-210); Koyré 1943 (reproduced in Koyré 1973, 166-195). An observation regarding the first title chosen by Koyré, “À l'aurore de la science moderne”: in *Le Système du Monde*, tome IV (1916), Duhem used the phrase “l'aurore du XVII<sup>e</sup> siècle” (Duhem 1973, 312); it is impossible that Koyré had not seen it.

as “une véritable ‘mutation’ de l’intellect humain” (“a veritable ‘mutation’ in human thought”), probably the most important one from the invention of the Cosmos by the Greek thought;<sup>76</sup> this “decisive mutation” consists in the “transformation of the very frames of intelligence”;<sup>77</sup> the “mutation” was necessary because it was only by a “transformation of the frames of intelligence” that nature could be interrogated in a mathematic language (“dans un langage mathématique, ou plus exactement géométrique”);<sup>78</sup> this new “intellectual attitude” yielded two things, closely linked to each other: the “geometrization of space”, with the “dissolution” of the Cosmos and the disappearance of any reference in the scientific language to the Cosmos; and the replacement of the concrete space of pre-Galilean physics with the abstract space of the Euclidean geometry;<sup>79</sup> the inner rupture of the mind makes modern physics take place in another plan (called by Koyré “Archimedean”) than the physics of the “Parisian precursors of Galileo”, which would have stayed attached to the “Aristotelian” plan of the Cosmos; the scientific revolution makes Archimedes the forerunner of modern physics, instead of Buridan and Oresme.<sup>80</sup>

We see that for Koyré the scientific revolution is both a return to the distant past (to Archimedes) with exactly that mind unconverted by the revolution (for the plan in which modern science evolves is “Archimedean”) and a radical break with the recent past (the 14<sup>th</sup> century), namely through the new mind of the scientific revolution, which broke away from the past by the “transformation of the very frames of intelligence”.

In the conferences “Entretiens sur Descartes” (1937), the scientific revolution is an aspect of a broader “intellectual revolution”, part of a “*spiritual revolution*”<sup>81</sup> which should be seen as an “*itinerarium mentis in veritatem*”<sup>82</sup> and which has decisive consequences for human consciousness in general: this “spiritual revolution” is the “Cartesian revolution”<sup>83</sup> itself,

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<sup>76</sup> Koyré 1939, I-5 - I-6 (5-6).

<sup>77</sup> Koyré 1939, I-9 (9).

<sup>78</sup> Koyré 1939, I-7 (7).

<sup>79</sup> Koyré 1939, I-9 (9); III-51 (201).

<sup>80</sup> Koyré 1939, p. I-10 (10).

<sup>81</sup> Koyré 1962, 192.

<sup>82</sup> Koyré 1962, 184.

<sup>83</sup> Koyré 1962, 208.

whose fundamental act is to destroy the Greek Cosmos (ordered, beautiful, finite, well appointed, with man as his measure) and replace it with a mixture of space and motion or matter and motion – a boundless and endless expanse or matter without limits and without end (for Descartes these terms are synonymous);<sup>84</sup> the Greek Cosmos of Aristotle and of the Middle Ages had already been shaken by the modern science of Copernicus, Kepler, and Galileo;<sup>85</sup> but Descartes is the one who gives the blow that destroys: with the intellectual revolution, the old logic, old physics, old conception of the Cosmos are completely shattered;<sup>86</sup> there is no center, no place, no order, no system, no world, no God; everything is now just an endless expanse, which only Cartesian science can explore;<sup>87</sup> the universe resulted from the spiritual revolution of Cartesianism doesn't hold man to be its measure, but only spirit could be the measure of it. Here we have Koyré's words:

La naissance de la science cartésienne est sans doute une victoire décisive de l'esprit. C'est, toutefois, une victoire tragique: dans ce monde infini de la science nouvelle, il n'y a plus de place ni pour l'homme, ni pour Dieu."<sup>88</sup> "L'Univers cartésien offre à l'homme une image désespérante: Univers entièrement mécanique, monde composé uniquement d'étendue et de mouvement, monde dans lequel il n'y a plus de place ni pour l'homme, ni pour Dieu. (Koyré 1962, 211)

The characteristics of the "Scientific Revolution" developed in the two texts discussed above can also be found in the 1943 article "Galileo and Plato", with slight modifications and bizarre inconsistencies. The "Scientific Revolution" seems now to have happened in the 16th century by a "radical intellectual mutation", the deepest revolution of human thought from the Greek discovery of the Cosmos;<sup>89</sup> some pages below, Koyré speaks of the

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<sup>84</sup> Koyré 1962, 208-209.

<sup>85</sup> Koyré 1962, 208.

<sup>86</sup> Koyré 1962, 207.

<sup>87</sup> Koyré 1962, 209.

<sup>88</sup> Koyré 1962, 210.

<sup>89</sup> Koyré 1973, 166 (at p. 172, note 1, Koyré speaks again of the „scientific revolution in the 17<sup>th</sup> century”).

“intellectual attitude” of modern physics, which would be a consequence of the “spiritual revolution of the 16th century”, which is characterized by two solidary features: the destruction of the Cosmos and the geometrization of space, which in fact means the mathematization of science;<sup>90</sup> physics was mathematized by the adoption of “the perspective developed by Archimedes in his statics”<sup>91</sup> and of “Platonism”;<sup>92</sup> Galileo succeeded where others had failed because he was a Platonist,<sup>93</sup> and “the new science is experimental proof of Platonism”;<sup>94</sup> “the dissolution of the Cosmos is the most profound known revolution” because it consisted not in the criticism and refutation of erroneous theories, but in the destruction of a world and its replacement with another, and in order to achieve this it was necessary to “reform human intelligence itself” (described as being produced by the formulation and revision of concepts, by a new vision of Being, by a new concept of knowledge and science, and by replacing the common sense with a new notion of the “natural”).<sup>95</sup>

A stylistic remark, first of all: the verb most commonly used by Koyré in order to describe the “Scientific Revolution” is “détruire” (destroy). The idea is that the new cannot accommodate with the old, it must destroy it; therefore, the modern cannot coexist with the medieval, it is forced to destroy it. It is clear thus that the term “revolution” is used by Koyré in its radical political meaning, the violent overthrow and destruction of a political regime. His imagery follows the tradition opened by the theory of scientific change through revolutionary destruction, inaugurated by Jean-Sylvain Bailly in 1785 (for Bailly, the *destruction* of the Ptolemaic system is a mandatory prerequisite to any future revolutions).<sup>96</sup>

The second observation concerns the structure of the definition. The “Scientific Revolution” is defined by “the dissolution of the Cosmos” and the “geometrization of space” (i.e., the mathematization of science), and

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<sup>90</sup> Koyré 1973, 170.

<sup>91</sup> Koyré 1973, 184.

<sup>92</sup> Koyré 1973, 191.

<sup>93</sup> Koyré 1973, 192-194.

<sup>94</sup> Koyré 1973, 195.

<sup>95</sup> Koyré 1973, 171.

<sup>96</sup> Cohen 1995, 498-499; Bailly's theory is this: in order for a change to qualify as revolutionary, two conditions must be met: the change must usurp the authority of the old accepted system, and must replace the old with something better (“Supplement 7.4”).

these two are explained by what makes both of them possible, the “radical intellectual mutation”, namely the “transformation of the very frames of intelligence.” One finds here an irritating contrast between the clarity of the notions of “dissolution of Cosmos” and “geometrization of space” (which define the “scientific Revolution”) and the obscurity of the concept of “decisive mutation of the very functional frames of the mind” (which explains the possibility of the “mathematization of science”). Everything depends on the meaning of “decisive mutation”. If by “decisive mutation” one understands a real shift in the operating mode of the mind, then there disappears the possibility of any intelligibility, and Koyré’s definition is a typical illustration of *ignotum per ignotius*. If the “decisive mutation” is just a reformulation and revision of concepts, a new vision of Being and a new concept of knowledge and science (as he himself says in one place),<sup>97</sup> then the phrase “the transformation of the very frames of intelligence” is fanciful, and the connection between the mind and the possibility of mathematization is trivial. Whatever the meaning of “decisive mutation”, the consistency of the definition proposed by Koyré for the “Scientific Revolution” stands or falls with the truth of the proposition: “it is only the radical transformation of the mind that makes possible the mathematization of science”. Which is either false or trivial.

This is the notion of “Scientific Revolution” of which a very competent French historian of science could say that “it revolutionized the history of science”<sup>98</sup> and which stirred in an eminent American historian of science these lyrical reflections: “For me, as for many others of my generation [...], the ringing cadence of Alexandre Koyré’s dramatic statement of 1939 will ever echo strongly in the mind as a primary statement of revolution”.<sup>99</sup> Paradoxically, it was on the fact that the “dramatic” definition given by Koyré to the scientific revolution in 1939 still rings in the minds of most competent historians of science from the Anglo-Saxon world that the posterity of Duhem’s discoveries dramatically depended. For the destiny of the meaning of the Middle Ages physics was decisively marked

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<sup>97</sup> Koyré 1973, 171.

<sup>98</sup> Canguilhem 1987, 9.

<sup>99</sup> Cohen 1987 B, 184.

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by the way in which the history of science was institutionalized in the Anglo-Saxon world after World War II. It is now widely recognized that in the Anglo-Saxon environment Koyré was the one who introduced the idea of the scientific revolution. He did this both directly, through his personal influence and his writings, and indirectly, by the huge success of Herbert Butterfield's book *The Origins of Modern Science* (1949),<sup>100</sup> which was heavily influenced by Koyré's vision on the scientific revolution:

In the English-speaking world, Herbert Butterfield picked up this theme, expanded it into the mold of the general history of thought, and gave it a tremendous currency to the notion of a Scientific Revolution.<sup>101</sup>

Therefore,

[t]he decade of the 1950s saw the spread of the idea of the Scientific Revolution, to a large degree an effect of the influence of Butterfield and Koyré.<sup>102</sup>

Effectively, things happened as follows. After the fall of France in June 1940, Koyré fled to the United States, where he was integrated into the New School for Social Research in New York and became a member of the Ecole Libre des Hautes Etudes (a consortium of French and Belgian Scholars in exile). He held conferences and seminars in various institutions dedicated to philosophy, history or medieval studies. I.B. Cohen remembers how the brightness of these conferences had won admirers among which there were recruited his later disciples, followers and successors, an increasingly wider group of researchers who were interested in his works and began to be under the influence of his ideas.<sup>103</sup> After the war, he lectured in Chicago, Wisconsin and at Johns Hopkins, where he had as students John Murdoch,<sup>104</sup> Edward Grant, George Goldat. His action had a decisive impact

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<sup>100</sup> Butterfield 1958 (First published 1949).

<sup>101</sup> Cohen 1987, 183.

<sup>102</sup> Cohen 1995, 402-403.

<sup>103</sup> Cohen 1987 B, 57; 58-59.

<sup>104</sup> Murdoch 1987, 71-79.

on some already experienced historians, who found in Koyré a vision, a type of historical analysis and a philosophy of history which they would later illustrate in their works. I. Bernard Cohen counted among the American disciples of Koyré “the major figures in the history of science”.<sup>105</sup> We speak of Marshall Clagett, Charles Gillispie, Erwin N. Hiebert, Henry Guerlac, Marie Boas, A. Rupert Hall, Gerald Holton, and of those who did not know him closely, but were deeply marked by his ideas, such as Thomas S. Kuhn and Richard S. Westfall. “Kuhn said that his own ‘approach to the history of science owes more to Koyré than to any other living scholar’”, and “Westfall expressed succinctly the consensus of the profession that ‘No single work has done more to shape the history of science as it is now practiced than Koyré’s *Etudes galiléennes*.’”<sup>106</sup> “[M]any of us”, I.B. Cohen remembered, “became critically aware of the theme of revolution in science through the writings of Alexandre Koyré”.<sup>107</sup> A.C. Crombie also remembered that all professionals who dealt with the history of science in Britain and the United States were “inspired” by Koyré’s conception of the history of science, not only through his writings, but also by “personal influence”.<sup>108</sup> So that his vision of the history of science has become the standard view on the discipline. Adriano Carugo also notes that

Les *Études galiléennes* d’Alexandre Koyré [...] produirent dans les études de l’histoire de la science une sorte de nouvelle vague qui se répandit au delà de la Manche et de l’Atlantique pendant les années de l’après guerre.<sup>109</sup>

Examples could be multiplied yet. They show without doubt that, unlike France, where he has long been ignored,<sup>110</sup> Koyré “achieved

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<sup>105</sup> Cohen 1987 A, 62.

<sup>106</sup> Cohen 1987 A, 63.

<sup>107</sup> Cohen 1987 B, 183.

<sup>108</sup> Crombie 1987, 81.

<sup>109</sup> Carugo 1987, 321.

<sup>110</sup> Taton 1987, 37-53; Taton reminds us the vehement and personal opposition of Aldo Mieli to Koyré’s ideas, because of which he was received in the Académie internationale d’histoire des sciences only in March 1950, after Mieli’s death, as a Corresponding Member (and two years after that, he was finally appointed as a full Member), his first application having been rejected in 1935; his rejection by the Collège de France in 1951; the fact that Koyré could not coordinate doctoral theses in France as late as 1954, and

eminence in America”.<sup>111</sup> This intellectual eminence in the field of his discipline also meant a philosophical preeminence in the organization of the significances produced by its functioning: naturally, the profession crystallized around a “grand narrative”, and this *grand récit* was the Scientific Revolution.<sup>112</sup>

Here we have some elements. According to the testimonial of I.B. Cohen, “[Henry] Guerlac was convinced that the rise of the history of science as a serious academic discipline in America was in large measure due to the profound influence that Koyré had in changing the nature of the subject.” Until the appearance of Koyré, the history of science was done in America following the leading lights of a dutiful and well-behaved form of history of science which Sarton saw as “scientific”; it had as a doctrine a continuityist and cumulative vision on science, as a practice a narrative exposure of the facts, and as moral a new version of moral humanism (the “New Humanism”) which found in the *unity of science* the moral unity of mankind and in the *history of science* as a discipline the bridge capable of uniting science with humanities: a calm and self-confident combination of Auguste Comte, Ernst Mach, Paul Tannery and Henri Poincaré.<sup>113</sup> The influence of Koyré’s philosophy radically changed this dutiful and well-behaved approach.

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only then he could officially start teaching the discipline in which he was already considered a head of school in the United States. Pietro Redondi also emphasizes Koyré’s greater role in the US than in France, because of his marginal position in his relation with the French university system, showing the analogy of Koyré’s 1951 failure at Collège de France with the 1903 failure of Paul Tannery: this resulted in the “considerable retardation of the history of science in France, in relation to methodological and institutional developments in the United States, where Koyré’s influence was much higher” (Redondi 1987, 3-4).

<sup>111</sup> The phrase belongs to Jerome Ravetz, who deplored from materialistic positions as early as 1981 “the bad influence of Koyré[’s] [...] ‘idealist’ reinterpretation of Galileo” (quoted in Cohen 1987 A, 63).

<sup>112</sup> Cunningham and Williams 1993, 407-408 take as a fact, in their discussion over the “old big picture” of the history of science, the assumption that the professionalization of the history of science was made, in the years of its institutionalization after World War II, by incorporating the Scientific Revolution as “supremely important” for any historian of science, and this was done starting from Herbert Butterfield’s *Origins of Modern Science* (the authors only cite Butterfield’s work, but the inference to Koyré is immediate).

<sup>113</sup> Murdoch 1981, 123-137 (the information cited above is at pp. 128-132).

I. Bernard Cohen's conclusion is categorical: “[I]t was Koyré’s transmutation of the history of science into a subject that was intellectually interesting and respectable, as well as one that was related to other aspects of the history of thought, that had made it acceptable as a subject taught in programs of history departments.”<sup>114</sup> The public institutionalization was illustrated by the first occurrence of the formula “Scientific Revolution” in the title of a widely circulated work: *The Scientific Revolution, 1500-1800: The Formation of the Modern Scientific Attitude*.<sup>115</sup> Then, after the invention *de toutes pièces* of a Copernican revolution<sup>116</sup> by the book *The Copernican Revolution* (1957),<sup>117</sup> there came the assertion *urbi et orbi* of the concept, in its most radical form,<sup>118</sup> with the enormously influent work of Thomas Kuhn, *The Structure of Scientific Revolutions* (1962).<sup>119</sup> The revolution is not anymore related to the birth of science; it is now multiple, plural, ubiquitous, a sign of creativity and of scientific authenticity, and characterizes every advance of science. In what it has more real, genuine, authentic (we must notice the involuntary “jargon of authenticity”), science does not advance by accumulation, but by revolution.<sup>120</sup>

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<sup>114</sup> Cohen 1987 A, 61.

<sup>115</sup> Hall 1954.

<sup>116</sup> A revolution of which no one has heard for two centuries, until Montucla (1758) and Bailly (1785): see Cohen 1995, 498-500, the study “J.-S. Bailly and the Historian’s Invention of a Revolution”; hence, a purely retrospective revolution; see I. Bernard Cohen's arguments against the idea that there was such a revolution (Cohen 1987 B, 187-188).

<sup>117</sup> Kuhn 1957.

<sup>118</sup> According to which the job description of the true scientist is to make scientific revolutions, as the heroes of science produce scientific revolutions, instead of normal science.

<sup>119</sup> Kuhn 1962.

<sup>120</sup> Stephen Toulmin vehemently protested against the inflation of revolutions in the epistemology of science, arguing rightly that, in terms of explanation, the Kuhnian contrast between “normal” and “revolutionary” science lacks any theoretical significance: “at an explanatory level, the differences between normal and revolutionary change turn out to have little real theoretical significance”. Why then should we introduce in the history of science such a concept imported from the area of politics, which epistemologically is perfectly useless? – he wondered (Toulmin 1972, 103-117; quoted in Cohen 1987 B, 185).

Clearly, Koyré's vision of the history of science, as being essentially a history centered on the understanding of the "Scientific Revolution", has profoundly modified the content, the practices, and the academic institution of the history of science in the United States. This fact was acknowledged by Marshall Clagett in 1966, in the flagship journal of the discipline, *Isis*: "Si l'Histoire des sciences est parvenue à une maturité durable comme discipline, elle doit en large mesure cette maturité à Alexandre Koyré".<sup>121</sup> The same Marshall Clagett remembered how "particularly impressed" he was in the years of his formation as a historian "by the doubt [Koyré] cast on the easy generalizations of Pierre Duhem".<sup>122</sup> It seems to me that we can say with full confidence not only that the history of science was institutionalized in the United States in the patterns dictated by Koyré's philosophy, which had at its core the notion of "Scientific Revolution", but also that its professionalization was made by the incorporation of a tenacious anti-Duhem preconception derived from the tenacious anti-Duhem preconception of Koyré's vision and writings. If Alexandre Koyré came to be considered in 1984, at the twentieth commemoration of his death, as "the founder of the modern history of science",<sup>123</sup> it is because the history of science was institutionalized as an autonomous academic discipline after World War II, following the structure of a research program shaped by *his* vision of the "Scientific Revolution". It was thus that a *philosophical* vision of history, namely Koyré's, came to determine the vision of professional historians on their own discipline. The paradox is that, although this *philosophical vision* did not have the historical truth on its side, the *historians' vision* remained to this day marked by it as the deepest truth of their discipline<sup>124</sup>. And this second paradox also needs an explanation itself (for the first paradox, *vide supra*, p. 18).

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<sup>121</sup> Quoted in Redondi 1987, 1.

<sup>122</sup> Quoted in Cohen 1987 A, 60.

<sup>123</sup> "Koyré [...] est largement considéré comme le fondateur de l'histoire moderne des sciences" (Redondi 1987, 1).

<sup>124</sup> „Pour nous limiter à l'histoire et aux historiens, il est certain que bien des idées ou des principes avancés par Koyré recueillent toujours une large approbation." (Clavelin 1987, 25).

### III.

Let us rephrase once again the two paradoxes. Paradox one (P1): although Duhem is widely recognized as the founder of the history of medieval science, his findings are not viewed with sympathy by the practitioners of the discipline he founded. Paradox two (P2): even though Koyré's philosophical vision, which professionalized and institutionalized the history of science as an academic discipline, did not have the historical truth on its side, the vision of the historians of science on their own discipline continues to consider it indispensable.

Let us see first how the *philosophical vision* of Koyré did not have the historical truth on its side (I am not saying that it proved false; I simply claim that it did not have the historical truth on its side). Like the "Duhem Thesis", Koyré's philosophical vision is also complex. It is composed of the following five propositions: (1) the destruction of the Cosmos; (2) the radical transformation of the very frames of intelligence; (3) the return to Archimedes; (4) the adoption of Platonism; (5) the geometrization of space. All five propositions give the content of the Great Rupture, which is the Scientific Revolution: an event of overwhelming magnitude, which according to Koyré can only be likened with the birth of the Greek Cosmos or, in Butterfield's opinion, only with the advent of Christianity.<sup>125</sup> Proposition (1) is obvious (it is a statement of cultural history, of the "discarded image" type);<sup>126</sup> proposition (2) is false if taken literally, and trivial if taken metaphorically; propositions (3) and (4) are historical conjectures, which can be confirmed or refuted by historical research; proposition (5) is theoretical (the substitution of the qualitative space of the Aristotelian cosmology with the Euclidean mathematical space) and, as such, stands or falls with the theory it supports.

What is important to understand is that those who absolutely share Koyré's philosophical vision may dispense with the truth of any of the propositions that sustain it – or even with the truth of all of them. None of the propositions exhausts it, because the vision is more than either of them taken separately or all taken together; the vision epitomizes all of them by the spirit in which they were brought together. And this spirit is the split, the

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<sup>125</sup> Koyré 1939, I-6 (6); Koyré 1973, 166; Butterfield 1958, 190.

<sup>126</sup> Lewis 1964.

overthrow, the separation: it is the idea of rupture placed between the worlds, of overthrow as a means of replacing the old with the new, of the clear separation between modern and premodern. It is exactly Koyré's *vision* that rejects the "Pierre Duhem Thesis", and not any of the propositions which express it. As a last resort, to varying degrees, all propositions (1-5) can be identified in the writings of Duhem and can be supported with historical or theoretical arguments taken from his books; conversely, many of Duhem's evolutionist accents can be found in the writings of Koyré.<sup>127</sup> This is not the place to do here this demonstration, but it can be done. What cannot be deduced from or found in Duhem is the idea of rupture, namely the Koyré *philosophical vision*. It lies at the origin of all criticism brought by Koyré to Duhem and it explains why all this criticism can be reduced to one type of argument, which is the argument of the irreducibly different contexts. Even when historical research confirmed Duhem in his claim that the propositions advocated by some scholastics are identical with the propositions claimed by some heroes of the Scientific Revolution, the argument raised against the identity discovered by Duhem was the irreducibly different context which would make each of those propositions true in a different way. The error of this argument is clear now, I think. In order to *demonstrate* that there is no continuity, its opponents *assert* that there is no continuity: they assume as initial argument (identical propositions formulated at different times are actually not identical as they differ by context) what they ultimately want to prove (contexts are different). The demonstration by *petitio principii* is considered valid in this case because the Koyré *philosophical vision* is stronger than logic. And it is stronger than logic because the *philosophical vision* of rupture and discontinuity is in reality an abiding *faith* in rupture and discontinuity.

Where does this belief originate? It comes from the natural solidarity which the modern man has with his own modernity, according with the definition: "la modernità è l'epoca in cui diventa un valore determinante il fatto di essere moderno" (Gianni Vattimo, 1989).<sup>128</sup> What nurtures this

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<sup>127</sup> Cf. Coumet 1987, 497-529.

<sup>128</sup> Vattimo 1989, 7. Likewise, Pierre Manent said that "becoming modern means becoming-conscious-that-one-is-modern", which is to say that "the feeling of living in history as in man's own element [...] is the essential aspect [...] of the modern experience" (Manent 1998, 13).

belief? It is the self-consciousness of modernity, which is an awareness of the privilege of being modern, according to the definition: modern is the man for whom the fact of being modern is itself a value. By his *philosophical vision*, Koyré expressed this modern self-consciousness, which constantly checks itself with the unshakable belief in the value of rupture from the non-modern past and of discontinuity with the premodern. The Koyré *philosophical vision* is reflected in the *Zeitgeist*, and the *spirit of times* is reflected in it.

In a profound and not insignificant sense, the conditions that ensured the success of the Koyré *philosophical vision* were necessary. But they were not also sufficient, because, obviously, its imposition was a result of the historical conjuncture, and the way in which the history of science was institutionalized after World War II in the Anglo-Saxon world explains well enough this conjuncture, I think. What the historical conjuncture cannot explain is the resistance to arguments and confutations of the Koyré *vision*. Only the *necessity* of the conditions which imposed it may explain the tenacity with which a *philosophical vision* of rupture and discontinuity continued in 1993 to be “supremely important” to *modern* historians of the science of the *Middle Ages*.

It is possible that postmodernism will also manage to dissolve the Koyré *philosophical vision*, just as it “dissolved” many of the “hard” beliefs and values of modernity. Andrew Cunningham and Perry Williams, two top researchers, expressed their hope that this will happen.<sup>129</sup> But if it happens, it will be at a cost which the two researchers (and probably many other historians imbued with the new postmodern *Zeitgeist* of the post-materialist era) are willing to pay: the modern science of nature will be stripped of its traditional attributes – universality, objectivity, neutrality and transcendence in relation to all conditionings, religious, social, philosophical, ideological, historical, political, cultural, ethnic, sexual. The new concept of science will be contingent, historical, local, reflecting the values, goals and rules of a particular social group, and the resulting knowledge will not be anymore considered universal, objective and neutral, but local and biased ideologically, socially, culturally, etc., a piece of knowledge among others, all equally valid.<sup>130</sup> The exceptionalism of the modern natural science will end and, with it, the whole Duhem-Koyré issue will become obsolete.

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<sup>129</sup> Cunningham and Williams 1993, 407-432.

<sup>130</sup> Cunningham and Williams 1993, 418 (where the “new” science is characterized.)

From the point of view of both Duhem and Koyré, this situation would be a gross falsification of reality. Their motives would, however, be very different. For Duhem, the falsification would concern the epistemology, for the object and structure of the physical theory would be completely disregarded, and the unification of physical theories in a natural classification, which is a natural process, would pass unnoticed, because its very existence would be denied;<sup>131</sup> for Koyré, the falsification would consist in the denial of the fact that the Scientific Revolution is essentially an *itinerarium mentis in veritatem*.<sup>132</sup>

But for our discussion the most interesting aspect is that today, even when it comes to overcoming a history of science conceived in terms of “Scientific Revolution” (or scientific revolutions), the solution spontaneously embraced is not to abandon the concept of revolution (and return to a reconsideration of the “Duhem Thesis”), but to abandon the strong sense in which the modern science of nature is a science (*eine strenge Wissenschaft*, as Husserl would have said). This proves that, for our spirit, the tough conceptual core of the notion of “Scientific Revolution” is not related to the nature of science, but derives from the need of “revolution”. As we have seen (in the proposal made by Cunningham and Williams), from the idea of “Scientific Revolution” the moderns of today could possibly abandon the science, but not the idea of revolution.

Thus, we have precisely defined the hard core of the Koyré *philosophical vision*: it is the idea of revolution, seen as a radical rupture with the premodern past. Let us see now its relation with the factual truth. This fact is best seen in the relation of the criticism raised by Koyré against Duhem with the historical facts. Koyré categorically rejected the sub-theses (ii), (iii), and (iv) and classified as a singularity with no consequences whatsoever, or as “enigma”, the “de Soto Connection” (sub-thesis (v)).

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<sup>131</sup> Duhem 1997, 409-411.

<sup>132</sup> Koyré 1962, 184.

Ref. (i). Sub-thesis (i) was never mentioned by Koyré (and, indeed, by none of the commentators of Duhem), but, as one can easily see, the structure of the concept of “Scientific Revolution” is modeled entirely on the structure of the argument of the “Theological Revolution”. Rapidly said, Koyré took the idea of theological revolution and turned it into a scientific revolution. But in doing so, he turned a transcendental conditioning into a principle of causation. Here we have the transposition of “revolutions” (theological, at Duhem; scientific, at Koyré): a change of the absolute presuppositions of thought (in the Collingwood sense) was turned into a “decisive mutation” of the intellect (in the Brunschvicg and Bachelard sense); a transcendental reasoning (in the Kant sense) was replaced by a causal reasoning; a discussion about what makes the modern science of nature possible was transformed into a debate about what produces its birth. Developed historically, Duhem's point of view leads to an evolution of physics (history as the history of evolutions); Koyré's point of view leads to a sequence of mutations which produce sequences of theories (or paradigms, as Kuhn will call them) and discontinuities of truths (history as the history of ruptures). Continuity and the possibility of truth, on the one hand; discontinuity and the inevitability of relativism (or radical relativism), on the other.

Ref (ii). Koyré strongly denied sub-thesis (ii). He refused the Condemnation of 1277 any significant impact on scientific reflection; he denied the propositions of conviction any scientific competence; and ridiculed Duhem's “negligence” of indicating two different dates for the “birth” of the modern science of nature.<sup>133</sup> In reality, the impact of the Condemnation on scientific reflection was important and it happened just as Duhem estimated. Attestations of their effect are extremely numerous, and the ontological and epistemological consequences are remarkable: by recourse to “the absolute power of God”, which is limited only by the principle of logical contradiction, the Condemnation helped overthrow the idea of nature imposed by the necessitarianism of Aristotelian natural philosophy and developed counterfactual reasoning, through which the Calculators and others natural philosophers of the 14th century could build

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<sup>133</sup> See Ariew and Barker 1992, 331-333 (especially 332) for the clarification of the issue that the idea of dating the birth of modern science is incompatible with Duhem's epistemology.

*secundum imaginationem* alternative worlds, counterfactual principles, and ideal experiments (which are essential for physics). Roland Hissette showed, on one of the very sentences ridiculed by Koyré, that the team of theologians under the authority of the Bishop Tempier was not at all incompetent and knew perfectly well what they were talking about, and Edward Grant has shown that the effect of the proposition regarding the possibility of translating the world, which Koyré considered “parfaitement absurde”, can still be found at Gassendi in 1649 or at Samuel Clarke in 1716.<sup>134</sup>

Ref. (iii) & (iv). Koyré categorically rejected both the continuity thesis and the thesis of the “Parisian precursors”:

In 1935: (“À l’aube de la science classique”): “la physique classique, sortie de la pensée de Bruno, de Galilée, de Descartes ne continue pas, en fait, la physique médiévale des ‘précurseurs parisiens de Galilée’: elle se place d’emblée sur un plan différent [...]. En effet, le précurseur et le maître de la physique classique, ce n’est pas Buridan ou Nicole Oresme, mais Archimède.”<sup>135</sup>

In 1943 (“Galileo and Plato”): “l’apparente continuité dans le développement de la physique du Moyen Âge aux Temps modernes (continuité que [...] Duhem [a] si énergiquement soulignée) est illusoire.”<sup>136</sup> Paradoxically, by postulating the “scientific Revolution”, Koyré has re-found the abyss of the eighteen centuries of darkness which, according to Lagrange, separated Archimedes from Galileo. Except that in 1788 Lagrange had not yet heard of the existence of the Scientific Revolution...

Maurice Clavelin, who made in 1987 an assessment of the Koyré-Duhem dispute, drew the following solomonic conclusion: “La physique ancienne n’a pas engendré la physique nouvelle. Son héritage fut loin d’être inutile et inutilisé.”<sup>137</sup> Therefore neither did Duhem, nor Koyré. In fact, as most historians after Koyré, Clavelin is also a discontinuist, but one who knows that historical truth is not on the side of the Koyré *philosophical vision*. As such, because he is a good historian, Clavelin

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<sup>134</sup> Beaujouan 1987, 427-428; Koyré 1971, 41; for an overall view, see Hissette 1977 and Grant 1979, 211-244.

<sup>135</sup> Koyré 1939, I-9 – I-10 (9-10).

<sup>136</sup> Koyré 1973, 171-172.

<sup>137</sup> Clavelin 1987, 31.

recognizes the continuities, but, typically, asserts the discontinuity.<sup>138</sup> Thus, based on studies of Carugo, Crombie, and Wallace, Clavelin believes that “rien ne permet [...] de lier la naissance de la physique nouvelle à une rupture préalable et totale avec l’héritage aristotélico-scolastique”.<sup>139</sup> He realizes that Koyré's statement that the epistemology of Galileo was Platonist (apriorist, etc.) is simply false: Galileo never abandoned “the general methodological schemes of traditional science” of Aristotelian type.<sup>140</sup> Even more, the manuscripts of 1603-1608 (never published by Favaro in Edizione Nazionale), which were analyzed by Stillman Drake,<sup>141</sup> clearly show that Galileo conceived real experiments which he realized meticulously<sup>142</sup> – which means that, in this respect, Koyré was also wrong.<sup>143</sup> However, Clavelin does not reject the existence of the Scientific Revolution (he says, for example, that the Scientific Revolution was already consumed a few decades after the death of Galileo), he only denies the existence of an “insaisissable révolution intellectuelle”, such as Koyré saw it (as “mutation”); all in all, he considers that the discontinuist thesis has an “obvious advantage”.<sup>144</sup> At the same time, he assures us that “la discontinuité ainsi conçue est-elle parfaitement compatible avec la permanence des idées aristotélico-thomistes sur la possibilité d’une démonstration des principes en philosophie naturelle.”<sup>145</sup> “Ainsi en va-t-il, à

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<sup>138</sup> Clavelin formulates a thesis of his own (neither Duhem, nor Koyré), indicating his own mechanism of discontinuity, the transformation of the “premises of cosmology” (*prémisses de la cosmologie*); it was exactly this transformation, which began with Copernicus and reached its maturity with the major astronomical discoveries in 1609-1612, that allowed a “renewed understanding of the motion” and showed that “a mathematical theory can be physically relevant” (Clavelin 1987, 28); see also the “Clavelin test” regarding the truth of continuity: „montrer que le rôle tenu par les nouvelles prémisses de la cosmologie chez Galilée pouvait l’être également par une thèse issue de la science traditionnelle” (Clavelin 1987, 30).

<sup>139</sup> Clavelin 1987, 28.

<sup>140</sup> Clavelin 1987, 27.

<sup>141</sup> Drake 1978, 74-133.

<sup>142</sup> As proven also by Thomas B. Settle, who conducted in 1961 one of the experiments described by Galileo and proved thus not only that it was possible, but that there can be obtained exactly the measurements he indicated (Settle 1961, 19-23).

<sup>143</sup> Clavelin 1987, 35 (note 86).

<sup>144</sup> Clavelin 1987, 30.

<sup>145</sup> Clavelin 1987, 31.

mon sens, de la doctrine des *latitudines formarum* ou d'une idée comme celle de mouvement *praeter naturam* qui, marginale et sans emploi dans la philosophie naturelle scolastique, a pu d'une certaine façon aider Galilée à progresser vers la notion de mouvement inertial."<sup>146</sup> With so many qualifications, discontinuity seems to have become a more paradoxical expression of continuity.

Today, the specialized literature seems to have finally admitted that in Galileo's methodology there are closely intertwined two traditions: one coming from Archimedes, namely the mathematical conception developed by Pappus and Proclus (the only one Koyré acknowledged), and the logical-mathematical one, derived from the approach to natural philosophy of the Mertonians and the School of Paris. Here is what A. C. Crombie says: "[Galileo] conducted his experimental and observational analysis of the causes [and] effects according to the 'laws of logic' or 'physical logic',<sup>147</sup> which were the Aristotelian rules of inference as developed by scholastic natural philosophers".<sup>148</sup> Based on similar observations, Duhem has raised these scholars to the rank of precursors of Galileo; refusing to take note of them on account of his *philosophical vision*, Koyré came to definitely reject the very idea of precursor, ridiculing Duhem for seeing them everywhere.

The followers of the Koyré *philosophical vision* commonly cite Anneliese Maier's studies as an example of effective refutation of sub-theses (iii) & (iv): "Taken as a whole [...], Maier provides a much better balanced, immensely more correct, and surely more truly medieval picture than Duhem on any given conception or issue."<sup>149</sup> The refutation would consist in

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<sup>146</sup> Clavelin 1987, 30-31.

<sup>147</sup> Crombie quotes here Galileo, *Il Saggiatore*, 1623, questioni 12 and 42 (*Le Opere*, VI, pp. 252; 333).

<sup>148</sup> Crombie 1987, 87. Galileo did not distinguish between the two methods and forms of mathematization (the Scholastic-Aristotelian one, typical for the *Calculatores*, and the Archimedes- Pappus-Proclus type), although between 1612-1616 there is a shift from the first to the second. General historiography continues to celebrate Galileo, Crombie notes, only for the „epistemology of science by the mathematical thinking”.

<sup>149</sup> Murdoch 1991, 285. What Murdoch objects though to Maier, after acknowledging “Maier’s explicit case for putting things into their proper medieval context” (Murdoch 1991, 284), is that she never abandoned what he calls the “Duhem’s canonic roster”:

the fact that, through Maier's studies, Duhem's discoveries were eventually given their authentic intellectual context; Duhem, the argument continues, would have seen too much 14<sup>th</sup>-century physics with the eyes of the modern physicist; or, the argument concludes, if not considered in the right intellectual context, historical reality cannot be reconstructed "wie es eigentlich gewesen ist" (Leopold von Ranke).<sup>150</sup> It is true. But if Duhem had not had the specialized eye of the competent modern physicist, he would not have been able to recognize the seeds of future in the incomplete and hesitant thought of the past, expressed in a language which often conceals both its meaning and novelty. The paradox of the history of science is that, in order to be truly historic, it must necessarily incorporate "a Whig interpretation of history".<sup>151</sup> The historian of science must first know perfectly what science is in order to identify its history in the past. There is no chance to track the past of an idea, if the idea in its complete form is not perfectly known *beforehand* to the historian. What one objects to Duhem is exactly the quality which enabled him to recognize in the inchoateness of the primary forms the stages of the form which the contemporaries recognize only when it has reached maturity. That does not mean that I do not admit the objection that sometimes Duhem's hermeneutics is poorly contextualized. But Duhem is the first to recognize in some completely forgotten reasonings, considered excessively rebarbative by intelligent people, the germs of a principle that was much later to meet its intelligible formulation. In order to be *the first* to recognize some things which nobody has ever seen or recognized, one must have what Maier called "die Augen des Naturforschers".<sup>152</sup> Duhem had them. He cannot be objected that.

In the logic of limiting any interpretation to the strict observance of the intellectual context (*geistige Zusammenhang*), Maier herself can be accused of "modernizing" medieval texts, for example when she identifies a particular meaning of the phrase *infinitum in actu* (occured in the discussions

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"[t]he core of topics in her five volumes of *Studien sur spätscholastischen Naturphilosophie* is still Duhemian: impetus theory, acceleration and free fall, the infinite, the intension and remission and latitude of forms, the nature of motion, of time, and of space." (Murdoch 1991, 285).

<sup>150</sup> Murdoch 1991, 283; Maier 1964, 427; Maier quotes Ranke as historiographic ideal at the end of the manifesto-like introduction to Maier 1949, 6.

<sup>151</sup> Butterfield 1931.

<sup>152</sup> Maier 1964, 427.

regarding the infinite and the continuum in the 14th century) with the modern idea of the transfinite;<sup>153</sup> when she finds that some medieval authors have expressed “with full clarity” the premises of mathematical analysis, the principle of equivalence from the set theory, or the concept of the Dedekind cut; or when she credits Buridan with discovering the concept of natural law as a methodological principle.<sup>154</sup> Murdoch criticized her for these identifications.<sup>155</sup> His reasons are not scientific though, but ideological and are related, in my opinion, to the intellectual and moral power of fascination that the Koyré *philosophical vision* exerts on historians.

Contrary to the opinion of Duhem's critics (who are always followers of the Koyré *philosophical vision as well*), Anneliese Maier's studies have confirmed Duhem, instead of invalidating him. “Essentially, Duhem was right,” Maier says in her manifesto-preface to the first volume (of a series of five) of *Studien zur Naturphilosophie der Spätscholastik*, which, most relevantly, is entitled “Galileo's precursors in the 14th century”:

Grundsätzlich hat Duhem sicher recht, wenn er in der Naturauffassung des 14. Jahrhunderts eine Vorstufe und Vorbereitung der klassischen Physik sehen will; nur hat er im einzelnen die scholastischen Lehren oft in zu modernen Sinn interpretiert und zu viel aus ihnen herausgelesen.

(Maier 1949, 1)

What Maier objects to Duhem is that he sometimes interpreted too modernly the texts he had the merit to discover. The objection, we should

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<sup>153</sup> Maier 1949, 212: „Wir geben das infinitum in actu in dieser zweiten Bedeutung am besten mit dem modernen Begriff des Transfiniten wieder.”

<sup>154</sup> „Man erkennt, dass es Grössenunterschiede im unendlich Grossen und auch im unendlich Kleinen gibt, und kommt damit einerseits zu den Anfängen der Mengenlehre, andererseits mindestens zu den *Voraussetzungen der Differentialrechnung*.” (Maier 1958, 378); „Der Äquivalenzsatz der Mengenlehre ist mit aller Deutlichkeit ausgesprochen worden, und ebenso ist das Prinzip, das im «Dedekindschen Schnitt» der modernen Mathematik seinen Ausdruck findet, klar erkannt worden.” (Maier 1958, 379); „Ein grosser Schritt über den Aristotelismus hinaus ist weiterhin vor allem Buridans Entdeckung des Naturgesetzes als eines methodischen Prinzips, das geeignet ist, das Prinzip der Finalkausalität zu ersetzen.” (Maier 1958, 378).

<sup>155</sup> Murdoch 1991, 285.

keep in mind, concerns the fidelity of context and relates to the details of reconstructing in terms of nowadays the formulations of back then. Maier's objection does not concern *the substance* of Duhem's statements: "Fundamentally," Maier says, "Duhem was certainly right when he saw in the theories about nature of the 14th century a precursor and a preparation of the modern science of nature".<sup>156</sup> Maier believes Duhem's vision essentially correct (proven that she always starts from it), but somehow too fast, too hasty. She herself proposed a theory of her own for what we have called, within the "Pierre Duhem Thesis", sub-theses (iii) & (iv), a theory that incorporates Duhem and does not refute him. It is a comprehensive theory of cultural change which, metaphysically seen, could be also interpreted as a thesis of philosophy of history.

Maier argues that, between the 13<sup>th</sup> and the 18<sup>th</sup> centuries, the history of exact sciences in Western Christianity is the history of gradually overcoming (*allmähliche Überwindung*) of Aristotelianism; this "overcoming" happened neither through a single successful revolution, nor through a constant process of gradual emancipation, spread over centuries; there were two major stages of this overcoming: the first culminated in the 14th century, the second in the 17th: thereafter, physics is completely freed both of Aristotelianism and of philosophy and theology; all in all, physical theories of the later scholastics must be considered forerunners of classical physics.<sup>157</sup> In the 14th century, Parisian and Oxonian schools are the ones that created the first major release from the restrictions of Aristotelianism; their members are the precursors of the creators from the 17th century: "these forerunners *prepared* the way for later science insofar as they created the assumptions which the practitioners of that later science used as points of departure."<sup>158</sup> In the article "Die Stellung der scholastischen Naturphilosophie in der Geschichte der Physik" (1956), Maier states her own view on the relationship between physical theories of the 14<sup>th</sup> century and those of the 17<sup>th</sup>, making the conceptual distinction between "anticipation" or "prefiguration" (*Vorwegnahme*) and "preparation"

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<sup>156</sup> In order to designate the modern science of nature, Maier uses the phrase "klassische Physik", which resembles the phrase "science classique" used by Koyré 1939 (Tome I).

<sup>157</sup> Maier 1949, 1-2; 4-5.

<sup>158</sup> Murdoch 1991, 276 (quoting Anneliese Maier. 1943. *An der Grenze von Scholastik und Naturwissenschaft*. Essen: 6).

(*Vorbereitung*); for Maier, the issue raised by the continuity thesis must be formulated in these terms: “to what extent has the physics of the 14<sup>th</sup> century predicted (*vorweggenommen*) or prepared (*vorbereitet*) the modern science of nature?”.<sup>159</sup> Maier's answer is that the continuity thesis must be interpreted in the sense of “preparation” instead of “anticipation”. Here it is how Maier believes the relation between the 14th and the 17th centuries has worked in reality: “the late scholastics made ready (*bereitgelegt*) many of the assumptions, concepts, and methods that were later taken for granted”;<sup>160</sup> so that the ulterior “mechanization” was prepared by the sustained criticism to which the 14<sup>th</sup>-century philosophers have had subjected their new representations of nature.<sup>161</sup> For Maier, the physics of the Middle Ages did not anticipate (*vorweggenommen*) the modern science of nature (as Duhem claimed), but prepared it (*vorbereitet*).

What seems to me interesting to underline is that Maier uses in formulating her thesis of continuity the transcendental mode of argumentation inaugurated by Duhem in the argument of the “Theological Revolution”. For Maier, 14<sup>th</sup>-century physics prepared the assumptions, concepts, and methods which would be for the physics of the 17<sup>th</sup> century a sort of *a priori* framework of relating to the world. It is obviously a transcendental type of reasoning. From a historical perspective, the concepts and methods developed by the late scholasticism, in what regarded nature and its treatment by logic and mathematics, came to work a century and a half later as assumptions tacitly accepted in the scholarly world, as a result of the unprecedented extent, thoroughness, and tenacity with which this reflection was presented and practiced in the network of medieval universities by the philosophers of the 14th century. The fact that those philosophers were not especially physicists, but rather philosophers of nature in a broad sense reinforces the transcendental nature of the argument. For, as Maier notes, the most important achievements of the 14<sup>th</sup>-century scholastics

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<sup>159</sup> Maier 1964, 420-421.

<sup>160</sup> Maier 1964, 421: “die Spätscholastik hat vieles bereitgelegt, was für die klassische Physik selbstverständlich wurde, d.h. gewisse Voraussetzungen, Begriffe, Methoden, über die man nicht mehr diskutierte, sondern die man stillschweigend akzeptierte und gelten liess.”

<sup>161</sup> Maier 1964, 422: «Nun hatten aber die Philosophen des 14. Jahrhunderts an diesen Vorstellungen schon vielfach selbst Kritik geübt und der späteren «Mechanisierung» tatsächlich schon weitgehend vorgearbeitet.»

are not in the field of physics, but in that of the metaphysical-ontological analyses relating to space, time, mass, force, and energy, motion and speed, *raritas* and *densitas*, weight and inertia: “es gibt kaum einen Begriff, mit dem die Naturerkenntnis auch noch der klassischen Zeit gearbeitet hat, den die scholastischen Philosophen nicht untersucht und in ontologischer Beziehung geklärt hätten.”<sup>162</sup> Or, the very fact that their analyses took place in the metaphysical-ontological field (“das Gebiet der metaphysisch-ontologischen Analysen”) clearly shows that the contribution of these scholastics is of transcendental, and not causal, nature. It is the importance given to the ontological-metaphysical aspects that best distinguishes the physics of the 14th century from the physics of the 17th, which has its emphasis on quantitative aspects.<sup>163</sup> This is the sense in which the philosophy of nature of the 14th century “prepared” (*vorbereitet*) the physics of the 17th century. This preparation (*Vorbereitung*) was so profound, that Maier compares the cosmology to which the reflections of these *moderni* led to a kind of revolution, the “intellectual revolution” of the 14th century.<sup>164</sup> Here we have Maier's conclusion:

In vielen Fällen haben diese Analysen zu Ergebnissen geführt, die eigentliche ‘Vorwegnahmen’ künftiger Einsichten darstellen. Wir haben es immer wieder gesehen, insbesondere bei den Bemühungen um die Deutung der Bewegung, die in mehr als einem Punkt bis nahe an eine im Sinn der klassischen Mechanik ‘richtige’ Auffassung herangeführt haben und damit zu einer impliziten Entdeckung des Trägheitsprinzips von philosophischer Seite habe. Aber darüber hinaus haben die scholastischen Begriffsbestimmungen zum Teil auch eine merkbare historische Wirkung in der Entstehung der neuen Physik gehabt.  
(Maier 1958, 379)

This is not, of course, 100% Duhem. But it is far from a rejection of his theses. With her thorough analyses, Anneliese Maier brought an

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<sup>162</sup> Maier 1958, 379.

<sup>163</sup> Maier 1955, 340-341.

<sup>164</sup> Maier 1964, 426: “Die Kosmologie dieser «moderni» stellt tatsächlich eine Art von geistiger Revolution dar [...]”.

exceptional contribution within the *field* opened up by Duhem, within the *data* set by him, using the *argumentative innovations* introduced by him for the first time in the history of science. In my opinion, Maier made the most important contribution to sub-theses (iii) & (iv) of the “Pierre Duhem Thesis” (just as, of those who completely rejected the “Pierre Duhem Thesis”, John E. Murdoch and Edith D. Sylla are the most important contributors to some aspects of sub-thesis (iv) which were either treated superficially or completely unobserved by Duhem).<sup>165</sup>

Marshall Clagett, who was a mediaevalist only slightly younger than Maier and who thought she offered the most comprehensive assessment and adjustment of Duhem's work, also asserted that

the physical concepts of a Galileo or a Descartes, or even a Newton, radical as they may seem, were conditioned in many ways by the ancient and medieval learning that survived into the early modern period.

Clagett refers to the fact that medieval mechanics

was continually modified to the point where it was seriously undermined, thus requiring a new mechanical system – and it was the Galilean-Newtonian system of the seventeenth century that fulfilled that requirement.<sup>166</sup>

Two observations should be made immediately. The first is that the cognitive model Clagett used in order to give a historical support to the way in which the ancient and medieval concepts come to be unrecognizable in modern physics concepts, while staying at their origins, is a typical Duhemian model: it is the model of continuous and diverse accumulations, arriving to aggregate into a coherent design which does not seem to keep any connection with its beginnings and whose plan could not have possibly been guessed from them. In the “Conclusion” of the second volume of *Les Origines de la Statique*, Duhem illustrated this model by

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<sup>165</sup> See the history of this research line in Murdoch 1991, 288-299; Sylla 1984, 540-563; Murdoch 1984, 564-591.

<sup>166</sup> Clagett 1959, xix.

two metaphors: the metaphor of the tree which, although contained in the seed, has no resemblance to the originary seed and the metaphor of the monument erected apparently at random, although there is an invisible plan.<sup>167</sup> Here it is how Duhem illustrates the operation of this cognitive model for the evolution of statics:

Les quelques lignes où Jordanus démontrait la règle du levier droit contenaient en germe une idée juste et féconde; de Jordanus à Descartes, cette idée s'est développée au point de comprendre la Statique tout entière. Tandis que se poursuit et s'achève cette graduelle évolution d'une vérité, la Science est le théâtre d'un phénomène non moins intéressant, mais plus étrange; une doctrine fausse se transforme peu à peu en un principe très profond et très exact; il semble qu'une force mystérieuse, attentive au progrès de la Statique, sache rendre bienfaisantes la vérité et l'erreur.

(Duhem 1906, 286)

The second observation concerns Clagett's statement that the physics of the 17th century was "conditioned" in its birth by the medieval physics. Here we recognize immediately the transcendental reasoning of the Duhemian type. Let us recapitulate: at Maier, the physics of the 17th century is "prepared" by the late scholastics, in that the latter creates the former its premises and basic assumptions; at Clagett, the physics of the 17th century is "conditioned" by medieval physics. Duhem's hard continuity becomes at Maier "preparation" (*Vorbereitung*), placed in opposition with the "anticipation" or "prefiguration" (*Vorwegnahme*) about which Duhem spoke, while at Clagett the "conditioning" is brought into opposition with Duhem's thesis of continuity.<sup>168</sup> They actually say all the same thing. Murdoch also notices that:

the serious undermining of medieval mechanics that required, in [Clagett's] view, a new mechanical system, was

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<sup>167</sup> Duhem 1906, 288: the metaphor of the seed (*germe*); 289-290: the metaphor of the monument.

<sup>168</sup> Murdoch 1991, 278.

something like Maier's second, seventeenth-century and decisive phase of a process of development that had begun in the fourteenth.<sup>169</sup>

And what they say, as it also follows from the adoption by both of them of the "Duhem canonical list", is in congruence with the "Pierre Duhem Thesis," even though each of them would have numerous delimitations and rectifications to make.

Ref. (v). Koyré rejected obliquely the "de Soto Connection": he formulated it as an "enigma", in order to be able to definitively bury it in his deep skepticism about the possibility of such a connection.<sup>170</sup> Thorough historical research showed that the de Soto connection existed and therefore that Duhem was right. Here we have the verdict of William A. Wallace, the scientist who formulated the second "de Soto enigma" and resolved both of them:<sup>171</sup>

A yet more important result of these researches [...] is their vindication of Duhem, as contrasted with Koyré [...]. Koyré's fortunes have declined in recent years with the discoveries by Stillman Drake and others of the extensive experimental program on which Galileo had embarked between 1604 and 1610. This has sounded the death knell for Koyré's appraisal of Galileo as a Platonist or rationalist who had no need of experiment to found his 'new science'. My own work tarnishes Koyré's image a bit more, for it shows that his neglect of medieval and scholastic sources vitiated much of the reasoning behind his *Études galiléennes*, the part relating to Benedetti alone excepted. But if Koyré has been devaluated, as it were, the same cannot be said of Duhem. Duhem's emphasis on Soto, it turns out, was well founded. One would no longer wish to maintain that Soto was the proximate source of Galileo's science. But whether one

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<sup>169</sup> Murdoch 1991, 277.

<sup>170</sup> Koyré 1971, 106 ("Enigma lui Domenico Soto").

<sup>171</sup> Wallace 1968, 384-401.

traces Soto's influence through the Jesuits in Italy or in Spain and Portugal, or by a parallel route through Benedetti, there seems little doubt that Soto played a pivotal role in promoting a mathematical analysis of local motion.  
(Wallace 1990, 257-258)

Guy Beaujouan, a historian of medieval science unsympathetic to Duhem,<sup>172</sup> whom he considers neither philosopher nor historian,<sup>173</sup> tells the following story regarding Koyré. After the appearance in 1956 of volumes VII and VIII of *Système du Monde*, which gave ample evidence that the references of the 14<sup>th</sup>-century natural philosophy to the Condemnation of 1277 were so numerous that the rejection of their significance could not be seriously supported, Beaujouan wrote an article which synthesized the available historical material and showed that, concerning the Condemnation of 1277, Duhem was right and Koyré was not.

J'envoyai mon article à Koyré, nous en parlâmes de vive voix et je me souviens qu'il conclut la discussion en disant 'Vous avez peut-être raison, mais moi je n'ai sûrement pas tort'. (Beaujouan 1987, 427)

Koyré's answer is not especially typical of his psychology – although Crombie, who knew him well, says that Koyré was “not easily persuaded to change but always open to disagreement”<sup>174</sup> –, so much as it is an exemplary illustration of the *typical* force with which people who have a vision (in this case, “the Koyré *philosophical vision*”) resist any factual contradictions and denials. For people endowed with *bon sens*, *contra factum argumentum non est*; for people with tenacious *philosophical visions*, the Latin apophthegm must be modified: *contra visionem non est argumentum*. This resistance of the *philosophical vision* to facts or arguments made Guy Beaujouan draw attention to the fact that history of science made by philosophers is different from the history of science made by historians:

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<sup>172</sup> According to Stanley Jaki, „La partie consacrée à la science médiévale, que G. Beaujouan a écrite pour l'*Histoire générale des sciences*, publiée sous la direction de Taton, est d'une injustice criante envers les réalisations de Duhem.” (Jaki 1990, 144.)

<sup>173</sup> Beaujouan 2004, 153-172.

<sup>174</sup> Crombie 1987, 82.

L'histoire des sciences des philosophes est souvent plus intelligente que celle des historiens; elle n'est pas toujours, en tout, meilleure.<sup>175</sup>

Against Beaujouan, who did not consider Duhem a true historian of science, but merely a physicist, I say that in his endeavours in the history of science Duhem acted as a historian, while Koyré acted as a philosopher. As a historian, Koyré was invalidated; as a philosopher, despite all evidences, he succeeded. It was not Koyré the historian of science who succeeded, but Koyré the “*philosophical vision*.” The history of science, as institutionalized academic discipline, was founded according to a vision of science *qua* Scientific Revolution derived from the philosophy of Koyré. In its stage of institutionalization and maturation, the history of science was much more influenced by the *vision* of a philosopher than by the vision of practicing historians who for too long (many still today) saw the world with the eyes of philosophers. Later, when some came into their senses, as Edward Grant did,<sup>176</sup> they completely revised their attitude. But for the discipline and for our culture it was too late. The dice had been thrown. History of science had become a temple celebrating the “rupture with the past” as scientific liberation, although everyone has learned meanwhile that the “Scientific Revolution” did not exist or, if it did, it meant something else, or that the era with which it was originally associated must be dated differently, or that the science it referred to ceased to exist.<sup>177</sup> Even though the myth of the scientific revolution is exhausted, the myth of the rupture with the past as a *sine qua non* condition of progress has survived, even within the postmodern

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<sup>175</sup> Beaujouan 1987, 429.

<sup>176</sup> See Grant 1971 *versus* Grant 1996.

<sup>177</sup> “There was no such a thing as the Scientific Revolution [...]. Some time ago, [...] historians announced the real existence of a coherent, cataclysmic, and climactic event that fundamentally and irrevocably changed what people knew about the natural world [...]. This conception of the Scientific Revolution is now encrusted with tradition. [...] Nevertheless, like many twentieth-century ‘traditions,’ that contained in the notion of the Scientific Revolution, is not nearly as old as we might think. The phrase ‘the Scientific Revolution’ is probably coined by Alexandre Koyré in 1939, and it first became a book title in A. Rupert Hall’s *The Scientific Revolution* of 1954.” (Shapin 1996, 1-2). For the relocation of the scientific revolution and the relativization of the notion of science, see: Cunningham and Williams 1993, 407-432.

philosophical culture. What still exists and continues to be very much alive is the desire of both moderns and postmoderns to keep us separated from the Middle Ages.

For the argument of my paper, Edward Grant's case is equivalent to a medieval apologue. Grant published in 1971, in the collection "History of Science Series" from John Wiley & Sons, a history of medieval physics which was to become in time a standard manual with nine reprints between 1977 and 1993: *Physical Science in the Middle Ages*. The paper summed up eruditely all the information of the discipline up to that date and interpreted it in a conformist manner, following the standard Koyré *philosophical vision*, which was the official *vision* of the discipline. In essence, Grant said that although there was a science of physics in the Middle Ages, its influence on modern physics is negligible, because there was a Scientific Revolution and as the medieval science remains prisoner of its historical context its contributions, some of them real, cannot escape the cage of medieval religious culture. In 1996, Edward Grant, meanwhile acknowledged as an eminent specialist in the history of medieval science and author of several exhaustive books on some medieval topics, published a surprising work, titled *The Foundations of Modern Science in the Middle Ages. Their Religious, Institutional, and Intellectual Contexts*, a palinode to his 1971 book:

My sense of the medieval achievement in science and natural philosophy and my understanding of the intellectual environment that produced it, as well as my perception of the relationship between medieval science and the Scientific Revolution, had all been fundamentally transformed.

(Grant 1996, xi)

The thesis of his new book is that the Middle Ages played a major role "in the generation of early modern science, a role that is independent of whether or not medieval scholars made identifiable contributions to the transformation of the exact sciences in the Scientific Revolution."<sup>178</sup> In the "Preface", Grant tells us how he has come to radically change his opinion, as

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<sup>178</sup> Grant 1996, xiii-xiv.

compared with the one in his 1971 book: by abandoning the thesis that “the Middle Ages had not contributed significantly to the Scientific Revolution of the seventeenth century”.<sup>179</sup> In other words, in my terms, Grant abandoned the Koyré *philosophical vision*, keeping the idea of Scientific Revolution and adopting a continuity thesis both hard (in the sense of the “Pierre Duhem Thesis”) and extended (in the sense of including several extra-scientific cultural contexts: religious, institutional, intellectual, etc.). As a historian of science, Grant has converted to the vision of the history of science professed by Duhem, abandoning the philosophical vision of rupture which Koyré imprinted on almost all the historians of science, with Grant included among them prior to his reconversion.

Another example is I. Bernard Cohen. We remember his words:

For me, as for many others of my generation, the ringing cadence of Alexandre Koyré’s dramatic statement of 1939 will ever echo strongly in the mind as a primary statement of revolution.

We also remember the veneration he bore to Koyré, as well as the fact that they worked together to the new edition of Newton’s work, *Philosophiae naturalis principia mathematica*, which Cohen brought to an end after the death of his master and friend.<sup>180</sup> Well, my impression is that his practice of minute historian made Cohen to become ever more alien to the vision of an “epistemological history” (a term coined by Michel Foucault that I will justify below) and ever more imbued with the vision of history as thorough reconstruction of the facts (what Foucault mockingly labeled “factography”). The echoes of the 1939 “dramatic statement” in favor of the Scientific Revolution through “decisive mutation” sounded increasingly less in his conscience, culminating with the modification of the concept of revolution itself. Even though the concept of “Scientific Revolution” was preserved, the *meaning* of the idea of revolution has changed dramatically. The idea of revolution has not been used anymore in its meaning of radical rupture, of “decisive mutation” (Koyré) or “cut” (*coupure intellectuelle*, at

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<sup>179</sup> Grant 1996, xiii; xii.

<sup>180</sup> Newton 1972.

Foucault), but with a meaning which incorporates the concept of cumulative growth, of evolution by successive accretions. When he dealt with Newton's most revolutionary ideas, I.B. Cohen noted they derive from the successive transformations of much older ideas:

As we trace Newton's transformations of the ideas, concepts, methods, laws, and principles by which the science of dynamics grew during the seventeenth century, we cannot help becoming aware of how much Newton owed to his illustrious predecessors and contemporaries.  
(Cohen 1985, 220)

His conclusion was that there is a “macroscopic” and a “microscopic” way to look at the ideas with historical reality. The further away you are and more “macroscopically” you look, the more revolutionary and newer the ideas seem to you; the closer you get to them while undertaking a more detailed and more “microscopic” analysis, the more pronounced the element of transformation and continuity appears: “The analysis of revolutions into a series of transformations shows the continuity within the change, but does not thereby diminish the magnitude of the net change itself.”<sup>181</sup> This is how a historian of scientific revolutions, initially strongly influenced by the Koyré *philosophical vision*, came to speak, after a careful historical practice of the detail and by thoroughly establishing the historical genealogies for every revolutionary idea in part, not of a revolution by “mutation”, but of “revolutions by transformation”:

In my research I have found again and again that the most revolutionary scientific ideas tend to have in them elements of older ideas to the extent that I have named the revolutionary creative process a ‘transformation’. The term revolution – with both an etymological sense of a return or rolling back (as found in astronomy) and a present accepted sense of a radical innovation – conveys very well the double nature of revolutions in science, as a process of producing a

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<sup>181</sup> Cohen 1985, 219.

new set of beliefs, concepts, theories, methods which are to some degree transformations of older or existing ideas.  
(Cohen 1987 A, 200)

Bernard Cohen has formed the view that what qualifies as revolution on a large scale (at “macroscopic” level) actually consists in accretionary “microscopic” developments, spread over long periods of time.<sup>182</sup> For the opposite view, that of the radical ruptures, Cohen evoked a discussion between Michel Foucault and a historian of science, in which Foucault with his usual brilliance defended the theory of the “intellectual cuts”. Invited by the historian of science to provide an example to illustrate his theory, Foucault would have answered: “Vous, messieurs, êtes les factographes; moi, je fais l’histoire épistémologique”.<sup>183</sup> This is a typical response, which strikingly evokes the manner in which Koyré turned away from the facts that contradicted his theory in order to be able to save his vision: “Vous avez peut-être raison, mais moi je n’ai sûrement pas tort”. The opposition between a history of science based on historical realities, on recording the facts, and an “epistemological history” of science built upon philosophical visions could not be more clearly drawn.

#### IV.

We can now provide an explanation of the two paradoxes which we set at the beginning of Section III (*vide supra*). Somehow, the answers naturally emerge from the above analysis.

Paradox one: Why, even though Duhem was unanimously recognized as the founder of the history of medieval science, his findings were not viewed with sympathy by the practitioners of the discipline he founded? Answer: Because the recognition of his discoveries would have implied admitting the truth of the “Pierre Duhem Thesis”, and admitting the truth of the “Pierre Duhem Thesis” would have implied the rejection of the Koyré *philosophical vision*, which would have resulted in acknowledging the fact

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<sup>182</sup> Cohen 1987 A, 204.

<sup>183</sup> The account belongs to M.D. Grmek (Cohen 1987 A, 209, note 63).

that the idea of “Scientific Revolution” is not anymore “supremely important” for the philosophical and ideological unity of the discipline.

Paradox two: Why, even though the Koyré *philosophical vision*, through which the history of science was professionalized and institutionalized as an academic discipline, did not have the historical truth on its side, historians continue to regard it as indispensable for the identity of their discipline? Answer: Because, if one had admitted that it is false that the rupture from the Middle Ages was the compulsory pre-condition for the modern science of nature to be born, then one would have had to admit that the Middle Ages is not in conflict with modernity (even if modernity is in conflict with the Middle Ages) and one should have reconsidered the relation of the modern world with Christianity (as religion, as theology and as philosophy) and with medieval Christendom (as civilization and as societal device); such a reconsideration cannot would have put into crisis the founding statement of modernity: namely, that modernity is the epoch when the fact of being modern is itself a value – and this fact, it seems, cannot (yet) be accepted. We have already learned the postmodern answer: rather than reconsider the relation of modernity with Christianity, we should better give up the universality, objectivity, and neutrality of modern science.

At the hard core of the Koyré *philosophical vision*, expressed by the thesis of the “Scientific Revolution” as “decisive mutation” and illustrated by the rejection of the “Pierre Duhem Thesis” in all its components (despite all the historical arguments which support it), there lies a principle of separation through the production and maintenance of rupture: of modern rupture with Christianity and Christian civilization. The “Pierre Duhem Thesis” was rejected not because it was false — all the objections raised by Koyré against the sub-theses which compose it have been compellingly invalidated by historical research: it was rejected because it acknowledged (and postulated at the same time) a principle of continuity between the Christian civilization and modernity. In the rejection of the “Duhem Thesis”, it was exactly the filiation between the civilization of modernity and Christianity that was rejected vehemently and stubbornly.

For this very reason, however many confirmations historical research will bring to the theses formulated by Duhem, and however much one will demonstrate that Duhem was right and Koyré was wrong, Koyré's

intellectual model will remain accepted as instrumental to a *correct* vision, while the intellectual model proposed by Duhem will be constantly refused, criticized, and avoided as suspicious. My assumption is that the limit up to which one will be able to reach in the abandoning of the Koyré *philosophical vision*, in a world such as ours, which seems to have been built *against* its Christian roots,<sup>184</sup> consists in the preservation of the principle of separation and rupture with Christianity. The hard core of the rejection of the “Pierre Duhem Thesis” and of the acceptance of the Koyré model of rupture and separation from premodern past is the maintainance of Christianity outside modernity.

In fact, the reason for the obstinate resistance to facts of the Koyré *philosophical vision* is neither scientific nor epistemological, but ideological. Or, more philosophically put, it pertains to *a vision of history* which reflects in itself a quite stubborn philosophy of history, a mixture of progressivism and cataclysmic evolutionism. The necessary changes having been made, the Koyré *philosophical vision* of the history of science has much in common and is solidary with Jacob Burckhardt's vision of the Renaissance as an era absolutely distinct from the Middle Ages, obviously superior to it and the only one possessing features of the future modern age, obtained through the rupture with the medieval past. Beyond the factual falsity of disuniting a Leonardo da Vinci (hero of the Renaissance) from an Albert of Saxony (hero of the Middle Ages and victim of the Renaissance humanists' scientific incompetence), the vision of a Renaissance which would be actually a Pre-naissance of modernity due to the assumption that it was contrary to the Middle Ages must concern us not only as historically false, but also as extremely harmful to our own culture and its future. Already in 1943, Lynn Thorndike, the eminent historian of magic as precursor of experimental science (author of the impressive eight-volume study *A History of Magic and Experimental Science*),<sup>185</sup> made this argument in a short essay titled “Renaissance or Prenaissance?”:

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<sup>184</sup> See the interpretation given by Joseph H.H. Weiler, an eminent specialist in European law (e.g., *The Constitution of Europe*, 1999), to the contumacy with which European Union officials rejected any reference to the Christian roots of the European civilization in the Preamble to the draft of the European Constitution: *Un' Europa cristiana. Un saggio esplorativo* (Weiler 2003; the French translation, Weiler 2007, was prefaced by Rémi Brague); the key concepts are that of „Christofobia” and „Christian self-ghettoization” (*crisofobia; il ghetto cristiano europeo*; Weiler 2003, 96-112).

<sup>185</sup> Thorndike 1923-1958.

The concept of the Italian Renaissance or Renaissance has, in my opinion, done a great deal of harm in the past and may continue to do harm in the future. It is too suggestive of a sensational, miraculous, extraordinary, magical, human and intellectual development, like unto the phoenix rising from its ashes after five hundred years. It is contrary to the fact that human nature tends to remain much the same in all times. It has led to a chorus of rhapsodists as to freedom, breadth, soaring ideas, horizons, perspectives, out of fetters and swaddling clothes, and so on. It has long discouraged the study of centuries of human development that preceded it, and blinded the French *philosophes* and revolutionists to the value of medieval political and economic institutions. It has kept men in general from recognizing that our life and thought is based more nearly and actually on the Middle Ages than on distant Greece and Rome, from whom our heritage is more indirect, bookish and sentimental, less institutional, social, religious, even less economic and experimental. (Thorndike 1943, 74)

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# **Theory of Freedom: The Weaknesses of Classical Thesis and the Necessity of a New Foundation\***

Adrian Radu

## **1. Introduction**

The analysis of the current concept of freedom cannot be achieved without looking back to its development, in order to identify determinant stages and events that shaped its meaning as we know it nowadays. In this paper, we will try to explain the mechanism that engendered the contemporary meanings of freedom by decoding the corresponding theoretical process. Aiming to achieve a balance between theory and the empiricism of the free society, our goal is to trigger a conscious creative process that could lead us to a better paradigm of freedom.

The historical perspective on the composing concepts introduces us to a prior well-defined meaning of freedom that was able to describe an identifiable situation in the world.

In their subsequent development, the concepts have become more flexible, by losing their initial precision and gaining a wider direction, along with new and more complex meanings determined by the general human progress. In this case, we identify new meaning levels that cross the objective-denotative power of the concept.

What is the foundation of the concept of liberty, given the situations from real life that were imposed as a particular fact in the panoply of life events, and how can a special concept capture all of its complexity?

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The historical beginnings of human kind were marked by a hard and embarrassing particularity, still present today and still representative of human nature, which consistently led man's attitude against his peers, that is the fight for power that primarily refers to the subjugation of the other and the suppression through killing or the constant threat of death, which eventually materialized in the *master-slave* relationship – a violent state of human action against his fellow man that divided the community in classes and categories. This kind of relationship expresses a state of confrontation which, in an antithetical context, engendered the concept of freedom. This aspect was strongly suggested by Isaiah Berlin:

The fundamental sense of freedom is to not be chained, imprisoned or a slave to another. Other meanings are merely extensions or metaphors of the original meaning. Striving to be free is manifested through efforts to remove obstacles: the struggle for personal freedom by eliminating the interference, exploitation, enslavement of people who have different interests. Freedom, at least in its political meaning, relating to the absence of tyranny and domination (Berlin 1996, 70).

In antiquity we had to do with a very well known and defined *object* when it came to freedom – it was represented by a man who was not under the control of any other man. It is very easy to understand if we explain this concept in contradistinction to its antithetical term of slavery. Freedom appears to be the state of non-slavery, so the concept can be understood and explained by highlighting an antithetical situation and using this duality to outline both opposing concepts.

Charles Peirce expresses this theory recalling the basic reality that led to the birth of a concept:

A sign, or *representamen*, is something that takes the place of something for someone, in some ways or under certain conditions. It addresses somebody, creating in his mind an equivalent sign, or perhaps a more developed sign. The sign

created I shall call the *interpretant* of the first sign. The sign takes the place of something, namely its *object*. It takes the place of this object not in all respects, but in reference to a sort of idea, which I sometimes called the *foundation* of the *representamen*. (Peirce 1990, 269)

This situation started to change very slowly, in interdependence with society changes, so that it is imperative for us to study the relationship between the evolution of the society as an empirical parameter and the theory of freedom as a noetic parameter so that one can deduce which of the two parameters is foundation or cause and which is the effect.

## **2. Historical Evolution and Connotative Development of the Concept**

Unfortunately, the institution of slavery was perpetuated in different geopolitical parts of the world and still exists today, and we make this remark to show that a comprehensive analysis of the *freedom – slavery* relationship can cover almost the entire history of humanity. We will discuss the foundations of the concept of freedom, by recording a specific content, well established in the original, so that only a slave could say *I am not a free man*, because his situation was very clear and his existence, the possibility of emancipation, of changing his ontological condition, did not depend solely on himself. Similarly, a slave who was freed from this condition and no longer depends on the master, can say with absolute certainty: *I am a free man*. The original situation that gave rise to the concept of freedom, which reality defined very well, without intermediate grades, began to gain a degree of relativity that grew over time, although not disappearing completely.

Even in ancient times, there were a number of regulations so that the slave's existence was not totally dependent on his master, thus he began to have rights, such as the right to life, meaning that the owner no longer had the slave's life to his sole discretion and would only be allowed to kill the slave for certain actions considered illegal at the time. Of course, today,

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these issues may seem irrelevant, even though the “slave” continues to be available to his “master”. Considering the historical developments that led to the beginning of a process for the development of human consciousness, although with many bumps and interpretations along the way, finally we have come to respect human life, at least in its theoretical meaning. It is widely recognized today that the emancipation of consciousness was produced by Christianity, by putting a man and his life in the spotlight through the assertion of human equality before the deity etc., but it should also be noted that even before the Christian era there were voices of Greek and Roman philosophers that spoke out on the humanity of slaves and about the common destiny of all people.

Interestingly enough, the Mosaic religion, in which Christianity finds its roots, refers to freedom and the institution of slavery. In the case of the Israelites it was a significant difference between the “holy people” and the Gentiles, in the sense that Jews could be held as slaves if they got into that situation through poverty, but were able to redeem themselves or to be redeemed by someone with financial means. Had this situation not materialized, the slave would have had to wait for the sabbatical year to come, in order to be released without any ransom and be given back the confiscated lands.

There was, therefore, a permanent state of recovery that was offering new opportunities, and the hope of freedom was kept alive through concrete laws. Regarding Gentile slaves:

You can bequeath your children after you as a possession, and so, you can keep them as slaves forever. Regarding your brothers, the children of Israel, another shall not rule over his brother with rigor. (Leviticus 25:46)

There is no redemption clause, although the Gentiles who wanted to live in the midst of “the holy people” had to be treated with love, as if they were the same people.

Perennial enslavement opportunities arise, therefore, as a derogation from the general context and it is strange that no mention is made of any redemption of will – it is done through other members of one’s own people who can express the will of the man to be free or to remain a slave for life:

If the slave will say: *I love my master, my wife and my children and I don't want to go like a free man*, then his master has to bring him to God, has to close the door for him and shall bore his ear with an awl, and the servant forever will remain in his service (Exodus 21:5-6).

Emphasizing the meanings that gave the institution of slavery degrees of interpretation and boundaries on different grounds, which means that already at that time some people were beginning to have a certain moral conscience, the slavery-freedom ratio began to have some intermediate grades. Also note the importance of symbols: for example, all the scenes carried out near the door, which refer to the possibility of leaving the old state of slavery and going to the new state of freedom; and the ear piercing as a sign of locked and canceled possibility.

Through this very suggestive symbolism it is recognized that between slavery and freedom there is a radical ontological difference which implies a shift; leaving a world and entering another where the walls are no longer closed. The slaves were always physically marked and could not wear certain clothes that were only allowed to free men.

Christianity brings, probably, the most important transformations to human consciousness and reexamines the relationship between fellows. The question of freedom applies to two levels:

### 2.1. The spiritual level –

... If you continue in my word, you are indeed my disciples; you will know the truth and the truth shall make you free...Verily, verily, I say unto you, Jesus answered them, everyone who commits sin is a slave of sin (John 8:31-34).

The notion of freedom is no longer a social and political issue, but a strictly spiritual one, related to a certain gnosis by God's revelation and the knowing of truth. This means that the relationships within the society may well be overturned; thus, the slave who believes in Christ can be free, whereas the master is a slave of sin. The free man is the one who is not subjugated by the power of sin. Paul stresses this point on many occasions

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and defines freedom not just as an antithetical concept to slavery, but by itself as an application of human holiness, by recognizing and fulfilling Christ's teachings:

But God be thanked that though you were slaves of sin, you obeyed from the heart that you were delivered and having been set free from sin, you became slaves of righteousness. (Romans 6: 17-18)

## 2.2. The social level –

When Jesus was asked by the Jews insidiously if they had to pay tribute to Caesar, He answered as follows:

Render therefore to Caesar the things that are Caesar's, and to God the things that are God's. (Luke 20:25)

This aphorism is, by an astonishing relevance, the expression of the two levels that we speak of. Therefore, the spiritual freedom and the social freedom are two different issues, and one does not assume the other. Moreover, even the existence of classes of slaves and free people in society proves that human freedom is a random issue and is misunderstood, because it does not depend on a person's will, but on conjecture and independent factors.

I need to specify that a special value in the Christian paradigm refers to the transformation of the self, and not on peers, through enslavement or cultural/physical destruction, as it was understood at the time. Following the word of Christianity, the theory of freedom acquires new meanings and offers a new perspective that engages men in the analysis of their own freedom. A person who has embraced Christianity, in case he was in a state of slavery, will not define freedom as a liberation from the master, but as a liberation from one's own weaknesses, and the state of his freedom will mean holiness, which also implies loving the master that he serves. Here we see the appearance of the suggestive and polysemic symbolism of the Cross: an object used mainly by the Romans to torture, humiliate and provide men with a painful and public death; it is recovered by Christian theology as a

symbol of transition from death to life and as a symbol of the crucifixion of the flesh which enslaves the man, so the cross becomes the symbol of freedom by opening the path to spiritual fulfillment through the passions of Christ.

Although by the end of the Roman Empire a movement of contents had started around the concept of freedom, it was in the Middle Age when the free man – slave relationship shifted from a relationship between two individuals, to a new type of relationship: the man gradually loses sense, the idea that he is directly subjugated by his fellow man and will see how he becomes subjugated by the economic context in which he lives. The lack of opportunities for economic emancipation, the impossibility to improve the standard of living, the constraints imposed primarily by poverty, will outline the context that will make man feel like a servant, to feel that he is not free in a true sense. Even if the noble is the lord for whom medieval peasants work, this does not happen because this noble has direct power over the peasants working his land, but, at first, because he has the resources to keep the peasants alive; he is the owner of the land and the master over means of subsistence and this possession determines many to accept the situation as they need to work for a living.

Freedom nowadays is associated with major economic opportunities, which offer a good living, the ability to travel, to have a family, etc. It thus becomes possible, in the eighteenth century, for Thomas Hobbes to write about freedom in the following terms:

From this fundamental natural law, that man is commanded to seek the peace, derives a second law: that a man is disposed, when others are as long as deemed necessary for peace and for their own defense, to give up at this right to all things and to be content with as much liberty against other men as he would allow other men against himself. For as long as each retains the right to do whatever he wants, everyone is at war. (Hobbes 2011, 21)

What Hobbes noticed was the obvious relationship between freedom and the desire to possess, that he saw as identical in a different sense than the

original meaning of freedom. In this case, freedom is defined as the natural state of man's innate condition which causes him to want and to express his will as the desire to possess. This seems to achieve the bridge between the spiritual and the social, already expected in Christianity. Hobbesian philosophy recognizes that man has inherent characteristics that put him in inappropriate situations when he is in a social context. For this, the human being needs self-control and self-censorship. It is important to note that, while Christianity sees the desire and other natural features as burdens for the spirit, handcuffs that undermine freedom, Hobbes had called desire a manifestation of freedom and concludes with a Christian perspective which recognizes that these features are an obstacle to coexistence and must be institutionally limited.

The analysis of the concept of freedom is prominent in modern times and fully demonstrates the loss of meaning precisely at the roots. Another determinant aspect is the attempt to define this concept through a rupture of the empirical situation, therefore, the definition does not take into account the direct reporting to reality and this is of particular relevance because it implicitly recognizes that human reality is no longer an appropriate framework for the foundation of the concept of freedom, while at the same time, this process reveals thinkers attempting to produce a new theory of freedom through a superior understanding concluded by a model foreshadowed beyond reality, so that humanity can aim towards this model.

### **3. Meanings and Reflections of the Prevailing Theory**

In spite of the fact that ever since the Modern Era research is needed in order to overcome the classical approach of freedom, there is a plethora of authors that inevitably slid into theorizing models founded on social aspects of human reality.

Thus, Thomas Hobbes considers human nature subject to natural instincts and designs its theoretical approach based on this fact. Man is born with the instinct of possession and therefore, he comes into conflict with his fellows as they compete for the same purposes. Inevitably, it goes to conflict and war. As such, the concept of freedom is confined by these borders in

which freedom should avoid the conflict and appears as a minimum guarantee of the existence of each individual. Man must act in accordance with his volitional impulses, without invading the field of action of those who should act in the same way. This way of understanding appears to be the most appropriate for the human being, having guaranteed his own security and the security of the other members of the society. Isaiah Berlin brings this subject into discussion and shows how freedom is often confused with a sense of security as is preferred by most people to a dangerous free existence (Berlin 1996, 110-112).

The question that rises is whether a theoretical paradigm of liberty can be created irrespective of the human features, the empirical part of the society, therefore if we can create an ideal model of freedom able to decisively influence humanity by going beyond the borders of the human weaknesses.

History has shown how the meanings of freedom have changed and their contribution to the improvement of the society is important, irrespective of the concrete situation that exists at a time.

All existing theories which were grounded on empirical situations related to the human nature, have created and shaped the society, as we know it today. Nevertheless, we deal with violence, discontent, strikes, civil wars, wars between nations and a permanent state of conflict. This demonstrates that the author's assumptions on human nature and the need of constraint forces are correct, but, at the same time, this aspect shows us that, in order to propose an optimized definition of freedom, one must overcome this foundation and discover a more relevant one, which is not related to the social-human reality, but to the pure thinking as starting point.

The main idea that guided the research on freedom was has been to emphasize the characteristics derived from human genetics and shape special theories based on these hereditary traits, so that there would be an enhanced paradigm of the community life that primarily involves the widest possible opportunity for thought and action.

This formulation which sticks its roots in the soil which engendered the man, although it seems the most truthful and logical, it cannot create an efficient and viable model for several reasons:

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1. It starts from a base that is essentially negative represented by the human being features which predispose to aggression and violence. These are features like selfishness, individualism, aggression, lack of balance, etc.;
2. It does not emphasize the transformation of these human hereditary features, and it tries to solve them instead through regulations that have as main instruments of action, coercion and punishment, therefore also brutal human intrinsic traits;
3. History has repeatedly shown via countless episodes of violence, destruction, outbursts, and even heinous crimes that took place within or between free nations, that freedom in its original meaning is no longer relevant and it does not produce the desired effects on the individual and society;
4. The existence of social classes and intellectual steep economic gaps;
5. Painful poverty in some geopolitical zones determined by invasive and aggressive policies.

It appears imperative that this state of conflict generally monitored by a power device that does not solve the situation, but controls it, should be replaced by a new order that takes into consideration the solving of these pervasive problems in the society, and would be able to determine some radical changes.

Nobel prize winner James M. Buchanan emphasizes the fundamental importance of the punishment from the classical theory of freedom, but he sees its dilemmatic nature:

The fundamental dilemma of punishment appears even in this quasi-fictional story of the charge carried by the robot. Why don't people want to punish those of them who violates the terms of the contract existing default, the law which defines individual rights? (Buchanan 1997, 188)

The answers that the author offers are of economic nature, showing how the society in many cases has discovered that sentencing has costs that exceed the loss caused by the offense.

#### **4. The Need for a New Theoretical Foundation**

What one's it appears as a path of freedom, to another it seems to be just the opposite. In the name of freedom people are ready for almost anything. In the name of freedom it is crossed even the path that lead to bondage. (Jaspers 1986, 260)

Karl Jaspers believed that absolute truth and perfect freedom are impossible and that is why a permanent evolution is needed where the focus would be on the essence of freedom, so that to avoid negative effects and whose foundation would permit a human to human relationship.

Formulating a new theory really different from existing ones, with a real possibility of being effective and to produce the desired changes, it can no longer go from a negative basis.

It is necessary to ignore the primitive human traits that lead inevitably to the search of effective ways to master and control them. In conclusion, we deal with a change in direction, the man with all his psycho-cultural baggage is no more the starting point, the cause of theory, but its purpose. In this case, there will inevitably appear a hiatus to separate the noetic process from the social-human reality and it will redefine priority as a process of thought. This does not mean a way of thinking without any empirical evidence available, but giving up to the analysis of reality as the foundation of thought and determining reality as destination of thinking, as its purpose. It is necessary to distinguish between what one wants and what is or should be. The volitional sphere of the human being still dominates the perspective and it should be replaced by an ontological approach, capable of addressing one's own values and evolution as the right foundation of the free man.

John Stuart Mill anticipated this when he spoke about freedom as a necessity of thought for every individual:

No man can be great thinker unless he recognizes that, as a thinker, his first duty is to follow his own path reasons, no

matter what conclusions would lead it. The truth gains more even from the errors made by a man which, based on studies and the appropriate prepare, thinks with his head than following correct opinions from those who support them only because they cannot think by themselves. The freedom of thought is needed not only, or primarily, to create great thinkers. On the contrary, it is as indispensable, or even indispensable to a greater extent, to give ordinary human beings the possibility to achieve mental development of which they are capable. (Mill 1994, 47)

It may be inferred that freedom is a process of personal development that each of us should experience, and we can say that wealth and personal ambitions go to the background. We could even state that they would be forgotten at the time the man steps to the next stage of development, and freedom would only determine positive effects, such as logics, without any negative repercussions as seen nowadays.

James M. Buchanan, as a defender of Hobbes' thesis, focuses on the substantial shortcomings of the classical model and he does not hesitate to make some reflections coming out of the cold sphere of the economy. Thus, he shows how the dilemma triggered by economic reasons deepens when the legislature itself admits occasional violation of the law. This shows how the freedom based on the natural human traits can trap everyone and no one can be excluded from the mistake and punishment. It implicitly recognizes that, ultimately, the most important role is played by the man and his intrinsic value: "The person who recognizes his tendency to overeat may adopt a strict diet". (Buchanan 1997, 212)

And here comes into play the fundamental role of the will, but there is a fundamental change, because the will is no longer directed to something, but to the human intrinsic aspects, which implies knowledge development and a change of priorities.

## 5. Conclusions

Revealing the meanings of freedom and the attempt to discover new directions represent very popular research subjects in the actual context. Unfortunately, most of them remain anchored in the classic psychology thesis, as I proved, and they are building their theories on the same basis that has considered the individual will and the human predispositions of domination and gain. Despite the fact that many researchers identified the main issues of the existant models of the theoretical paradigm, they are unable to loose them, because these models take into account the need of the individual to live in the community and the need of the human to express the freedom in this way, the only way in which the freedom can be defined, in terms of the need to relate to others.

The aim of this paper is to identify a new approach by removing the traditional bases and unveiling new grounds that are relating to the thinking and aim the intrinsic development of the human being.

Friedrich A. Hayek, in his seach for new meanings, also defends Hobbes' thesis, by arguing as follows:

Occasionally, we also use these terms when we say that the ignorance or the superstition prevents people to do what they would do if they were better informed, when we claim that - in fact – *the knowledge frees*. (Hayek 1998, 39)

Outstanding economist, Nobel laureate, Hayek is unable to detach himself from his predominantly utilitarian vision, and when he mentions knowledge, he insists on the information that can provide major opportunities and economic alternatives of development. This is not the kind of knowledge that can serve as basis for a new model of freedom. It is a knowledge that can move the direction of the research from *to have* to *to be*, which implies the personal development, metaphysical knowledge, overcoming selfish barriers and treating the other as an *alter ego* that provides people with a fulfillment of freedom.

The implications of such a change would be fundamental and would change completely the man's view of himself and of otherness, eliminating, first of all, the kind of relationship that makes the conduct towards the other to be fearful or aggressive. The freedom will no longer be perceived as a

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sum of wealth and opportunities for the society's progress, but as an own ontological status in which the world would reflect itself in an entirely original way.

The realization of this change is difficult not only because of the human natural traits, but also because of the way the man has evolved in the society he created. It is all part of a complex game with rules already defined and crystallized that keep the humanity in a certain way of thinking. The change is possible only through a noetic search able to produce a superior model and in the same time to discover an effective way of replacing the old mentality with a new one. I think we are dealing with a process as complex and painful as that of the abolition of slavery, process that seemed unthinkable at a time, yet, it proved itself as possible.

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# A Defence of the Basic Coherence of Conceptualism\*

Mihai Rusu

## 1. Introduction

The privileged status of conceptualism in the analytic tradition is nowadays disputed, following the post-Kripkean resurgence of metaphysics. Nevertheless, the epistemological benefits provided by the characteristic views of conceptualists should be weighed in, even in critical inquiries of the doctrine. The main aim of this paper is to provide a defence of conceptualism as a viable epistemological option, particularly with regard to the epistemology of modality. The case I build here is by and large an answer to Jonathan Lowe's criticism of conceptualism from (Lowe 2008). However, this is not a solely negative endeavour. The points I make in response to Lowe's arguments outline various ways wherein conceptualist theories could be or have been developed by philosophers with distinct conceptualist penchants.

I will take Lowe's own characterisation of conceptualism as a working definition (Lowe 2008, 10):

Many modern forms of anti-realism have their basis in a form of *conceptualism*, according to which all truths about essence knowable by us are ultimately grounded in *our concepts* – that is, in our ways of thinking about things – rather than in things 'in themselves'.

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This is not to say that ‘conceptualism’, as a philosophical term of art, has this meaning exclusively. The actual, practice-sanctioned limits of applying this label to philosophical systems and doctrines are rather imprecise. In the philosophical literature regarding mental content, for instance, ‘conceptualism’ is taken to stand for the related claim that all representational content is determined by our concepts/conceptual capacities. However, for my present purposes, Lowe’s definition provides a suitable and informative general characteristic of conceptualist theories. We should also note that we may distinguish between general or global conceptualism and particular forms of conceptualism, as applied to different classes of notions, processes or phenomena that are of philosophical interest. To wit, one may, for instance, withhold assent to an all-encompassing form of conceptualism that would conformably hold that *all* knowledge about the world is ultimately grounded in our concepts, but may maintain that this is the case for some particular domain, such as modality. Thus, someone could be a modal conceptualist and hold that the modal portion of our knowledge is fundamentally mind-dependent, that there is no modal reality ‘in itself’ that grounds modal truth, but he may not extend this theoretical attitude to the whole of our knowledge. It is also true, however, that motivation for particularized conceptualism, such as in the modal case, is most often found in some universal perspective on the nature of the world and our knowledge thereof. An anti-realist view of modality that is reflected in conceptualist tenets is quite often the result of a global anti-realist inclination.<sup>1</sup>

In the next section, I will argue why conceptualism has an epistemic upper hand over essentialist theories. This is not to be regarded as an indication of the absolute superiority of conceptualism, but I believe it counts as a strong reason for considering conceptualist theories and also for giving a more substantial explanation of metaphysical necessity. Sections 3 to 7, with the exception of section 6, contain replies to Lowe’s arguments against conceptualism. In section 6, I elaborate on Lowe’s original *a priori* – *a posteriori* distinction and explain why his variant of essentialism brings Lowe very close to conceptualism about modality. In this approach, section

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<sup>1</sup> However, conceptualism and realism are not, strictly speaking, incompatible. While the former is based on an epistemological distinction, the latter is developed mostly as a metaphysical perspective. Consequently, Wiggins is able to make sense of *conceptualist realism* in Wiggins 2001.

6 is the clearest illustration of an overall aim of the paper: to provide insights about the conceptualist perspective by showing how philosophers with uncongenial tendencies (in this case, Lowe) ‘run into’ conceptualism as a result of their professed views.

## 2. Essentialism versus Conceptualism – From an Epistemological Point of View

Kripke’s defence of essentialism, based on his purported examples of substantial (metaphysical or *a posteriori*) necessary truths, heralded the rebirth of robust metaphysical inquiry. Some of these new metaphysical theories have naturally strayed away from Kripkean tenets, but they are still related to the general philosophical framework outlined by Kripke’s contribution, as is the case of Lowe’s work. The anti-metaphysical stance and, therewith, the various forms of conceptualism, anti-realism, and modal scepticism that were previously dominant in analytic philosophy appear to be nowadays the views of a defensive minority.

Essentialism provides what are arguably the most promising prospects for an epistemological and metaphysical account of necessity.<sup>2</sup> Nevertheless, conceptualists enjoy a hard to deny epistemological advantage over their essentialist opponents. This benefit can be described in the following way. The Kripkean distinction between epistemic and metaphysical possibility is crucial for developing an essentialist theory. Kripke’s well-known discussions of the necessity of identity or of the uncertain epistemic status of mathematical conjectures urge us to distinguish between an *objective* sense of possibility – real or metaphysical possibility that would pertain to the world itself – and a *subjective* type of possibility, relative to a certain state of our knowledge, that is epistemic possibility or possibility for all we know. Traditionally, arguments against essentialism were based on conceivable counterexamples to essential property attributions. But this strategy is overturned by showing that the purported counterexamples are not *really* possible – they are modal illusions engendered by unrestricted acts of imagining/ conceiving wherein we fail to

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<sup>2</sup> See Fine 1994.

take notice of the epistemic-metaphysical difference. This distinction has been drawn out from Kripke's lectures and adopted quite unreflectively by many philosophers. The easily overlooked point is this: *metaphysical possibility is itself ascertained at the epistemic level*. Real possibility is a concept just like the others and what is really possible is likewise deemed to be so in relation to our knowledge, so just putting forth the distinction is not sufficient. We need something more in the way of characterizing metaphysical possibility. If the conundrum does not seem obvious, we may simply think of it as the main question of modal epistemology: how can / do we have knowledge of metaphysical modality? How do we 'arrive at' metaphysical modality?

It is somewhat surprising that an unswerving Kripkean, such as Scott Soames, presents metaphysical modality as a special case of epistemic modality. In Soames 2001 and most notably in Soames 2011, he proposes an explanation of necessary *a posteriori* truths according to which there is an initial competition of sorts between various epistemically possible candidates for being essential properties of considered objects. These 'candidates' are determined in relation to certain categories of properties (such as origin or composition) that are deemed essential of objects by means of our *a priori* intuitions. When we have empirical evidence of the actual possession of a putative essential property (e. g., that Queen Elizabeth is the daughter of the late King George VI), we find metaphysical necessity by simply detaching this fact from the space of competing epistemic possibilities regarding properties of that type and necessitating it. But, as Frank Jackson points out in a criticism of what he calls the two-spatialism of Soames, we are never able to get metaphysical modality out of the space of epistemic possibility.<sup>3</sup> Either the other competing epistemic possibilities are not truly eliminated or they are indeed obliterated, but in each case the two types of possibility should always go together – what is epistemically possible is metaphysically possible and *vice versa* (Jackson 2010, 88-92). This shows at least that we need a different epistemological account of metaphysical modality that eschews appeal to epistemic possibility. The contemporary landscape of modal epistemology testifies to the fact that this is not an effortless endeavour at all.

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<sup>3</sup> Jackson uses the term 'conceptual possibility', but it appears very clearly to have the same theoretical content as 'epistemic possibility'.

These remarks are not intended as proof that a realist modal epistemology is hopeless, but it can be argued that conceptualism sits better with this fundamental difficulty. For conceptualists, any type of modality has ultimately a conceptual grounding, but it is also open for them to acknowledge the existence of a distinction similar to the epistemic-metaphysical one. It is important to note that conceptualists do not have to claim that *all* the content of our knowledge is of a subjective or conceptual nature. The gist of conceptualism is not that there is nothing ‘out there’, no portion of reality that is mind-independent, but just that we cannot speak / have knowledge of some kind of objective truth, distinction or classification outside our conceptual schemes. From this standpoint, a conceptualist can be a radical sceptic about modality and hold that the metaphysical-epistemic distinction amounts only to a difference between reflected and non-reflected epistemic possibility, respectively. To wit, cases of dubious epistemic possibility may be explained as the result of a superficial examination of our concepts, whereas metaphysical possibility would be issued from the carefully scrutinized content of our concepts and rules for their use, but nothing more. However, radical modal scepticism is not enforced upon the conceptualist as a result of his anti-realist stance about the world. The conceptualist need not maintain that there is nothing substantial in purported metaphysically necessary truths. In fact, the Kripkean schema of reaching *a posteriori* necessity (*a priori* principle / intuition about types of essential properties + empirical content) works better in the conceptualist account. Although different in many respects, the accounts of Sidelle (1989), Chalmers (2006, 2012), Jackson (1998, 2010) and Thomasson (2007, 2013) all have in common the idea that *a posteriori* necessity is ultimately grounded in (*a priori*) principles or rules that are ‘filled in’ with empirical information about actual property possession.

This comparative epistemological advantage may nevertheless seem meaningless to proponents of full-blown metaphysics. Moreover, if as Lowe holds, conceptualism is fundamentally incoherent, the very legitimacy of conceptualist philosophy is at stake. The following sections will be devoted to answering the arguments advanced in (Lowe 2008) against conceptualism. We should note that Lowe counts some of the most illustrious figures of analytic philosophy in the second half of the twentieth century as being conceptualists. According to him, the ideas of Dummett,

Wiggins, Bernard Williams and Putnam in his later phase would comply with Lowe's understanding of what it is to be a conceptualist (*ibid.*, 31). However, Lowe's arguments are not directed against a particular philosopher's doctrine, but towards a generic form of conceptualism. My replies to Lowe's critique will be formulated at a corresponding level of generality, with a focus on their implications for the study of modal notions. I have already distinguished between a general form of conceptualism and modal conceptualism. It is obvious, nonetheless, that the two are closely linked (cf. section 6 of Lowe 2008). Facts about essences appear to be the only source of genuine modal truths, if there are any, so any claim about the constitutive level should be mirrored by our modal theses.

### 3. Conceptual Truths Are Grounded in the Essences of Concepts

For Lowe (*ibid.*, 11), the essence of something, X, is "what it is to be X". Conceptualism, according to Lowe's second informal definition in section 7, is "the view that [...] facts about essences are really, in the end, just facts about certain of our concepts" (*ibid.*, 24-25). There is an important difference between this description of conceptualism and Lowe's earlier characterisation that was cited in the Introduction to this paper. Whereas at first he claims that according to conceptualism, truths about essences are *ultimately grounded* in our concepts, here Lowe formulates a stronger thesis, namely, that facts about essences *are just facts about our concepts*. So, according to Lowe, this reduces modal truths to *conceptual (analytic) truths*.<sup>4</sup> This latter claim is too reductive, especially in connection with the post-Kripkean accounts that I have mentioned above (like Sidelle's conventionalism or Thomasson's modal normativism), which attempt explicitly to accommodate Kripkean *a posteriori* necessities within conceptualist frameworks without reducing the former to disguised

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<sup>4</sup> This should not be taken to mean that true or false statements that are deemed possible are analytic. Lowe probably wants to say that according to conceptualism, modal statements of the type "It is necessary that *p*" or "It is possible that *p*" are analytically true in virtue of the content of our concepts. In the case of necessity, the truth of *non-p* is disallowed by our concepts, whereas *p*'s possibility is purportedly explained by conceptualists as *p*'s truth being allowed by our concepts.

contingent or analytic truths. The first definition of conceptualism that Lowe propounds allows that the above-mentioned contributions be considered conceptualist and it is also more in line with the historical use of the term. The fact that modal truths are ultimately grounded in our concepts or, with another expression that Lowe accepts, in our ways of thinking does not have to make all necessary truths identical to analytic truths. A more flexible conceptualist thesis concerning modality is that it does not make sense to speak of or consider necessary truths outside a given conceptual scheme.<sup>5</sup> Thus, we cannot track some mind-independent necessary truth, one that is not the consequence of our ‘slicing-up’ of the world through our conventions (Sidelle) or through our conceptual rules (Thomasson), but some of these necessary truths are allowed to have an empirical content, *viz.* a content that is not part of the meaning of their component terms.

The second definition of conceptualism is not crucial for the first counterargument formulated by Lowe, but it may contribute to presenting it in more radical terms. According to Lowe (2008, 27), “the proper thing to say about ‘conceptual’ truths is, very plausibly, that *they are grounded in the essences of concepts*”. Even if we maintain that not all necessary truths are analytic, concepts are still the ultimate ground of essential truths and the argument may proceed. So, according to Lowe, concepts / conceptual truths must have their own essences. If the conceptualist admits to that, he is after all committed to essentialism, as the essences of concepts are not allowed to be some other concepts. Lowe argues that the conceptualist cannot attempt his specific reductive move (essences to concepts), “for this is to imply that putative facts about *the essences of*

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<sup>5</sup> Conceptual schemes are regarded traditionally as individual or collective perspectives whereby sensory experience is organized. The claim that sensory content *is always / must be* structured by a conceptual scheme does not entail *conceptual relativism*, i.e. the idea that there are multiple, possibly untranslatable, conceptual schemes that different human beings or communities possess. One may hold that there is a single, universal conceptual scheme or that some features of our various conceptual schemes are universal. See (Strawson 1959) for such a view. I use the notion of conceptual scheme for reasons of convenience, but I do not aim to propose a fully-fledged theory of conceptual schemes. Nor do I insist on using this particular notion at the centre of any development whatsoever of conceptualist doctrines. However, I take it that any such account should point to the general idea that underlies the notion of conceptual scheme, to wit, the thesis that there is a mind-dependent structure of the whole of our experience.

*concepts* are really just facts concerning *concepts of concepts* – and we have set out on a vicious infinite regress.” (*ibid.*)

The first objection one can bring to this argument – and Lowe does not shy away from admitting it (cf. *ibid.*) – is that it is question-begging. The conceptualist typically wants to do away with essences. Consequently, the claim that essences are grounded in concepts is in this case the staple of a reductive account of essence. Even if the conceptualist concedes to using the term ‘essence’, he surely rejects being committed to a substantial and non-derivative meaning of it. If concepts are the ultimate ground of essence, then if the reductive account is to be useful and meaningful, the ‘search’ should stop there. Essences and concepts are simply not on an ontological par. Granted, this may leave us with a question about our account of concepts. Should we treat them as primitive and self-evident? This is not a problem I will pursue in this article. My point is just that Lowe’s argument that concepts (should) also have essences does not establish the incoherence of conceptualism by any means.

It is also unclear why if the essence or identity of concepts is purportedly grounded in other concepts, the latter should be *concepts of concepts* (whatever that is supposed to mean). The idea of a conceptual scheme (see *supra*, fn. 5), as it has been developed in classical analytic philosophy, is tied to a hierarchy of a different kind than the infinitely regressive one proposed by Lowe. The hierarchical nature of conceptual schemes is committed rather to a grounding level of basic or primitive concepts that structure the content of our knowledge. From there on, conceptual schemes, as well as knowledge, may be enriched by adding new concepts relating in some way to more basic ones. It is beyond the scope of this paper to advance an epistemological theory of concepts following these lines. For my purposes, it suffices to show that the idea that concepts are to be grounded (up to a certain point) in other concepts is not untenable by pointing to viable ways it could be or has been developed. This is what I have done here.<sup>6</sup>

Lowe’s reply to my arguments would probably have been that even if concepts may be consistently grounded in other concepts (with the exception

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<sup>6</sup> Giving a definition seems to be another plausible way of grounding a concept in other concepts (the *definiendum* is grounded in the *definiens*).

of basic ones), there still remain essential facts about concept users, *viz.* human beings, that the conceptualist must be committed to. This is admittedly a trickier question, as we cannot indeed speak of concepts as some free-floating entities outside human minds. Nonetheless, if conceptualists succeed in giving reductive accounts of essence, then the same difference of level should also apply to the ‘repository’ of concepts, the human mind. So, there are not only concepts, but also concept users, to wit, human beings. But the use of concepts need not be an identity fact about human beings. For conceptualism, it is crucial only that there are concept users, not that they have a certain (concept-using) nature. No further fact about concept users is entailed by the conceptualist position, just that there are some, at least one. Moreover, it is not manifestly incoherent to hold that we can speak and think of concepts and concept users only inside some conceptual scheme. The existence of a (basic) universal conceptual scheme should make us hopeful that we are on the right track when giving a general epistemological account, but even relativistic conceptions can claim to be ‘onto something’ without being incoherent. It is just that that content is ineluctably known and expressed inside a certain frame.

At this point, the reader may wonder why Lowe would endorse such an argument; the more so as Lowe himself reckons it should be question-begging from a conceptualist perspective. The explanation lies in Lowe’s prior account of essence which is put to work here.

#### **4. The ‘What It Is To Be’ Argument**

In section 3, Lowe gives the following answer to the question of why we need to suppose that there are essences:

[B]ecause otherwise it makes no sense – or so I believe – to say that we can talk or think comprehendingly about things at all. For if we do not at least know what a thing is, how can we talk or think comprehendingly about it? (Lowe 2008, 13)

The key terms here are ‘talk or think *comprehendingly*’ and Lowe’s claim about them is quite strong. In order to talk or think comprehendingly

about Tom the cat, Lowe holds I must know what a cat is and which cat Tom is – and these are *identity* or *essential* facts concerning Tom. It would be rather difficult to hold that one cannot talk or think about something without knowing what that thing's essence is. That is why Lowe adds 'comprehendingly'. However, who is to decide what it means to talk and think comprehendingly? An immediate candidate for a realist criterion comes to our mind: accurately reflecting the natures of things. But people are surely wrong about many facts concerning the identities of things or of kinds. Does this mean that people who thought whales were fish could not talk or think comprehendingly about whales? Even if we do not have knowledge of the biological essence of an individual or of a kind, it seems that most times we are in possession of some uniquely identifying criterion (that could otherwise be linked to an unknown putative essence) or, as some philosophers argue, such a content (whether essential or not) is not needed at all. How are we then to understand Lowe's claims?

Not surprisingly, Lowe takes issue with the "Kripke-Putnam doctrine", as he calls it. As it is widely known, the view that referential terms in our language do not need to have and, moreover, *do not have any descriptive semantic content* attached to them is a staple of Kripke-Putnam views concerning names, natural kind terms and reference. This tenet pertaining to the philosophy of language is usually paired with a metaphysical commitment to the existence of essential properties of objects and kinds. Kripkean philosophers usually equate essential properties and necessary properties – a view disputed by Fine (1994); there are, nevertheless, paradigm cases of essential properties of objects and kinds that Kripke-Putnam theories endorse, such as internal structure, origin or composition. The epistemological perspective is aligned with the view on language as it countenances the claim that some essences are unknown (and in some cases maybe even unknowable) to us. The existence of essential properties is always presupposed, but in many cases we defer the establishment and knowledge of essences of kinds to scientists. And there are, of course, cases when even scientists ignore the actual essence of things. This fact is used by Kripke when developing his examples of *a posteriori* necessary truths. Essences were not always known to users when they named an object or a kind, therefore they could not be part of the meaning of the term. At the same time, normal use of referential terms somehow

warrants the fact that these terms stick to their referents. When we discover empirically some putatively essential property, this property is not and cannot be a part of the meaning of the referential term denoting the object that has the property; however, it must be true of the object or kind that possesses the property that it has it in every possible situation. The most important point about orthodox Kripke-Putnam views in relation to the current discussion is that according to such theories, it is possible for users to talk and think (comprehendingly, one may venture to add) about things without knowing what those things are essentially. This is ensured by the character of our naming practices and of our referential terms.<sup>7</sup>

Lowe disputes Kripke-Putnam views by reaffirming Locke's claim that the idea of an unknowable essence is futile. This dialectical move is rather spurious, as Kripke and Putnam do not hold that essences are unknowable in principle. Some essential properties appear to be knowable and, of course, known by human beings, according to this view; otherwise, Kripke's examples of *a posteriori* necessary truths could not be reached or justified. Lowe opts instead for what he takes to be an Aristotelian principle of transparency concerning essences that, in my opinion, offers us an important insight concerning his own view:

[T]he real essences of material substances are known to those who talk or think comprehendingly about such substances – and consequently [...] such essences are not to be identified with anything that is *not* generally known to such speakers and thinkers, such as the 'particular internal constitution' of a material substance, or a human being's (or other living creature's) 'origin' in the Kripkean sense (Lowe 2008, 10, fn. 3).

We see that Lowe holds that essential facts should be known to all users who talk and think comprehendingly about things (material substances, living creatures, etc.). As a matter of fact, Lowe's view does not actually contradict the Kripke-Putnam doctrine as long as a proponent of the latter

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<sup>7</sup> For more details, see the two classic texts of the Kripke-Putnam doctrine, Kripke 1980 and Putnam 1975.

maintains just that we can talk and think about things without knowing their essence, but does not claim that we do so *comprehendingly*.<sup>8</sup>

More importantly, the transparency principle, as stated above, leaves us in a cul-de-sac concerning knowledge of essence. For how are we to determine that we talk and think comprehendingly about an object? In order *to talk or think comprehendingly about an object*, we must *have knowledge* of that object's *essence*. But how can we determine that we have knowledge of an object's essence? Well, we can do so only by appealing to some fact that is generally known by people who *talk or think comprehendingly* about that object.

Perhaps Lowe could have argued convincingly that this is only an apparent circularity. At the very least, it is clear nonetheless that Lowe's view cannot be considered a decisive criticism against Kripke-Putnam style philosophy, as the former establishes a distinction that is not philosophically compelling between talking and thinking about something and talking and thinking about something *comprehendingly*. More interestingly, Lowe's own brand of essentialism shares with conceptualist theories an apriorism about essence, made explicit at (*ibid.*, 29), that is distinctively anti-Kripkean. His criterion for essentiality points to a perspective that is not very different from conceptualism. To sum it up, for Lowe there are no unknown essences; necessary facts are directly linked to the knowledge of users who talk and think comprehendingly about the considered objects. This does not regard only knowledge of the structural makeup of essential properties, but also requires knowledge of the actual content of essential facts. To take an example, if origin were an essential property, then we would presumably have to know actual facts about the gametes that generated a certain living creature, for instance a certain human being, and not only label them as 'gamete A' and 'gamete B', or something similar.

At this stage of the discussion, the questions about the meaning of the transparency principle and of 'talking and thinking comprehendingly' re-emerge. How can we decide if someone talks and thinks comprehendingly about something? The limits of talking and thinking comprehendingly are seemingly set in relation to the limits of concepts possessed by certain users. It is a certain type of knowledge of a certain fact

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<sup>8</sup> I believe this is not typically the case.

that decides who talks and thinks comprehendingly about something. But this raises an important question concerning people who do not possess that certain knowledge and even people who possess it, but do not deem it relevant or constraining. As we know, many of our predecessors thought that whales were fish, and there probably exist contemporary members of our own linguistic communities who think the same. Can we really claim that our predecessors could not talk and think comprehendingly about whales and, moreover, about a certain whale? It is more reasonable to hold that their kind concepts were different, both in type (pre-scientific or inchoately scientific, perhaps) and content. But it is also reasonable to hold that the facts they deemed possible or necessary were different from what we may hold in similar respects. The substantial conceptual underpinnings of Lowe's characterisation of talking and thinking comprehendingly become more obvious when we attempt to inquire how members of a certain linguistic community at a given time can establish that they – the community – are not talking and thinking comprehendingly about something. It is quite clear that the question does not make much sense. One also has to wonder to what measure we can determine the same thing about members of *our* linguistic community that do not hold some widely held belief or set of beliefs about putative essential facts. I will come back to these matters shortly, but for now it suffices to point out that even if it may seem too strong to contend that the delimitation of talking and thinking comprehendingly is artificial, we should agree that it is at least very difficult to specify.

Knowledge of what a thing is 'in itself' remains too strong a condition for talking and thinking comprehendingly about that thing. The belief that we have such knowledge, perhaps supplemented by conformity to some practice-sanctioned standards of a term's use, may be a more realistic operational criterion. But even if we grant the important points Lowe makes on the matter, they still do not fly in the face of conceptualism. Conceptualists can reconstruct a sense of objective knowledge, but only *as inside a particular conceptual scheme*. The conceptualist may hold that we know what a thing is and this is not a merely subjective matter (conceptual schemes may be shared and something mind-independent may exist), but he is free to maintain at the same time that we do not know this absolutely. To wit, we have no knowledge of what that thing is 'in itself', outside some conceptual scheme that informs our experience.

## 5. Conceptualism is Rooted in Scepticism

According to Lowe, the motivation for conceptualism is to be found in sceptical attitudes, especially scepticism concerning ‘the external world’:

The sceptic feels at home with himself and with his words and concepts, but expresses doubt that we can ever really know whether those words and concepts properly or adequately characterize things in the external world. [...] According to the sceptic, all that we can really know is how we *conceive* of the world, or *describe* it in language, not *how it is* (*ibid.*, 28).

Lowe believes that the separation between minds and their concepts, on the one side, and the external world, on the other, is illegitimate. Or, as he puts it,

there is, in truth, no intelligible division that can be drawn between the external world, on the one hand, and us and our concepts and our language on the other” (*ibid.*).

But this is not sufficient as an argument against scepticism concerning the real world. Lowe does not attempt to extend this idea and transform it into a full-fledged argument against external world scepticism. As it stands, his claim seems to be no more than a statement of an insurmountable principled disparity between his own view and conceptualism. Lowe’s discussion does not establish the lack of intelligibility of the (ontological and epistemological) separation between minds and concepts, on the one side, and whatever else there is, on the other – it just provides a statement of a heavyweight (and rather dogmatic) stance of realism and epistemic externalism.

The history of modern philosophy contains, as we very well know, various notable forms of scepticism concerning the external world. The fact that such views were propounded (and by first-rate philosophers) shows at the very least that Lowe’s dismissal of conceptualist scepticism as

unintelligible is unwarranted. Cartesian scepticism, for instance, is a *reconstructive* form of scepticism that aims to find an ultimate ground of certainty, and does so in the *cogito*. In relation to this, Lowe expresses serious doubts about the possibility of ‘inside-out’ accounts of knowledge, to wit, of accounts that attempt to (re)constitute objective knowledge of the world proceeding from our concepts and words. But a point similar to the one he makes about the principled impossibility of such an effort is applicable to Lowe’s own claim that any fundamental separation between conceptual entities and external world entities is unintelligible – yes, it is, *as long as we commit ourselves from the beginning to realism and (Lowe’s) essentialism*.

## 6. A Note About Knowledge of Essence and the *A Priori*

Lowe proposes his serious essentialist account of knowledge as an alternative to conceptualist scepticism and provides some guidelines about the way it should work. A short analysis of his conception is, I believe, interesting not only independently, but also in relation to the purposes of this paper. What is distinctive about this part of Lowe’s work is that it aims to offer a redrawing of the *a priori* – *a posteriori* distinction. The account proposed here remains schematic, but Lowe’s ideas were subsequently developed by Tahko (2008, 2011), one of Lowe’s students. In direct connection to Lowean tenets, Tahko regards the relation between the *a priori* and the *a posteriori* as a ‘bootstrapping’ one. No clear demarcation between the *a priori* and the *a posteriori* can be drawn, as there is no purely *a priori* or *a posteriori* knowledge – the two are rather in a continuous mutually redefining interplay.

The fact that essence precedes existence is crucial to Lowe’s doctrine concerning the *a priori* – *a posteriori* distinction. Consequently,

[W]e can at least sometimes know *what it is* to be a K – for example, *what it is* to be a material object of a certain kind – and thereby know, at least in part, what is or is not *possible* with regard to Ks, in advance of knowing whether, or even

having good reason to believe that, any such thing as a K actually *exists*. Knowing already, however, *what it is* whose existence is in question and that its existence is at least *possible*, we can intelligibly and justifiably appeal to empirical evidence to confirm or cast doubt upon existence claims concerning such things (Lowe 2008, 28).

In the same paragraph, Lowe describes the relation between the *a priori* and the *a posteriori* and its role in knowledge acquisition in the following way (*ibid.*, 29):

The growth of objective knowledge consists, then, in a constant interplay between an *a priori* element – knowledge of essence – and an *a posteriori* element, the empirical testing of existential hypotheses whose possibility has already been anticipated *a priori*. This process does not have a foundational ‘starting point’ and it is constantly subject to critical reappraisal, both with regard to its *a priori* ingredients and with regard to its empirical contributions.

Now, one may wonder about the significance of this rethinking of the *a priori* – *a posteriori* distinction and of the ensuing relation between the two types of knowledge. If the passages above are to be taken as a complete description of this distinction in Lowe’s view, then the relation between the *a priori* and the *a posteriori* could simply be recast as the distinction between hypothetical thinking and the empirical testing of hypotheses, to wit, empirical knowledge that may confirm or disconfirm the hypotheses. But there is more, traditionally, to the *a priori* than hypothetical thinking about the world – the *a priori* is a domain of distinctive (mathematical, logical, semantic) knowledge that is regarded as independent of experience.

Possibly, the remarks cited above were only a part of Lowe’s view of the *a priori* – *a posteriori* distinction or maybe he would have replied that he was interested in a novel and perhaps more significant way of framing this distinction. Either way, Lowe’s account faces a more interesting challenge that shines a light on the similarities between his essentialist doctrine and

conceptualist thinking. Whether his delimitation is original or not, Lowe seems to lose sight of the fact that the *a priori* is always *constitutive of meaning*. And this is the case not only in traditional philosophy, but also with Lowe's own view. The constraints he imposes on talking and thinking comprehendingly should make knowledge of essence meaning-constitutive and, consequently, limit severely the reappraisal process of both *a priori* and empirical knowledge. To take an example, if being an animal is part of the essence of cats, then could we admit that, according to Lowe's theory, someone who believes cats are robots talks or thinks comprehendingly about cats? Obviously not. Moreover, anyone who thinks cats are robots does not know what the word 'cat' means in English. So, knowing what it is to be X should impose some meaning-constitutive constraints on the terms denoting X, on pain of not talking and thinking comprehendingly about X. But then, according to Lowe (at least implicitly), *essential truths should be constitutive of meaning*, so they seem to be closer to conceptual truths than Lowe himself would want.

I believe Lowe is right to hold that knowledge of essence is, at least in most cases, a form of *a priori* knowledge. Nevertheless, in my opinion, Lowe fails to realise that – by his own lights, as essential properties must be known, not only knowable, and also *known to be essential* – this should impose a strong, meaning-constitutive constraint on the process of building knowledge that appears to have as a consequence the conceptualist equivalence of necessary and conceptual truths. It remains open for discussion if a constraint of this type is realistic, efficient or perhaps too restrictive.

## 7. The Application Argument

In the final part of his paper, Lowe attempts to deal a decisive blow to conceptualist theories. In my opinion, this last jab also fails to be a knock-out punch.

The argument proceeds as follows. Lowe proposes an important question for the conceptualist: in virtue of what can it be said that there exist entities that satisfy our concepts? According to Lowe, the conceptualist

would naturally and effortlessly answer that there must be entities that possess the features built into our concepts. But this answer yields in its turn a global question: what does it take then for the world to contain entities that fall under a certain concept? The conceptualist cannot suppose that there is something mind-independent that makes entities satisfy the concept. Therefore, he must advance a different understanding of what it is for a concept to have application. The only solution available to the conceptualist is the pragmatic one:

the concept of a K ‘has application’ just in case thinkers find it *useful*, or *convenient*, to conceive of the world as containing Ks (*ibid.*, 31).

Subsequently, Lowe cites some well-known philosophers and their famous phrases that exhibit conceptualist perspectives: Putnam’s rejection of a ‘ready-made’ world, Williams’ dismissal of truths about ‘what there is anyway’, Dummett’s ‘amorphous lump’-world or Wiggins’ conceptualist realism wherein individuation is regarded as “the singling out of objects by thinkers”. Lowe rejects categorically the inherent anti-realism of these views and affirms their ultimate incoherence (cf. *ibid.*, 30-32). However, in order to support his claim about the incoherence of conceptualism, Lowe just repeats his first argument regarding the matter (*ibid.*, 32):

There simply is no coherent position to be adopted according to which *all* essences are constituted by concepts, because concepts themselves are either *something or else nothing* – they either exist or they do not. If they don’t, then conceptualism is out of business. But if they do, then they themselves have an essence – *what it is* to be a concept.

I have explained above why I do not think that Lowe’s argument succeeds. The fact that a conceptualist should agree that *concepts must be something* does not lead him into any realist trap forcing him to admit to an *objective knowledge of essences* (again, according to Lowe, essences must be known by users, not just supposed). I would like to make a further point

here about Lowe's final argument. It is a misapprehension on Lowe's part to think that the conceptualist has only a pragmatic alternative for an account of the application of concepts. Much more plausibly, one could argue that *the application of concepts is not always a matter of choice*. At the level of global conceptual schemes, this thesis seems very compelling. It hardly seems that we have the total freedom of moving back and forth between conceptual schemes. From this point of view, conceptual schemes may appear similar, *mutatis mutandis*, to Kuhnian paradigms in the philosophy of science. If the general conceptualist stance I have attempted to delineate here is indeed close to the most frequent understanding of this view, and I think it is, then this latter characterisation seems more appropriate. According to conceptualists, we always operate inside some conceptual scheme. Perhaps human beings actually use just one basic conceptual scheme (out of indefinitely many that can be used in principle), and this may be the result of evolution. Arguably, language users do not even know many of the rules underpinning use of concepts and words, which makes the idea of a free transition between conceptual schemes even more implausible. But more importantly, we should stress the fact that there is no *first application* of a concept to reality: a conceptual scheme, however rudimentary, is already given and the world has already received a form before we become aware of our referential and concept-forming practices. As such, there is a sense of *objectivity* that we can talk about. If conceptual schemes are shared, then the world appears at least to some of us in similar ways.

We are certainly able to enrich our conceptual schemes, but this does not mean that everything that pertains to a conceptual scheme is up for revision without the risk of decisive (potentially unwanted) alterations (e.g., manifest contradictions, the actual changing of conceptual schemes). Further application conforms to the pre-existing conceptual scheme or, if important changes are to be made, it is quite difficult to argue that these should / could always be conscious or detached modifications. It is important to note that we are indeed able to intervene on our conceptual schemes, but we are also *moulded* or *predisposed* by them in certain ways, which shows that conscious, pragmatic choice about the application of concepts is not always an option for us.

## 8. Conclusion

Lowe's arguments fail to establish (individually or jointly) the basic incoherence of conceptualism. In my opinion, claims of incoherence, such as the ones levelled by Lowe, are best addressed to particular developments of the conceptualist perspective. Otherwise, critics of conceptualism risk painting a diverse intellectual landscape with too broad of a brush. This is what Lowe does when describing the staples of conceptualism.

Matters of imprecision aside, what is more important is that Lowe's main argument against conceptualism – basically, that concepts also need essences that cannot be conceptual – is ineffective. The three objections I mounted against Lowe's case were as follows. First of all, the argument is question-begging – the conceptualist attempts a reductive account of essences in order to explain them away, so he would not admit to a substantial understanding of essential truths. Second, conceptualism does not lead to infinite regress because the grounds of concepts need not be concepts of concepts. There are other ways of grounding concepts in other concepts, such as the enriching of conceptual schemes or definitional grounding. And third, we should keep in mind the fact that there is no *first application* of concepts. A conceptual scheme is always *already given*. We can also speak of concepts and concept users only inside a conceptual scheme. No objective essential facts about concepts and concept users should be derived from their basic status.

Conceptualism is not threatened if we are not already committed to a realist perspective, a commitment that is admittedly hard to avoid when taking the common sense appeal of realism into account. Nevertheless, conceptualism has its own perks, such as a privileged epistemological position regarding modality. The importance of this point appears all the more clearly as we dwell upon Lowe's version of essentialism, which seems to have trouble steering a middle course between Kripke-Putnam views and conceptualism. Also, the sceptic or anti-realist underpinnings of conceptualism should not be taken as arguments against this position as long as scepticism and anti-realism are not shown to be fundamentally incoherent.

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