FILOSOFIA E SCIENZA

Filosofia e Scienza sono due campi in continuo dialogo tra loro. Un dialogo sempre nuovo nei protagonisti e nei temi, con una storia ancora ricca di sentieri da scoprire e strade da ripercorrere, per arrivare a nuovi spazi di confronto comune. Questa collana vuole essere uno strumento di viaggio lungo questi itinerari, uno strumento di presentazione e dibattito di riflessione filosofica e problemi scientifici (non solo quelli propri delle scienze della natura, ma anche quelli delle scienze sociali). Uno strumento a disposizione dei singoli filosofi e scienziati, ma soprattutto a disposizione del lavoro comune di costruzione di una forma di conoscenza.

To my nephew Diego and my niece Clara

Gaetano Licata

Truth and Facts

Rejection of the Slingshot Argument in Defence
of the Correspondence Theory of Truth

Contents

Introduction

Holistic conceptions of the semantics of natural language are incompatible with the classical correspondentist idea of truth. In the theory of correspondence, true sentences refer to (or have as meanings) facts, events or states of affairs, where facts, events or states of affairs are conceived as complex entities built with ordinary objects. Davidson, one of the most passionate developers of Quine's holistic program, refuses the "strategy of facts" in his discussion of the concept of the "true sentence". It must be remembered, however, that the refusal of the "strategy of facts" did not entail for Davidson, in *True to the Facts* [1969], the complete refusal of correspondentism. In this essay, Quine's student affirmed that, although the relation between true sentences and discrete facts is impossible, the truth can still be described as a correspondence between language and the world. In *Truth and Predication* [2005] Davidson concludes the discussion claiming that in 1969 he was mistaken to define truth as correspondence, also in the weak sense of a correspondence between the whole language and the whole world[1]. In my opinion, Davidson's initial

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1. In *The Structure and Content of Truth* [1990: 304] Davidson attacks all the correspondence theories. In this essay the Dewey Lectures of 1989 are collected, and the self–critic about the use of the label "correspondence" appears here for the first time. The three Dewey Lectures have finally transformed into chapters in *Truth and Predication* [2005]. In these lectures Davidson is completely against the existence of facts and the representationalist/realistic presuppositions of modern philosophy.

definition of his theories as "correspondence theories" (for the relation of satisfaction), is a sign that it is not possible to understand the concept of truth without referring to correspondence and the world.

What are the reasons to erase the facts from semantics, if these are understood to be relations between objects of the world? Russell theorizes that a true sentence stands for a fact, giving us a classical image of the correspondence theory of truth [1918: 182–183]. In his opinion, facts are parts of the real world, they are expressed by a whole sentence and not by a single name. Facts are structures of objects (particulars) and properties (universals), and the constituents of a true sentence correspond to the components of the fact to which that true sentence corresponds. Facts are individuated by their components and, in this way, they are related to one another. In *Tractatus*, Wittgenstein partly follows Russell's thought and writes that sentences are images of facts or of states of affairs. The states of affairs are complex entities built with simple objects: simple names which are the constituents of sentences correspond to simple objects which are the constituents of states of affairs.

The slingshot argument is a simple but dangerous logical weapon used against the concept of fact and against the correspondence theory of truth. Gödel, Church, Quine and Davidson used it with different aims. Those who accept the slingshot argument, like the Holists, reject the idea of discrete "fact" as the entity which each true sentence stands for. As Quine claims, the facts are *entia non grata* in good semantic theories. Neale's paper, *The Philosophical Significance of Gödel's Slingshot* (1995), has recently revived the debate on this argument. Neale's work and the slingshot constructed by Gödel are a defence of Russell's

theory of descriptions. This theory, as shown in *On Denoting*, is connected to the refusal of the distinction between intensional and extensional sides of meaning. My defence of Frege's distinction between meaning and reference, and of a semantic theory of natural language which considers the extensional and also the intensional side of meaning, is due to the great importance that the *point of view* has in language. It can be argued that sentences are not pure representations of facts of the real world, but that they also express a point of view. In this sense, as Buzzoni claims [1995, 2008], the Fregean *Sinn* expresses a point of view on reality (on the *Bedeutung*)[2]. The theories that involve

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2. Developing the idea of *Sinn* as point of view on *Bedeutung*, Buzzoni [2008: 22–24] writes: "Operations (always mediated by some concept) and real objects (always potentially instruments) are inseparable notions: operations trace those distinctions in reality that we designate as objects, and in doing so, they always include and involve natural aspects as well. [. . .] The empirical properties of a body (say, the transparency of a crystal glass) have a *meaning* that is determinate and in principle univocal, and therefore an *existence* that is in principle testable and ascertainable, only in so far as two conditions are met. First, these properties must be linked to the concepts that establish the cognitive point of view from which reality, or the object, are being investigated. Secondly, they must be linked to the in principle reproducible actions that make the object interact with other objects and are necessary to ascertain the properties in question (say, the act of looking through the glass with respect to the property of transparency). Further properties of the object (such as its hardness, solidity, fragility etc.) can be highlighted, that is, translated into meanings and established, that is, translated into technical–operational terms by means of other actions (scratching with other materials, touching, throwing onto the ground etc.). *These actions are always guided by concepts and values, and it is only for this reason that they have cognitive significance*. It is clear that, in a sense, an object's properties, asserted by a proposition, depend on these concepts and actions without which they would have no cognitive value for us. However, these properties remain, *as to their content*, independent of the concepts and actions that have been employed to discover them. Here, 'to discover' means to give cognitive and linguistic expression to real contents that we keep on bumping into at

direct reference are always theories of language without a speaker, and without a point of view. Russell's theory of meaning and of descriptions is a theory of direct reference: as we will see in the third chapter of this work, an inadequate concept of identity is a dangerous consequence of this conception of language.

In the first chapter of this book[3] I will analyze the slingshot used by Davidson and that employed by Gödel to introduce the profound differences between the holistic and the classical theory of meaning. Moreover, I will demonstrate how Neale looks for some constraints for a coherent

the technical and operational level, since they won't let themselves be bent by our imagination. Certainly, in order to be able to test the proposition according to which the crystal glass is transparent, I must (among other things) be able to carry out a certain action, namely that of looking through the glass. But this is not at all sufficient. Whether or not it is possible to carry out this action does not depend only on me. If the glass appears transparent to me, this does not depend *only* on me, as it does not depend only on me if I see a certain object as white (or not white). [. . .] In order to grasp an object *as a natural object*, we need a mental or theoretical project. Even the simplest observation must be interpreted at once from the point of view of doing and from that of thinking; it has a meaning only in so far as it partakes at once (1) of our acting and interacting in (and with) the world, and (2) of the inevitable theoretical mediation, both of this acting and of its repercussions in the world. When we recognise that empirical knowledge is always already mediated both theoretically *and* technically, this does not mean that we reject or radically challenge reality's independence of our cognitive efforts to grasp it. Conceptual mediation by consciousness, which takes specific forms at specific times, allows operational techniques to show up the empirically real properties of natural bodies. That is, operational techniques can translate the empirical referents of natural bodies into meanings by making these bodies interact with technical instruments, and ultimately always with our sense organs, according to determinate points of view expressive of determinate interests or values".

3. I am grateful to the "Giornale di Metafisica" and to Giuseppe Nicolaci (director) for their permission to reprint (with some modifications) the essay *The slingshot argument. Troubles for the correspondence theory of truth* as the first chapter of this book.

theory of facts. In the second chapter, I will show that Davidson, despite his complete acceptance of the slingshot argument, maintains in his Holism strong similarities with correspondentism. This shows that correspondentism is never completely eliminable. In the third chapter of the book, I will demonstrate that all the slingshot arguments are unacceptable, because they are founded on an ambiguous and misleading concept of identity.

During the development of my work I have enjoyed the criticism of such expert scholars as Marco Buzzoni, Gabriel Sandu, Graham Oppy, Friederike Moltmann and Giuseppe Nicolaci. To them and to my family, who helped me in various ways, my deepest thanks.

The slingshot argument: troubles for the correspondence theory of truth

1.1. An important difficulty for the strategy of facts

In the classical theory of correspondence, but also in the naïve intuition of the speaker, synonymy is the familiar phenomenon for which different true sentences correspond to the same fact. Here there can be a difficulty for the strategy of facts (D1): what does the expression "different true sentences correspond to the same fact" mean? Do two sentences in different languages, such as (1) "Cicero denounced Catiline" and (2) "Cicerone denunciò Catilina", correspond or refer to the same fact? In the same language, e.g. English, the passivization and the topicalization respectively generate from (1) the forms (3) "Catiline was denounced by Cicero" and (4) "It was Cicero who denounced Catiline"[1]. It is reasonable to think that also (3) and (4) correspond to the same fact to which (1) and (2) do[2]. As Russell (1918) and Davidson (1969) point out, a useful theory of facts should refuse these two poles: all true

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1. Here I use the examples employed by Neale [1995: 775].
2. It is possible to discuss the difference between sentences and their transformations. (1) and (3) could correspond to different facts, if the theory is so refined to say that (1) refers to something about Cicero, while (3) refers to something about Catiline.

sentences stand for the same fact and every true sentence stands for a distinct fact. In the first case the theory would suffer from Frege's *equiestensionality*, in the second case facts are not useful in the explanation of truth because they are characterized in terms of true sentences[3]. If p is any true sentence, f is any fact and $n = \infty$, the best conception of correspondence between true sentences and facts is c):

a)	b)	c)
each single p corresponds to a single f	$\forall p$ corresponds to the unique f	$\exists p$ corresponds to the same f_1

$$
\begin{array}{lll}
p_1 \longrightarrow f_1 & p_1 \searrow & p_1 \searrow \\
p_2 \longrightarrow f_2 & p_2 \searrow & p_2 \longrightarrow f_1 \\
p_3 \longrightarrow f_3 & p_3 \longrightarrow f & p_3 \nearrow \\
\ldots & \ldots & \\
p_n \longrightarrow f_n & p_n \nearrow &
\end{array}
$$

one to one	all to one	many to one
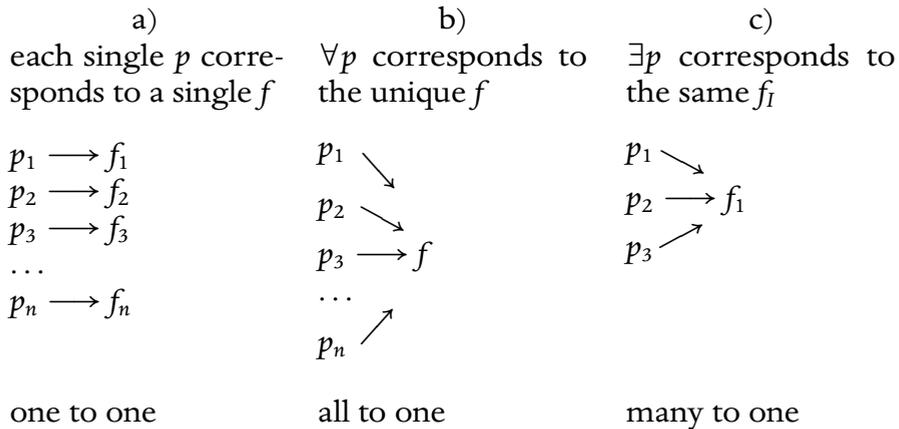
A good theory must show how an entity distinct from a sentence can be conceived as the sentence's meaning; however if every linguistic change in the sentence gives rise to a different fact, the meaning would not be conceived as something distinct from the sentence. If the change in language, or the use of an analogue syntactic structure, or the change of a word (or also of a comma), in the same sentence, changes the fact denoted by the sentence, then the facts would be as refined as the sentences. This would make the theory of facts useless and unacceptable. In an acceptable theory, the same fact should be the meaning of a true sentence even if expressed in different languages or transformed by passivization or topicalization,

3. See Strawson [1950].

or by other superficial changes. To explain this point Stainton [2006] suggests that facts should be "world bound", i.e., built from objects, properties and relations of our everyday world. Thus a good theory of facts should propose situation c), in which the same fact can be expressed in different ways.

1.2. Two kinds of theories of facts: the reference of false sentences

(T1) One kind of theory of facts conceives facts as complexes built with commonplace objects, properties and relations. This is, more or less, the conception of Russell and Wittgenstein's *Tractatus*.

(T2) A second kind of theory of facts conceives things which the sentences refer to as propositions that exist independently from language and in correspondence with the ordinary world. This is the conception proposed by Carnap [1942].

This second kind of theory seems very close to the Fregean and Platonic ontology, in which there is a world of thoughts (*Gedanke*) — the world of truth — separated from the ordinary world, and thoughts are the meanings of the sentences. The difference between Frege's conception and the (T2) theories is that in Frege's philosophy the propositional thought is the *Sinn* of a sentence, while in (T2) theories the proposition is conceived as the *Bedeutung* of a sentence.

Another important difficulty for a theory of facts is that (D2): according to Carnap [1942] facts *per se* can not be denotations of sentences, because, in this case, false

sentences would stand for facts that do not exist: what fact would be signified by the expression 'Toronto is the capital of Canada'? This sentence, as all false sentences, is meaningful but it does not exist as a fact, given that Toronto is not the capital of Canada. This invites us to identify propositions, more than facts, as *denotata* of sentences, and to prefer (T2) instead of (T1). Considering Aristotle's theory of proposition, the problem of reference of false sentences could be solved without using (T2) theories. Neale [1995: 762] explains the theory of correspondence affirming that representations of reality can be accurate or inaccurate: the accurate ones are true, while the non accurate ones are false. But, as Aristotle shows, it is not a question of degree of accuracy, it is a question of correspondence: a representation can be simple and not so accurate, nonetheless it can remain true. In Aristotle's *Categoriae* and *De Interpretatione* the simplest form of theory of correspondence is expressed. In this theory correspondentism is bound to compositionalism. According to Aristotle's conception the negation, or a negative sentence, is a separation between a subject and a predicate, while the affirmation, or an affirmative sentence, is the connection between a subject and a predicate. A sentence is true when the connection, in the sentence, between the subject and the predicate corresponds to the connection, in the world, of the objects signified by the subject and the predicate. In case of negation, a sentence is true when the separation, in the sentence, corresponds to the separation in the world. Vice versa, a sentence is false when it connects a subject and a predicate which refer to objects that are separated in the world, or when it separates a subject and a predicate which refer to objects that are connected in the world. The objects "Toronto" and "is the capital of Canada" are not

connected in the world thus, from an Aristotelian point of view, a fact can be the reference of the false sentence "Toronto is the capital of Canada" but it is just a *virtual* fact. In other words the sentence is false just because there is no such a fact: the non existence of the fact, and the falsity of the sentence which stands for this fact, are the same thing.

The proposition 4.023 of Wittgenstein's *Tractatus* confirms the conception mentioned above. Understanding a sentence means understanding its conditions of truth, a sentence can be understood also when it is false. The fact intended by a sentence and the conditions of truth of this sentence are always the reference of the sentence, even if they are not real. Therefore, in the Wittgensteinian development of Aristotle's theory of proposition it is possible to see the solution of (D2) and a reason to prefer (T1) theories. Developing this idea, we can say that a virtual fact can also be the reference of sentences expressed in different languages, or modified by passivization or topicalization, and so on. Therefore, the Fact {<*Toronto, the capital of Canada*>}[4] can be the reference of "Toronto is the capital of Canada", but also of "Toronto è la capitale del Canada", of "The capital of Canada is Toronto" and of "It is Toronto which is the capital of Canada". Moreover, the truth of a sentence depends upon the beliefs of the speakers: if a speaker considers a sentence false, it is because he/she believes that the world does not correspond to the sentence (or vice versa). Indeed the world is always considered from a particular point of view. The truth is not in the world but in the mind. Thus, there is always a fact in the mind of the speaker (the image of a fact) to which the

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4. Here I use the logical notation of facts employed by Van Fraassen [1969].

false sentence corresponds, but it is only a virtual fact. In the case of "Toronto is the capital of Canada" the speaker considers it false because he/she believes that "Ottawa is the capital of Canada" or at least that "Toronto *is not* the capital of Canada".

1.3. The context of logical operators useful for a good theory of facts

Now I will consider the rules of substitution *salva veritate* to show the features of logical operators useful for an acceptable theory of facts. Let us consider a fact–sentence correspondence operator as *The statement that* () *corresponds to the fact that* (), or a fact identity operator as *The fact that* () = *the fact that* (). These operators, and others, have particular features that I will now outline. In the literature they are considered useful for building a good theory of facts: I will call them Φ operators. Consider the following complex sentences:

(5)   *The statement that* Cicero denounced Catilina *corresponds to the fact that* Cicero denounced Catilina.
(6)   *The fact that* Cicero denounced Catilina = *the fact that* Cicero denounced Catilina.

Given that "Cicero = Tully", i.e. given that the names 'Cicero' and 'Tully' refer to the same object, we can substitute the name "Cicero" with the name "Tully" in the first part of (5) and (6) without altering their truth (and without altering the fact they refer to). Thus we will have:

(1') *The statement that* Tully denounced Catilina *corresponds to the fact that* Cicero denounced Catilina.

(2') *The fact that* Tully denounced Catilina = *the fact that* Cicero denounced Catilina.

The first important feature of operators like those which appear in (5) and (6) is that it is not important which names are used for the objects: coreferential names can be changed without altering the fact that the sentence stands for.

In classical logic the operators () *and* () and () *or* () are truth–functional, this means that the truth of a complex sentence, in which one of these operators appears, depends upon the truth of the simple sentences contained. This also means that the truth value of the compound does not change if a true sentence, contained in it, is substituted by a different true sentence. Consider the following example:

(7) Cicero denounced Catilina *and* Cicero was the greatest Roman orator.

The (7) is true because it is true that Cicero denounced Catilina and that Cicero was the greatest Roman orator. But the truth value of (7) does not change if we substitute the second conjunct with a different true sentence:

(7') Cicero denounced Catilina *and* Cesar conquered Gallia.

Think about the complex sentences (5) and (6). In the case of (5) and (6) it is impossible to substitute the true sentences contained in the compound without altering the

truth value of the entire sentence. Indeed (5") and (6") are false:

(5")   *The statement that* Cicero denounced Catilina *corresponds to the fact that* Cesar conquered Gallia.
(6")   *The fact that* Cicero denounced Catilina = *the fact that* Cesar conquered Gallia.

The second important feature of Φ operators, which appear in (5) and (6), is that they are not extensional like "and" and "or".

Consider now the causal, temporal and modal contexts. In sentences which express causal, temporal or modal contexts the truth does not depend upon what the objects are called. For instance, given that that Cicero = Tully, consider the following couple of sentences:

(8)   Catiline fell *because* Cicero denounced him.
(8')   Catiline fell *because* Tully denounced him.
(9)   Cicero denounced Catiline *before* the birth of Christ.
(9')   Tully denounced Catiline *before* the birth of Christ.

It is clear that substituting "Cicero" with "Tully" the truth value of (8) is unchanged in (8'), and the truth value of (9) is unchanged in (9'). Moreover, in modal contexts the same holds:

(10)   *Necessarily* 9 exceeds seven.
(10') *Necessarily* nine exceeds seven.

Substituting '9' with the coreferential term 'nine', the truth value of (10) does not change in (10').

The case of substitution of whole true sentences in causal, temporal or modal contexts is different. Consider the following couples of sentences:

(8)   Catiline fell *because* Cicero denounced him.
(8")   Catiline had an army *because* Cicero denounced him.
(9)   Cicero denounced Catiline *before* the birth of Christ.
(9")   Tiberius became emperor *before* the birth of Christ.
(10)   *Necessarily* nine exceeds seven.
(10") *Necessarily* our arithmetic is on the basis of ten.

The truth of (8), (9) and (10) is not preserved in (8"), (9") and (10"). Thus the causal, temporal and modal contexts are not extensional like "and" and "or". For these two features, i.e. substitution of coreferential names and non–substitution of true sentences, the causal, temporal and modal contexts are considered very similar to contexts generated by the Φ operators.

Here it is useful to discuss another kind of substitution: the one between logically equivalent sentences. In this case we will question again if this kind of substitution is, or should be, a feature of the Φ operators like *The statement that () corresponds to the fact that ()* or *The fact that () = the fact that ()*. Two logically equivalent sentences are true or false together in every circumstance. Linguistic contexts as "() *entails* ()" allow the substitution *salva veritate* of logically equivalent sentences: any two sentences which are logically equivalent entail the same things. Consider the following example:

(11)   That it is not the case that Catiline was an honest citizen and it is not the case that Catiline obtained

power *entails* that it is not the case that Catiline obtained power.

(12)   It is not the case that Catiline was an honest citizen and it is not the case that Catiline obtained power.

(12') It is not the case that either Catiline was an honest citizen or Catiline obtained power.

(11') That it is not the case that either Catiline was an honest citizen or Catiline obtained power *entails* that it is not the case that Catiline obtained power.

We have obtained (11') substituting, in (11), sentence (12) with the logically equivalent (12'). Sentence (11') has the same truth value as (11), because the operator "() *entails* ()" allows the substitution *salva veritate* of logically equivalent sentences. Logically equivalent sentences can be substituted in causal, temporal or modal contexts, because it is clear that logically equivalent sentences have the same semantic value. Φ operators should behave similarly. A good theory of facts should be built on operators which allow free substitution of logically equivalent sentences, because it is clear that sentences with an identical semantic value should stand for the same fact. It would be worrying if temporal, causal or modal contexts, (and with them the Φ contexts), lost free substitution of coreferential names or of logically equivalent sentences. In this case, we would lose the possibility of saying that sentences expressed with synonyms, or sentences with the same semantic value, correspond to the same fact. Unfortunately, the slingshot argument is just showing that Φ operators cannot allow, at the same time, free substitution of coreferential names and of logically equivalent

sentences[5]. It demonstrates that, preserving both kinds of substitution, there can be, at most, only one fact to which all true sentences correspond.

1.4. Difficulties for a theory of facts which do not rise from the slingshot argument

Before introducing the slingshot argument let us consider some difficulties for a theory of facts which do not rise from the slingshot.

Limitations in the substitution of coreferential terms. Sometimes it is not possible to substitute coreferential singular terms while preserving the truth. Metalinguistic and *Know that* () contexts are two of these cases.

A) Metalinguisticity. When the name of an object is changed in a true metalinguistic sentence, the truth is not preserved in the new sentence. Let us consider the example by Quine:

(13)   Andre the Giant was so called because of his size.
(13')   Andre Roussimoff was so called because of his size.

The names "Andre the Giant" and "Andre Roussimoff" refer to the same person but while (13) is true, (13') is false. In this context it is not possible to substitute coreferential names because in (13) *the name* "Andre the Giant", as linguistic object, is predicated of "was so called because of

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5. This is what the slingshot argument proposed by Church, Quine and Davidson demonstrates; the slingshot argument proposed by Gödel does not involve the logically equivalent sentences; see *Infra*.

his size", and not *the person* with this name. In cases like this, substitution is not valid because of the metalinguisticity of the predicate. It is also possible to give examples of metalinguisticity with entire sentences:

(14)   "Nuntio vobis gaudium magnum: habemus Papam" is the usual expression employed to announce the election of a new Pope.

Also in this metalinguistic context it is impossible to substitute any name with a coreferential name in the Latin expression, because only the exact sentence "Nuntio vobis gaudium magnum: habemus Papam" is truly predicated of "the usual expression employed to announce the election of a new Papa". The "fact" referred to in (14) has, as a subject, a linguistic object which is that Latin sentence and only that: coreferential names cannot be substituted into the Latin sentence without changing the truth value of the entire sentence (14). These remarks suggest that a theory of facts should also consider linguistic facts in order to analyse the metalinguistic function of language.

B) *Know that* () context. Another classical context in which it is not possible to substitute the coreferential names while preserving the truth is the *"know that* ()" context. The most famous example is the one given by Russell [1905]:

(15)   George IV wishes to know if Walter Scott is the author of *Waverly*.
(15')   George IV wishes to know if Walter Scott is Walter Scott.

Even if Walter Scott is the author of *Waverly* it is clear that

(15) is a true sentence while (15') is not. It is important to re-member that the question of knowledge and the *know that* () context, with regard to the substitution of coreferential singular terms or definite descriptions, gives the solution to the problem, in *Sinn und Bedeutung*, regarding the differ-ence between *a = b* and *b = a*. Russell's analysis [1905] aims to solve the enigma of the denotational difference between the identities "Walter Scott is the author of *Waverly*" and "Walter Scott is Walter Scott". The enigma is solved by the quantificational theory of definite descriptions, but Russell does not deny that the denotational difference between these identities is connected to the *know that* () context[6], and to the beliefs of the speaker. Indeed, in other contexts "Walter Scott" and "the author of *Waverly*" can be perfectly substituted.

Contexts like *"know that* ()" not only prevent the sub-stitution of coreferential names, but also the substitution of true sentences with other true sentences. Suppose, for instance, that I do not know if my team today has won the match and that it is the case that my team today has won the match. Suppose that I just know that my team has played. In this case the following sentence is true

(16)   I know that today a match has been played.

But, if in (16) we substitute the true sentence "today a match has been played" with the true sentence "today my team has won the match", we will have the false sentence

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6. Russell [1905: 489] writes that the sentence "Scott was the author of *Waverly*" has a property that the sentence "Scott was Scott" does not have, this property is the fact that George IV wishes to know if the sentence is true. This means that Russell believes that the difference between these identities is in the *know that* () context.

(16')   I know that today my team has won the match.

Know that () context and other propositional attitude contexts do not allow the substitution of materially equivalent sentences, then, like Φ operators, they are non–extensional contexts.

Other limitations of propositional attitude contexts.
Propositional attitude contexts like *Know that* (), *Believe that* () or *Expect that* (), etc. do not allow the substitution of logically equivalent sentences while preserving the truth. The following sentences are logically equivalent:

(17)   It will be sunny in August.
(17') $\{x : x = x \text{ \& It will be sunny in August}\} = \{x : x = x\}$.

The first half of (17') stands for the set of xs such that x is self–identical and it will be sunny in August; the second half of (17') stands for the set of xs such that x is self–identical, i.e. the set of all individuals. If (17) is true, the identity expressed in (17') will be true, if (17) is false, the identity of (17') will be false. In every case, (17) and (17') are true or false together, thus they are logically equivalent. Now consider the sentence:

(18)   A person who does not understand the set theory knows that it will be sunny in August.

In (18) it is impossible to substitute (17) with (17') preserving the truth, indeed the following sentence is clearly false:

(18')   A person who does not understand the set theory knows that $\{x : x = x \text{ \& It will be sunny in August}\} = \{x : x = x\}$.

Therefore, the *know that* () context, and the other verbal contexts of propositional attitudes like *believe*, *expect*, *think*, *desire* and so on, are a hard problem for a good theory of facts. Given that they do not allow the substitution of material equivalent sentences, they are non–extensional contexts like Φ operators. But these contexts often do not allow either the substitution of coreferential singular terms, or the substitution of logically equivalent sentences: the two features required for a good theory of facts. Therefore, how can a theory of facts treat these contexts? Keeping this question in mind, let us analyze the slingshot argument, that is the real trouble for the theories of facts.

1.5. The Davidson's slingshot

In a footnote of *Truth and Meaning* Davidson ascribes to Frege the origin of the slingshot argument and quotes A. Church's *Introduction to Mathematical Logic* [1956: 24–25]. The argument was first formulated independently by A. Church [1943: 299–300] and K. Gödel [1944: 128–129]. It was also used by Quine, but it is hard to attribute it to Frege, even if it explains how all true sentences, in Frege's semantics, refer to the True (and all false sentences to the False). The slingshot employed by Church, Quine and Davidson involves the substitution of coreferential terms and of logically equivalent sentences, while Gödel's slingshot involves only the substitution of coreferential terms. Barwise and Perry [1981] called it "slingshot argument" for its efficacy and its small dimension.

    The slingshot argument is a good reason to erase the facts from semantics. Let us follow the argumentation step by step. Davidson [1967: 307] writes that on the basis

of Frege's building block semantics we can assume that 1) logically equivalent singular terms have the same reference and that 2) a singular term does not change its reference, if a contained singular term is replaced by another with the same reference. If R and S are two sentences with the same truth value then the following four sentences have the same reference[7]:

A) R
B) $\{x : x = x \ \& \ R\} = \{x : x = x\}$
C) $\{x : x = x \ \& \ S\} = \{x : x = x\}$
D) S

Indeed, A) and B) are logically equivalent, like C) and D); while C) is different from B) only because it contains the singular term $\{x : x = x \ \& \ S\}$, where B) contains the term $\{x : x = x \ \& \ R\}$. These two terms refer to the same thing if R and S have the same truth value, therefore B) and C) also have the same truth value and the same reference[8].

7. Quoting Davidson's slingshot we follow the logico—mathematical notation employed by Stainton [2006: 78].

8. On Davidson's assumptions, Stainton [2006: 78] writes that: "The first two sentences of the quotation essentially lay out, though in rather different terminology, conditions (i) and (ii) above [free substitution of coreferntial terms and free substitution of logically equivalent sentences]. This is obscured by two things. First, because of the context in which he is writing, Davidson doesn't explicitly limit his claims to sentences occurring within the scope of words like 'necessarily', 'possibly', 'before' and 'because'. [. . .] Second, the relation between these first two sentences and conditions (i) and (ii) is obscured by the fact that Davidson is here assuming, for the sake of argument, that sentences refer, and hence just are a special kind of singular term; and that they refer specifically to truth values. Thus, when he says 'a singular term does not change its reference if a contained singular term is replaced by another with the same reference', this entails (i) as special case: the special case where the containing 'singular term' is a sentence, and the contained singular term is a name. And when he says 'logically equivalent

Thus, with this argument, Davidson argues that the operators that permit the substitution of coreferential singular terms and the substitution of logically equivalent sentences (nonhyperintensional operators) also permit the substitution of materially equivalent sentences (transparent operators)[9]. Davidson's slingshot is built on two assumptions and three lemmas which regard logical relations. The assumptions are:

A1.   Substitution of coreferential singular terms does not change the truth value of the whole.
A2.   Substitution of logically equivalent sentences does not change the truth value of the whole.
L1.   The sentence $\{x : x = x \ \& \ R\} = \{x : x = x\}$ is logically equivalent to R.
L2.   The sentence $\{x : x = x \ \& \ S\} = \{x : x = x\}$ is logically equivalent to S.
L3.   The singular term $\{x : x = x \ \& \ R\}$ is coreferential with the singular term $\{x : x = x \ \& \ S\}$.

Indeed, given that both sentences R and S are true, both of the singular terms in L3 refer to the set of all individuals. Indeed, everything is such that it is self identical and R, and everything is such that it is self identical and S.

singular terms have the same reference' this yields, given his dictum about constant reference for the whole given constant reference of the parts, (ii): that logically equivalent sentences may be substituted, *salva veritate*, within larger sentences".

9. In Stainton's terminology, the operators that allow the substitution *salva veritate* of coreferential names and of logically equivalent sentences are called "not hyperintensional", the operators that allow the substitution *salva veritate* of materially equivalent sentences are called "transparent". Davidson's slingshot demonstrates that any operator which is nonhyperintensional is also transparent.

In § 1.1–1.3 we have evidenced that a good theory of facts needs to employ operators which allow the substitution *salva veritate* of coreferential names and of logically equivalent sentences: nonhyperintensional operators. The reason is that the theorists of facts look for a theory in which there is not a different reference for each true sentence, like in situation a). The theorists of facts look for a theory in which different true sentences, but not all true sentences, have the same fact as reference, like in situation c). It also means that facts, which the sentences stand for, should be complexes of commonplace objects, properties and relations: facts, or fact–like things as propositions, should be autonomous from sentences. The necessity for facts to be world bound entails that the context of Φ operators must allow the substitution of coreferential singular terms. In the same way, it seems that two sentences which 'say the same thing', but in different words, should not correspond to distinct facts; thus the context of Φ operators must also allow the substitution of logically equivalent sentences, without altering the truth of the whole. As we have seen, Davidson's slingshot demonstrates that, if an operator is nonhyperintensional it is also transparent, therefore the theory falls into situation b). We can express this circumstance affirming that the possibility of substitution of coreferential terms and of logically equivalent sentences, within the scope of an operator, makes this operator extensional, like *and* and *or*. On the other hand, as we have seen, Φ operators must always be non–extensional. Davidson affirms that one can deny the assumptions of the slingshot argument to save the facts theory, but how? Is it possible to save the theory of facts and reject the slingshot?

Two interesting rebuttals to the slingshot have been proposed by facts theorists. To save the possibility of a

good theory of facts, we must allow that the Φ operators lack either the substitution of coreferential singular terms or the substitution of logically equivalent sentences. With this aim, Barwise and Perry (1981) reject the idea that logically equivalent true sentences always stand for the same fact. In their opinion, even if (17) and (17') are logically equivalent because they are true or false in precisely the same circumstances, they do not have the same subject matter because only (17') talks about sets. Only the logically equivalent sentences, which have the same subject matter, say precisely the same thing. This solution seems to be coherent with the theory of correspondence[10]. It is possible to suggest, in agreement with Barwise and Perry, that logically equivalent sentences can be substituted in the context of Φ operators, with the exception of logically equivalent sentences like (17) and (17'), which do not have the same subject matter. Without falling into type a) correspondence theory, it is possible to refine the concept of correspondence by theorizing that the facts or the propositions (which the true sentences stand for) are extremely refined and similar to the sentences. Affirming, for instance, that (1), (2) and (4) stand for the same fact, while (3) corresponds to a slightly different fact. Another possible response given by Gödel and followed by Neale [1995] is that, though coreferential names can be substituted in the context of Φ operators, the substitution of singular terms cannot be employed in the slingshot argument because $\{x : x = x \ \& \ R\}$ and $\{x : x = x \ \& \ S\}$ are not singular terms. As Russell [1905] affirms these expressions are complex

10. Stainton [2006: 80–81] writes: "This makes facts, which are supposed to be built from ordinary elements of the world on the world–bound conception, look a bit more like the linguistic items that stand for them: facts get individuated in terms of meaning–related criteria as 'subject matter'".

definite descriptions whose role is quantificational, not referential[11], thus A1 does not hold, because [Stainton, 2006: 81]: "A1 [...] only apply to expressions whose function is to pick out an object, without describing it". The response given by Barwise and Perry [1981] rejects Davidson's slingshot but it is not a defence against Gödel's slingshot. On the other hand, the response given by Gödel and Neale is a defence against Gödel's slingshot, given that this response regards the substitution *salva veritate* of singular terms and it is valid also against Davidson's slingshot.

Davidson's slingshot demonstrates that if two sentences have the same truth value they will have the same reference. Davidson concludes that if the meaning of a sentence is its reference, all the sentences with the same truth value are synonyms, and this is unacceptable. In this argument, which Davidson ascribes to Frege, the reason to abandon the facts as references of sentences is found. Frege did not have this problem because he distinguished the meaning of a sentence from its reference: the equiextensionality regards only the *Bedeutung* of sentences, the *Sinn* distinguishes each true sentence from the others. Davidson does not deny that the distinction between *Sinn* and *Bedeutung* can be a solution to this problem, but his aim is to show that Frege's building block semantics is a pseudo–explanation of meaning: from a holistic point of view it is wrong, or useless, to speak about meanings as *entities*.

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11. Stainton writes [2006: 81]: " 'the set of objects such that...' [...], is not namelike; it is instead more like the quantifiers 'every set of objects such that...' and 'some set of objects such that...' ".

1.6. The Gödel's slingshot

More dangerous for the correspondence theory of truth is Gödel's slingshot argument. Indeed it does not require that the true sentences, in the context of Φ operators, are also logically equivalent, to cause the collapse of facts in one fact. According to Gödel [1944], any theory in which true sentences correspond to facts must either give up an intuitive principle of compositionality or else presuppose Russel's theory of descriptions (or a similar non–referential theory of descriptions), in order to avoid the ontological collapse in which all true sentences refer to the same fact. Gödel, followed by Neale, chooses this second way to reply to the slingshot: he accepts Russel's theory of descriptions to save the compositionalism and the correspondentism in the classical sense, in which different true sentences correspond or refer to different facts. Gödel, speaking about Russell's theory of descriptions, affirms that, assuming the intuitive Fregean principle of compositionality and the apparently obvious thesis that descriptions behave as singular terms (e.g. "the author of *Waverly*" refer to Walter Scott), falling into the ontological collapse of equiestensionality is inevitable [1944: 128–129]. Thus Russell, with his theory of descriptions in which the definite descriptions are not referential but quantificational, can save his conception of facts from collapse.

Let us consider the symbolism of Russell's theory of definite descriptions. In Russell's account, a sentence like "The king is bald" stands for a *general* fact, because definite descriptions are treated not referentially but quantificationally: the expression "The king" does not have a reference. The logical form of a sentence like "α is G" can be given by the formula "$G\alpha$", while the logical form of a sentence

like "the F is G" is given by the quantificational formula:

(19) $(\exists x)((\forall y)(Fy \leftrightarrow y = x) \cdot Gx)$

In *Principia Mathematica*, a definite description "the F" is represented by a pseudo–term of the form "$(\iota x)Fx$", which means "the unique x such that Fx"[12]. The definite description

(20) $(\iota x)(x = a \cdot Fx)$

means "the unique x such that x is identical to a and x is F" (where "a" is a singular term, e.g. a name). The sentence

(21) $G(\iota x)(x = a \cdot Fx)$

is a shorthand for

(22) $(\exists x)((\forall y)((Fy \cdot y = a) \leftrightarrow y) \cdot Gx)$

Gödel argues that a non Russellian treatment of descriptions as singular terms causes the ontological collapse.

If an expression like "$(\iota x)\phi$" were viewed as a singular term which stands for the unique object satisfying ϕ, then, referring to minimal logical principles in connection with formulae containing descriptions of the same form of (20), it would be possible to demonstrate that all true sentences stand for the same fact. This is the proof given by Gödel:

> The only further assumptions one would need in order to obtain a rigorous proof would be: [G1] that "$\phi(a)$" and the

12. Neale [1995: 768] writes: "The *iota*–operator looks like a variable–binding operator for creating a term from a formula ϕ".

proposition "*a* is the object which has the property ϕ and is identical to *a*" mean the same thing and [G2] that every proposition "speaks about something" i.e. can be brought to the form $\phi(a)$. Furthermore one would have to use the fact that for any two objects $a \cdot b$ there exists a true proposition of the form $\phi(a, b)$ as, e.g., $a \neq b$ or $a = a \cdot b = b$. [Gödel, 1944: 129].

[G1] is interpreted by Neale as if Gödel means that (23) and (23') stand for the same fact:

(23) Fa
(23') $a = (\iota x)(x = a \cdot Fx)$

[G2] says that any sentence which stands for a fact can be put into predicate–argument form. [G3] The third assumption, as we have seen, is the Fregean compositionality. The following is the proof hypothesized by Neale [1995: 778–779]. "Assume the following three sentences are all true:

(I) Fa
(II) $a \neq b$
(III) Gb

Then each stands for some fact or other: call the facts in question f_I, f_{II} and f_{III} respectively. By [G1], since (I) stands for f_I so does

(IV) $a = (\iota x)(x = a \cdot Fx)$

By the same assumption, since (II) stands for f_{II} so does

(V) $a = (\iota x)(x = a \cdot x \neq b)$

If a definite description "$(\iota x)\phi$" stands for the unique thing satisfying ϕ, then the descriptions in (IV) and (V) both stand for the same thing, viz. a. So, by [G3], sentences (IV) and (V) stand for the same fact, i.e. $f_I = f_{II}$. By [G1], since (III) stands for f_{III} so does

(VI) $b = (\iota x)(x = b \cdot Gx)$

And by the same assumption, since (II) stands for f_{II} so does

(VII) $b = (\iota x)(x = b \cdot x \neq a)$

Again, on the assumption that a definite description "$(\iota x)\phi$" stands for the unique thing satisfying ϕ the descriptions in (VI) and (VII) stand for the same thing, viz. b. So, by [G3], sentences (VI) and (VII) stand for the same fact, i.e. $f_{II} = f_{III}$. Thus $f_I = f_{II} = f_{III}$, i.e. "Fa" and "Gb" stand for the same fact. *Mutatis mutandis* where "$a = b$" (rather than "$a \neq b$") is true. So all true sentences stand for the same fact". In contrast, if definite descriptions are treated in agreement with Russell's theory of descriptions then, as Gödel affirms, the ontological collapse of equiestensionality is avoided. On Russell's account, since descriptions do not stand for things, because they are not singular terms, neither (IV) nor (V) can be obtained, respectively, from (I) and (II), by the replacement of expressions that stand for the same thing, thus it does not follow from [G3] that (IV) and (V) stand for the same fact. A similar reasoning can be made for (VI) and (VII).

1.7. Definitions, rules of substitution and logical consequences of Gödel's slingshot for an acceptable theory of facts

We are now ready to give a more rigorous logical explanation of the problems involved in the slingshot argument and of the features which should belong to Φ operators to build an acceptable theory of facts. Consider the following definitions:

Definition 1 *An S–connective is any expression that combines with one or more sentences to form a sentence.*

Definition 2 *An S–connective is extensional if it permits the substitution salva veritate of coextensional sentences.*

Definition 3 *An S–connective is non–extensional if it does not permit the substitution salva veritate of coextensional sentences*[13].

Consider the following composed sentences in which Φ operators appear:

(24) *The statement that* there was a fire *corresponds to the fact that* there was a fire.

(25) *The fact that* there was a fire = *the fact that* there was a fire.

As we have seen, Φ operators like *"The statement that* () *corresponds to the fact that* ()*"* and *"The fact that* () *= the*

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13. See Neale [1995: 781–2].

fact that ()"[14] are clearly non–extensional *S*–connectives: they do not allow the substitution *salva veritate* of coextensional sentences. In contrast, operators like *and* and *or* are extensional *S*–connectives.

We can now enunciate the Principle of Substitution for Material Equivalents (PSME): if two sentences φ and ψ have the same truth–value and $\Sigma[\varphi]$ is a sentence containing at least one occurrence of φ, then $\Sigma[\varphi]$ and $\Sigma[\psi]$ have the same truth–value, where $\Sigma[\psi]$ is the result of replacing at least one occurrence of φ in $\Sigma[\varphi]$ by ψ.

(i) $\varphi \leftrightarrow \psi$

$$\frac{\Sigma[\varphi]}{\Sigma[\psi]}$$

In extensional contexts PSME always holds, in non–extensional contexts the PSME is never valid; using the Neale's notation we can say that extensional *S*–connectives are +PSME, while non–extensional *S*–connectives are −PSME.

As we have seen, the Principle of Substitution for Singular Terms (PSST) is fundamental for our discussion about facts: if two singular terms α and β have the same extension and $\Sigma[\alpha]$ is a sentence containing at least one occurrence of α, then $\Sigma[\alpha]$ and $\Sigma[\beta]$ have the same truth–value, where $\Sigma[\beta]$ is the result of replacing at least one occurrence of α in $\Sigma[\alpha]$ by β.

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14. Neale calls this second *S*–connective *FIC* ("Fact Identity Connective").

(ii) $\alpha = \beta$

     $$\frac{\Sigma[\alpha]}{\Sigma[\beta]}$$

In an acceptable theory of facts the PSST must hold, so that a sentence like "Cicero snored" corresponds to the same fact to which "Tully snored" corresponds, if Cicero = Tully. With regard to definite descriptions, if Frege's theory considers descriptions as singular terms, Russell's theory does not. An identity statement "$a = b$" only holds between singular terms which have the same extension: in Russell's account, descriptions are not singular terms and do not have extension. Thus, Frege's theory allows a sentence like "Cicero snored" to correspond to the same fact to which "The greatest Roman orator snored"[15] corresponds, because in this theory the identity statement "Cicero = The greatest Roman orator" holds. Russell's theory does not consider "Cicero snored" and "The greatest Roman orator snored" as referring to the same fact, because it does not consider that "Cicero = The greatest Roman orator" holds. This seems to be a defect of Russell's theory of descriptions, because it is clear that "Cicero snored" and "The greatest Roman orator snored" refer to the same fact; but this defect is what saves a Russellian theory of facts from the slingshot argument. In other words, we can say that, in a Russellian account, the following argument is not valid:

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15. It is clear that in this example Cicero really is considered the greatest orator of ancient Rome.

(26)   Cicero = the greatest Roman orator
Cicero snored
_____

the greatest Roman orator snored

Indeed, in Russellian terms, where Rx is read as "x is the greatest Roman orator", this last inference can be written as:

(27) $c = (\iota x)(Rx)$
Sc
_____

$S(\iota x)(Rx)$

Here the conclusion is derived from the premises on the basis of PSST. (27) is not valid because PSST can only be used where there is an identity statement, and an identity statement always has singular terms on either side of identity sign. $c = (\iota x)(Rx)$ is not an identity statement because $(\iota x)(Rx)$ is not a singular term. (27), in explicit Russellian terms, is written as:

(28) $(\exists x)((\forall y)(Ry \leftrightarrow y = x) \cdot x = c)$
Sc
_____

$(\exists x)((\forall y)(Ry \leftrightarrow y = x) \cdot Sx)$

(28) is not valid from a logical point of view. Russell (and Whitehead), however, felt the necessity to give an account of the intuitive validity of (26) and (27) in extensional contexts. "Although descriptions are not genuine singular terms (in their system), if a predicate F applies to exactly one object (i.e. if it has exactly one thing in its extension),

in truth–functional (i.e. extensional) contexts, the description "$(\iota x)(Fx)$" can be treated *as if* it were a singular term for derivational purposes" (Neale 1995: 786). In *Principia Mathematica* Whitehead and Russell proved the following theorems for truth–functional contexts:

$\star$14.15 $\{(\iota x)\phi = \alpha\} \rightarrow \{G(\iota x)\phi \leftrightarrow G\alpha\}$
$\star$14.16 $\{(\iota x)\phi = (\iota x)\psi\} \rightarrow \{G(\iota x)\phi \leftrightarrow G(\iota x)\psi\}$

On the basis of these two theorems Neale adds the inference rules of ι–SUBSTITUTION: in truth functional contexts, if the individual that α stands for is the unique object satisfying the formula φ, then one can verbally substitute α for the description $(\iota x)\varphi$, or *vice versa*; moreover, if the unique object satisfying the formula φ is identical to the unique object satisfying the formula ψ, then one can verbally substitute the description $(\iota x)\varphi$ for the description $(\iota x)\psi$, or *vice versa*.

(iii) $(\iota x)\varphi = \alpha$ $(\iota x)\varphi = (\iota x)\psi$ $(\iota x)\varphi = \alpha$

   $\dfrac{\Sigma[(\iota x)\varphi]}{\Sigma[\alpha]}$ $\dfrac{\Sigma[(\iota x)\varphi]}{\Sigma[(\iota x)\psi]}$ $\dfrac{\Sigma[\alpha]}{\Sigma[(\iota x)\varphi]}$

It is important to remember that the verbal substitutions of ι–SUB are not applications of PSST. $\star$14.15 and $\star$14.16, and the derived ι–SUB rules, are not PSST. They are rules of inference that can be used only in truth–functional contexts and that permit certain substitutions when the referent of a particular singular term, or the unique object satisfying a particular formula, is identical to the unique object satisfying another particular formula. Therefore,

the inferences (26) and (27) are also valid from a Russellian point of view, but only if the conclusions are derived from premises on the basis of ι–SUB (not of PSST), and only in extensional contexts, i.e. within the scope of extensional S–connectives.

On the basis of λ–conversion, Neale [1995: 788–9] adds the rules of ι–CONVERSION, which involve the description–operator ι. Where α is a singular term and x is a variable:

$$
\text{(iv)} \quad \frac{\Sigma[x/\alpha]}{\alpha = (\iota x)(x = \alpha \cdot \Sigma[x])} \qquad \frac{\alpha = (\iota x)(x = \alpha \cdot \Sigma[x])}{\Sigma[x/\alpha]}
$$

$\Sigma[x]$ is any sentence containing at least one occurrence of a variable x, and $\Sigma[\alpha]$ is the result of replacing every occurrence of the variable x in $\Sigma[x]$ by the singular term α. The ι–CONV rules hold in extensional contexts. In Neale's notation: extensional S–connectives are $+\iota$–CONV.

Logical equivalence.   Two sentences φ and ψ are logically equivalent ("$\varphi \vDash\dashv \psi$") when they are true and false together in every circumstance. Or, following Tarski, $\varphi \vDash\dashv \psi$ if, and only if, φ and ψ have the same truth–value in every model. On the basis of this notion, Neale introduces another inference rule, the Principle of Substitution for Logical Equivalents (PSLE): if the sentences φ and ψ are logically equivalent and $\Sigma[\varphi]$ is a sentence containing at least one occurrence of φ, then $\Sigma[\varphi]$ and $\Sigma[\psi]$ have the same truth–value, where $\Sigma[\psi]$ is the result of replacing at least an occurrence of φ in $\Sigma[\varphi]$ by ψ.

(v) $\varphi \vDash\dashv \psi$

$$\frac{\Sigma[\varphi]}{\Sigma[\psi]}$$

It is clear that PSLE is valid in an extensional context: extensional *S*–connectives are +PSLE. Also, some non–extensional *S*–connectives are +PSLE and, as we have seen, a good theory of facts needs to theorize +PSLE Φ operators.

Employing a version of Gödel's slingshot, Neale [1995: 789–90] demonstrates that no non–extensional *S*–connective can be both $+\iota$–SUB and $+\iota$–CONV, because, if an *S*–connective is both $+\iota$–SUB and $+\iota$–CONV, then it is also +PSME. And to be +PSME for an *S*–connective means it is extensional. This proof does not show that an *S*–connective is extensional if it is both +PSST and $+\iota$–CONV; moreover, it does not demonstrate that is inconsistent for an *S*–connective to be +PSST, −PSME and $+\iota$–CONV. If descriptions are Russellian, it is impossible to construct a proof to show that this combination is inconsistent.

1.8. Discussion

Neale uses Gödel's slingshot to limit the theoretical options of a fact theory. With this aim he introduces the FIC ("Fact Identity Connective"), a two–place *S*–connective which means *"the fact that ( ) = the fact that ( )"*. FIC must be −PSME, because if it is +PSME there will be ontological collapse. If FIC is $+\iota$–SUB and $+\iota$–CONV, as we have seen, it must also be +PSME, then it is impossible

to theorize FIC as $+\iota$–SUB and $+\iota$–CONV. According to Gödel, Russell solves the problem by 1) individuating facts by reference to their components (objects and properties constructed non–extensionally), 2) denying that FIC is $+\iota$–SUB, 3) using Russell's Theory of Descriptions. FIC should be +PSST to permit that the same sentence, modified by use of synonyms, refer to the same fact. This is a way to avoid Frege's equiestensionality. However, the theorization that synonym sentences correspond to the same fact needs an interlinguistic conception of PSST, of PSLE and a set of logical correspondence rules between syntactic algorithms. Indeed the sentences could be synonym in one or in different languages, they can be modified by passivization, topicalization or by the use of coreferential names.

Therefore, in the Russellian conception proposed by Neale, FIC must be +PSST, −PSME, $-\iota$–SUB and $+\iota$–CONV. Neale [1995: 796–7] does not exclude, nor demonstrate, that FIC is also +PSLE. In this case it would mean that logically equivalent sentences stand for the same fact, which is a reasonable feature for a good theory of facts. Using Church's slingshot, Neale shows that if definite descriptions are conceived as Russellian, an *S*–connective which is +PSLE and $+\iota$–SUB would also be necessarily +PSME. This entails that no *S*–connective can be +PSLE, $+\iota$–SUB and −PSME, but nothing prevents that an *S*–connective from being +PSLE, +PSST and −PSME. This is the permitted combination for non–extensional *S*–connectives. Therefore, Church's slingshot shows that non–extensional +PSLE *S*–connectives can exist, but it is necessary that they are $-\iota$–SUB. However, as we have seen, it is only with Barwise and Perry's response [1981] that it is possible to conceive a Φ operator as +PSST and +PSLE — where the PSLE is understood in the special sense in

which the logically equivalent sentences also have the same subject matter. Sentences like (17) and (17') are not logically equivalent in this special sense, because they do not have the same subject matter.

This combination of features for FIC indicates that a theory of facts, which treats the descriptions in a Russellian way, cannot consider inferences (26) and (27) valid, indeed it is only on the basis of ι–SUB that we can consider "Cicero snored" and "the greatest Roman orator snored" as corresponding to the same fact. But, in accordance with Russell and Neale, FIC is $-\iota$–SUB: it must remain a non–extensional connective, while ι–SUB holds only in extensional contexts. If accepting Russell's theory of descriptions, and accepting the non synonymy between "Cicero snored" and "the greatest Roman orator snored", seems excessive, then it is impossible to affirm that FIC is $+\iota$–CONV and it is necessary to give a referential treatment to descriptions. If this solution does not appeal (in alignment with Neale), the last option is to positively accept the slingshot argument and renounce a classical correspondence theory of truth, in which facts are the *denotata* of true sentences. *Facing Facts* [2001], the book written by Neale after his famous essay about Gödel's slingshot of 1995, does not present new results on the theoretical points I have highlighted.

Accepting or refusing the slingshot argument is a problem that regards the point of view on the semantics of natural language, and on its logical structure; it depends whether you have a holistic conception of meaning or a more Fregean and Russellian conception. As Davidson [1969] affirms, you can completely reject the presuppositions of the slingshot argument, also those required by Gödel. Instead, as Gödel and Neale do, you can use the

slingshot to find constraints in the construction of a coherent theory of facts. It is also possible to consider the slingshot argument as a way to explain why Frege considered the truth–values the only possible reference of sentences. In this case, the slingshot is a device used to show the limits of Frege's building block semantics. According to this hypothesis, the classical correspondence theory of truth (in which sentences are considered images of facts) can be viewed as an old framework, which is useless at solving the problems of semantics. This is the opinion expressed by Davidson, who remains a compositionalist, but denies the classical form of correspondentism based upon the strategy of facts. Neale's work raises to a lot of questions and indicates a lot of possible ways to build a semantic theory (with or without facts), the theorist who believes in the correspondence theory, but also the holist philosopher, must face these questions to build a good and up–to–date semantic theory.

Davidson and correspondentism

2.1. Davidson's theory

In *Truth and Meaning* [1967] Davidson binds the criticism against the strategy of facts to the criticism against Frege's compositionalism. A Fregean theory of meaning analyzes the sentence "Teaethetus flies" saying that: given the meaning of "Teaethetus" as the argument, the meaning of "flies" generates the meaning of "Teaethetus flies" as the value. In this compositionalism, the meanings of words are conceived as entities and, according to Davidson, this is a useless way to conceive compositionalism. Davidson looks for a compositionalism in which single words do not correspond to single meanings: parts of sentences do not have proper meanings, they only give a systematic contribution to the sentences in which they occur. This is the direction of a holistic conception of meaning, in which the meaning of the sentences depend on their structure, and the meaning of each element of the structure is only an abstraction from the totality of sentences in which it occurs. It is possible to indicate the meaning of a sentence, or of a word, only indicating the meaning of all sentences of the language. This kind of holistic theory entails all the sentences of the form e means m. As we know, Davidson erases the intensional and enigmatic

expression "means" or "means that" and substitutes it with the predicate of truth. Thus he proposes the use of Tarskian biconditionals and the sufficient restrictions to the predicate of truth to build an adequate theory of meaning, which does not depend on other semantic concepts like that of "meaning"[1]. The compositionalist conclusion is that: a theory of meaning for a language L shows how the meanings of sentences depend on the meanings of words if it contains a recursive definition of truth in L. In these few simple steps we find the origin of Davidson's program: the foundation of an adequate theory of meaning on the semantic concept of truth. Indicating the truth conditions of a sentence is a way to indicate the meaning of that sentence. It is important not to forget that he also refers to Tarski's problem of clarifying the ordinary use of the words "truth" and "true".

This kind of semantic theory does not use the "meanings" of the words or of the sentences, in a Fregean sense. The theory does not reveal anything more about the truth conditions of a sentence with respect to the same sentence, which is on the right side of the biconditional. The task of the theory is to confront the truth conditions of each sentence with those features of the sentence (the words) which can have the same functions also in other sentences. According to Davidson, the semantic position of the sentence, in the complex of the entire language, is much more important than the correspondence of the sentence with a fact.

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1. Davidson affirms that if the metalanguage is rich enough, the theory of meaning we are considering can take the form of the explicit definition of the predicate "is T".

In the fundamental essay *True to the Facts* [1969], David-
son studies the correspondentist conceptions of truth.
The theories of correspondence are founded on a simple
and ineluctable idea, they are true but banal and useless.
Davidson quotes Strawson's opinion [1950]: the theory of
correspondence should not be purified but erased. David-
son questions the possibility of learning something about
the truth by deleting or substituting the predicate "is true"
in assertions. The sentences

(A)   The Pythagora's theorem is true
(B)   Nothing of what Aristotle said is true

can be substituted by

(A') (p) (the sentence that p = the Pythagora's theorem → p)
(B') $\sim (\exists p)$ (Aristotle said that $p \cdot p$)

In this way the quantification substitutes the predication
of truth. Through the principle '(p) (the sentence that p
is true ↔ p)' it may be possible to erase the predicate of
truth: in this way, Davidson affirms, the truth can be ex-
plained. Ramsey [1931] does not agree with this opinion: in
ordinary language the shown substitutions are not possible
and it is necessary, in (A') and (B'), to add the predicate
"is true". Davidson thinks that the extra–linguistic aims of
the sentences are logically independent from their literal
meaning, and he is interested only in the literal meaning.
In ordinary language the predication of truth is used to
express assent, to emphasize the conviction or the author-
ity, to avoid repetitions to receive confirmation and so on.
According to Davidson, his method of elimination of truth
would reinforce this opinion. The only synonym expres-

sion of the predicate "is true", which can be employed in a theory, is "corresponding to the *facts*". However, Davidson's conclusion is that the predication of truth is hard to eliminate.

Surprisingly, the American philosopher claims he is defending a kind of theory of correspondence: the truth can be explained through reference to a relationship between language and the world. But it is suddenly clear that the correspondence that Davidson accepts is not the classical form of correspondence. Indeed, using the slingshot argument he refuses the classical strategy of facts. Consider the sentence "The sentence that *p* corresponds to the fact that *q*". When is this sentence true? When "*p*" and "*q*" are substituted by the same sentence, but not only in this case. The sentence that Napoli is farther north than Red Bluff corresponds to the fact that Napoli is farther north than Red Bluff, but also to the fact that Red Bluff is farther south than Napoli; and also to the fact that Red Bluff is farther south than the biggest Italian town within thirty miles of Ischia. Davidson affirms that Napoli satisfies this description: it is the biggest Italian town within thirty miles of Ischia and such that London is in England. In this way it is possible to conceive that if a sentence corresponds to a fact then it corresponds to all facts[2]. All true sentences describe the same thing: the Great Fact. The relation of correspondence is a relation between any true sentence and the Great Fact: it is impossible to distinguish between the predicate "corresponds to the Great Fact" and "is true". With regard to the slingshot argument, Davidson says that it is possible to refuse the principles of proof and to build

2. As proof of these hypotheses, Davidson [1969: 756] proposes a form of slingshot argument almost identical to that of *Truth and Meaning* [1967].

a fact theory which avoids ontological collapse, but in this case there is another serious difficulty. Let us accept the Fregean distinction between meaning and reference. If we try to distinguish the facts at intensional level and not at extensional level, we would only have sentences to differentiate the facts. In this case, we would distinguish facts with the same refinement as sentences. However, it is impossible to explain the true sentences affirming that they correspond to facts which are linguistically described, because it is a circular explanation[3].

Davidson affirms that there is an alternative solution to the strategy of facts; it is suggested by Tarski in his work on the concept of truth in formalized languages [1933]. The truth of sentences must be defined through the concept of satisfaction. The sentences are entities which are satisfied, while the entities which satisfy sentences are functions which apply the variables of the object–language on the entities on which they vary. A function satisfies an n–place predicate, with variables in its places, if the predicate is true of those entities which the function assigns to those variables[4]. It is clear that the relation of satisfaction is still a correspondence relation, but reversed with respect to truth.

3. This problem is discussed in § 1.1 of this work. It shows the impossibility of accepting a type a) correspondence between true sentences and facts (as depicted in figure p. 16). §§ 1.2–1.7 indicate the solution found by the facts theorists.

4. The example given by Davidson is: a function f satisfies *"x loves y"* only if the entity given by f to x loves the entity given by f to y.

Truth as correspondence:

"John loves Mary" ——corresponds to the fact→{<*John*, <*loves*, *Mary*>>}
                          (is true iff)

Satisfaction:

| f gives the right entities to variables x and y and to the binary predicate L |
——satisfy the sentence→"xLy"

The relation of satisfaction follows the usual truth tables and rules to treat connectives and quantification. Given that the satisfaction is, in a certain sense, a reversed truth, Davidson affirms that, the semantic conception of truth suggested by Tarski merits the name of correspondence theory. Davidson shows the logical advantages of the satisfaction with respect to the strategy of facts: the strategy of satisfaction can be applied to open sentences (those with free variables) and to closed sentences, while the facts can be the references only of closed sentences. For sentences of ordinary language, the satisfaction can be realized through successions of commonplace objects. The sentence "Dolores loves Dagmar" would be satisfied by the succession: Dolores and Dagmar, if Dolores loves Dagmar. The sentence "e is satisfied by all the functions" does not have the same meaning as "e corresponds to the facts". These two sentences have this in common: both express a relationship between language and the world, both are identical to "e is true".

A comparison between the correspondence theories which employ the concept of satisfaction and the correspondence theories based upon facts is more clear if we accept "Frege's argument" (the slingshot argument) on the extension of sentences. True sentences cannot be distin-

guished by what they refer to (the Great Fact) or by what satisfies them (all the functions, all the successions). This is not a problem for Tarski's theory because the satisfaction of closed sentences is explained on the basis of the satisfaction of closed and open sentences. Instead, in the theories which employ the strategy of facts, only closed sentences have correspondent facts. In Davidson's conception, the truth is reached through different ways, because different assignations of entities to variables satisfy different open sentences and because the closed sentences are built upon open sentences. All the true sentences go in the same place but there are different ways to reach this place. Davidson's virtual theory describes this itinerary for a sentence, showing the steps of the recursive *iter* of satisfaction adequate for the sentence. The description is the demonstration of a theorem which has the form of a T–sentence.

Davidson affirms that the correspondence theories based upon the strategy of facts failed above all for one reason: the desire to include in the entity which corresponds to the true sentence not only the objects named in the sentence, but also what the sentence says about them. In this way it is almost impossible to describe the fact that makes a sentence true without the use of the same sentence[5]. On the contrary, a correspondence theory based upon satisfaction has less pretences about what to put in the entities that correspond to the sentences: these entities are only an arbitrary coupling between the objects on which the variables vary and the variables. The simplicity of objects is balanced by the difficulty of the explanation of the relation between objects and sentences: in the description of satisfaction it is necessary to include each feature of the

5. See note 3.

sentence which is important for the truth. Thus, in order to explain the truth through satisfaction, all the conceptual devices of the language are exploited.

In this way, Davidson [1969] divides the destiny of correspondence theory form that of strategy of facts: he accepts the idea that truth is due to a relation between language and the world, but refuses the employment of facts. Moreover, he understands the common philosophical use of considering all correspondence theories as founded on strategy of facts, but regrets that correspondence theories are discredited by inadequate attempts to explain truth on the basis of facts. Therefore, Davidson selects a theory derived from Tarski's correspondence theory, which is very far from the classical concept of correspondence. Davidson believes *contra* Strawson [1950], that this kind of theory merits elaboration and not elimination.

In the essay *In Defence of Convention T* of 1970, Davidson quotes an important principle expressed by Tarski in *The Semantic Conception of Truth* [1944: 345]. While the words "designs" "satisfies" and "refers" express semantic relations, the word "true" has a different logical nature. It expresses a property (or denotes a class) of particular expressions: the sentences. According to Davidson it is essential, in Tarski's theory, that the predicate of truth does not express a semantic relation. If the truth expressed a semantic relation, the fundamental disappearance of all semantic concepts, in the right side of biconditional (T–sentence), would not be possible. The T–convention has the advantage of substituting an important but obscure problem with a clear task. The problem is: what does it mean for a sentence to be true? Because of a misunderstanding, the problem has been expressed in this way: what makes a sentence true? The serious problem rises when this question suggests

that the truth must be conceived as a relation between a sentence and an entity like a fact or a state of affaires. The T–convention shows how it is possible to formulate the original question without this misunderstanding. The form of the T–sentences shows that, a theory can characterize the *property* of truth without reference to the entities to which the sentences, which have this property, correspond differentially. Also the absolute theories of truth are, in a certain way, correspondentist, but their true sentences are satisfied by successions of objects. This is very different from the correspondence between sentences and facts.

A recursive theory of truth that employs the T–convention does not solve obscure problems like "what does it mean for a sentence to be true?", but it solves an important and clear problem: "how the meaning of a sentence depends upon its parts?". Given that there is an infinite number of T–sentences, the theory will select a finite number of expressions and a finite number of syntactic structures relevant for the truth: these devices will be used to compose all the sentences. This kind of compositionalism refuses the building block semantic: it does not entail that meaning is opposed to reference or that the meanings are entities. The Davidsonian concept of truth is also a means of facing a difficult problem. The aim of building a theory of truth for a natural language, in a natural language, is, according to Tarski, unattainable. However, we can eliminate the predicate of truth and that of satisfaction from the object–language, and put them in the metalanguage, so this is the only difference that we can theorize between the two languages. It is now clearer why it is important not to overanalyze the concept of truth. To give an explicit definition of truth can only increase the difference between the wealth of metalanguage and that of

object–language. On the contrary, the aim of a theory of truth for the natural language is to improve the resources of object–language and to maintain those of metalanguage as similar as possible to those of object–language. In this way, the impossibility of obtaining a scientific treatment of truth and of semantics theorized by Tarski is overcome. This is another advantage of conceiving the truth as the basis of meaning of sentences, a basis which is not to explain or to define.

If interpreting a sentence entails understanding its meaning, the concept of interpretation is another important point of view for a theory of meaning. In *Radical Interpretation* of 1973, Davidson asks in what sense the theory can furnish an interpretation of a sentence. In a Fregean analysis the theory could produce a function $y = f(x)$ in which the sentences are the arguments and the interpretations are the values. In this way, the problem would only be moved: the interpretations would be mysterious entities, like the meanings of building block semantics. Instead, it is necessary to eliminate, in the explanation, semantic concepts like meaning, interpretation, synonymy and so on. Who knows the theory is able to interpret the sentences. Davidson conceives the theory of interpretation as a method of translation from one language to another. Also the interpretation can be a way of showing the compositional nature of sentences: the interpretation of complex sentences depends systematically on the interpretation of simple sentences. A theory of truth for a natural language is conceived by Davidson in the following way. A large and meaningful fragment of natural language, with two semantic predicates, is used to formulate a theory of truth for the same fragment. Maybe it is necessary to give the sentences the form of standard

quantification and to furnish the concept of satisfaction. However, it is certain that each T–sentence expresses the truth conditions of the sentence by employing resources of the same wealth of the sentence. It happens when the sentence does not refer to possible worlds, intensional entities, properties or propositions, or when the formulation of the truth conditions refers to these entities. Following the T–convention, we can consider a theory of truth adequate if it generates a T–sentence for each sentence of the object–language. To show that the theory is empirically correct it is necessary to check that all the T–sentences are true. The empirical check can only be done on the basis of behaviour and of attitudes of the speakers with respect to sentences.

In Tarski's work the T–sentences are considered true because the right side of the biconditional is a simple translation of the sentences of the object–language. Presupposing the translation, Tarski was able to define the truth. Davidson, on the contrary, wishes to explain the translation and the interpretation presupposing the truth: the truth is taken as an absolute basis and thanks to the truth it is possible to explain the translation and the interpretation. The advantage is clear: while each sentence has its proper interpretation, the truth is a simple property that can be applied to a sentence or not. The T–sentences must not be considered one by one, because all the axioms, i.e. a sufficient number of them, can produce interpretations. The evidence on which to check the truth of T–sentences are the attitudes of the speakers with respect to sentences. For the comprehension of meaning, Davidson considers belief as the fundamental attitude of speakers with respect to their sentences. "Believing" means, according to Davidson, "considering (a sentence) true". There

are other attitudes with respect to the sentences: wishing that a sentence be true, commanding that a sentence come true, asking whether a sentence is true, and so on. The beliefs of speakers and the other attitudes can be evidenced by the behaviour of speakers. The evidence at the beginning is only this: the speakers of a language consider different sentences true, in some moments and circumstances. On this basis the truth conditions are assigned to the sentences that we want to interpret, truth conditions such that the speakers are considered to be right, when it is possible and for the charity principle. Therefore, if we only know the truth conditions of the sentences, and if the theory is adequate, we can obtain an interpretation of each sentence. Davidson repeats: the truth conditions of a sentence, the right side of the T–sentence, is not an entity or a fact. The truth conditions are given by the right side of the T–sentence, but it is not the single T–sentence which permits the interpretation. It is the *demonstration* of the T–sentence which permits the interpretation. The demonstration of a T–sentence is built with a succession of biconditionals. The criterion is always holistic. It is possible to interpret a single sentence if a correct theory of truth of the language to interpret is known. In this case, not only the single T–sentence to interpret would be understood, but also T–sentences which regard *all* the sentences of the language and *all* the demonstrations. In this case, we could see the right place of the sentence to interpret in the context of the entire language, we could understand the role of each meaningful part of the sentence and the logical connections between this sentence and the others.

Davidson accepts Quine's thesis of the inscrutability of reference, and this is another important point to understand Davidson's rejection of facts. If there is not an

objective criterion to connect the extensions to singular terms and to predicates, it will be impossible to think that a fact, which is a connection of objects, can be the reference of a true sentence, on the basis of the reference of parts of that sentence. In traditional correspondentism, from Plato and Aristotle to Frege and to the *Tractatus*, the reference of single words was not inscrutable and relative: a sentence is true of a fact because it is composed by the names correctly referred to the objects which compose the fact, and the sentence connects the subject and the predicate correctly[6]. The truth of a sentence, in this conception, is something composed and derived[7]. With respect to traditional correspondentism, the order in Davidson is reversed.

In *Reality Without Reference* of 1977, the theses proposed by Davidson on ontology are clear. On the basis of all the true sentences (on the basis of the entire language), we can fix a particular frame of reference relative to a language. Only on this basis it is possible to assign references to names and predicates. The truth of the sentences is not built on the basis of the correct reference of the parts of the sentence, because, for the inscrutability, there is not a criterion to define a correct and absolute reference. The basis of relative reference is the truth, and the truth of sentences is something intuitive and simple, it is directly connected to the truth conditions, which are all the facts of the world. The truth is not a predicate that regards the relation between a sentence and a fact of the world: the predicate of truth determines a property of a class of sen-

6. In Frege's view the truth of a sentence is the result of the composition of its parts, according to the scheme $y = f(x)$, in which the truth value y is the result of the connection of a singular term x with a predicate $f(\dots)$.

7. This is also Field's opinion [1974].

tence, it is an *intra–linguistic* predicate. Often a Tarskian theory of truth is criticized because it does not offer a deep comprehension of the concept of truth, but this critique does not cause problems. The T–sentences are clearly true in a pre–analytic sense: they are founded on a primitive and independent comprehension of truth. The Tarskian theory is not interesting because it says what is, in general, the truth, but because it shows how the truth value of each sentence of a language *L* depends upon its structure and its constituents (in a different sense with respect to the building block semantic). Scholars like Harman [1974], Field [1972], Parsons [1973] and Putnam [1975] criticize Davidson's theory because it does not explain the relation of reference. But, from the point of view of an absolute theory of truth, it is necessary to leave the reference unexplained, because an absolute reference would cause a return to the building block semantic. A semantic theory which Davidson calls "ancient and natural", but wrong. According to Davidson, it is important to understand whether the reference is or is not the point of contact between the linguistic theory and the events, the actions and the objects of the world. In accordance with Quine's semantic behaviourism, Davidson claims that only the truth can be treated in a non linguistic way, not the reference. Behaviourism has the merit of abandoning the building block semantic and putting the sentence in the focal point of an empirical analysis of language: the only function of the words is their role in sentences, their semantic features are abstracted from the semantic features of the sentences. The point in which we can connect the language with non linguistic behaviour is the level of the sentence. For this reason Davidson does not consider the concept of reference as fundamental for an empirical theory of truth.

The abandonment of reference for the explanation of truth is possible because a Tarskian theory of truth does not analyze the concept of truth: the extension of the predicate of truth is shown for a language with a fixed primitive dictionary. It is possible, in such a theory, to explain the truth of the single sentences on the basis of their structure but not on the semantic feature of single words. To solve this dilemma, it is necessary to distinguish between an explanation *inside* the theory and an explanation *of* the theory. Inside the theory, the truth conditions of a sentence are described through the postulated structures and through semantic concepts like satisfaction and reference. On the other hand, to explain the theory in general, the concept of truth, applied to closed sentences, is connected with human activity. Satisfaction and reference are theoretical devices, their function is to formulate, with logical form and logical categories of terms, the truth conditions of sentences. If there is a good way to assign entities to expressions, with respect to truth conditions of sentences, for the inscrutability of reference, there are other infinite good ways. The theory put forward by Davidson presupposes a general and pre–analytic concept of truth. Truth is not explained through the T–sentences, but on the basis of truth we can indicate the evidence of a T–sentence. The meaning, as interpretation of a sentence, is given assigning to the sentence a conceptual place in the scheme of all the sentences of language. The building block semantic and the theories of facts try to give a very rich content to each sentence on the basis of non semantic evidence, but they want to profess too much too soon.

The truth conditions of sentences, in Davidson's theory, could look like (or could be considered the substitute of) the facts postulated by the building block seman-

tic, but it is necessary to remember the extreme difference between them. In Davidson's conception the truth conditions of a true sentence are not an entity of real world which corresponds to the true sentence, they are described by the right side of the T–sentence and are expressed in the meta–language. They use all the richness of the language, but, being only a translation of the sentence from object–language to meta–language, they remain linguistic expressions holistically bound to all sentences of the language. Davidson's theory falls into a correspondence conception of type a)[8], but in his conception this is not a problem: he considers an infinity of axioms, because the correspondence he uses is conscientiously intra–linguistic at the level of each single sentence. The extra–linguisticity of the correspondence can be reached only at holistic level: the entire language is in correspondence with the whole world. The fact that the T–sentences have the same sentence on the left and on the right side of the biconditional means that the predicate of truth is not defined, it is unexplained and plays the role of the basis of the theory. The fact theorist looks for a conventional way to describe facts that is not the natural language[9], but, according to Davidson, this is not possible: we only have natural language to speak about the world and we use our perception to be in touch with the facts of the world.

The real substitute of the concept of fact, in Davidson's theory, is the function or the succession of objects assigned

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8. See § 1.1.

9. As we have seen in Van Fraassen [1969], the "non–linguistic" way employed by fact theorist to describe facts is usually a formalized language, the more expressive and powerful is possible.

to the sentences by satisfaction and by reference. The truth conditions are linguistic descriptions of succession which produce a relation between the single sentence and a part of world in an extralinguistic sense. However, as we know, the definition of truth is not founded on satisfaction and on reference: reference and satisfaction of sentences (given by succession) are founded and relative to a pre–analytic and a primitive perception of truth.

2.2. Discussion

Davidson's contribution to semantic tradition contains important innovations, but also maintains elements of continuity with the past: in 1969 he thought that the correspondence theory merited being elaborated and not eliminated as Strawson [1950] theorized. In the Dewey Lectures of 1989 he rejected every form of correspondentism and criticized his own use of the concept of correspondence to define truth, as in *True to the Facts* [1969]. The fact that Davidson in the past called himself a *sui generis* correspondentist could indicate that it is meaningless, in philosophy of language, to fight against correspondentism. Indeed the Davidsonian concept of succession is a substitute of the concept of fact. However, the truth of correspondentism, after the holistic theories, can be understood as a truism, a useless truth. The obvious result of correspondetism is the explanation of the pre–analytic concept of truth: for a sentence to be true means that it is correspondent to a fact. In Davidson's theory the concept of truth is the fundamental concept: it is possible, but not useful, to ask what the words "true" or "truth" mean. All the words and all the sentences of language can be defined with other words or sentences,

this also holds for the expressions "truth" and "is true". In Davidson's theory of meaning, the concept of truth is the device of axiomatization, the basis of everything, it is not worth considering that "true" means "correspondent". Moreover, it is possible to consider that a true sentence is correspondent to a fact of the world, but the construction of a coherent theory of facts which employs a formalized language and which is a part of semantics, as Neale theorizes, is a different matter: this is, according to Davidson, a failed endeavour from a theoretical–semantic point of view. The correspondence between a true sentence and a fact, as in Aristotle's theory of proposition, is the natural idea of the speaker: is this sufficient to choose the theory of facts and to refuse the important advantages of holistic theories? It depends on what we want to do with our theory. The answer to this question depends on the aims that we want to obtain through our theory.

Identity and difference: troubles for the slingshot argument

Frege's discussion of the identity statements and of the principle of identity [1892] is the starting point for the distinction, in semantics, between meaning and reference and for the "puzzling" identification of the reference of sentences with their truth value. In Russell's critique [1905] of the theory proposed by Frege, the concept of identity is a central point. Indeed the clarification of this concept has a fundamental role for the construction of good semantic theories, and for the comprehension of the ways in which our language analyzes the world. Thus I will base my discussion about the currently popular slingshot argument on the concept of identity, showing that Gödel's slingshot [1944] is built on the landscape of the problems raised in *Über Sinn und Bedeutung* by Frege and in *On Denoting* by Russell. Gödel's argument, indeed, treats and draws conclusions about meaning, reference and definite descriptions: the same themes considered by Frege [1892] and Russell [1905]. In particular, Gödel presents his slingshot as a danger for the correspondence theory of truth, which can be avoided only by endorsing Russell's theory of descriptions. In substantial agreement with Gödel, Neale [1995, 2001] considers Gödel's Slingshot argument as a very important device to build *ex contrario* good correspondence

theories of truth on. Neale also considers this argument a strong reason to endorse Russell's theory of descriptions (henceforth simply RTD). *Contra* Neale I will argue that (i) Gödel's slingshot is not a good reason to endorse the RTD, that (ii) Gödel's slingshot is not a good argument against the correspondence theories of truth and that (iii) it is not an important constraint to build *ex contrario* good correspondence theories of truth on. Moreover, (iv) I will propose a new way to stop Gödel's slingshot, (v) I will propose some reasons to refuse RTD and to endorse Frege's distinction between meaning and reference, (vi) I will endorse a coherent theory of facts refusing the identification of the reference of the sentences with their truth–values, (vii) I will propose some reasons not to consider identity and difference statements like $a = a$, $a = b$ or $a \neq b$ authentic sentences made true by real facts.

3.1. Identity and difference

Let us begin from the last point (vii), as it is on this point that most of my work is founded. Those who accept my theses on identity will likely be persuaded to accept the other points (i–vi); on the other hand, for those who do not accept my theses on identity I have other arguments to defend (i), (ii), (iii) and (v).

Is identity an ontological or an epistemological relationship? I am convinced that the discussion by Frege about the difference between $a = a$ and $a = b$ is an important finding in philosophy, one of those rare ideas which has resolved a great number of problems for the formulation of semantics and knowledge theories. This is something that is widely accepted in scientific community.

Firstly, Frege notices that it is hard to say whether $a = a$ and $a = b$ are relations between objects or between names of objects. The proposal by Frege is that $a = a$ and $a = b$ are relationships between names of objects, because $a = a$ and $a = b$ have a very different value for knowledge: $a = a$ is a tautology (*a priori* analytic judgement), always true and empty, while $a = b$ contains an enlargement of our knowledge (*a posteriori* synthetic judgement)[1]. If $a = a$ and $a = b$ would be relationships between the objects named by a and b, then, admitting that $a = b$ is true, there would not be difference between $a = a$ and $a = b$. Considered as a relationship between objects, both $a = a$ and $a = b$ express the identity of a thing with itself, as in the sentences:

(1)   Hesperus is Hesperus.
(2)   Hesperus is Phosphorus.

Frege claims that the only difference between (1) and (2) is that the identity of Hesperus with itself, in (2), is expressed *by a different coreferential name*[2]. In this discussion we find the origin of the distinction between the meaning, understood as "way of designation", and the reference, but also an important feature for the theory of facts. Admitting that a good theory of facts must allow the substitution of coreferential singular terms, we can say that the fact which corresponds to (1) is the same that corresponds to (2). But which is the form of this fact? We could say that this form is "x is x", an object has the property to be identical with

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1. To highlight the distinction between $a = a$ and $a = b$ let us consider that $\square \, a = a$ while $\diamond \, a = b$.

2. This is what Frege affirms in the first page of his essay [1892] as in the last: if in $a = a$ and $a = b$ we see a relation between the referents of a and b, then the judgements $a = a$ and $a = b$ cannot be different.

itself. But this is a property that all objects have, this is not a property usually highlighted in our sentences, in our perception or in our sciences[3]. In order to be coherent with the idea that a theory of facts must build the facts as compounds of parts of the world, we cannot consider "x is x" an authentic fact. In sentence (2) we find the information that x is also called "Phosphorus", and no more, *but this does not appear in his truth–maker*. In my opinion it is not possible to consider "x is x" as an authentic fact of our everyday world, given that everyone can admit that facts should be complex things such as:

(3)   Cicero snores.
(4)   The cat rests on the table.
(5)   The moon turns around the earth.

(3), (4) and (5) are fruitfully represented by the logical form *Fa* in which the relationship between the subject *a* and the property *F* is depicted. The richness of phenomena permits the connection of infinite properties with infinite subjects. With this variability, which role does the property of self–identity play? Which property is, for the subject, the property to *be the subject*? This is *not* a fact. If one would force the matter claiming that "x is identical to x" is a fact, he / she cannot deny that, at most, it can be a *logical fact*. It is the *zero* of the logic, a conventional device which does not exist in the real world, it is only employed to make square our logical representations of reality. Sentence (2), which has the form $a = b$, is made true by "x is identical with x" but, moreover, gives us the information that x has another name. Is this information sufficient to consider

3. See Russell [1905: 482].

(2) as a representation of an authentic fact? My answer is no, because, in accordance with Frege, the truth–maker of (2) is a logical fact and the adjunctive information is only about the existence of another name for the same object, only about a synonymy. It is clear that $a = b$ is a general form of judgements that can be regarded as a substantial part of our knowledge, but, from the point of view of a good theory of facts, it would be better to give *Fa* the task of representing the real predication of the synthetic properties for the subjects; $a = b$ (considering its similarity with $a = a$) should have the task of informing about synonymy. It is clear that nothing prevents the synonymy from being informative. But distinguishing *Fa* from $a = b$ in this way, the logical identity between two subjects would be distinct from the predication of a property to a subject.

Difference.   In light of these considerations I can now make some remarks about the non–identity sign: $a \neq b$. Recalling the Fregean discussion we can note a dangerous ambiguity: the relation of non–identity could be between the *nominata* of a and b, or the relation could be between the names a and b. In the first case, the sign $\neq$ means an indeterminate ontological non identity; in the second case, the sign means an epistemological non identity, the absence of a determinate synonymy. In both cases, what form could have a fact which corresponds to $a \neq b$? In the first case, an object has the property of not being another object: this is again an analytic feature of all the objects of the world, like the feature of an object being identical with itself (in this sense we can accept $\square\, a \neq b$ as we accept $\square\, a = a$). In the second case, if the non–identity regards an epistemological relation, and the relation means

"the name *a* is not coreferential of the name *b*", I cannot imagine a possible fact as truthmaker of $a \neq b$. Therefore, let us come back to $a = b$. If we accept Frege's view that $a = b$ means "the name *a* is coreferential of the name *b*", then we can also agree that it is not useful to think that $a = b$ corresponds to a fact. Against my opinion, it is however possible to consider sentences like the following as corresponding to authentic facts:

(6)   Today's sun is the same as yesterday's.
(7)   This little celestial body observed in the sky today is Halley's comet.
(8)   Aristotle was not Plato's teacher.

However, it is easy to see how the following sentences avoid the identity statement form, maintain the *Fa* form and permit the representation of the same facts as in (6), (7) and (8):

(6')   Today and yesterday's sun is the same.
(7')   Halley's comet is observed today as that little body in the sky.
(8')   Aristotle did not teach Plato.

It is clear that the form *Fa*, which is more general than $a = b$, employing all the resources of the language can easily do the trick of representing the facts. It is also clear that in our culture we are used to seeing in the verb "to be" the sign of identity, but the verb "to be" is much more rich than simple identity. Frege aside, this is the most important reason to reserve the form $a = b$ for synonymy and the form *Fa* for sentences which correspond to facts. These remarks about logical notation and symbols also

have a conceptual value: they show how a useful theory of facts could bring more order to logical symbolization. However, even if the proposal to reserve the form *a = b* for synonymy and the form *Fa* for sentences which correspond to authentic facts would not be accepted, I hope that my remarks have shown that the forms *a = a*, *a = b* and *a ≠ b* 1) suffer from a dangerous ambiguity and, even if they would be disambiguated, 2) they do not refer to authentic facts, but, at most, to "identitary facts" which have forms like <*x* is *x*> or <*x* is not *y*>.

3.2. Definite descriptions

The slingshot argument, and the debate developed around it, for logical reasons is strongly bound to the semantic form of the definite descriptions (henceforth simply DD). It's time, I believe, to go back to the origin of the studies about the descriptions to prepare our discussion on the slingshot and on the theory of facts. Proposing theses which solve important problems is very hard in philosophy, while finding mistakes or incoherence in the proposed theses is much easier: unfortunately, for his different point of view, Russell had a destructive rather than a constructive attitude towards the Frege's work on meaning and reference. The result was a weak confutation[4] of *Über Sinn und Bedeutung* and the proposal, I think, of a counter–intuitive and too much complicated theory of descriptions. Consider the following sentence:

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4. A confutation refused, for instance, by Carnap [1947], Strawson [1952], Donnellan [1966], Kaplan [1970], Bonomi [1973: 177].

(9)   The father of Charles II was executed.

According to Russell's theory [1905: 483], the logical form of (9) is: "It is not always false of x that x generated Charles II and that x was executed and that 'if y generated Charles II, y is identical to x' is always true of y". About this interpretation Russell affirms that it can seem almost *incredible*. I think that it is an heavy violation of the Occam's razor[5]: according to Frege's theory, in the logical form of (9) there is only a determinate subject predicated of a determinate property: *"Fa"*. Russell presents his theory of description *contra* Frege's distinction between meaning and reference [484]. The English philosopher acknowledges that an advantage of this Fregean distinction is the clarification of identity statements like $a = a$ and $a = b$, but his refusal of the distinction between *Sinn* and *Bedeutung* pushes him to treat the problem of the identity between names and descriptions, without solving the ambiguity of $a = a$, $a = b$ and $a \neq b$. Russell affirms that the improper descriptions are a problem for Frege's theory, because, in sentences like (10) "The actual king of France is bald", the referent of "The actual king of France" does not exist; or because a sentence like (11) "If Ferdinand is not drowned, Ferdinand is my unique son" is clearly true also if Ferdinand is drowned; thus it would be necessary to furnish a referent also when this referent is absent. But Frege did not consider this as a problem. Suddenly, after he defined the distinction between meaning and reference, he added [27] that not all definite descriptions have a referent[6]: it is a

5. Even if Russell thinks to follow the Occam's razor, see Kaplan [1970].
6. Moreover, with regard to this problem, Russell affirms that Meinong's theory violates the principle of non–contradiction while Frege's

normal feature of our language the possibility to build expressions (names, descriptions, sentences or discourses) whose referents are fictions or non subsistent, consider, e.g., "Ulixes" and the *Odyssey*. However the conclusion of Russell is that it is only a question of choice to affirm that all the descriptions (proper and improper) do not refer at all or to furnish a conventional referent also for improper descriptions. Frege chooses the second way. About Frege's method Russell claims that it does not contain logical errors but it is "artificial" and does not give an exact analysis of the situation. Thus, as Russell admits, until this part of his essay the reader has only theoretical choices, not real arguments against Frege.

The real confutation should derive from the solution to three enigmas which Russell's theory would give [485], while Frege's theory would not. Now I will expose the three enigmas with the solutions given by Russell, after I will say why I do not agree with these solutions, point by point.

1) Identity. If *a* is identical to *b*, everything that is true of *a* will also be true of *b* and they can substitute each other without alteration of the truth–value of the sentence. George IV wishes to know whether Scott was the author of *Waverley*, but it is impossible here to substitute "Scott" with "the author of *Waverley*", even if Scott was really the author of *Waverley*, because, in this case, George IV would ask whether Scott is Scott. According to Russell, the logical form of (12) "Scott was the author of *Waverley*" is: (12') "It is not always false of *x* that *x* wrote *Waverley*, that it is always true of *y* that if *y* wrote *Waverley y* is identical

theory does not [484] thanks to the distinction between meaning and reference.

to x, and that Scott is identical to x". Russell's solution is
the following. The (12') does not contain the description
"the author of *Waverley*", that could be substituted with
"Scott" [489], therefore it is impossible to infer that George
IV wishes to know whether Scott is Scott. It is always pos-
sible to substitute *verbally* "the author of *Waverley*" with
"Scott" only if, in the sentence, "the author of *Waverley*"
has a primary occurrence. A description has a secondary
occurrence when it is contained in a sentence p' which is
only a constituent of the sentence p that we consider, and
the description can be substituted only in p', not in p; a
description has a primary occurrence[7] when it is contained
in p and not in p', and the description can be substituted in
p. Russell claims that, with (13) "George IV wishes to know
whether Scott was the author of *Waverley*", we mean (13')
"George IV wishes to know whether one and only one
man wrote *Waverley* and whether Scott was that man". In
(13') "the author of *Waverley*" has a secondary occurrence,
this is why in (13) the substitution of "the author of *Wa-
verley*" with "Scott" is impossible. (13) aside, Russell claims
[483] that one important merit of the Fregean distinction
"is that it shows why it is often worth while to assert iden-
tity". The identity which Russell refers to is "Scott is the
author of *Waverly*", i.e. the strange difference between
"Scott is the author of *Waverly*" and (12')"Scott is Scott". In
puzzle 1) of identity Russell proposes his non–Fregean way
of solving the problem using the propositional attitude[8].
This problem (with the same example) will be the cen-

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7. The definition of primary occurrence is not explicit in Russell, but
easily derivable.

8. I do not think that complicating the question by the addition of
another problem is a good strategy to solve it, also here we find a violation
of Ockham's razor.

tral point around which Gödel builds his slingshot: this is further evidence of the fundamental role of identity (and of its linguistic and logical expression) for the theory of definite descriptions, for the slingshot arguments and for the problems raised by it.

2) Excluded Middle. By the principle of excluded middle, either "A is B" or "A is not B" must be true. Hence, either (14) "the present King of France is bald" or "the present King of France is not bald" must be true. But if we enumerate the objects that are bald and the objects that are not bald, we will not find the present King of France in either list. Russell's solution is the following. The logical form of (14) is (14'): "One and only one term has the property (F) to be the King of France, and this one has the property (φ) to be bald"; then, if the property (F) to be the King of France belongs to no terms or to many terms, it follows that (14) is false.

3) Difference. Consider the sentence "A differs from B"; if it is true that there is a difference between A and B, then we can say "the difference between A and B subsists". However, if it is false that "A differs from B", there is no difference between A and B, a *fact*[9] that may be expressed in the form "The difference between A and B does not subsist". But how is it possible that a non–entity is the subject of a sentence? How is it possible to deny the being of anything? It seems that it is always self–contradictory to deny the being of anything. In the footnote on page 485 Russell claims to use as synonyms the subsistence and the being of an object. Therefore, if A and B does not differ, it seems equally impossible to affirm either that there is, or

9. These are the words employed by Russell: here the identity statements are considered as correspondent to real facts.

that there is not "the difference between A and B". Russell's solution is the following. If A and B differ, there is one, and only one, entity x such that "x is the difference between A and B" is a true sentence; if A and B do not differ there is not an entity x. Hence, Russell affirms that, according to RTD, "the difference between A and B" has a denotation when A and B differ, but not otherwise. From any sentence we can derive a denoting phrase which denotes an entity if the sentence is true, but this denoting phrase does not denote any entity if the sentence is false. Given that it is true that the earth revolves around the sun, while it is false that the sun revolves around the earth, "The revolution of the earth around the sun" denotes an entity, while "The revolution of sun the around the earth" does not denote any entity.

Now I will analyze these three puzzles and I will show that they do not disprove Frege's theory, while the distinction between meaning and reference is an adequate way (maybe necessary) to solve them.

1a) In the exposition of the enigma of identity, a worsening of the ambiguity of $a = b$ is contained. Russell does not write $a = b$, but "a is identical with b". He writes: "If a is identical with b, whatever is true of the one is true of the other" [485]. This is a very interesting characterization of the concept of identity, it was proposed by Leibniz in the *Discourse de Métaphysique*. It means: "If a is identical with b, each property that is truly predicated of a will be truly predicated also of b", thus this part means that identity is an ontological relation between objects. But the whole statement is "If a is identical to b, whatever is true of the one is true of the other, and either may be substituted for the other in any proposition without altering the truth or the falsehood of that proposition". Therefore, Russell

is mixing here the ontological and the epistemological sense of identity. The epistemological sense is: *a* and *b* are descriptions or names. Given that the predicates can be true of the *referents* and not of the descriptions or names, at least Russell is here victim of a serious ambiguity. This ambiguity derives from his refusal of the distinction between meaning and reference. It is the elimination of the *Sinn*, or the confusion between *Sinn* and *Bedeutung*, that permits us to think wrongly that George IV's curiosity is based on whether "Scott is Scott", given that he wishes to know whether Scott was the author of *Waverley*. Consider the sentence

(15)　　"George IV wishes to know whether Scott was Walter".

Russell could not affirm, as he affirms for (13), that in (15) there is no referent for the coreferential names "Scott" and "Walter" to operate this substitution. Because at least the proper names, in Russell's theory, have a referent. In a Russellian framework the fact that in (15) "Walter" cannot be substituted because it has a secondary occurrence is still valid, but out of RTD it is better to say that the *scopes* of verbs which regard knowledge, and the other propositional attitudes, do not admit the substitution of coreferential singular terms. The reason for this is that the propositional attitudes regard knowledge, and this is the place in which the meaning of terms, as way of designation, has its value. Only because George IV does not know that Scott is Walter, he could ask whether Scott was Walter; only because George IV does not know that Scott is the author of *Waverley*, he can ask whether Scott was the author of *Waverley*. Moreover, if someone thinks that

George IV wonders about an identity, I answer that this is possible, but I think also that the real sense of (13) is (13") "George IV wishes to know whether Scott wrote *Waverley*", then George IV wonders about a real synthetic fact of the form *Fa*. From my point of view this is not evidence that some identities are real facts, but that some synonymies are informative. It is better to represent, in the logical notation, that authentic facts *Fa* are distinct from identity statements with the form *a* = *a*, *a* = *b* and *a* ≠ *b*. Consider the sentences

(12)   "Scott was the author of *Waverley*"
        a   *F*

(12")   "Scott wrote *Waverly*"
        a   *F*

Even if one wants to consider (12) an identity statement made true by an authentic synthetic fact, it is certain that the form *Fa* represents (12) as (12") well, while the *a* = *b* form can only represent (12). This is evidence that the identity statements are something special, they can be contained in a subset of predication. Moreover, Russell admits [487] that the sentence (12) "Scott was the author of *Waverley*" has a property that "Scott was Scott" does not have, i.e. the property that George IV wished to know whether it was true. Therefore, given Russell's premise "If *a* is identical with *b*, whatever is true of the one is true of the other", (12) is not a perfect identity. Indeed the difference between (12') "Scott was Scott" and (12) "Scott was the author of *Waverley*" is that a coreferential singular term gives information about the subject; this information is that which distinguishes (12) from (12'). It is clear

that a lot of Russell's misunderstandings on identity are derived from his abandonment of Frege's distinction between meaning and reference.

2a) The puzzle of excluded middle seems to be a pure logical exercitation: in the page before the proposal of puzzles, Russell claimed that Frege's method which considers "the present King of France" as denoting the empty class, does not lead to actual logical errors. Russell claimed that it is only a question of choice to affirm that (*a*) all the definite descriptions (proper and improper) do not refer to anything at all or (*b*) to furnish a conventional referent also for improper descriptions. Proposing and solving puzzle 2) Russell shows that he is very interested in understanding whether sentences like (14), "the present King of France is bald", are false or nonsense. As we know, Frege did not consider this as a real problem: it is the normal creativity of our language that allows us to nominate non subsisting objects like "the revolution of the sun around the earth", "the round square", "Ulixes" and so on. These can be also fictional objects, or false, or not yet verified scientific hypotheses. Before the proposal of puzzles, Russell [483] affirmed that the chief objection against these objects is that they infringe the principle of non–contradiction, but Russell claims also that Frege's theory avoids this last objection thanks to the distinction between meaning and reference. Hence, Russell claims that, with regard to the puzzle of excluded middle, it is only a question of choice to affirm that all the definite descriptions do not refer to anything at all or to furnish a conventional referent also for improper descriptions. In addition Russell claims that Frege's method does not contain logical errors.

3a) The puzzle of the subsistence of an object as "The difference between A and B", when A does not differ from

B, is again the problem of non–subsistent objects like "the present King of France" or "the round square", thus it is valid what I have claimed at point 2a) and before, but the solution given by Russell to puzzle 3) is more interesting. From a true sentence we can derive a denoting phrase which *refers* to an entity, then "The revolution of the earth around the sun" denotes an entity while "The revolution of sun the around the earth" does not denote any entity. This solution is interesting, and valid, because it is a solution of Frege's theory not of RTD, indeed the core of RTD is that definite descriptions, proper or improper, do not denote anything. It is almost a self–contradiction. The only Russellian contribution is the specification that a DD has a referent only if it derives from a true sentence (and only in the context of an entire sentence), but this shows how it is intuitive and natural to assign a referent to descriptions. Russell claims:

> This is the principle of the theory of denoting I wish to advocate: that denoting phrases never have any meaning in themselves, but that every proposition in whose verbal expression they occur has a meaning. [480]

> The King in "The Tempest" might say, "If Ferdinand is not drowned, Ferdinand is my only son". Now "my only son" is a denoting phrase, which, on the face of it, has a denotation when, and only when, I have exactly one son. But the above statement would nevertheless have remained true if Ferdinand had been in fact drowned. Thus we must either provide a denotation in cases in which it is at first sight absent, or we must abandon the view that the denotation is what is concerned in propositions which contain denoting phrases. The latter is the course that I advocate. [. . .] Another way of taking the same [former] course (so far as our present alternative is concerned) is adopted by Frege, who provides by definition some purely

conventional denotation for the cases in which otherwise there would be none. Thus "the King of France," is to denote the null–class; "the only son of Mr. So–and–so" (who has a fine family of ten), is to denote the class of all his sons; and so on. But this procedure, though it may not lead to actual logical error, is plainly artificial, and does not give an exact analysis of the matter. [484]

In the solution of puzzle 3) Russell does not adopt the RTD's course but the Frege's one. Another big problem of the puzzle 3) is that, proposing it, Russell claims to consider the "being" and the "subsistence" of an object as synonyms [485, footnote 1] because he considers that the affirmation "I think, therefore I am" is no more evident than (16) "I am the subject of a proposition, therefore I am". But the being and the subsistence may be synonyms only in rare cases, like in (16): the being is the verb of the predication, the subsistence is only a special meaning of the being[10]. The proposal of puzzle 3) is based upon this misunderstanding.

In the three puzzles proposed by Russell I do not see any problem that RTD does solve while Frege's theory does not. Nevertheless Russell affirms that the distinction between meaning and reference involves curious difficulties which proves that this distinction is wrong. To highlight these difficulties Russell confounds the reader with the quotation marks and with metalinguistic problems: he uses a definite description, "The first line of Gray's Elegy", whose denotation is a sentence which has its meaning and its denotation, but in a different level. Moreover he plays over the exchange of two different meanings of "meaning": 1) the normal metalinguistic "meaning"

10. If the being would be always synonym of the subsistence, the sentence "The not–being is not being" would entail that the not–being subsists.

of ordinary language, 2) the "meaning" understood as Fregean *Sinn*. The distinction between meaning and reference is a logical and semantic device to explain the relation between the expressions, the world and our knowledge. Russell tries to demonstrate that the distinction is mysterious and wrong applying it to the "semantic explanation" of the sentences, not to sentences. Let's follow the complicated reasoning proposed by Russell. In order to obtain an easier reading of the page, and to propose my critics, I have divided it in five points, introduced by the Russell's theses.

> When we wish to speak about the meaning of a denoting phrase, as opposed to its *denotation*, the natural mode of doing so is by inverted commas. Thus we say:
>
> The centre of mass of the Solar System is a point, not a denoting complex;
> "The centre of mass of the Solar System" is a denoting complex, not a point.
>
> Or again,
> The first line of Gray's Elegy states a proposition.
> "The first line of Gray's Elegy" does not state a proposition.
>
> Thus taking any denoting phrase, say *C*, we wish to consider the relation between *C* and "*C*," where the difference of the two is of the kind exemplified in the above two instances. We say, to begin with, that when *C* occurs it is the *denotation* that we are speaking about; but when "*C*" occurs, it is the *meaning*. Now the relation of meaning and denotation is not merely linguistic through the phrase: there must be a logical relation involved, which we express by saying that the meaning denotes the denotation. But the difficulty which confronts us is that we cannot succeed in both preserving the connexion of meaning and denotation and preventing them from being one and the same; also that the meaning cannot be got at except by

means of denoting phrases. This happens as follows. [I] The one phrase *C* was to have both meaning and denotation. But if we speak of "the meaning of *C*," that gives us the meaning (if any) of the denotation. "The meaning of the first line of Gray's Elegy" is the same as "The meaning of 'The curfew tolls the knell of parting day,' " and is not the same as "The meaning of 'the first line of Gray's Elegy' ". Thus in order to get the meaning we want, we must speak not of "the meaning of *C*," but of "the meaning of '*C*,' " which is the same as "*C*" by itself. [II] Similarly "the denotation of *C*" does not mean the denotation we want, but means something which, if it denotes at all, denotes what is denoted by the denotation we want. For example, let "*C*" be "the denoting complex occurring in the second of the above instances". Then

C = "the first line of Gray's Elegy,"

and

the denotation of *C* = The curfew tolls the knell of parting day.

But what we meant to have as the denotation was "the first line of Gray's Elegy". Thus we have failed to get what we wanted. [III] The difficulty in speaking of the meaning of a denoting complex may be stated thus; The moment we put the complex in a proposition, the proposition is about the denotation; and if we make a proposition in which the subject is "the meaning of *C*," then the subject is the meaning (if any) of the denotation, which was not intended. This leads us to say that, when we distinguish meaning and denotation, we must be dealing with the meaning: the meaning has denotation and is a complex, and there is not something other than the meaning, which can be called the complex, and be said to *have* both meaning and denotation. The right phrase, on the view in question, is that some meanings have denotations. But this only makes our difficulty in speaking of meanings more evident. [IV] For suppose *C* is our complex; then we are to say that *C* is the meaning of the complex. Nevertheless, whenever *C* occurs without inverted commas, what is said is not true

of the meaning, but only of the denotation, as when we say: The centre of mass of the Solar System is a point. Thus to speak of *C* itself, *i.e.*, to make *a* proposition about the meaning, our subject must not be *C*, but something which denotes *C*. Thus "*C*," which is what we use when we want to speak of the meaning, must be not the meaning, but something which denotes the meaning. And *C* must not be a constituent of this complex (as it is of "the meaning of *C*"); for if *C* occurs in the complex, it will be its denotation, not its meaning, that will occur, and there is no backward–road from denotations to meanings, because every object can be denoted by an infinite number of different denoting phrases. [V] Thus it would seem that "*C*" and *C* are different entities, such that "*C*" denotes *C*; but this cannot be an explanation, because the relation of "*C*" to *C* remains wholly mysterious; and where are we to find the denoting complex "*C*" which is to denote *C*? Moreover, when *C* occurs in a proposition, it is not *only* the denotation that occurs (as we shall see in the next paragraph)[11]; yet, on the view in question, *C* is only the denotation, the meaning being wholly relegated to "*C*". This is an inextricable tangle, and seems to prove that the whole distinction of meaning and denotation has been wrongly conceived. [486–7]

In point [I] Russell claims that if we speak about "The meaning of *C*" this should give the meaning of "the first line of Gray's Elegy" (*C*), while it gives the meaning of the denotation of *C*[12], but this misunderstanding can arise only because *C* denotes a sentence, which has its meaning and its denotation in a different level. When we speak of "The meaning of *C*", it does not give the meaning of the

11. Russell is here referring to the instance of George IV's curiosity about Scott, in which not only the denotation of "the author of Waverly" is important but also the meaning. With regard to (13) I consider the idea that, when *C* occurs in a proposition it is not *only* the denotation that occurs, but also the meaning, as an advantage of Frege's theory.

12. In the sentence "The sun shines", the shining object is the denotation of "the sun", not the expression "the sun".

denotation of *C*, because in Frege's theory the denotations do not have meanings or do not mean anything. From the point of view of the semantic analysis of "the first line of Gray's Elegy" (*C*), the line 'The curfew tolls the knell of parting day' is only a denotation which does not have a meaning; from the point of view of the semantic analysis of 'The curfew tolls the knell of parting day' the line has a meaning and a denotation. It is possible to say that this denotation has meaning only when two different levels of semantic analysis are confused. Moreover, Russell is mistaken when he says that "The meaning of the first line of Gray's Elegy" is the same as "The meaning of 'The curfew tolls the knell of parting day'", because if this meaning is the Fregean *Sinn*, then "the first line of Gray's Elegy" and 'The curfew tolls the knell of parting day' have very different meanings. On the other hand, if the meaning is the normal metalinguistic concept, then these two meanings can be very similar, but only in the sense of interpretation of the line in literature. This shows that these instances are not adequate, because the precise meaning of the words can be well understood only in a larger context, and the contexts of particular expressions are always specific. Russell considers as a problem the fact that, in order to speak about the meaning of *C*, in a Fregean sense, we must write "the meaning of '*C*'" (which is the same as "*C*" by itself), because if we write "the meaning of *C*", this gives the meaning of the denotation of *C*[13]. But this causes confusion because the denotation of *C* is a sentence. Moreover, where is the problem if, speaking about the meaning of *C* in Fregean sense, we write "the meaning of '*C*'"? The "meaning" in Fregean sense is a special semantic

13. See the preceding footnote.

concept, and it is normal to refer to it with the expression "the meaning of '*C*'", given that *C* is a sentence. Here Russell confuses the issue mixing the meaning as normal metalinguistic concept, employed in ordinary language, and the meaning as Fregean *Sinn*.

In point [II] Russell claims that with the expression "the denotation of *C*" we want to have, as denotation, "the first line of Gray's *Elegy*", supposing that "*C*" is "the denoting complex occurring in the second of the above instances"[14]. Instead the expression "the denotation of *C*" does not mean what we desire, but something which either does not denote anything or denotes something that is denoted by "the first line of Gray's *Elegy*", i.e. 'The curfew tolls the knell of parting day'. This inference is a significant paralogism: if Russell says that *C* is "the first line of Gray's *Elegy*", *C* has, as its denotation, 'The curfew tolls the knell of parting day' (something which either does not denote anything or denotes something that is denoted by "the first line of Gray's *Elegy*"). But, supposing that "*C*" is "the denoting complex occurring in the second of the above instances", "*C*" will denote "the first line of Gray's *Elegy*". If the reader has the impression that "the denotation of *C*" does not denote what we desire, i.e. "the first line of Gray's *Elegy*", it is because Russell, until point [II], has meant that *C* is "the first line of Gray's *Elegy*" (whose denotation is 'The curfew tolls the knell of parting day'); instead *C* is now "the denoting complex occurring in the second of the above instances", whose denotation is "the first line of Gray's *Elegy*". Therefore, Russell is mistaken because, in this case, with "the denotation of *C*" we mean exactly what we desire, i.e. "the first line of Gray's *Elegy*". I do

14. See the preceding quotation in Russell [1905].

not know if Russell was aware of his error but, given that
C, until point [II], was "the first line of Gray's *Elegy*", the
denotation we want with "the denotation of *C*" is "The cur-
few tolls the knell of parting day". Instead, Russell claims
that with "the denotation of *C*" we want "the first line of
Gray's *Elegy*" as denotation, but also when "*C*" was "the
first line of Gray's *Elegy*"; but only now do we want "the
first line of Gray's *Elegy*" as denotation of *C*, because "*C*" is
now changed into "the denoting complex occurring in the
second of the above instances". In this case "the denotation
of *C*" is exactly what we want, i.e. "the first line of Gray's
Elegy". Thus, why does Russell claim that with "the deno-
tation of " we want "the first line of Gray's *Elegy*" before
the change, when *C* was still "the first line of Gray's *El-
egy*"? Moreover, immediately after he changed "*C*" in "the
denoting complex occurring in the second of the above
instances", he rightly writes: "then *C* = 'the first line of
Gray's *Elegy*' and the denotation of *C* = The curfew tolls
the knell of parting day". Thus it is impossible that with
"the denotation of *C*" we want "the first line of Gray's *El-
egy*" as denotation. These are some critical mistakes made
by Russell.

In point [III] Russell uses the rule 'the moment we
put the description in a proposition, the proposition is
about the denotation of the description'. This rule works
with instances like "the sun shines", in which the shining
object is the denotation of "the sun", not the expression
"the sun" or the meaning of the expression "the sun".
But "the sun shines" is not a metalinguistic statement. In
a sentence in which the subject is "the meaning of *C*"
the subject is not the meaning of the denotation of *C*,
because "meaning" is a metalinguistic word and usually it
is used to refer to linguistic expressions or, metaphorically,

to things. Therefore, when the subject of a sentence is "the meaning of *C*" the predicate is usually affirmed of the meaning of '*C*', like in "The meaning of 'il sole splende' is 'the sun shines'". So, in the sentence "The meaning of these words is that this theory is wrong" the predicate is affirmed of the meaning of certain words, not of the denotation of their meaning. And if we say "The meaning of the bill of rights is very important for the people" the predicate is affirmed of the cultural meaning of a text, not of the denotation of the logical meaning of that text. In the metaphorical sentence "The meaning of this action is that it is no longer possible to wait" the word "meaning" is used like "entailment" or "cause" or "effect". In this case, *C* does not have a denotation, and the meaning is not a meta–linguistic concept. In this case, the sentence is about the meaning of the expression *C*, not about the denotation of *C*.

In point [IV] Russell asks how it is possible to speak about the meaning of *C*, given that when *C* is in a sentence, the sentence is about the denotation of *C*. The answer is that to speak about the meaning of *C* we must use "*C*". But Russell protests that, in this case, "*C*" is not the meaning, but something which denotes the meaning. My question is: where is the problem? Given that we were looking for a semiotic device to speak about the meaning of *C*. Maybe here Russell forgets the semiotic nature of language or he wants to use it as a problem. Meaning and reference are theoretical devices to explain expressions, *it is useless and misleading to speak about a way to mean or to denote the meaning.* Russell adds that *C* should not be a constituent of this complex as in "the meaning of *C*", because if it is a constituent it will be its denotation, not its meaning, that will occur. But in Russellian style I could answer that it is not its

denotation that will occur, but something which denotes the denotation; and if *C* is inside the quotation marks, *"C"*, this will denote the meaning, as was established by Russell. If the complex is "the meaning of *C*" this entails that we are simply speaking about the meaning of a denotative phrase. Here Russell seems to forget the principle of context, which claims that the semantic value of an element of an expression is altered by the other elements.

In point [V] Russell's conclusion is the exact repetition of the premise. The premise was: "We say, to begin with, that when *C* occurs it is the *denotation* that we are speaking about; but when *"C"* occurs, it is the *meaning*"; now the conclusion is: "Thus it would seem that *"C"* and *C* are different entities, such that *"C"* denotes *C*; but this cannot be an explanation, because the relation of *"C"* to *C* remains wholly mysterious". From his own premise, and from Frege's theory, Russell derives the same premise, but now he adds that the relation between *"C"* and *C* is wholly mysterious. Thus this judgement is only affirmed, not demonstrated. The only new problem of point [V] is that when *C* occurs in a sentence it also brings meaning, not only denotation. The same holds in propositional attitudes, when *C* occurs it not only brings denotation, but also meaning. However, at the beginning we had established that *C* only brings denotation, because the meaning is brought by *"C"*. Russell is referring here to (13) "George IV wishes to know whether Scott was the author of *Waverley*" — and *C* is now "the author of *Waverley*" — in which not only the denotation of "the author of *Waverley*" is involved. From my point of view, this only shows that the use of *C* and *"C"* is not always a good way to differentiate between meaning and reference. On the other hand, as we have seen, Frege's distinction between meaning and

reference is a very good way to understand the relation between coreferential expressions and their role in knowledge. In propositional attitudes, a definite description such as "the author of *Waverley*" not only brings denotation but also meaning. This is not a weak point in Frege's theory: it is evidence of the usefulness of the strategy employed in *Über Sinn und Bedeutung.*

As we have seen, in order to show that Frege's distinction is mysterious and wrong, Russell employs three meta–linguistic obstacles: change of meta–linguistic level of analysis, confusion between "meaning" in a Fregean sense and meaning as a wide concept of ordinary language, and symbolization of descriptions with *C*. Instead Frege's opinion on these problems is clear and convincing:

> If words are used in the ordinary way, one intends to speak of their referents. It can also happen, however, that one wishes to talk about the words themselves or their sense. This happens, for instance, when the words of another are quoted. One's own words then first designate words of the other speaker, and only the latter have their usual referents. We then have signs of signs. In writing, the words are in this case enclosed in quotation marks. Accordingly, a word standing between quotation marks must not be taken as having its ordinary referent. In order to speak of the sense of an expression "A" one may simply use the phrase "the sense of the expression 'A.' ". In reported speech one talks about the sense — e.g., of another person's remarks. It is quite clear that in this way of speaking words do not have their customary referents but designate what is usually their sense. In order to have a short expression, we will say: in reported speech, words are used indirectly or have their indirect referents. We distinguish accordingly the customary from the indirect referent of a word; and its customary sense from its indirect sense. The indirect referent of a word is accordingly its customary sense. Such exceptions must always be borne in mind if the mode of con-

nection between sign, sense, and referent in particular cases is to be correctly understood. [1892: 27]

I think that, despite the difficulties raised by Russell, the distinction between meaning and reference is defendable, and that the rejection of this distinction causes heavy mis-understandings for the concept of identity. Moreover, this concept is already damaged by a tradition that confuses its ontological and its epistemological value. Nevertheless, Russell believes he has explained, through the RTD, the usefulness of identity in ordinary language.

> The usefulness of *identity* is explained by the above theory. No one outside a logic book ever wishes to say "*x* is *X*," and yet assertions of identity are often made in such forms as "Scott was the author of *Waverley*" or "thou art the man". The meaning of such propositions cannot be stated without the notion of identity, although they are not simply statements that Scott is identical with another term, the author of *Waverley*, or that thou art identical with another term, the man. The shortest statement of "Scott is the author of *Waverley*" seems to be: "Scott wrote *Waverley*, and it is always true of *y* that if *y* wrote *Waverley*, *y* is identical with Scott". It is in this way that identity enters into "Scott is the author of *Waverley*"; and it is owing to such uses that identity is worth affirming. [492]

Russell's conclusion is that the identity "*x* is *x*", that he reads as the Fregean *a* = *a*, is useful only in books of logic, while the *usefulness* of identity in the ordinary language would be evident in statements like (12) "Scott was the author of *Waverley*" or (16) "thou art the man"[15]. This is very hard to affirm, because the identity "*x* is *x*" or *a* = *a* is something different in (12) with respect to (16), if it is an

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15. Here it is clear that Russell's conception of identity is so large (and so confused) to subsume the whole copula and the whole predication.

identity at all. Russell thinks that in (12) and in (16) identity is *a part* of the meaning, and that his analysis shows how identity enters in (12) and in (16). But how is it possible to divide the meaning into parts, given that Russell does not admit that there is meaning between the expression and the referent? However, in this quotation we find an important feature of the RTD: identity is always a part of the logical form of sentences, the fundamental part which binds all the predications to the subject. According to Russell, the logical form of (12) "Scott was the author of *Waverley*" is: (12') "It is not always false of x that x wrote *Waverley*, that it is always true of y that if y wrote *Waverley* y is identical to x, and that Scott is identical to x". Here y is identical to x and Scott is identical to x. Thus Russell mixes the identity between two objects and the identity between a name and an object: this is a new problem. Another serious misinterpretation of the concept of identity made by Russell is that, in (12'), Scott, y and x are identical objects, while in (12) there are not many identical objects but only Scott. Russell's logical forms seem to be unnatural and too long as explanations of sentences. The identity, as Aristotle claims, is always between two or more objects, and when we say that something is identical with itself we consider one thing as two things. Sometimes Russell uses the adjective "identical" with an improper meaning, i.e. with "identical" he means "the same". He did not introduce the distinction between identity and sameness, nor a new symbol for the concept of sameness: he used the traditional sign =[16] to indicate the relation of identity between

16. Also the sign = is not a good sign for the identity, given that it has been introduced at the end of XVI century to denote the arithmetical equality. Frege in the first footnote of its essay adverts that he is using the

terms. But there is no *relation* between x, y, and Scott, they are simply the same object[17]. For these reasons, I believe, Russell commits much more work than it is worth to identity, while Frege's treatment of identity is less imaginative and more useful.

Russell is aware that his theory is much too complicated:

> Of the many other consequences of the view I have been advocating, I will say nothing. I will only beg the reader not to make up his mind against the view — as he might be tempted to do, on account of its apparently excessive complication[18] — until he has attempted to construct a theory of his own on the subject of denotation. This attempt, I believe, will convince him that, whatever the true theory may be, it cannot have such a simplicity as one might have expected beforehand. [493]

Frege's theory is instead more defendable and doubtlessly simpler. Therefore, when Russell proposed in 1905 his theory of denotation and descriptions, he did not respect Occam's razor. Moreover, RTD is strongly counter–intuitive because in a Russellian account, the following arguments are not valid:

(17)   Cicero is the greatest Roman orator
         Cicero snored
         ―――――――――――――――――――――――――
         the greatest Roman orator snored

equality sign to mean the identity.

17. In Licata [2000], I proposed to distinguish "identical" from "same".

18. It is very ironic that in *Logical Atomism* [1924] Russell claims that his theory of descriptions is an application of Ockham's razor. Also Kaplan [1970] believes that RTD is against Ockham's razor.

(17')   Cicero is the author of *De Fato*
the author of *De Fato* snored

———————————————————

Cicero snored

(17")   the author of *De Fato* is the greatest Roman orator
the author of *De Fato* snored

———————————————————

the greatest Roman orator snored

In the Fregean account, instead, these inferences are perfectly valid. Simplicity and intuitiveness are important features of a theory: a scientific theory can be counter–intuitive only if it gives strong proof of its truth. I am not sure that Russell's theory of description is wrong, but I do not think that the arguments furnished by Russell are strong enough to make one prefer this complicated and counter–intuitive theory, and to refuse the simple and intuitive theory of Frege. However Russell overcame the difficulties of proposing a purely extensional theory of denotation, in which the problems usually bound to intensional (or hyperintensional) aspects of expressions are solved through complex paraphrases.

3.3. Identity and predication

The problems and the ambiguities of Russell's conception of identity, i.e. the problems we find in his identity statements and in the logical forms of RTD, are in part caused by tradition. Aristotle proposed an interpretation of identity which is much more ontological than epistemo-

logical[19]:

> Thus, some things are called identical in this way [accidentally identical]; other things, instead, are called *per se* identical in the same sense in which the *per se* one is called. Indeed, those things whose matter is one either for form or for number are called per se identical, and also those things whose substance is one; therefore, it is clear that the identity is a unity of being either of many things or of one thing considered as many things; as when a thing is said to be identical with itself, indeed it is considered as two. Other things are called *per se* identical when their forms or matters or notions are many; and the other is said to be in total opposition to the identical. Different are called those things that, even if they are others, they are the *same* for some aspect, not only for number but for form, for gender or for analogy; moreover, those things whose gender is other, the contraries and those which have the alterity in the substance are called different. [Aristotle, *Metaphysics*, Δ 9, 1018a 4–15, my translation and my italics]

It is worth noting that Aristotle considers the relation of identity as bound to the relation of difference, and also that he distinguishes between alterity and difference. In this quotation about difference we also find a distinction between identity (*tautòtes*) and sameness (*autos*)[20].

Also Hegel, in the *Wissenschaft der Logik*, treats the concept of identity from an ontological point of view. He speaks about the principle of identity as a law of thinking, but the study of identity is developed inside the "Objective Logic"; this is distinct from the "Subjective Logic"

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19. It is clear that the distinction between the ontological and the epistemological aspect of identity is very hard, and this is the cause of the conceptual problems that Russell inherited from the tradition.

20. See Licata [2000].

in which judgement and knowledge is studied. Hegel is aware that identity and difference entail each other and are strictly bound: this is an important feature of the relation of identity. Identity and difference are two aspects of the same relation: each object is identical with itself and different from another. But Hegel is interested in the study of movement that leads from identity to contradiction, from an ontological point of view. He does not pay attention to the distinction between expression and content of identity. Another important thing noted by Hegel is that in our everyday life we never find the pure identity or the pure difference, they are always mixed in natural phenomena and only a logical treatment can abstract them. As we will see, this is a repetition of the principle of indiscernibility of identicals. Moreover, this is another argument to exclude the identity statements from the set of sentences which refer to authentic facts.

Leibniz, differently from Hegel, is interested in the distinction between the ontological and the epistemological value of identity. He enunciates the principle of substitutability of identicals and the principle of indiscernibility of identicals. The first, quoted by Frege, and studied by Leibniz in a lot of works, regards the coreferential expressions: "Eadem sunt, quae sibi mutuo substitui possunt, salva veritate"[21]. The second is also known as "Leibniz's law" and, with the principle of sufficient reason, it is one of the two great metaphysical principles of Leibniz's philosophy. The principle of indiscernibility of identicals is

21. This principle is repeated very often, with different words, in Leibniz's studies of logic. "Eadem sunt quorum unum in alterius locum substitui potest, salva veritate" [Gherardt 1931, VII: 219], or "Eadem seu coincidentia sunt quorum alterutrum udilibet potest substitui alteri salva veritate" [Gherardt 1931, VII: 236].

enounced in the *Discourse de Métaphysique*, 9 [1931 (1686)]:

> [...] chaque substance singulière exprime tout l'univers à sa
> manière, et que dans sa notion tous ses événements sont com-
> pris avec toutes leurs circonstances et toute la suite des choses
> extérieures. Il s'ensuit de cela plusieurs paradoxes considé-
> rables; comme entre autres qu'il n'est pas vrai que deux sub-
> stances se ressemblent entièrement et soient différentes solo
> numero.

In this principle the scholars find a definition of ontolog-
ical identity which can be expressed only with the language
of second order logic, which quantifies over properties:

$$(18) \quad x = y \leftrightarrow \forall P(Px \rightarrow Py)$$

However, I think it is possible to see in the words of Leib-
niz the intuition of the difference between identity (also
absolute) and *sameness*. In the *Primae Veritates* [1901 (1686)]
Leibniz claims that the principle of sufficient reason de-
rives from the principle of indiscernibility of identicals and
that identity is in all sentences.

> The complete or perfect concept of the individual substance
> entails all its past, present and future predicates. Because it
> is already now certain that a future predicate will be in the
> future a predicate, and it is contained in the concept of the
> thing. Therefore, in the [perfect individual] concept of Petrus
> or Judas, considered from the point of view of possibility [...],
> there are — and these are seen by God — all the events that
> will happen to them, necessary or free. [1901: 521]

Then every truth is analytic. The prime truth is the princi-
ple of identity, "A is A" or "A is not non–A". All the others
truths, synthetic or contingent, are reducible to the prime

truths through the definitions. Let us consider the sentence "Petrus is a sinner": through the complete analysis of the subject "Petrus" we find the predicate "sinner", then "Petrus is a sinner" means "A sinner is a sinner".

But maybe it is not good to give this importance, and this significant logical role, to identity. Maybe it is better to revert to the Aristotelian distinction between identity and predication (being). Given that identity is so generic that you can find it in all the predications, a logical treatment of identity must always respect its generality and its emptiness. From the point of view of a theory of facts this generality and this emptiness entail that identity statements, as Wittgenstein claims, are not authentic sentences which refer to facts. The importance attributed by Russell to identity reminds us of the relevance given to identity by Leibniz, but there are also differences. What is important to remember about Leibniz's identity is his important distinction between the principle of substitutability of identicals and the principle of indiscernibility of identicals. In this separation, the distinction between the epistemological and the ontological consideration of identity is clear. On the contrary, as we have seen, Russell mixes these two aspects. In the exposition of puzzle 1) of identity he claims:

> If a is identical with b, whatever is true of the one is true of the other, and either may be substituted for the other in any proposition without altering the truth or falsehood of that proposition. [1905: 485]

It is clear, instead, that Frege's distinction between meaning and reference follows Leibniz's project which distinguishes between the ontological and the epistemological consideration of identity. Russell, with his criticisms of

Über Sinn und Bedeutung, stops the development of this project.

Definable or indefinable?   Russell gives a definition of identity in *Principia Mathematica* [1910]. According to Frege identity is indefinable, because it is the basis of all definitions. The definition of identity, according to Russell, is given in the form of the principle of indiscernibility of identicals, in the second order logic, because is impossible in simpler and more fundamental languages to quantify over properties. Thus Russell uses the sign = of identity in the RTD, which is formulated in first order logic, while the explicit definition of identity is given in a language of higher order. It is important to remember that (18) in *Principia Mathematica* [1910] is an explicit definition as

$$(19) \quad x = y \equiv_{def} \forall P(Px \to Py)$$

In *Grundgesetze der Arithmetik* [1893], (19) is only derivable from the axiom III (I volume) and it is not considered a "definition" by Frege[22]. In the years 1892–1894 of *Über Sinn und Bedeutung* and of *Grundgesetze der Arithmetik* Frege came to the conclusion that identity is a primary notion that cannot be defined. The Fregean idea of leaving the identity undefined, as logicians do nowadays, allows him to use the concept of identity in simpler languages also. Instead, Russell's definition of identity in second order logic creates problems for the use he made of identity in RTD of

22. Frege claims [1894: 327] that Leibniz's principles of substitutability and indiscernibility of identicals reveal the nature of identity, but they cannot be definitions, because every definition is an identity and the identity cannot be defined.

1905. Consider the problems and the criticisms addressed to second order logic[23]. The concept of the totality of all properties seems to be impossible and self–contradictory according to some philosophers. Quine [1970] rejects the possibility of quantifying over properties. Properties are like points of view over objects, and the points of view are clearly infinite and subjective: it may be considered inadequate to put the concept of the totality of properties into a logical calculus. In the § 3.6 we will see why Russell also finds the concept of the totality of properties very problematic for a logical system.

Logical constant or two–place predicate?   Frege and Peirce made a revolution in symbolic logic introducing quantifiers and *n*–place predicates, while traditional logic, from Aristotle to Kant, is founded on the subject–predicate structure, in which the predicate is always a one–place predicate. Frege [1879, 1893] considered identity as a logical constant, while Quine [1970] expresses doubts on this. In *Tractatus* there is not a coherent use of identity as a two–place predicate. In *Principia Mathematica* we find definitions of identity as function and as relation (see § 3.6). Therefore, it is not clear whether the identity is a two–place predicate or a logical constant: the distinction of identity between terms from the identity between sentences should be one of the first tasks of a coherent calculus. In Gödel's slingshot, as we will see, identity is used in the same demonstration as a dyadic predicate and as a logical constant, and this greatly devalues the proof.

Let us resume our remarks on Russell's conception of identity.

23. See, for instance, Boolos [1975: 516–517].

1) Identity statements such as *a = a*, *a = b* and *a ≠ b*, as we have seen, suffer from the dangerous ambiguity between the ontological and the epistemological aspect of identity. The Russellian treatment, which contains the refusal of the Fregean distinction between meaning and reference and the acceptance of direct reference, is not able to solve this problem.

2) Russell considers identity as the basis of predication. Aristotle did not confuse these two terms and treated identity by separating it form being, which is the real basis of predication (see *Metaphysics*, Δ 7–9). The treatment of accidental identity, in Aristotle's *Metaphysics*, is close to the treatment of accidental being, which is an explication of accidental predication. But *per se* identity, which corresponds to our modern concept of identity, is completely separated from the explication of *per se* being, in which the categories of predication are contained. In Aristotle, and also in Frege, the concept of identity is considered sufficiently independent from the predication. Russell, instead, analyzes all of the sentences (both subject and predicate) in single predications and employs identity to bind all single predications. For this pervasive role given to identity *inside* the predication, Russell's theory is close to Leibniz's conception. This may be a way to individuate the role of identity inside the predication, but, in accordance with Aristotle, I believe the role that Russell and Leibniz give to identity is excessive (and it causes an excessive complication of the logical form of sentences).

3) Russell confuses identity and sameness. In RTD's logical form of sentences sameness is confused with identity.

4) In Russell's work, but this is a difficult problem for all logicians, it is not established whether the logical concept of identity is definable or not.

5) In Russell and Gödel's work, but this is a difficult problem for all logicians, the sign of identity is not coherently used as a logical constant or as a two–place predicate.

Therefore, the Russellian and Gödelian concept of identity is extremely loaded with ambiguities and misunderstandings.

3.4. Identity statements in the *Tractatus*

The propositions of *Tractatus Logico-Philosophicus* which regard the concept of identity and the sign = contain: 1) a strong criticism of the Russellian conception of identity; 2) the idea that the identity statements are not authentic sentences, because they do not refer to authentic facts or they do not refer to facts at all; 3) The usual confusion between the employment of the identity sign as a two–place predicate and as a propositional connective. It is very interesting, from my point of view, that the fact that Wittgenstein conceives the identity statements as empty and non authentic sentences is bound to the fact that, as in Russell, the singular terms have only the *Bedeutung* and not the *Sinn*: Wittgenstein accepts the direct reference. This again causes Wittgenstein to misunderstand Frege's discussion of the difference between $a = a$ and $a = b$; and, consequently, the impossibility to solve the problems raised by sentences

like "Scott is the author of *Waverly*" or "Scott = the author of *Waverly*".

Consider the proposition 5.53 and its comments. In this series a short theory on identity and its logical notation is exposed. The identity sign, this is the core of the theory, is not necessary in the logical notation (5.533), because the identity of objects should be expressed by identity of signs (by identical signs) and not by a sign of identity (=), and the difference of objects should be expressed by difference of signs (by different signs) and not by a sign of difference (≠) (5.53). In 5.5301 Wittgenstein claims that identity is not a relation between objects because the only real identity is the identity of *a* with itself. On this basis the negative formulation of the principle of indiscernibility of identicals proposed by Leibniz is repeated. Wittgenstein criticizes Russell's definition of the sign =. It is impossible that *two* objects have all properties in common (5.5302). Here Wittgenstein is affirming that the definition (19) $x = y \equiv_{\text{def}} \forall P(Px \rightarrow Px)$ of *Principia Mathematica* is nonsense, because the only case in which two objects can have all properties in common is when an object is considered identical with itself[24]. Thus (19) should be corrected to (19') $x = x \equiv_{\text{def}} \forall P(Px \rightarrow Px)$. In (19') the reason why Frege considered the identity a primitive notion is clear. Indeed it is completely useless and obvious that $x = x$ when all properties of x are properties of x. Therefore, the conclusion is that to affirm that *two* things are identical, and to affirm that *one* thing is identical with itself, is affirming nothing (5.5303, Wittgenstein's italics). These propositions

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24. The acceptance of this critic leads to an absolute concept of identity: the self–identity in time. If one wants to express the fact that in the time in which is told "x is identical with…" or "$x = \ldots$" the x is changed, he should write $x = x$ at T_0.

show that, in the context of a purely extensional language with direct reference of simple names, the identity statements can be considered only from an ontological point of view: the meaning of $a = b$ and $a = b$ is the same, but the expression $a = b$ is nonsense because, being different names, a and b must refer to different things. In the language theorized by Wittgenstein in 5.53 and its comments there is no place for synonymy, each single name means a different object. For direct reference the concept of identity is considered here only from an ontological point of view, but the necessary existence of an epistemological point of view on identity, as is shown in *Über Sinn und Bedeutung*, demonstrates that the distinction between meaning and reference is the best way in semantics. A completely extensional language for names is accepted in *Tractatus*; nevertheless the young Wittgenstein criticizes Russell's conception of identity and his use of the sign = . In 5.531 he proposes eliminating expressions like "$f(a, b) \cdot (a = b)$" and writing simply "$f(a, a)$" or "$f(b, b)$"; eliminating expressions like "$f(a, b) \cdot \sim (a = b)$ and writing simply "$f(a, b)$".

In my opinion, the propositions 4.241[25], 4.242[26] and 4.243[27] are also conceivable upon the basis of 5.53 and its comments. The proposition 4.241, in Russellian style, enounciates the principle of substitutability of identicals; but in 4.243 a purely ontological point of view on iden-

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25. In 4.241 the sign = is conceived to mean that two signs are coreferential: $a = b$ means that a and b have the same *Bedeutung*, or that the sign a is substitutable with the sign b.

26. 4.242 affirms that expressions of the form $a = b$ are only devices for representation, they say nothing about the meaning of the signs a, b.

27. The conclusion in 4.243 is that expressions like $a = b$, or expressions derived from them, are not atomic propositions, neither otherwise meaningful signs.

tity (due to direct reference) causes a serious problem for the *Tractatus*. The reasoning is the following. If I use two names and I understand their meaning, then it is useless to employ them in identity (or difference) statements, because from their meanings I understand whether they are different or identical, thus the identity statements are meaningless. The example chosen by Wittgenstein — two words with the same meaning, in German and in English, which a bilingual speaker cannot ignore — is not explicative, because the problem here is for expressions like "Scott = the author of *Waverly*" and "Scott is the author of *Waverly*". In face of these problems 4.241, but also 6.2322, shows the weakness of Russellian direct reference in solving the enigma of the difference between $a = a$ and $a = b$. With the introduction of synonymy in a language, there is the possibility that two terms a and b refer to the same object (see 4.241). Russell uses the identity statement only in the epistemological sense of the substitutability of coreferential signs but, at the same time, without the distinction between meaning and reference, he implicitly claims that $a = a$ and $a = b$ have the same meaning and the same semantic value. Therefore, Russell's method does not permit the distinction between $a = a$ and $a = b$, and this is, in my opinion, a bad result. Moreover, Russell's position remains open to accusation that identity statements are not authentic sentences, because (from the point of view of a theory of facts) they do not refer to authentic facts. Russell's ontological consideration of identity is instead problematic, because in (19) $x = y \equiv_{\text{def}} \forall P(Px \rightarrow Py)$ the identity of all properties can be valid only between x and itself (at least in the name, x and y differ).

Also the young Wittgenstein does not eliminate the double use of the sign = as a two–place predicate and as a

logical constant. Despite the fact that identity in *Tractatus* is a relation between objects (i.e. a two–place predicate), however, in other propositions identity is treated as a sentence connective. In 5.254 we find $\sim\sim p = p$; in 5.501, 5.51 and 5.52 the sign $=$ is used between the propositionnal variable ξ and complexes propositions. In 5.141 Wittgenstein considers p and q identical when $p \leftrightarrow q$. Here the identity is a propositional connective coincident with the biconditional. In 5.1311 the $=$ is used as the word "means", to translate "$p \mid q$" in "nor p neither q", thus it is employed as a sign of translation in the metalanguage. In 6.2 and its comments, the sign of identity $=$ is the sign of substitutability between mathematical expressions.

In *Tractatus* there is a deep analysis of identity, nonetheless Wittgenstein does not give a systematic explanation of the concept of identity, nor a coherent employment of the sign $=$ in logical notation. This analysis is made on the basis of direct reference and it is an heavy criticism against the Russellian conception of identity, moreover it is the confirmation that the identity statements are not sentences that refer to authentic facts.

3.5. The Gödel's slingshot and the identity of facts

We can now examine Gödel's slingshot, to see which consequences my discussion could have for identity and difference, for a correspondence theory of truth and for the treatment of definite descriptions.

> An interesting example of Russell's analysis of the fundamental concepts is his treatment of the definite article "the". The problem is: what do the so called descriptive phrases (i.e.,

phrases as, e.g., "the author of *Waverly*" or "the king of England") denote or signify [footnote: I use the term "signify" in the sequel because it corresponds to the German word *"bedeuten"* which Frege, who first treated the question under consideration, first used in this connection.] and what is the meaning of sentences in which they occur? The apparently obvious answer that, e.g., "the author of *Waverly*" signifies Walter Scott, leads to unexpected difficulties. For, if we admit the further apparently obvious axiom, [G3] that the signification of a complex expression, containing constituents which have themselves a signification, depends only on the signification of these constituents (not on the manner in which this signification is expressed[28]), then it follows that the sentence "Scott is the author of *Waverly*" signifies the same thing as "Scott is Scott;" and this again leads almost inevitably to the conclusion that all true sentences have the same signification (as well as all the false ones). [footnote: The only further assumptions one would need in order to obtain a rigorous proof would be: [G1][29] that "$\phi(a)$" and the proposition "a is the object which has the property ϕ and is identical to a" mean the same thing and [G2] that every proposition "speaks about something" i.e. can be brought to the form $\phi(a)$. Furthermore one would have to use the fact that for any two objects $a \cdot b$ there exists a true proposition of the form $\phi(a, b)$ as, e.g., $a \neq b$ or $a = a \cdot b = b$.] Frege actually drew this conclusion; and he meant it in an almost metaphysical sense, reminding one somewhat of the Eleatic doctrine of the "One." "The True" — according to Frege's view — is analysed by us in different ways in different propositions; "the True" being the name he uses for the

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28. As Oppy [1997] notes, here Gödel clearly assumes the Russellian direct reference *contra* Frege's *Über Sinn und Bedeutung*. If Gödel's objective is the defence of RTD, then the demonstration that "the author of *Waverly*" cannot signify the object Walter Scott, the apparently obvious axiom of the compositionality operating on referents must be endorsed. I do not understand how Neale and Dever [1997] can refuse the opinion expressed by Oppy.

29. I call these assumptions G1 and G2 to follow Neale, and for an easier understanding of the Neale's interpretation of the proof.

common signification of all true propositions. [Gödel, 1944: 128–9]

It is worth noting some important points. i) It is clear from the style, the words and the philosophical background employed in the formulation of proof, that Gödel's Slingshot is strongly influenced by RTD of 1905. ii) The proof suggested (but not developed) by Gödel is conceived as a defence of RTD, *only on the presupposition of the compositionality and of direct reference* and even on *a compositionality which operates directly on the referents*. Gödel accepts the direct reference of *On Denoting*[30]. Without the RTD, the acceptance of a compositionality which operates on the referents entails that "Scott is the author of *Waverly*" signifies the same thing as "Scott is Scott" — a position that Gödel criticizes on the basis of Russell's *On Denoting*[31]. Gödel considers the compositionality which operates directly on referents as absolutely correct. From this presupposition he derives the certainty of RTD, because, without RTD, the direct compositionality would entail that "the author of *Waverly*" signifies Walter Scott and that "Scott is the author of *Waverly*" signifies the same thing as "Scott is Scott", and these conclusions are unacceptable.

30. This is why Oppy [1997] claims that the direct reference is, with the semantic innocence, a presupposition of the proof.

31. If the problem considered by Gödel is that *a*) "Scott is the author of *Waverly*" and *b*) "Scott is Scott" have the same reference, thus the direct reference obliges us to endorse the RTD, because it is clear that Gödel considers it a problem that *a*) and *b*) refer to the same fact. However, the example is also a demonstration that identity statements are not authentically correspondent to facts, and also a demonstration that sentences like "Scott is the author of *Waverly*" are not real identity statements. In conclusion, in a theory of facts, identity statements like "Scott is the author of *Waverly*" should be substituted by homologues like "Scott wrote *Waverly*".

iii) The proof is not a problem for Frege's account of descriptions, even if he does not endorse the direct reference, because he proposes his famous theory of truth value as reference of sentences. iv) Gödel acknowledges to Frege a certain attention to the truism that different true sentences must mean different propositions, also if they refer to the True (or False). Finally I want to note that v) Gödel is not completely sure of his own argument because he writes "this again leads *almost* inevitably to the conclusion. . . ".

The direct reference is evidence that Gödel, employing a Russellian concept of identity, does not take into consideration, with regard to the concept of identity, the Leibnizian–Fregean idea of substitutability as an intensional phenomenon. The distinction in the way of designation has no semantic relevance, the semantic value of the expressions is squashed on the extensional side. In this theoretical frame, more than in a Fregen framework, as the young Wittgenstein claims, identity statements cannot be sentences which stand for authentic facts, like the synthetic facts expressed by *Fa* and *Gb*. Moreover, Gödel distinguishes $\phi(a)$ from $\phi(a, b)$, showing that the forms $a = b$ and *Fa* are structurally different. This makes the demonstration that *Fa*, $a \neq b$ and *Gb* stand for the same fact, more unacceptable.

Neale [1995] proposes an interesting interpretation of the proof suggested by Gödel. [G1] is interpreted by Neale as if Gödel means that (20) and (20') stand for the same fact:

(20)   *Fa*

(20') $a = (\imath x)(x = a \cdot Fx)$

[G2] says that any sentence which stands for a fact can be put into predicate–argument form. The third assumption, [G3], as we have seen, is compositionality, but it is a compositionality which operates directly on the referents. This is the proof hypothesized by Neale [1995: 778–779]. Consider that the following three sentences are all true:

(I) Fa
(II) $a \neq b$
(III) Gb

Each stands for some fact. Call the facts in question f_I, f_{II} and f_{III} respectively. By [G1], since (I) stands for f_I so does

(IV) $a = (\iota x)(x = a \cdot Fx)$

By the same assumption, since (II) stands for f_{II} so does

(V) $a = (\iota x)(x = a \cdot x \neq b)$

If a definite description "$(\iota x)\phi$" stands for the unique thing satisfying ϕ, then the descriptions in (IV) and (V) both stand for the same object a. So, by [G3], sentences (IV) and (V) stand for the same fact, i.e. $f_I = f_{II}$. By [G1], since (III) stands for f_{III} so does

(VI) $b = (\iota x)(x = b \cdot Gx)$

By the same assumption, since (II) stands for f_{II} so does

(VII) $b = (\iota x)(x = b \cdot x \neq a)$

Thus, on the assumption that a definite description "(ιx) ϕ" stands for the unique thing satisfying ϕ, the descriptions in (VI) and (VII) stand for the same object b. So, by [G3], sentences (VI) and (VII) stand for the same fact, i.e. $f_{II} = f_{III}$. Thus $f_I = f_{II} = f_{III}$, i.e. Fa and Gb, stand for the same fact. *Mutatis mutandis* where "$a = b$" (rather than "$a \neq b$") is true. The conclusion is that all true sentences stand for the same fact. By contrast, if definite descriptions are treated in agreement with RTD then, as Gödel affirms, the ontological collapse of equiextensionality is avoided. On Russell's account, since descriptions do not stand for things because they are not singular terms, thus it does not follow from [G3] that (IV) and (V) stand for the same fact, for the replacement of expressions that stand for the same object. The same reasoning can be made for (VI) and (VII).

i) From Gödel's suggestion, from Neale's development of the proof and from my remarks on the concept of identity, it is clear that this proof is not acceptable. The environment in which the slingshot is initiated is RTD: Russell's direct reference and Russell's conception of identity is involved in this proof. Russell's conception of identity is corrupted by three kinds of ambiguities: 1) ontological/epistemological identity, 2) sameness/identity, 3) primitive/definable identity. Moreover, 4) it is not established whether the sign = is a two–place predicate or a logical constant. On the basis of these serious difficulties, I think that the proof is invalid.

With regard to the first ambiguity, I ask whether (IV), (V), (VI), (VII) are identities between the signs (the expressions) or between the referents of these signs. In the first case (IV)–(VII) affirm something impossible, i.e. the identity of a simple sign with a complex sign — e.g. in (IV)

the identity of a with $(\iota x)(x = a \cdot Fx)$. In the second case, which is more plausible in a context of direct reference, (IV)–(VII) affirm clearly false identities, i.e. the identity of a simple object with itself and with a fact which regards the object. One could object that this referential identity is valid when [G1], i.e. the ι–CONV, and RTD are accepted. But in this case we have a *petitio principi*, given that RTD is exactly what Gödel is defending with the proof.

With regard to the second ambiguity, I ask whether (IV)–(VII) affirm the identity or the sameness between the referents of the expressions between which we find the sign =. A friend of the slingshot could answer that (IV)–(VII) affirm the sameness between the referents; but in this case, again, how is it possible that the object called a is also called "$(\iota x)(x = a \cdot Fx)$"? Is it sameness the identity of x with a and with a fact which regards x? Is it sameness the identity between f_I and f_{II}? The identity is always a relation between objects, while the sameness is uniqueness. And how can the identity with itself, or the sameness, express a real fact?

With regard to the third ambiguity, even if it may seem a general and abstract obstacle for the slingshot, it could be considered the most dangerous. The fact that Gödel, before his proposal of the proof, does not furnish a precise definition of identity (neither from a metaphysical nor from a logical point of view) this can be a reason to think that he, like Frege, considers the identity a primitive and undefinable concept. The use of RTD presuppositions, Russellian logical form of the sentences (" '$\phi(a)$' and the proposition 'a is the object which has the property ϕ and is identical to a' mean the same thing"), the aim to defend the RTD and the example of Walter Scott, can be reasons to think that Gödel writes his paper [1944] in complete

coherence with Russell's logico—mathematical definitions. On the other hand, it is also possible that he considers identity a concept defined by (19) $x = y \equiv_{\text{def}} \forall P(Px \to Py)$. In the first case, we have an undefined concept, which corresponds to the sign =, that can hardly be used in a demonstration so counter–intuitive as the slingshot. In the second case we use an ontological definition given in second order logic, i.e. at a logical level which is derived from the one used in the proof. Moreover, consider the problems of the second order logic already quoted (§ 3.3).

ii) On the basis of the great difference between synthetic sentences like *Fa* and identity / difference statements like $a \neq b$, I think that it is impossible that they stand for comparable facts, and maybe $a \neq b$ does not stand for a fact at all (the same is valid for $a = a$ or $a = a \cdot b = b$). As we have seen, this is exactly the position of Wittgenstein in the *Tractatus*. Moreover, the descriptions in (IV) and (V) both stand for the same object a, thus they have the form $a = b$, or at worst $a = a$ (because in a Russellian framework $a = b$ and $a = a$ are not distinct). In the same way, the descriptions in (VI) and (VII) both stand for the same object b, thus they have the form $b = a$, or at worst $b = b$.

iii) The three kinds of ambiguities aside, Gödel does not clarify whether he means the identity sign as a two–place predicate or a logical constant. In the second footnote, where he specifies the assumptions of the proof, he assumes that *idp*) "for any two objects $a \cdot b$ there exists a true proposition of the form $\phi(a, b)$ as, e.g., $a \neq b$ or $a = a \cdot b = b$". This may mean that Gödel is treating the identity sign as a two–place predicate. But in the development of the proof we find $f_I = f_{II}$, then $f_{II} = f_{III}$ and, in the conclusion, we find that $f_I = f_{II} = f_{III}$. Given that the identity sign between f_I and f_{II} means that they are substi-

tutable signs, or that both denote the same fact, this also holds for the couple (I) and (IV) and for the couple (II) and (V). Given that the direct reference is explicitly assumed by Gödel, $f_I = f_{II}$ can be written as

(21) $(Fa) = (a = (\iota x)(x = a \cdot Fx))$
(21') $(a \neq b) = (a = (\iota x)(x = a \cdot x \neq b))$
(21'') $(a = (\iota x)(x = a \cdot Fx)) = (a = (\iota x)(x = a \cdot x \neq b))$

or as

(21''') $(Fa) = (a \neq b)$

Indeed, all the proof is based upon the substitutability of coreferential expressions. If Neale's development of the proof is right, (21), (21'), (21'') and (21''') show that Gödel treats the identity sign also as a logical constant, despite his assumption idp). Moreover, given that (V) is a coreferential expression of (II) and that (VII) is a coreferential expression of (II), this also entails that (V) and (VII) are coreferential expressions, thus

(22) $(a = (\iota x)(x = a \cdot x \neq b)) = (b = (\iota x)(x = b \cdot x \neq a))$

In which we find two contradictions, given that I) and II) are true for hypothesis.

iv) But Neale's interpretation of the proof, or at worst Gödel's proposal, is not acceptable also if one is not worried by my remarks on identity, or by Gödel's indecision whether the identity is a two–place predicate or a logical constant. Indeed the identity between $f_I = f_{II} = f_{III}$ is demonstrated only with the discovery that $a = b$, where one of the three premises is that $a \neq b$. I do not think that

the expression *"mutatis mutandis"* employed by Neale can solve this problem.

v) The expression $(\iota x)(x = a \cdot Fx)$ is considered by Neale as a complex description which must be read "the unique x such that x is identical to a and x is F". The Gödelian assumption [G1] is " '$\phi(a)$' and the proposition 'a is the object which has the property ϕ and is identical to a' mean the same thing". [G1] is the inference rule ι–CONV, which permits the transformation of Fa in the coreferential $a = (\iota x)(x = a \cdot Fx)$. But $(\iota x)(x = a \cdot Fx)$ refers to the unique x such that x is identical to a, and x has the property F, while $a = (\iota x)(x = a \cdot Fx)$ refers to the identity between a and the unique x such that x is identical to a, and x has the property F; the difference between the description and the sentence is only a repetition of the identity between a and x. *From the point of view of a good theory of facts, can the iota–conversion be a good device to transform a sentence in a sentence containing a description? This transformation is done with a repetition of an already stated identity (i.e. $a = x$). As a consequence we should ask: can the iota operator be a good device to form descriptions?* The expression $(\iota x)(x = a \cdot Fx)$ is a description, while $a = (\iota x)(x = a \cdot Fx)$ is a sentence. But the semantic content of the description is not different from that of the sentence: this semantic content is the object x, which is identical to a, and has the property F[32]; no matter if the identity between a and x is repeated. Again I am claiming here that only with blind faith in the RTD, in its notation and in its conception of identity it is possible to accept Gödel's

32. As we will see at the end of this work, it is just the iota–generation of descriptions and the rule ι–CONV that are the basis of Gödel's slingshot, of its philosophical significance, but also the weak point of the proof and of RTD.

slingshot. Therefore, the apparently obvious assumptions of the famous footnote and of the direct compositionality, I think, give Gödel's slingshot the character of a *petitio principi*: Gödel put in the premises what he wants to prove.

In conclusion I think that, without forgetting the remaining difficulties, the most important reasons to refuse Gödel's slingshot are i) the fact that the identity statements are *Scheinsätze* which do not correspond to authentic facts and that ii) in Gödelian proof the concept of identity was not purified from the ambiguities inherited from the tradition and from Russell. As the *Tractatus* shows, the identity statements should be considered *Scheinsätze* in the context of direct reference even more than in a theory which distinguishes between meaning and reference. Gödel's Slingshot explicitly assumes direct reference and employs identity statements to prove that all the true sentences refer to the same fact, thus it is unacceptable. My arguments on identity are valid also against the slingshots proposed by Church, Quine and Davidson[33]. Gödel's Slingshot is influenced and corrupted by the other ambiguities of Russell's conception of identity (ontological/ epistemological, sameness/identity, primitive/definable), but these problems also corrupt the other slingshots. Church, Quine and Davidson did not face (and solve), with a rigorous logical convention and a philosophical discussion premised to their slingshot, the problems I raised with regard to the concept of identity.

This discussion about identity leads us to an important consideration about identity between facts. The expression $f_1 = f_2$ (and similar ones) employed by Neale, and

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33. Quine [1970], for instance, has doubts about the question whether the identity is a logical constant or a two–place predicate.

maybe presupposed by Gödel, are strongly misleading for a good theory of facts. The coreferential sentences have a common referent when they refer to a unique fact, therefore we should not say that coreferential sentences refer to *identical* facts, but that coreferential sentences refer to the *same* fact. Thus the expression $f_1 = f_2$ is improper like the Fact Identity Connective, *The fact that* () *is identical to the fact that* (). The only possible meaning of $f_1 = f_2$ is that different sentences have the same referential value.

3.6. The conception of identity in *Principia Mathematica* and in Gödel until 1944

The discussion on identity in the *Principia Mathematica* is made in different places, in relation to different problems: this is a clear sign of the difficulty of this subject and of the logico—philosophical pathology of the concept of identity. The first important point in which Whitehead and Russell treat identity is in the *Introduction* to the first edition (1910). The *Introduction* is split up into three chapters: I) Preliminary Explanation of Ideas and Notations; II) The Theory of Logical Types; III) Incomplete Symbols. We find definitions of identity in the first and second chapters. In the first chapter, the definition is strongly bound to the discussion of *On Denoting*:

> *Identity*. The propositional function "*x* is identical with *y*" is expressed by $x = y$. This will be defined (cf. *13·01), but owing to certain difficult points involved in the definition, we shall here omit it (cf. Chapter II). We have, of course,

⊢ . $x = x$ (the law of identity[34])
⊢: $x = y . \equiv . y = x$,
⊢: $x = y . y = z . \supset . x = z$.

[...] *If x and y are identical, either can replace the other in any proposition without altering the truth–value of the proposition*; thus we have

⊢: $x = y . \supset . \phi x \equiv \phi y$.

This is a fundamental property of identity, from which the remaining properties mostly follow. It might be thought that identity would not have much importance, since it can only hold between x and y if x and y are different symbols for the same object. This view, however does not apply to what we shall call "descriptive phrases," *i.e.* "the so–and–so." It is in regard to such phrases that identity is important, as we shall shortly explain. A proposition such as "Scott was the author of Waverly" expresses an identity in which there is a descriptive phrase (namely "the author of Waverly"); this illustrates how, in such cases, the assertion of identity may be important. [1997 (1910): 22–23, my italics]

Here the dangerous ambiguity between the ontological and the epistemological aspect of identity is repeated: the principle of substitutability of identicals (that I have high-lighted in italics) founds the indiscernibility of identicals. Again here, as in 1905, Russell mixes two aspects that must be carefully kept distinct. Moreover, here Russell repeats that the importance of identity is only in the relation be-tween a name and a definite description which has the same referent of the name, i.e. the problem that he claims to solve with his theory of descriptions. Instead, I think that identity is a very important concept for many prob-

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34. The identity between x and y is reflexive, symmetrical and transitive.

lems, and not only for the problem of co–referential terms and descriptions. I think that the problem raised by Russell concerns propositional attitudes and hyperintensional contexts more than identity, and that Russell's solution to the problem of George IV's curiosity is not a good solution in comparison with Frege's theory.

In the second chapter, "The Theory of Logical Types", the definition of identity is bound to the axiom of reducibility. Section V of the second chapter, "The Hierarchy of Functions and Propositions" starts by claiming that, for the vicious circle principle[35] and for direct inspection, the functions to which a given object a can be an argument are incapable of being argument to each other, and that they have no terms in common with the functions to which they can be arguments. Thus it is necessary to construct a hierarchy. Given a and the other terms which can be arguments to the same functions to which a can be argument, we come next to functions to which a is a possible argument, and then to functions to which such functions are possible arguments, and so on. Therefore a function in which $\phi\hat{z}$ appears as argument requires that "$\phi\hat{z}$" should not stand for *any* function which is capable of a given argument; but it must be restricted in such a way that none of the functions which are possible values of "$\phi\hat{z}$" should involve any reference to the totality of such functions. The example chosen by Whitehead and Russell to show the necessity of this limitation is precisely the definition of identity. The expression "x is identical with y" should mean "whatever is true of x is true of y," i.e. "ϕx always implies ϕy". But, since we are concerned

35. Cf. section I of chapter II of the *Introduction* to the first edition of *Principia Mathematica*.

with asserting all values of "ϕx implies ϕy" regarded as a function of ϕ, we must impose upon ϕ some limitation which will prevent us from including among values of ϕ values in which "all possible values of ϕ" are referred to. On the other side, if we impose some limitation upon ϕ, it may happen that with other values of ϕ it may result that ϕx is true and ϕy is false, thus the definition of identity would be wrong. According to Whitehead and Russell the difficulty can be avoided through the axiom of reducibility.

The result of the reasoning of Whitehead and Russell in section V is that no statement can be significantly made about "all a–functions," where a is an object. The notion "all properties of a", which means "all functions which are true with the argument a" will be illegitimate. We must distinguish the order of the function concerned: it is possible to speak of "all predicative properties of a", "all second–order properties of a", and so on; but not of "all properties of a". Therefore, the introduction of the axiom of reducibility is useful to legitimate many inferences in which such notions as "all properties of a" or "all functions of a" appear. The axiom of reducibility is the assumption that, "given any function $\phi\hat{z}$, there is a formally equivalent *predicative* function, *i.e.* there is a predicative function which is true when ϕx is true and false when ϕx is false. In symbols it is

$$\vdash : (\exists \psi) : \phi x \, . \equiv_x \, . \, \psi ! x$$

The axiom of reducibility permits us to solve the problem of the definition of identity, with regard to the impossibility of speaking about "all properties" of a given object a:

We may next illustrate our principle by its application to *iden-*

tity. In this connection, it has a certain affinity with Leibniz's identity of indiscernibles. It is plain that, if x and y are identical, and ϕx is true, then ϕy is true. Here it cannot matter what sort of function $\phi\tilde{x}$ may be: the statement must hold for *any* function. But we cannot say, conversely: "If, with all values of ϕ, ϕx implies ϕy, then x and y are identical"; because "all values of ϕ" is inadmissible. If we wish to speak of "all values of ϕ," we must confine ourselves to functions of one order. We may confine ϕ to predicates, or to second–order functions, or to functions of any order we please. But we must necessarily leave out functions of all but one order. Thus we shall obtain, so to speak, a hierarchy of different degrees of identity.[...] Thus we cannot, without the help of an axiom, be sure that x and y are identical if they have the same predicates. Leibniz's identity of indiscernibles supplied this axiom. It should be observed that by "indiscernibles" he cannot have meant two objects which agree as to *all* their properties, for one of the properties of x is to be identical with x, and therefore this property would necessarily belong to y if x and y agreed in *all* their properties. Some limitation of the common properties necessary to make things indiscernible is therefore implied by the necessity of an axiom. For purposes of illustration (not of interpreting Leibniz) we may suppose the common properties required for indiscernibility to be limited to predicates. Then the identity of indiscernibles will state that if x and y agree as to all their predicates, they are identical. This can be proved if we assume the axiom of reducibility. For, in that case, every property belongs to the same collection of objects as is defined by some predicate. Hence there is some predicate common and peculiar to the objects which are identical with x. This predicate belongs to x, since x is identical with itself; hence it belongs to y, since y has all the predicates of x; hence y is identical to x. It follows that we may *define* x and y as identical when all the predicates of x belong to y, *i.e.* when $(\phi) : \phi!x . \supset . \phi!y$. We therefore adopt the following definition of identity:

$x = y . =: (\phi) : \phi!x . \supset . \phi!y \qquad$ Df.

But apart from the axiom of reducibility, or some axiom

equivalent in this connection, we should be compelled to regard identity as indefinable, and to admit (what seems impossible) that two objects may agree in all their predicates without being identical. [Whithead–Russell, 1997 (1910): 57–58]

In this way, the definition of identity becomes the proposition *13·01 of *Principia Mathematica*. *13·02 is the definition of difference as the simple negation of identity,

$$x \neq y \, . \, = \, . \sim (x = y) \qquad \text{Df.}$$

In this definition identity is considered as a propositional function. In the first chapter of the *Introduction* of 1910, "Preliminary Explanation of Ideas and Notations", the propositional functions with the form ϕx are distinct from the relations, which have form $\phi(x, y)$:

Any function $\phi(x, y)$ determines a relation R between x and y. If we regard a relation as a class of couples, the relation determined by $\phi(x, y)$ is the class of couples (x, y) for which $phi(x, y)$ is true. The relation determined by the function $\phi(x, y)$ will be denoted by $\tilde{x}\tilde{y}\phi(x, y)$. [...] The propositional function "x has the relation R to y" will be expressed by the notation xRy. This notation is designed to keep as near as possible to common language, which, when it has to express a relation, generally mentions it between its terms, as in "X loves y," "x equals y," "x is greater than y," and so on. [1997: 26]

This concept of relation is important for the concept of identity because in Part II of *Principia Mathematica*, "Prolegomena to Cardinal Arithmetic", identity and diversity are defined as relations, in opposition to their definitions as functions:

In this section we begin (*50) by introducing a notation for the *relation* of identity, as opposed to the *function* "$x = y$";

that is, calling the relation of identity *I*, we put $I = \tilde{x}\tilde{y}(x = y)$ Df. [...] At the same time we introduce *diversity*, which is defined as the negation of identity, and denoted by the letter *J*. The properties of *I* and *J* result immediately from ⋆13, since $xIy \, . \equiv . \, x = y$. [1997: 329]

This short analysis of the concept of identity in the *Principia* confirms that in Russell a) the ontological aspect of identity is mixed with the epistemological aspect, that b) the question whether identity is definable or indefinable remains unsolved and that c) identity is ambiguously defined as function and as relation.

I cannot find in Gödel's writings reasons to think that the concept of identity he endorses solves the problems I raised in this work, or that his concept of identity is different from that of Whitehead and Russell's in *Principia Mathematica*. Almost all the works by Gödel [Fefermann: 1990] from 1929 to 1944 make a large employment of the concept of identity and of the sign =, but there is no philosophical analysis of identity or a notational clarification about it in these works, especially with regard to the problems I raised. In Gödel's works, given that the definition of identity, like that of many other fundamental concepts of mathematical logic, is that of *Principia*, Gödel's conception of identity inherits all the ambiguities and misunderstandings I highlighted in the Russellian conception. The problem of the mixture between the epistemological and the ontological aspect of identity is unsolved in Gödel. In some places Gödel writes that expressions with identity may be substituted by expressions without identity, meaning that identity is unnecessary in a logical system. Like Russell, Gödel does not decide whether identity must be

considered a definable or an indefinable concept[36]. As we
have seen, it is not easy to understand whether identity
is a logical constant, i.e. a propositional connective, or a
two–place predicate. In the demonstration of the theorems
about the axiomatic system of the set theory, the sign $=$
is used between objects, between functions, between sets,
between numbers and so on. Therefore, the ambiguity
of $=$ is worsened in Gödel. In *Russell's Mathematical Logic*
there is no clarification of the concept of identity on which
to found the slingshot. The unique presupposition is that
"one would have to use the fact that for any two objects
$a \cdot b$ there exists a true proposition of the form $\phi(a, b)$ as,
e.g., $a \neq b$ or $a = a \cdot b = b$". This presupposition clarifies
that identity, in the proof, must be used as a two–place
predicate. But, as we have seen in Neale's interpretation, to
demonstrate that all the true sentences refer to the same
fact, the proof must use expressions like $f_I = f_{II} = f_{III}$. In
these expressions we find the ambiguity of sameness and
identity between facts and the use of the identity sign as a
propositional connective.

3.7. The Neale–Oppy debate on Gödel's slingshot

In the rich literature on the slingshot arguments I selected
the Neale–Oppy debate because it is maybe the most inter-
esting and the most discussed. This debate very adequately
considers, from opposite points of view, the problems in-
volved in Gödel's slingshot. I would like to express my
opinions about these studies because they are connected

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36. With regard to Gödel's conception of identity, and to Gödel's works
in general, see Galvan [1992].

to the acceptance of Fregean theory, or of an otherwise referential theory of definite descriptions. Moreover, these studies are connected to eventual dangers for a coherent correspondence theory of truth. This part of my work is dedicated to those who are not convinced by my discussion on identity and on the weakness of Gödel's slingshot (but also of the other slingshots) for the employment of identity statements. Moreover, Oppy's work shows why it is convenient to endorse a referential treatment of definite descriptions also accepting the validity (but not the philosophical importance) of Gödel's slingshot. On the other hand, Neale thinks that Gödel's slingshot, even if it does not completely prevent the referential treatment of definite descriptions, leans towards a Russellian treatment of definite descriptions. Therefore, apart from my arguments *contra* RTD, the theorists must consider Oppy's ones, which are independent. In this section I will follow Oppy's reasoning and argue that the answers given by Neale (and Dever) to Oppy's criticisms are often inadequate. In this section I will pretend that the concept and the sign of identity are not problems for the slingshot argument. Thus, if the slingshot argument will be proved unimportant, independently from the problems I raised on identity, my demonstration of the weakness of the slingshot will be even stronger.

The title chosen by Oppy [1997] to reject Neale's theses is already indicative of the problem discussed: is Gödel's slingshot so important in the philosophical debate? Does it entail important consequences for theories of truth? Oppy is not convinced by Neale of the philosophical importance of Gödel's slingshot (and of slingshot arguments in general). The following are the main theses proposed by Neale that Oppy considers [121]:

I)   Gödel's Slingshot highlights unpleasant conse-
        quences of the referential treatment of descriptions;
II)   Gödel's Slingshot raises important philosophical
        questions about the consequences of rejecting
        RTD;
III)   Gödel's Slingshot forces friends of facts to take a
        definite position on the semantics of definite de-
        scriptions;
IV)   Gödel's Slingshot forces anyone who is giving a
        logic for causal statements to endorse RTD[37];
V)   Gödel's Slingshot has important consequences for
        any theory of facts because of the consequences
        which it has for the non–extensional connective FIC
        — "The fact that () = the fact that ()".

Oppy disagrees with all these theses. Gödel's slingshot does not have important philosophical consequences for theories of facts and for referential treatment of definite descriptions. Oppy's opinion is not bound to any consideration about the problems of identity that I raised above, thus it also strikes those friends of the slingshot who are not worried by my remarks on identity. According to Oppy — to be philosophically significant for theories of facts and for referential treatment of definite descriptions — Gödel's slingshot a) should impose a particular

37. The refutation of this thesis is not developed by Oppy [1997]. I imagine that Oppy considers as demonstrated its falsity by his articulated arguments against the other theses, which are logically bound to thesis IV) on causal statements. The fact that Gödel's slingshot does not entail important consequences for the choice between referential and Russellian treatments of DD (and does not entail unpleasant consequences for referential treatment of descriptions) makes it very difficult to accept that, in causal contexts, the RTD is the only valid theory. However, I am not interested in discussing this thesis on causal contexts here.

constraint, beyond those constraints that can be derived from the usual theoretical *desiderata* such as consistency, completeness, simplicity, etc; b) should impose a constraint for which it is *prima facie* plausible that there are interesting theories, of the kind in question, which fail to meet this constraint; c) should impose a constraint that operates independently of theoretical assumptions which would, by themselves, suffice to demolish the theory in question. But Oppy claims that none of these three points are satisfied by Gödel's slingshot[38]. Because it is impossible "to construct a *prima facie* plausible theory of facts which falls foul of Gödel's Slingshot" and the

> assumptions involved in the construction of Gödel's Slingshot must be denied by any referential treatment of definite descriptions. It seems to me that any referential treatment of definite descriptions will require rejection of semantic innocence (or direct reference or both) — i.e. rejection of the claim that the semantic content of vocabulary does not vary as the non–quotational sentential frames, in which that vocabulary is embedded varies (or rejection of the claim that the semantic content of (say) singular terms in extensional contexts is just the objects (if any) to which those singular terms refer, or both) — and yet, the assumption of semantic innocence (or

38. Oppy [1997: 122] writes: "While not wishing to deny that the discussion of Gödel's Slingshot has technical and historical significance, I want to insist that Gödel's Slingshot does not impose any philosophically interesting constraints upon theories of facts and referential treatments of definite descriptions". Neale and Dever [1997: 152] think that, it is not important that Gödel's slingshot does not impose constraints upon theories of facts, beyond those constraints that can be derived from the usual theoretical *desiderata* such as consistency, completeness, simplicity, etc. According to them, the fundamental constraint imposed by Gödel's slingshot on FIC is, however, a philosophically important result. In this I agree with Neale and Dever [1997], and not with Oppy [1997].

direct reference, or both) is implicitly built in the construction of Slingshot arguments. [122]

In order to demonstrate the insignificance of Gödel's slingshot, Oppy builds a fact friendly theory in which definite descriptions can be treated as singular terms. The Neale's constraint does not prevent this kind of theory, the constraint prevents a theory of facts that is at the same time $+\iota$–CONV and $+\iota$–SUB (fundamental constraint, FC). Denying that FIC is $+\iota$–CONV, it is possible to build a coherent theory in which FIC is $+\iota$–SUB, i.e. in which definite descriptions are treated as singular terms. Neale, in accordance with Gödel and Russell, denies that FIC is $+\iota$–SUB (he endorses RTD) and treats the connective as $+\iota$–CONV. He claims that this is the best way to build a coherent theory of facts but he does not claim that it is impossible to build a coherent theory in which FIC is $+\iota$–SUB, i.e. in which definite descriptions are treated as singular terms (in this case the ι–SUB rule is contained in PSST). Neale chooses to save ι–CONV and to endorse RTD (denying that FIC is $+\iota$–SUB), because Gödel's slingshot highlights unpleasant consequences of referential treatment of descriptions (I). Therefore, Oppy's construction of a fact friendly theory in which definite descriptions are treated as singular terms is made against the thesis I), not directly against the FC.

It is now useful to remember the operative version of Gödel's slingshot given by Neale. This version is proposed on the basis of the rules of inference ι–SUB and ι–CONV:

$(\iota\text{--SUB})$ $\quad (\iota x)\varphi = \alpha \quad (\iota x)\varphi = (\iota x)\psi \quad (\iota x)\varphi = \alpha$

$$\frac{\Sigma[(\iota x)\varphi]}{\Sigma[\alpha]} \quad \frac{\Sigma[(\iota x)\varphi]}{\Sigma[(\iota x)\psi]} \quad \frac{\Sigma[\alpha]}{\Sigma[(\iota x)\varphi]}$$

$(\iota\text{--CONV})$ $\quad \dfrac{\Sigma[x/\alpha]}{\alpha = (\iota x)(x = \alpha \cdot \Sigma[x])} \quad \dfrac{\alpha = (\iota x)(x = \alpha \cdot \Sigma[x])}{\Sigma[x/\alpha]}$

The proof is the following:

1	[1]	Fa	premiss
2	[2]	$a \neq b$	premiss
3	[3]	Gb	premiss
1	[4]	$a = (\iota x)(x = a \cdot Fx)$	1, ι–CONV
2	[5]	$a = (\iota x)(x = a \cdot x \neq b)$	2, ι–CONV
2	[6]	$b = (\iota x)(x = b \cdot x \neq a)$	2, ι–CONV
3	[7]	$b = (\iota x)(x = b \cdot Gx)$	3, ι–CONV
1, 2	[8]	$(\iota x)(x = a \cdot Fx) = (\iota x)(x = a \cdot x \neq b)$	4, 5, ι–SUB
2, 3	[9]	$(\iota x)(x = b \cdot Gx) = (\iota x)(x = b \cdot x \neq a)$	6, 7, ι–SUB
10	[10]	$❽(Fa)$	premiss
10	[11]	$❽(a = (\iota x)(x = a \cdot Fx))$	10, ι–CONV
1, 2, 10	[12]	$❽(a = (\iota x)(x = a \cdot x \neq b))$	11, 8, ι–SUB
1, 2, 10	[13]	$❽(a \neq b)$	12, ι–CONV
1, 2, 10	[14]	$❽(b = (\iota x)(x = b \cdot x \neq a))$	13, ι–CONV
1, 2, 3, 10	[15]	$❽(b = (\iota x)(x = b \cdot Gx))$	14, 9, ι–SUB
1, 2, 3, 10	[16]	$❽(Gb)$	15, ι–CONV

This proof establishes that any *S*–connective which is both +ι–CONV and +ι–SUB is also +PSME, i.e. it is extensional. If an *S*–connective, which is important for a good theory of facts, e.g. FIC, is both +ι–CONV and +ι–SUB it cannot be non–extensional, then the theory crashes. Indeed, if FIC is +ι–CONV and +ι–SUB it will allow the substitution of materially equivalent sentences in its scope, e.g. "the fact that (the grass is green) = the fact (the snow is white)"; thus all the true sentences will refer to the same

Fact. According to Oppy, the proof is valid for sentences which contain singular terms, thus one might object that the slingshot can be avoided by those who, following a Quinean idea, reparse singular terms using predicates and quantifiers. Given that I do not believe in the Quinean elimination of singular terms and given that, in my opinion, a good theory of facts must admit particular facts, I am not interested in the discussion of the first two of Oppy's critiques against the fundamental constraint[39]. However, the non–extensionality of FIC is necessary for friends of facts, thus FIC must be either $-\iota$–CONV or $-\iota$–SUB or $-\iota$–CONV and $-\iota$–SUB. This is the fundamental constraint found by Neale in his work. Oppy does not deny that this conclusion is right, but he thinks that it is impossible that a theory of facts could be built as $+\iota$–CONV and $+\iota$–SUB. The fundamental constraint is already respected by the fact theorists for reasons which are independent from Gödel's slingshot: the FC would be respected even if the proof would be unknown, then Gödel's slingshot is a hit wide

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39. With regard to this point, in his second essay on Gödel's slingshot, Oppy writes [2004: 632]: "I suggested that it might be possible to avoid the descriptive constraint on non–extensional logic by adopting a language that eschewed both singular terms and definite descriptions in canonical notation or — relatedly — by supposing that there are only general facts, and not particular facts. I made the mistake of tying the first part of this suggestion to Quine's suggestion about how to eliminate singular terms — and Neale and Dever [1997: 147] and Neale [2001: 174] rightly take me the task for this. Moreover, the first part of this suggestion is, in any case, misformulated: the key idea is that canonical notation should wear its commitments on its face, and that there could be a notation that made it clear that it had no truck with particular facts. If your language does not allow you to formulate the claims that *a* is *F* and that *b* is *G*, then it is hard to see how you could be vulnerable to Gödel's Slingshot argument. But it is not so clear what such a canonical notation will look like: perhaps the kind of 'feature–placing language' required by ontological nihilists would do the trick".

of the mark. The following is the reasoning proposed by Oppy.

If we endorse RTD then *"Fa"* refers to an atomic fact, while *"$a = (\iota x)(x = a \cdot Fx)$"* refers to a general fact. Given that the classes of atomic facts and general facts are disjoint, FIC cannot be $+\iota$–CONV. If we give a referential treatment of definite descriptions then we must admit that *"Fa"* refers to a monadic fact (the attribution of the property *F* to *a*) while *"$a = (\iota x)(x = a \cdot Fx)$"* refers to a dyadic fact (the attribution of identity to the pair of *a* and *a*). Given that the classes of monadic facts and dyadic facts are disjoint, FIC cannot be $+\iota$–CONV[40]. However we treat DD, there are *prima facie* reasons to exclude that FIC is $+\iota$–CONV. I agree with Oppy with regard to this argument.

Oppy uses propositional attitudes to show that it is necessary to deny that non–extensional *S*–connectives, like FIC, are $+\iota$–SUB also without Gödel's slingshot. Assuming that definite descriptions are referential as singular terms (thus ι–SUB and PSST are the same rule) Oppy quotes two examples to show that friends of facts must deny that FIC is $+\iota$–SUB also without Gödel's slingshot. 1) If the

40. The emphasis of the difference between atomic and general facts, and between monadic and dyadic facts, is a criticism made by Oppy against the Russellian use of the *iota* operator to generate descriptions from sentences and *iota* sentences from normal sentences. Thus Oppy's criticism is also against the [G1] assumption of Gödel's footnote. Moreover Oppy's idea that FIC cannot be *prima facie* $+\iota$–CONV is only based upon "paradigmatically Russellian assumptions" [Neale and Dever 1997: 161–2]: "(1) there are both atomic and general facts; (2) the classes of atomic and general facts are disjoint; (3) atomic sentences all of whose argument positions are occupied by singular terms (e.g. "Cicero snores") express atomic facts; (4) sentences containing quantified expressions in argument positions (e.g. "every Roman snores") express general facts; (5) there are both monadic facts (e.g. the fact that Cicero snored) and dyadic facts (e.g. the fact that Cicero denounced Catiline); (6) the classes of monadic and dyadic facts are disjoint".

facts that "Hesperus is bright" and "Phosphorus is bright" are the same fact (because PSST / ι–SUB is valid[41]), then it seems that we are committed to the claim that the fact that "Hammurabi believes that Hesperus is bright" is identical to the fact that "Hammurabi believes that Phosphorus is bright", and this is a bad result. 2) "Necessarily, nine is the square of three" can be true while "Necessarily, nine is the number of planets" is false, even if it apparently involves substitution of coreferential descriptions (ι–SUB) in the scope of an intensional (non extensional) S–connective. Example 1) and 2) show that the friends of facts must deny that FIC is +ι–SUB and +PSST independently of Gödel's slingshot[42].

With regard to this point I would like to express my opinion. Oppy could be right to refuse the usefulness of Gödel's slingshot for non extensional S–connectives because they appear to be −ι–SUB independently from Gödel's slingshot. But I believe that the use of propositional attitudes is suspicious here (like Russell's use of the identity "Scott = the author of *Waverly*"). Following Oppy's operation, we should deny that FIC is +PSST, and this would cause a total crash of theory of facts. The problem

41. In Oppy's text, with regard to this example, the ι–SUB is unexpectedly quoted; but only because Oppy is considering ι–SUB and PSST as the same rule.

42. Given that the friends of facts must deny that non–extensional S–connectives are +ι–SUB, for reasons which are independent of their position on the semantics of definite descriptions, Oppy concludes that Neale's thesis III) is wrong: Gödel's slingshot does not force friends of facts to take a definite position on the semantics of definite descriptions. I do not consider that the examples chosen by Oppy to show that S–connectives are *prima facie* −ι–SUB are adequate. Despite this, I believe that Neale's thesis III) is incorrect because there are *prima facie* reasons to exclude that FIC is +ι–CONV. Indeed, failing the fundamental constraint, one can choose to endorse or reject ι–SUB (and RTD) for FIC.

of identity between $fact_1$ that "Hammurabi believes that Hesperus is bright" and $fact_2$ that "Hammurabi believes that Phosphorus is bright" regards semantic innocence of singular terms in the propositional attitudes. I believe it should be solved using Frege's distinction between meaning and reference. In a theory of facts, the facts are always facts of the world, ontological entities; thus I have no problem believing that $fact_1$ is the same as $fact_2$, but with the necessary specification that Hammurabi *knows* that "Hesperus" and "Phosphorus" are co-referring names. If Hammurabi does not know that "Hesperus" and "Phosphorus" are co-referring names, given that belief (as knowledge, hope, and so on) is something that regards knowledge, then $fact_1$ cannot be the same as $fact_2$. $Fact_1$ and $fact_2$ are facts that contain a fact. In these complex facts the property of the subject of the principal fact is a *belief* of the subject which stops the PSST (and ι–SUB) in the frame of the subordinate fact. Also in this example (like in the example of curiosity of George IV) I see the importance of the identity statements and the usefulness of Frege's solution through the distinction between meaning and reference. The propositional attitudes, like the one we find in the example 1), are the so called hyperintensional contexts[43]. These contexts are $-$PSST, $-\iota$–SUB[44] and $-$PSLE for the common conception of logical equivalence (large logical equivalence). In this work we are assuming that FIC is a generic non–extensional S–connective that must be $+$PSST ($+\iota$–SUB), $-\iota$–CONV, $+$PSLE and $-$PSME for

43. See Stainton [2006] and Oppy [1997].
44. The distinction between ι–SUB and PSST is valid for those who reject the referential treatment of definite descriptions, I consider them as the same rule.

good theories of facts. For these reasons I reject example 1) proposed by Oppy.

With regard to example 2) I believe that modal (intensional) *S*–connectives are non–extensional *S*–connectives, but it is not necessary that a non–extensional *S*–connective like FIC behaves logically in the precise same way as □[45]. Moreover, I think that the example chosen by Neale and by Oppy does not show that □ is −*ι*–SUB. Even if "the square of three" and "the number of planets" *seem* to be co-referring definite descriptions (both would refer to nine), they are not in reality. Indeed, in an identity statement with "nine", they express different kinds of truth: a) "the square of three is nine" expresses a mathematical (necessary) truth; while b) "the number of planets is nine" expresses an astronomical (contingent) truth. In the scope of □ it is clear that a) is true while b) is false. Another inadequate example like this could be done with □ ('the seventh ordinal number' is less than twelve) which is true. In this sentence the substitution of an *apparently* co-referring description gives □ ('the number of Snow White's dwarfs' is less than twelve). I do not consider the expressions "the square of three" and "the seventh ordinal number" as co-referring definite descriptions of "the number of the planets" and of "the number of Snow White's dwarfs". Indeed "the square of nine", "the seventh ordinal number" and all the descriptions which denote *pure* numbers cannot be co-referring of DD which denote numerical aspects (contingent) of real objects of the world (e.g. "the number of planets", "the number of my sons", and so on). Instead, there are very good reasons to think that □, and

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45. Neale and Dever [1997: 151] write: "There is no reason to think that every fact theorist is going to treat FIC and □ as having the same logic".

the other modal S–connectives, are $+\iota$–SUB and +PSST[46].
In sentences like □ (the father of Philip II was a human
being) the truth is preserved if we substitute the DD with a
coreferential name or with a coreferential DD: □ (Charles
V was a human being); □(The emperor who fought the
protestant reform was a human being).

Therefore, with regard to this point, I do not agree with
Oppy: non–extensional S–connectives are not *prima facie*
$-\iota$–SUB. Moreover, I think that FIC is $+\iota$–SUB
(+PSST). Given that I refuse Oppy's arguments that show
that non–extensional S–connectives are *prima facie* $-\iota$–
SUB, I should conclude that Gödel's slingshot has a partial
usefulness: it is *prima facie* evident that FIC cannot be $+\iota$–
CONV, but it is not *prima facie* evident that FIC is not $+\iota$–
SUB. What remains of the fundamental constraint which
prevents FIC from being both $+\iota$–CONV and $+\iota$–SUB?
Nothing. A fact theorist can choose to give a referential
treatment of definite descriptions and consider FIC as $+\iota$–
SUB (+PSST), or he/she can choose to endorse RTD and
consider FIC as $-\iota$–SUB. Then Neale's thesis III) is wrong.
Together with thesis III), all of Neale's theses considered
by Oppy fail.

However, if one completely agrees with Oppy (also on
the *prima facie* being $-\iota$–SUB of FIC) the fact theorists are
secured against Gödel's slingshot. "Regardless of what they
think about the semantics of the definite descriptions, they

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46. Stainton [2006: 77] thinks that modal S–connectives are +PSST; given
that I endorse the Fregean referential theory of descriptions and I consider
the ι–SUB and the PSST a unique rule, it is consequential that I consider
the modal S–connectives $+\iota$–SUB. Neale [1995], Neale and Dever [1997],
Smullyan [1948] and Quine [1953] consider □ $-\iota$–SUB, but more for an *a
priori* acceptance of the RTD than for a correct analysis of the semantic of
□.

will reject *both* of the principles which are required for the construction of the argument" [Oppy 1997: 128]. Therefore, the friends of facts should not be afraid of Gödel's slingshot "nor of the more familiar Quine–Church–Davidson Slingshots". Gödel's slingshot is not an important constraint on theories of facts. Given the insignificance of Gödel's slingshot, the "rhetorical comparison of Gödel's Slingshot with Oppy's Cheapshot" is perfectly acceptable. Oppy's Cheapshot is: "no theory of facts should allow that it is a fact that the moon is made from green cheese". The fact that Gödel's slingshot prevents ways that are already foreclosed by independent reasons, does not cause that it is not a constraint on theories of facts; it is a constraint but it is not more important than the obvious constraint that does not allow facts which are clearly false, like Oppy's Cheapshot does (see *infra*).

Neale's thesis III) claims that Gödel's slingshot forces friends of facts to take a definite position on the semantics of DD. Oppy claims that the friends of facts need to say something about the semantics of DD for the general theoretical *desideratum* of completeness, and not for Gödel's slingshot [1997: 121]. The friends of facts, according to Oppy, have reasons to consider FIC as *prima facie* $-\iota$–SUB, and no matter if one endorses the RTD or not: "one could be a friend of facts who is undecided about which way to go on that question" [Ivi: 126, footnote 6]. Another argument employed by Oppy to show that, independently from Gödel's slingshot, FIC is $-\iota$–SUB is the following. The truth–bearers [4] "$a = (\iota x)(x = a \cdot Fx)$" and [5] "$a = (\iota x)(x = a \cdot x \neq b)$", for theorists who consider facts as truth–makers, are made true by different facts. The former by the instantiation of the property F by the object a, the latter by the failure of the instantiation of the

relation of identity between *a* and *b*. I do not accept this argument. Let us suppose we accept that the ι–CONV is valid and that [4] and [5] are permitted transformations respectively of [1] *Fa* and [2] *a* ≠ *b*. Given that we do not know what the property *F* for *a* is, it is possible that it is the difference from *b*. Therefore, it is perfectly possible that the descriptions "$(\iota x)(x = a \cdot Fx)$" and "$(\iota x)(x = a \cdot x \neq b)$" are coreferential, and, with them, lines [4] and [5] and lines [1] and [2]. Thus this argument does not show that FIC is $-\iota$–SUB. Instead there are good reasons to think that FIC is $+\iota$–SUB. However, lines [4] and [5], in my opinion, do not preserve the truth (or the facts referred to) of lines [1] and [2], because ι–CONV should not be employed to create DD from formulae. However, Oppy is right: Gödel's slingshot does not force the friends of facts to take a definite position on the semantics of DD. With the constraint of completeness aside, Gödel's slingshot pushes us to take a definite position on the semantics of DD, but not with the force of a necessary constraint.

One of the most interesting problems raised by Oppy in his essay of 1997 is the idea that Neale's development of Gödel's slingshot presupposes semantic innocence. This presupposition might derive from Davidson's slingshot (thus it is a problem for Davidson also). Semantically innocent theories, with respect to singular terms, are those theories in which the semantic contents of singular terms, in non–extensional contexts, are just the semantic contents which those singular terms have in extensional contexts. Let us follow Oppy's reasoning:

> The idea is this: one begins with rules of inference which are clearly valid for extensional contexts. It follows from this that if Ω is an extensional *S*–connective and S is a sentence, then the

truth (falsity) of $\Omega(S)$ guarantees the truth (falsity) of $\Omega(T)$, where T is the result of applying one of the rules of inference to S. One then asks: if Ω is a non–extensional S–connective and S is an extensional sentence, does the truth (falsity) of $\Omega(S)$ guarantee the truth (falsity) of $\Omega(S)$, where T is the result of applying one of the rules of inference to S? In the case at hand, it is clear that ι–SUB and ι–CONV are both valid for extensional contexts. And what Gödel's Slingshot shows is that there cannot be a non–extensional S–connective which satisfies the conditions outlined in the question. [129]

In other words, Oppy is lamenting that Neale (and Davidson) presupposes the validity, also in non–extensional contexts, of certain inference rules that are valid in extensional contexts. For the semantic theories which deny the principle of semantic innocence it seems that fundamental constraint obtained by Neale does not deliver interesting results. Denying the semantic innocence, means that one thinks that expressions have different contents when embedded in non–extensional contexts with respect to when they are not thus embedded. For the theorist who denies semantic innocence, the method employed by Davidson and embodied in Gödel's slingshot does not tell us anything interesting about non–extensional S–connectives. There is no reason to think that a valid rule of inference which takes you from S to S⋆ will still be valid when different contents are assigned to S and S⋆. It seems plausible, claims Oppy, that referential theories of definite descriptions involve the denial of semantic innocence.

The relevance of this point is that it seems plausible to think that referential theories of definite descriptions will involve the denial of semantic innocence. If definite descriptions are to be directly referential singular terms, then their contents

in extensional contexts should be the objects to which they refer (if they refer). However, in order to get the truth values for modal claims involving definite descriptions right, it is plain that there must be something more to the content of definite descriptions which occur embedded in the scope of modal operators. (This is one lesson which we all learned from Quine's discussion of modal sentences [. . .]) In order to satisfy these *desiderata*, it seems that we should agree that semantic innocence will go by board. [. . .] (One immediate advantage of the denial of semantic innocence is that one can get to treat definite descriptions as singular terms, thereby satisfying one (defeasible) pre–theoretical intuition which many theorists share[47]. [129–30]

This is why Oppy thinks that Gödel's slingshot does not entail any consequences for referential treatment of definite descriptions. Gödel's slingshot is built in "an enviroment in which referential treatment of definite descriptions are" already excluded "by *fiat*". And "it is the decision to operate in that environment — rather than the Slingshot itself — which seems to create problems for referential treatments of definite descriptions".

Oppy believes that non–extensional *S*–connectives are clearly −ι–SUB. The bad example is repeated here. The inference from A) "*Necessarily* (the square of three is nine)" to B) "*Necessarily* (the number of planets is nine)" is invalid, thus the modal contexts are −ι–SUB[48]. The sentences contained in the parentheses are both true but, while A) is true, B) is false. Given that, in B), the description "the square of three" has been substituted with the alleged coreferential "the number of planets", the modal

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47. A pre–theoretical intuition which I consider very important, see the end of § 3.2 and my comments on (17), (17') and (17") above.

48. This example is repeated by Oppy [1997: 130, footnote 10] in his discussion on semantic innocence.

operators would be $-\iota$–SUB. I have already shown that this example is not correct, because "the square of three" and "the number of planets" are not coreferenial DD.

If semantic innocence is accepted, the descriptions cannot be referential. Indeed, if they were referential they would denote their referents, but would also have an intensional value to which the change of truth value from extensional to intensional context would be attributed — from "the number of planets is nine" to *Necessarily* (the number of planets is nine)". In this case the presupposition of direct reference, explicitly expressed by Gödel, would be violated. Therefore, given that (according to Oppy) Gödel and Neale previously accepted semantic innocence and direct reference, the possibility of considering the DD as referential is *a priori* excluded.

Contra Oppy, I believe that non–extensional operators can be considered $+\iota$–SUB, or more generally +PSST (by the referentialists on definite descriptions), semantic innocence aside. Consider the following sentences:

(24)   (Christ was killed) *before* (Tiberius died).
(24')   (Christ was killed) *before* (the second roman emperor died).

In the transformation of 24 into 24', the substitution of "Tiberius" with "the second roman emperor" does not influence the truth value. Now consider the following sentences:

(25)   (Catiline fell) *because* (Cicero denounced him).
(25')   (Catiline fell) *because* (the greatest roman orator denounced him).

Also in this couple of sentences, the substitution of a name
with a co-referring definite description does not alter the
truth value of the whole. Returning to modal connectives,
I also disagree with Oppy here:

(26)   *Necessarily* (Cicero was a human being).
(26')   *Necessarily* (the greatest roman orator was a human
        being).

It is the whole atomic sentence, with its meaning, which
can alter the truth value of a complex sentence in the scope
of a non–extensional connective, not the semantic value
of the single name or of a co-referring description. Indeed
we can derive (26') "*Necessarily* (the greatest roman orator
was a human being)" from (26'') "*Necessarily* (the author of
De Fato was a human being)"; while a true sentence such
as "the author of *De Fato* snores" does not preserve the
truth of "*Necessarily* (the author of *De Fato* snores)". What
is valid for MCT[49] operators is also valid, in this case[50], for
FIC. The truth value of

(27)   *The fact that* (Cicero snores) = *the fact that* (Cicero
        snores).

is not altered by

(27')   *The fact that* (Cicero snores) = *the fact that* (the author
        of *De Fato* snores).

49. MCT operators are the modal, causal and temporal *S*–connectives.
50. I intend that, in this case, MCT operators and FIC behave in the same
way; but it is not excluded (and it is very probable) that the studies will
highlight differences between non–extensional operators.

but it would be altered by

(27") *The fact that* (Cicero snores) = *the fact that* (Cicero denounced Catiline).

As we have seen, the example chosen by Oppy to show that the semantic innocence is a presupposition of Gödel's slingshot (and of Neale's interpretation) is the same bad example of A) and B) employed by him to show that the fact theorists are forced to consider the non–extensional S–connectives as $-\iota$–SUB. Given that the example chosen by Oppy is not adequate, I believe he did not succeed in his demonstration that: 1) the semantic innocence is a presupposition of Gödel's slingshot, 2) the environment of Gödel's slingshot excludes the referential treatment of definite description by *fiat*.

Oppy agrees with Neale that Gödel's slingshot shows that there cannot be semantically innocent non–extensional S–connectives, and I believe that this is an important result of the discussion. According to Oppy, this is a constraint for friends of facts who give a referential treatment of DD. Oppy claims that it is plausible that friends of facts, who give referential treatments of DD, wish to deny semantic innocence. Once again, those who accept semantic innocence must reject a referential treatment of DD. But, as we have seen, Oppy claims this incompatibility between semantic innocence and referential treatment of DD, on the basis of an inadequate example. I do not exclude that the environment in which Gödel's slingshot was constructed (or Neale's development of it, or both) presupposes (a certain) semantic innocence: this is possible. But I am quite sure that the example used by Oppy, to show that the semantic innocence *a priori* excludes the referential

treatment of DD, is an inadequate example. Therefore, I do not believe in what we can call 'Oppy's constraint': "A semantic theory cannot be semantically innocent and, at the same time, treat DD as referential". I believe Oppy is right when he claims that Gödel's (and Neale's) rejection of the referential treatment of DD is given by the environment in which the proof has been generated, rather than by the proof itself. But the reason is not semantic innocence. I believe that the acceptance of ι–CONV in the premises, the employment of the iota operator as a device to create DD from sentences, and the acceptance of direct reference, are already an acceptance of RTD which gives Gödel's slingshot the form of a *petitio principi*. Indeed, the direct reference is already a denial of Frege's distinction between meaning and reference, an acceptance of a purely extensional language, and, consequently, an acceptance of the Russellian solutions to the problems raised in *On Denoting* and in *Über Sinn und Bedeutung*.

The problem of semantic innocence is, however, much more worrying than the discussion in Oppy [1997] §3 makes us think. The discussion is more clear in §4. Semantic innocence is the idea that linguistic expressions, which alone have certain semantic contents, maintain their semantic contents unaltered when embedded in the contexts of larger linguistic expressions. It is normal that in the framework of a purely extensional language, like the Russellian one, semantic innocence is hypothesized; but the complicated devices employed by Russell to solve the problems given by the embedding of expressions in larger linguistic contexts are a clear sign of the weakness of his theory. Consider the simplicity of how the Fregean distinction between meaning and reference solves the problem of George IV's curiosity as to whether Scott was

the author of *Waverly*. Consider the Russellian distinction between primary and secondary occurrence, the abuse of sign =, the long paraphrases and the counter–intuitive idea that DD does not refer to anything *per se*. In Frege [1892] we find a long and accurate discussion about the rejection of semantic innocence and ways of obtaining a satisfying semantic treatment of the expressions embedded in larger linguistic contexts. In order to study the hypothesis of semantic innocence we must consider at least two kinds of linguistic expressions: singular terms and atomic sentences. He/she who endorses RTD must consider DD as a third kind of expression. Moreover, we must consider three kinds of linguistic contexts: extensional, intensional and hyperintensional. With the right examples, it is easy to see that in extensional contexts, more or less, semantic innocence of singular terms[51] and of atomic sentences is permitted. In intensional contexts, semantic innocence of singular terms, but not of atomic sentences, is permitted. In hyperintensional contexts, semantic innocence of atomic sentences, or of singular terms[52], is not permitted.

The question of semantic innocence is bound to substitutions *salva veritate*. Consider the following examples:

(28)   Cicero snores.
(28')   Tully snores.

Given that "Cicero" is co-referring of "Tully", the substitution of these two names does not alter in (28') the truth (or falsity) of (28).

51. In accordance with Frege, I consider DD as singular terms.
52. Hyperintensional contexts are only +PSLE, but only if the logical equivalence is conceived as tight, i.e. subject matter preserving.

(29)   Cicero snores *and* Hesperus is bright.
(29')   Tully snores *and* Phosphorus is bright.
(29")   Cicero snores *and* Catline fell.

Given that "Hesperus" and "Phosphorus" are co-referring names, the substitutions do not alter in (29') the truth (or falsity) of (29). Due to this freedom in substitution of co-referring names, in extensional contexts, there are no reasons to think that singular terms are not semantically innocent: the semantic content of singular terms does not vary if the sentences are alone or embedded in extensional contexts. The change of meaning (but not of truth value) of the second conjunct in (29") does not alter the truth of the whole with respect to (29'). Due to this freedom in substitution of sentences with the same truth value, in extensional contexts, there are no reasons to think that atomic sentences are not semantically innocent. The semantic content of atomic sentences does not vary if the sentences are alone or embedded in extensional contexts. Now consider the intensional or MCT contexts:

(30)   Catiline fell *because* Cicero denounced him.
(30')   Catiline fell *because* Tully denounced him.
(30")   Catiline fell *because* Cicero snores.

The substitution of co-referring singular terms does not alter in (30') the truth of (30), but the substitution of true atomic sentences does alter in (30") the truth value of (30'). Now consider:

(31)   *Necessarily* (nine exceeds seven).
(31')   *Necessarily* (nine is the number of planets of the solar system).

(31″)   *Necessarily* (9 exceeds seven).

"Nine exceeds seven" is a necessary truth, while "nine is the number of planets of the solar system" is a contingent truth: this is why the substitution of a sentence with the same truth value, but different meaning, does alter in (31') the truth value of (31). But the substitution of a co-referring singular term does not alter in (31″) the truth of (31). Consider the temporal contexts:

(32)   (Christ was killed) *before* that (Tiberius died).
(32')   (Jesus was killed) *before* that (Tiberius died).
(32″)   (Christ was killed) *before* that (Augustus became emperor).

The substitution of a co-referring singular term does not alter in (32') the truth of (32), while the substitution of a sentence with the same truth value, but different meaning, alters in (32″) the truth value of (32). Now consider FIC:

(33)   *The fact that* (Cicero snores) *is identical to the fact that* (Cicero snores).
(33')   *The fact that* (Cicero snores) *is identical to the fact that* (Tully snores).
(33″)   *The fact that* (Cicero snores) *is identical to the fact that* (Catiline fell).

The substitution of a sentence with the same truth value, but different meaning, alters in (33″) the truth value of (33). But the substitution of a co-referring singular term does not alter in (33') the truth of (33). Due to this freedom in substitution of singular terms in MCT contexts, but also in the context of FIC, there are no reasons to think

that singular terms are not semantically innocent in these contexts. The semantic content of singular terms does not vary if the singular terms are alone, or embedded in extensional, or embedded in intensional contexts. The impossibility of the substitution of a true sentence for another with a different meaning, in the MCT contexts or in the context of FIC, shows that the semantic value of atomic sentences varies when they are embedded in intensional contexts, in comparison to when they are alone or embedded in extensional contexts.

Now consider the hyperintensional contexts. In the following examples Hammurabi does not know that Hesperus is Phosphorus and that it is a planet:

(34)   Hammurabi *believes that* Hesperus is bright.
(34')   Hammurabi *believes that* Hesperus is a planet.
(34'')   Hammurabi *believes that* Phosphorus is bright.

The truth of (34) is altered in (34') but also in (34''). The impossibility of the substitution of a true sentence for another with different meaning, but also of co-referring singular terms in hyperintensional contexts, shows that the semantic value of atomic sentences and of singular terms varies when they are embedded in hyperintensional contexts, in comparison to when they are alone or embedded in extensional contexts. It is possible that there are exceptions to these rules, but the treatment of semantic innocence should have this form.

I have produced examples on substitution of names in the framework of a referential treatment of DD, but also a theorist which endorses RTD can accept them. It is clear that it is possible to use "the greatest roman orator" as a synonym of "Cicero" and "Tully" in (28)–(30''), and

"the morning star" or "the evening star" as a synonym of "Hesperus" or "Phosphorus" in (34)–(34"), and "the second Roman emperor" as a synonym of "Tiberius" in (32)–(32"). The case of "nine", "9" or "the square of three" is different. These cannot always be synonyms of "the number of planets of the solar system", because, in composition with a predicate of numerical equality, like "= 8+1", 9 expresses a necessary truth, while, in composition with a numerical aspect of the world, like "the number of my sons", 9 expresses a contingent truth.

In the work of 1997 Oppy tries to construct a referential theory of DD. Due to Oppy's constraint, it is a semantic theory which denies the semantic innocence. From the point of view assumed in this work, the theory presented in §4 of Oppy [1997] is very important. It is the required fact–friendly theory which, in accordance with Frege, treats DD as referential. The denial of semantic innocence is a good feature for a referential treatment of DD (and for any semantic theory), but I do not believe it is a *necessary* denial due to the referential treatment of DD. Proposing its fundamental constraint, Neale claimed that the better way to avoid the collapse of all facts in one was to endorse RTD an consider FIC as $-\iota$–SUB. The reasons he produced for his choice were: 1) the fact that the rejection of $-\iota$–SUB is a defence against Gödel's slingshot but also against Church–Quine–Davidson slingshots, given that the latter is constructed on PSLE and on ι–SUB/PSST[53]; and 2) the weakness of the referential theories of DD that Neale analyzes in his paper [1995: §12].

53. Church–Quine–Davidson slingshot is constructed on PSLE and on PSST, but, given that Church, Quine and Davidson, with regard to their slingshot, do not endorse RTD and are referentialist on DD, ι–SUB and PSST are, for them, the same rule.

I am not interested here in the detailed discussion of the theory proposed by Oppy. The Australian philosopher, for instance, considers the facts as true propositions expressed by sentences, while I consider the facts as entities made up of parts of ordinary world. Moreover, it seems that Oppy finds problematic that FIC is +PSST [1997: 124], while I think it is a necessary feature of the theories of facts that FIC is +PSST. It is important, however, that Oppy shows that a fact–friendly referential theory of DD is possible, and this permit the rejection of Neale's theses I)–IV). Oppy agrees with Neale about some points: i) theories of facts must avoid the collapse: there are many distinct facts; ii) many distinct sentences expresses the same fact: "the theory must not allow that facts are individuated by true sentences". With regard to hyperintensional facts, Oppy considers possible that they are "so fine–grained that they are sentence–like" [Neale, 1995: 816]. It seems to me that, in certain cases, hyperintensional contexts allow substitutions of logically equivalent sentences with the same subject matter[54], i.e. of sentences transformed by topicalisation, passivisation and so on. Consider the following examples:

(35) Hammurabi *believes that* (the celest body called Hesperus is bright).

(36) George IV *wishes to know whether* (Scott wrote *Waverly*).

(37) Caesar *knows that* (Cicero denounced Catiline).

(37') Caesar *knows that* (it was Cicero who denounced Catiline).

(37") Caesar *knows that* (Catiline was denounced by Cicero).

54. I.e. employing a tight logical equivalence.

In (35) the synonymy of hyperintensonal fact of (34) is preserved (with the truth value of the whole), and the (36) is synonym of (13). (37') and (37") preserve the synonymy of (37). Therefore, hyperintensional facts are not "so fine–grained that they are sentence–like" but it's is clear they remain −PSST (−PSST and −ι–SUB for the Russellians).

Even if I do not always agree with Oppy's conclusions, it is clear that his discussion about the difference between extensional, intensional and hyperintensional contexts is very important for a good theory of facts. If his theory of facts, in which DD are referential, can be developed (and I believe it can be) all the Neale's theses highlighted by Oppy fail.

Neale and Dever answer Oppy's criticism in *Slingshot and Boomerangs* [1997]. In particular, I am interested in the discussion which regards direct reference and semantic innocence, the two presuppositions of Gödel's slingshot (or of Neale's reading, or both) individuated by Oppy. Neale and Dever deny that slingshot arguments in general, and Gödel's slingshot in particular, presuppose semantic innocence and direct reference. The first argument proposed by Neale and Dever is the following:

> We can begin with a blatant appeal to authority: the *originator* of the slingshots was Church (1943, 1956), although Church himself detects the argument in Frege. *Both Frege and Church reject both direct reference and semantic innocence.* Operator version of slingshots are deductive arguments, and it is among the virtues of deductive arguments that they make perfectly clear what is and is not assumed. If one is interested in locating the assumptions of Gödel's slingshot, one should take a look at its right–hand column and at the details of the inference rules or assumptions employed. [1997: 149, italics by Neale and Dever]

This first argument is very weak. We admit that Frege and Church reject both direct reference and semantic innocence. However, although Church detects the argument in Frege[55], Gödel's slingshot is constructed by Gödel and the fact that Church is the *originator* of slingshots is not bound to the possible presupposition of direct reference and semantic innocence in Gödel's slingshot. Moreover, the Fregean correspondentism is very far from idea, contained in the slingshot, of eliminating discrete facts[56]. The Fregean conception of truth and ontology is completely different from that implicit in the slingshot arguments. Even if Frege is the father of equiestensionality, he believed in an ontology of discrete facts. Gödel's slingshot is clearly proposed by Gödel in defence of Russell's theory of descriptions. Russell creates a logical notation for a purely extensional language in which direct reference is a necessary assumption and semantic innocence should be rightly assumed. The opinion that deductive arguments make perfectly clear what is and what is not assumed is simply false: even if the assumptions, or the inference rules employed, are written at the right–hand column of the argument, this does not entail that the arguments have only *those* assumptions. The written assumptions have implicit presuppositions which can be explicated; and these, on their hand, are based upon other presuppositions, and so on. On the contrary, it is a useful task in philosophy, and in the study of logical arguments, to find the implicit presuppositions and assumptions at work. They can be infinite, as

55. Neale [2001: 81–82] claims there is a similar argument in Frege's works.
56. See the *Conclusions* of this chapter.

many as the interpreter finds, if he can justify them[57]. The second argument employed by Neale and Dever is more convincing:

> If Oppy is really claiming that slingshots presuppose the truth of semantic innocence or direct reference, he must be confusing the preservation of *truth* with the preservation of *meaning*. Principle of inference are meant to be *truth*–preserving; so to the extent that the appearance of a line *L* in the operator version of Gödel's slingshot is justified by appeal to some earlier line (or lines) assumed to be true and some inference principle, *L* is to be regarded as *true*. And this extends, of course, to the appearance of a line justified by some earlier line and an assumption about the logic of ❽ (e.g. the assumption that ❽ is +*ι*–SUB). So the operator version of Gödel's slingshot appeals to the *truth*–values of sentences, to *truth*–preserving principles, and to *truth*–relevant properties of connectives in connection to principles that are *truth*–preserving. It nowhere appeals to the *meanings* of sentences, to principles or operations that are meant to be *meaning*–preserving, or *meaning* properties of *S*–connectives. Consequently, the slingshot is simply agnostic on whether the *meaning* of an expression remains constant across linguistic contexts (semantic innocence) and on whether certain singular terms contribute just an object to the propositions expressed by sentences containing them (direct reference). [...] Church, Gödel and Neale commit themselves to neither direct reference nor semantic innocence; indeed, Church's own positive proposals entail *the denial of both*, a fact that Oppy seems to have overlooked. [Ivi: 149–50, italics by Neale and Dever]

This second argument is stronger than the first. It is on the basis of *truth*–preserving substitutions that we study the meaning of expressions, alone or embedded in larger

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57. Also in the expression 2 + 2 = 4 the number of assumptions depends on the interpret: they are not only the rules of arithmetic, because these have, on their hand, other presuppositions, and so on.

linguistic contexts (extensional, intensional or hyperintensional). Consequently, it is possible that the slingshot argument is agnostic on whether the *meaning* of an expression remains constant across linguistic contexts or not. However, in a purely extensional language semantic innocence may be considered an implicit presupposition; but in this kind of language a big work of syntactic paraphrases must be done to avoid the problems generated by semantic innocence[58]. The fact that Church, Gödel and Neale do not commit themselves to direct reference is an interesting information. Does it mean that these three authors believe in Frege's distinction between meaning and reference? This would be in contradiction with my hypothesis of the origin of Gödel's slingshot as a defence of Russell's extensional language. On the contrary, it seems very clear that Gödel's slingshot is a defence of RTD. Otherwise, do Gödel and Neale endorse the RTD, but in the framework of a semantic conception which distinguishes meaning and reference? This seems almost impossible: the direct reference is strictly bound to RTD. It is sure that, in the context of his slingshot, Gödel assumes direct reference:

> For, if we admit the further apparently obvious axiom, that *the signification of a complex expression, containing constituents which have themselves a signification, depends only on the signification of these constituents (not on the manner in which this signification is expressed*[59]), then it follows that the sentence "Scott is the

58. Consider, e.g., the complicated solution given by Russell for the puzzle of identity with primary and secondary occurrences: the curiosity of George IV whether Scott was the author of *Waverly* is not interpretable as the curiosity of George IV whether Scott was Scott, even if Scott = the author of *Waverly*. This also is a problem of semantic innocence.

59. Here it is assumed the Russellian direct reference *contra* Frege's *Über sinn und Bedeutung*. The implicit Gödel's idea, here, seems to be that

author of *Waverly*" signifies the same thing as "Scott is Scott;"
[Gödel, 1944: 128–9, my italics]

It is possible that Gödel is here assuming direct refer-
ence because he accepts Russellian criticism against *Über
Sinn und Bedeutung* and against the distinction between
meaning and reference. It is also possible that Gödel is
here speaking only of the reference of the expressions,
the extensional side of meaning; while he does not deny
that expressions designate their referents through their
meanings. But I believe this is a very weak hypothesis. In
both cases direct reference is explicitly assumed within the
framework of Gödel's slingshot, and this is obvious, given
that the slingshot arguments regard the theory of facts.

In conclusion, I believe that Oppy is right when he
claims that Gödel's slingshot has direct reference as presup-
position, but he is wrong about semantic innocence, which
is not presupposed in the proof. The presence / absence of
semantic innocence is studied through the substitutions
salva veritate and through the substitutional inference rules.
It is absurd to claim that it is a sign of semantic innocence
the fact that the inference rules which are valid in exten-
sional contexts, are considered valid also in intensional or
in hyperintensional contexts. Indeed also the difference
between extensional, intensional and hyperintensional con-
texts is studied through the substitutions *salva veritate* and

the axiom of compositionality operating on *Bedeutungen* is not obvious
("*apparently* obvious. . ."), but it must be endorsed ("if we admit. . ."). Given
that, on the basis of this axiom, "the author of *Waverly*" signifies the same
object which is signified by "Scott", and given that this is a problem, RTD
must be necessarily endorsed. With this reasoning, I believe, Gödel defends
RTD. I do not understand how Neale and Dever [1997] can deny that Gödel
assumes the direct reference in the proof.

through the substitutional inference rules. We have here a useless vicious circle.

I agree with Neale and Dever [1997] on the fact that Oppy cannot deny the philosophical significance of Gödel's slingshot *in general*: non–extensional *S*–connectives are possible devices of theories about necessity, possibility, probability, obligation, time, causation, explanation, intentionality. However I believe Oppy is right with regard to *S*–connectives useful for theories of facts, states of affaires and propositions. The *S*–connectives on facts like FIC cannot be *prima facie* $+\iota$–CONV because *Fa* and $a = (\iota x)(x = a \cdot Fx)$ cannot refer to the same fact. FIC is not $+\iota$–CONV independently from Gödel's slingshot. This erases the philosophical significance of Gödel's slingshot for facts theories. On the other hand, if one is convinced by my discussion on identity and identity statements, then the validity of Gödel's slingshot (and of the other slingshots) falls completely. Neale and Dever [156] claim that there are theories of facts which does not satisfy the fundamental constraint, e.g. the ones by Austin [1954], Taylor [1985] and Wilson [1974]. According to them, this shows that Oppy is wrong claiming that fact theorists cannot propose to treat FIC as $+\iota$–SUB and $+\iota$–CONV for the reason that this is *prima facie* implausible. Gödel's slingshot has philosophical significance against theories of this kind. But I believe that Neale and Dever make a great effort to demonstrate that the theories proposed by Wilson and Austin are $+\iota$–SUB and $+\iota$–CONV. Therefore, it seems that Neale and Dever give to these theories the shape they need in order to demonstrate that Oppy is wrong. Moreover, even if there would be theories of facts which are $+\iota$–SUB and $+\iota$–CONV it would not be sufficient to show that Oppy is wrong: it is possible that Austin [1954], Taylor [1985]

and Wilson [1974] propose theories which are *prima facie* implausible. Oppy [2004: 624] considers as *prima facie* implausible theories already proposed, thus he does not accept the position of Neale and Dever [1997: 159] that if a theory is already constructed it cannot be *prima facie* implausible.

As we have seen Oppy rejects the Neale's theses I) and II). According to Oppy, Neale is wrong when he claims that Gödel's slingshot "highlights unpleasant consequences for referential treatments of descriptions" and raises important questions about "the logical and philosophical consequences of rejecting Russell's Theory of Descriptions" [Oppy 1997: 139]. Neale and Dever answers:

> In § 12 of his paper [1995], Neale examines a number of referential treatments of descriptions; the reason is clear: if Russell's theory is assumed, the *most* that can be proved by means of Gödel's slingshot is that no non–truth–functional *S*–connective can be both +ι–SUBS and +ι–CONV; and the *most* that can be proved by means of the Church–Quine–Davidson slingshot is that no such *S*–connective can be both +ι–SUB and +PSLE. Quine and Davidson were both after bigger fish: they were aiming to show that no such *S*–connective can be both +PSST and +PSLE; but in order to have any hope to establishing *this*, they need to assume a treatment of descriptions (or abstracts) as singular terms, i.e. a referential treatment. After examining some potential treatments — due to Frege, Carnap, Grandy, Strawson and Taylor — in connection with "improper" descriptions and operators versions of slingshots, Neale concludes that none of them can be used to establish the results that Quine and Davidson were seeking. Neale reaches this negative conclusion by showing that each of the proposed referential treatments either fails (unlike Russell's theory) to permit the intuitively valid inferences that PSLE and ι–CONV are meant to capture in truth–functional contexts, or else fails in some other way to provide an intuitively plausible seman-

tics for definite descriptions in natural language. This point
— or rather, half of it — surfaces only because the behaviour
of descriptions in connection with the inference principles
used in slingshot argument is being examined. Thus Neale
is correct to say that "referential treatments of descriptions
have unpleasant consequences that are *highlighted* by Gödel's
slingshot, and to some extent, those of Church, Quine and
Davidson" (p. 817, italics added, SN/JD) and that Gödel's sling-
shot (via the inference principles it assumes) poses questions
about the "logical and philosophical consequences of reject-
ing Russell's Theory of Descriptions" (p.765). Oppy seems to
have overlooked the point that in order to be taken seriously, a
theory of descriptions must at least validate ι–CONV in truth–
functional contexts. Oppy cannot respond to this by claiming
that *"Fa"* and *"$a = (\iota x)(x = a \cdot Fx)$"* do not have the same
meaning or do not (when true) stand for the same *fact*, for what
is at issue is whether the *truth* of *"Fa"* guarantees the *truth* of
"$a = (\iota x)(x = a \cdot Fx)$"; valid inference principles need to be
truth–preserving, not *meaning*–preserving or *fact*–preserving.
[164–5]

The answer given to Oppy by Neale and Dever is clear,
but wrong. It is only upon the basis of Neale's intuitions
about the semantics of DD in natural language that theses
I) ("the unpleasant consequences of the slingshots for the
referential treatment of DD") and II) ("the important ques-
tions about the logical and philosophical consequences
of rejecting RTD") are repeated. Moreover, I do not be-
lieve in the *iota* generation of DD from formulae, neither
in the fact that the *truth* of *"Fa"* guarantees the *truth* of
"$a = (\iota x)(x = a \cdot Fx)$". It is clear that Neale and Dever
found all the argumentation against referential treatment
of DD on their faith in ι–CONV and on the *iota* generation
of DD from formulae (then on the RTD).

The discussion of Neale's thesis III) ("Gödel's Slingshot
forces friends of facts to take a definite position on the

semantics of definite descriptions") is interesting from my point of view, because it regards the semantic of DD. As we have seen Oppy rejects thesis III). Neale and Dever claim that FC (no non–extensional S–connective can be both $+\iota$–CONV and $+\iota$–SUB) forces the theorist "to explain how it shapes up with respect to these inference principles"[163]. Thus it is enounced the "Description Constraint" (DC):

> When one take a stand on the referential properties of a particular non–truth functional S–connective ❽ in connection with definite descriptions — i.e. a stand on whether or not ❽ is $+\iota$–SUBS or $+\iota$–CONV — one has a concomitant obligation to show that one has a plausible semantics for descriptions that is consistent with the ascription of such inferential properties to ❽.
>
>   (One cannot simply treat ❽ as, say, $+\iota$–CONV yet be independently committed to a treatment of descriptions that cannot combine with the purported logic of ❽ to yield this result.)[163]

As we have seen, Oppy denies DC. The fact that the FC is a constraint on already foreclosed possibilities makes Gödel's slingshot not philosophically important. According to Oppy, the friends of facts consider FIC as *prima facie* $-\iota$–SUBS and it is no matter if they endorse the RTD or not. Neale and Dever believe that this stand is due to two confusions. The following is the cause of first confusion. A) Oppy believes that Gödel's slingshot presupposes semantic innocence and direct reference. Oppy writes that [1997: 123]: "assumptions involved in the construction of Gödel's Slingshot must be denied by any [plausible] referential treatment of definite descriptions"; and that:

> Gödel's Slingshot is formulated in an environment in which

referential treatments of descriptions are more or less ruled out by *fiat*. [...] In order to give referential treatments of descriptions a fair trial, one needs to draw back from the assumptions implicit in the methodology which underlies Gödel's Slingshot. [Ivi: 130]

Even if, given Gödel's slingshot, it is difficult to construct a referential treatment of DD, this does not invalidate the slingshot. The referential treatment of DD is not *a priori* excluded by the assumptions of semantic innocence and direct reference that, according to Oppy [Oppy 1997: 123], are involved in the construction of the proof. Neale and Dever deny that semantic innocence and direct reference are involved in the construction of Gödel's slingshot. Indeed semantic innocence is not involved in the proof, and only from the composition of direct reference with semantic innocence the referential treatment of DD would be ruled out. The following is the cause of second confusion. B) Given that Gödel's slingshot does not exactly say which semantic treatment must be endorsed for DD, according to Oppy it does not force the friends of facts to take a definite position on the issue. But there are only three ways to avoid the collapse of non–extensional S–connectives in extensional S–connectives: i) deny that they are $+\iota$–SUB, ii) deny that they are $+\iota$–CONV, or iii) deny both. Thus Neale and Dever answer:

> Of course, considerations arising from Gödel's Slingshot do no more than force the theorist to commit to one of three disjunctions, each consisting of those semantic theories of descriptions that validate one of the three choices made in connection with the inference principles. As much is acknowledged in the statement of DC itself. Nonetheless, we have a genuine constraint here, one whose consequences become

sharper as the unacceptability of options in the theorist's chosen disjunct becomes clear. [Neale and Dever 1997: 164]

I do not believe that the presupposition of semantic innocence and of direct reference is the real reason to reject
the referential treatment of DD. In my opinion the construction of Gödel's slingshot presupposes direct reference
and *iota* generation of DD from formulae, but not semantic innocence. The direct reference, and the *iota* generation
of DD from formulae, makes impossible a referential treatment of DD. However, it is a personal choice of scholars to
consider valid the DC or not. It also depends upon which
idea of completeness a theorist has. In a certain sense, both
Oppy and Neale–Dever are right.

Let us consider the last episode of this complicate and
interesting debate: Oppy's essay *Facing Facts?* [2004]. It is
conceived as an answer to Neale and Dever [1997] and to
Neale's book *Facing Facts* [2001]. A terminological clarification is here necessary. In all the essay of 2004, Oppy
employs the expression "descriptive constraint" to speak
about the fundamental constraint (FC). This is a dangerous
mistake, because FC and DC are distinct constraints, even
if they are bound each other. I want to consider, in particular, three important Neale's theses that Oppy rejected in
1997, and that Neale and Dever defended against Oppy's
first attack.

2)   The power of the descriptive constraint (FC) on
non–extensional logics lies in the fact that it forces
philosophers to say something definite — "if only
disjunctively, with precise disjunct" — about the
semantics of definite descriptions (in Oppy [1997]
this is Neale's thesis III));

5)   Referential treatment of descriptions have unpleas-
       ant consequences that are highlighted by the descrip-
       tive constraint (FC) (in Oppy [1997] this is
       Neale's thesis I));
6)   In view of the descriptive constraint (FC) on non–
       extensional logic, every fact theorist is required to
       provide a logic for FIC that is not both +ι–SUBS and
       +ι–CONV (in Oppy [1997] this is Neale's thesis V)).

I do not consider the other three Neale's theses because
they are accepted by Oppy [2004]. Also I believe that these
theses are quite obvious. They are:

1)   Logical equivalence is not an issue for the descrip-
       tive constraint (FC) on non–extensional logic;
3)   The descriptive constraint (FC) on non–extensional
       logic need not spell trouble for advocates of non–
       extensional logic and connectives who endorses
       Russell's Theory of Descriptions;
4)   The descriptive constraint on non–extensional logic
       yields an *elegant* test for examining the logic of pur-
       portedly non–extensional contexts.

In Oppy [2004] the expression "descriptive constraint" is
employed to speak about the "fundamental constraint".
However, thesis 2) formulates the constraint which is
called "description constraint" (DC) in Neale and Dever
[1997].
    Oppy [2004] claims that, with regard to theses 2), 5)
and 6), there are *prima facie* reasons to claim that Neale is
wrong about what FC would do.
    Discussion of 5). "Suppose that one defends a refer-
ential treatment of descriptions according to which the

only thing that an extensional occurrence of a description contributes to truth conditions is the object — if there is one — which satisfies the description. On such a referential treatment of descriptions, it follows immediately — given the further assumption that the only thing that an extensional occurrence of a genuine singular term contributes to truth conditions is the object, if there is one, that is referred by the singular term — that $a = a$ and $a = (\iota x)(x = a \cdot Fx)$ express the same fact in cases in which the description $(\iota x)(x = a \cdot Fx)$ is satisfied by a unique object. Unless one is attracted to a theory of facts according to which the sentences Fa and $a = a$ express the same fact (for *every* interpretation of the predicate F), then it seems that, regardless of the details of one's referential treatment of descriptions, one will reject the claim that FIC is $+\iota$–CONV. But — as Neale [2001: 132] himself notes — it is hard to imagine any friend of facts accepting the claim that Fa and $a = a$ express the same fact. [...] Whatever further difficulties there may be in the proposal to develop a referential theory of descriptions, it is very hard to see how there could be any other problems that arise as a result of the descriptive constraint (FC) on non–extensional logic". [623] Oppy is here claiming that the acceptance of ι–CONV forces the theorists to endorse RTD. Indeed, if the theorist accepts ι–CONV in the framework of a referential treatment of DD then he would be obliged to accept also that Fa and $a = a$ express the same fact; but this is impossible because $a = a$ is a dyadic fact, while Fa is a monadic fact. Indeed, for ι–CONV, Fa becomes $a = (\iota x)(x = a \cdot Fx)$ and, if DD are referential, this would be coreferential with $a = a$. The distinction between monadic and dyadic facts is Russellian, and this is another argument which proves that the acceptance of ι–CONV

is an exclusion by *fiat* of referential treatment of DD (see *supra*).

Rejection of 2). "Suppose that one is a fact theorist with little interest in the theory of descriptions. Suppose further — as seems plausible — that one takes the alternatives to be *some* kind of referential theory of the kind described in the previous paragraph or *some* kind of structural theory of the kind exemplified by Russell's theory of descriptions, and that one has no interest in which kind of theory is correct, nor any interest in further details concerning the theories of either kind. Given the argument of the previous paragraph — and given the claims that Neale himself advances on behalf of Russell's Theory of Descriptions — it seems clear that our fact theorist can quite confidently deny that FIC is $+\iota$–CONV. (On any remotely plausible version of either kind of theory, Fa and $a = (\iota x)(x = a \cdot Fx)$ express distinct facts: on referential theories, this is because $a = (\iota x)(x = a \cdot Fx)$ expresses the same fact as $a = a$; and on structural theories, this is because $a = (\iota x)(x = a \cdot Fx)$ is a structured fact while Fa is an atomic fact.) So, contrary to Neale's claim, it seems that the descriptive constraint (FC) on non–extensional logic does not force a fact theorist to choose between precisely formulated theories of definite descriptions". [623] As we have seen, Oppy denies DC and claims that FC is philosophically insignificant. In the rejection of thesis 2), we find another argument to avoid Gödel's slingshot denying that FIC is $+\iota$–CONV. But here Oppy seems to overlook something. As Neale and Dever noted [1997: 165], it is not important whether $a = (\iota x)(x = a \cdot Fx)$ and Fa refer to the same fact or whether these expressions have the same truth–maker or not, the important point is that, when rule of ι–CONV is valid, $a = (\iota x)(x = a \cdot Fx)$ can be substituted with Fa because

these expressions have the same truth–value. Therefore, I suppose that Oppy completely rejects ι–CONV, and that, according to him, the truth of $a = (x = a \cdot Fx)$ does not guarantee the truth of *Fa* or viceversa.

Rejection of 6). "If the argument of the previous paragraph is correct, then it is clear that the descriptive constraint (FC) on non–extensional logic does not *require* a fact theorist to provide a logic of FIC that satisfies the constraints that Neale provides: one can confidently deny that FIC is +ι–CONV without knowing anything else about the logical behaviour of FIC. [. . .] Of course, these *are* genuine constraints on theories of facts: but they are constraints that theories of facts are obliged to meet quite apart from any issues about the descriptive constraint (FC) on non–extensional logic". [624: italics by Oppy] The FC is an effective constraint on theories of facts, but it is useless because every theorist has *prima facie* reasons to consider FIC $-\iota$–CONV. This is also my opinion. As we read in his essay of 1997, Oppy believes that there are *prima facie* reasons to think that FIC is also $-\iota$–SUBS. I have already explained why I do not agree with Oppy about this. With regard to the thesis of usefulness of FC — that is the most general about the philosophical significance of Gödel's slingshot — Neale [2001] presents three theories, that he considers to be *prima facie* plausible theories of facts. In these theories FIC is both +ι–CONV and +ι–SUBS. Neale considers two "Wittgensteinian" theories of facts, Prior [1948] and Wittgenstein [1921], as both committed to the claim that FIC is +ι–CONV. Before to check whether these theories are also committed to the claim that FIC is +ι–SUBS, Oppy [2004: 624] produces an argument to demonstrate that the theories in question are not *prima facie* plausible. We have here an answer to Neale and Dever's claim [1997: 159] that

the mere existence of theories, which fall foul of the FC, makes significant the FC and Gödel's slingshot. Oppy's opinion is that it is possible the existence of facts theories which are not *prima facie* plausible (and the existence of facts theories +ι–CONV and +ι–SUBS does not save the significance of Gödel's slingshot). Oppy writes:

> Of course, even if it turns out that there is a widespread opinion amongst those who have thought seriously about facts that FIC is both +ι–CONV and +ι–SUBS, there is still the question whether this belief is so much as *prima facie* plausible: sadly, it is possible for beliefs that are not even *prima facie* plausible to become widespread, even amongst philosophers. [2004: 627 n. 5]

Therefore, Oppy criticizes the claim by Neale and Dever that Austin's theory of facts treats SQ (the Austinian version of FIC) as +ι–CONV and +ι–SUBS; but he admits that "Austinian" theories of facts fall foul of the FC. Also in Taylor [1985] he finds "philosophical pressures" driving the friends of facts to accept that FIC is +ι–CONV and +ι–SUBS, but again Oppy's opinion is that the mere existence of a theory does not guarantee that it is *prima facie* plausible.

Direct reference and semantic innocence.   Neale [2001: 131, n.5] claims that Bernays [1946] mistakenly supposed that the derivation of FC "on non–extensional logic somehow relies upon a failure to distinguish between the sense and reference of sentences, and then adds that 'Bernay's mistake is repeated by Oppy [1997]'" [Oppy, 2004: 627]. But Oppy [2004: *Ibidem*] curiously claims that he does not think — and did not think in 1997 — that the "derivation" of the FC on non–extensional logic involves a failure to

distinguish between sense and reference of sentences, or it rely upon assumptions about direct reference and semantic innocence. Oppy [2004] considers this question as bound to another important criticism against Neale [1995] formulated in Oppy [1997]. Neale [1995: 815; 2001: 221] claims that "*no* fact–theorist who intends to get some metaphysical work out of facts wants to deny that FIC is +PSST. So the fact theorist who wants to maintain that descriptions are singular terms has some work to do to avoid Gödel's Slingshot". It is worth saying immediately that the work that Neale is here referring to, for this theorist, is the demonstration that ι–CONV is not a valid inference rule, at least in non–extensional logic. Indeed who maintains that descriptions are singular terms is maintaining that FIC is +ι–SUBS (in the sense that ι–SUBS and PSST are the same rule)[60]. Therefore it is necessary to deny ι–CONV to avoid the collapse. However, following what he claimed in [1997:126][61], Oppy affirms now [2004: 627] that "some kind of *substantive* assumption is required in order to reach the conclusion that *no* fact–theorist who intends to get some metaphysical work out of facts wants to deny that FIC is +PSST". Oppy does not believe, as Neale does, that FIC is *obviously* +PSST. Of course it is plausible that FIC is +PSST for the singular terms listed by Neale [1995: 783–4; 2001: 152–3] (ordinary proper names, simple demonstratives, complex demonstratives, personal pronouns, etc.), and it is plausible that modal operators are +PSST for the

60.   This is another way to show that the acceptance of +ι–CONV, at least in non–extensional contexts, is *ipso facto* a rejection of referential treatment of DD.

61.   "Curiously Neale says: 'I take it that no fact theorist wants to deny that FIC is +PSST.' (p. 815) On the contrary, it seems to me that work needs to be done to show that friends of facts should *not* deny this".

same terms. However Oppy claims that, if we suppose that DD are singular terms, then it is not plausible that modal operators are +PSST. Oppy has here in mind the example he used in [1997: 127]: "Necessarily, nine is the square of three" can be true while "Necessarily, nine is the number of planets" is false[62]. This example would show that intensional *S*–connective are $-\iota$–SUBS. The same would be valid for FIC. Oppy seems to claim that, if DD are considered Russellian then FIC can be ι–SUBS and +PSST, while if DD are considered referential singular terms, as they are considered by Oppy, FIC must be $-$PSST:

> In order to block this line of reasoning, one route that we might take is to make some kind of *substantive* assumption about the semantics of singular terms. We might assume that singular terms must be *rigid*; but that seems to rule out referential treatment of definite descriptions by *fiat*: surely any referential treatment of definite descriptions will have to suppose that definite descriptions are non–rigid singular terms. We might assume *both* direct reference and semantic innocence: if the only thing that a singular term ever contributes to semantic content is the object to which it actually refers, then singular terms are guaranteed to be rigid. But, again, this seems to rule out any referential treatment of definite descriptions by *fiat*. Moreover, assuming both direct reference and semantic innocence has consequences for the treatment of, say, BIC that we might well not wish to accept. [Oppy 2004: 628]

Oppy [2004] repeats the idea that the assumption of direct reference and semantic innocence rules out any referential treatment of DD; but he insists that it needs an argument to prove that FIC must be considered +PSST, if DD are sup-

62. I have already told why I do not accept this example, thus it is not a problem for my conviction that modal operator are $+\iota$–SUB.

posed to be referential and to belong to the class of singular terms. Indeed, as we see, Gödel's slingshot *a priori* excludes the referential treatment of DD. I do not believe that we need an argument to prove that FIC must be +PSST; in my opinion modal *S*–connectives, or FIC, cannot be −PSST. The example in which "the number of planets of solar system" is substituted by "the square of three" is unacceptable. Neale considers FIC as *prima facie* +PSST, thus, if he considers possible that FIC is ι–SUBS, he must consider as disjointed the class of singular terms and that of DD. Even if Oppy seems to change opinion about the fact that direct reference and semantic innocence are presuppositions of Gödel's slingshot, I am convinced that the Russellian direct reference (but not semantic innocence) is a presupposition of the Gödel's proof. The fact that Neale and Dever [1997: 163] deny both the assumptions, in their reading of Gödel's proof, might mean that they believe in the Fregean distinction between meaning and reference. On the other hand, as we know, they endorse RTD. What happens? Are they Russellian with regard to DD and Fregean with regard to other elements? I am not interested in this problem, but I would like to find a coherent position for FIC and for operators useful in theories of facts. I consider FIC as +PSST and ι–CONV[63]. Given that I believe in the referential treatment of descriptions, I consider the work of ι–SUB as already done by PSST.

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63. Some remarks on free logic give another reason to consider invalid the ι–CONV. In the essay of 1997, Oppy writes that "it isn't obvious that Gödel's slingshot can be successfully reformulated in (all version of) free logic". Neale [2001: 180 n. 3] writes that "Sainsbury has pointed out to me that certain forms of so–called free logic must deny that extensional contexts are +ι–CONV".

In Neale [2001: 209 n. 7] we find a criticism of Oppy's Cheapshot: "Oppy has simply missed the real point of the proof based on Gödel's Slingshot: it imposes a *structural* constraint on theories of facts, a constraint about the logic of facts as manifested in the connective FIC, a constraint on fact identity". But this rejection by Neale [2001] and by Neale and Dever [1997: 159 n. 13] is a misunderstanding: Oppy's Cheapshot is a rhetorical device to show that the Gödel's slingshot is not philosophically significant:

> I think that Neale (and Dever) have just missed the (rhetorical) point of my Cheapshot. No one can dispute that it is a constraint on theories of facts that they should not allow that it is a fact that the moon is made of green cheese: any theory of facts that endorses this claim is ruled out on the grounds that it fails to fit with the pre–theoretical datum that false sentences do not express facts. [Oppy 2004: 631]

There is no stronger reason to think that the FC, in comparison with Oppy's Cheapshot, filters out otherwise *prima facie* plausible theories that fact theorists could endorse[64]. Therefore, answering to some important Neale's questions [2001: 12], Oppy claims that "serious" friends of facts should not consider slingshot arguments and Neale's FC as causes of alarm. Even if they endorse a referential treatment of DD, it seems very difficult to produce a theory in which facts collapse into the great fact. Despite the FC, it is perfectly possible to have a useful ontology of events, states of affairs, situations or facts. Therefore,

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64. Oppy refers to those who he calls "serious friends of facts" and claims that none of them proposes theories which are filtered out by FC: van Fraassen [1969], Skyrms [1981], Fine [1982], Barwise and Etchemendy [1989], Armstrong [1997], and Mellor [1995].

Gödel's slingshot and FC do not entail any danger for the "representational philosophy".

The last important point we find in Oppy [2004] is another argument which denies the "unpleasant consequences for the referential treatments of descriptions that are *highlighted* by Gödel's Slingshot" (5), I). This is the answer given by Oppy [2004] to Neale and Dever [1997]:

> Neale and Dever [1997: 165] also argue that, because *some* potential referential treatments of descriptions either fail to permit PSLE and ι–CONV in extensional contexts "or else fail in some other way to provide an intuitively plausible semantics for definite descriptions in natural language", it is correct the claim that "referential treatments of definite descriptions have unpleasant consequences for the referential treatments of descriptions that are *highlighted* by Gödel's Slingshot"(their italics). And, in response to my claim that Gödel's Slingshot plainly does no such thing, they say that "Oppy seems to have overlooked the point that in order to be taken seriously, a theory of descriptions must at least validate ι–CONV in truth–functional contexts". [. . .] Neale's claim about some potential referential treatments of descriptions is based on his discussion of referential treatments of improper descriptions (Neale [1995: 795–804]; Neale [2001: 190–201]). The views that Neale examines are those of Hilbert and Bernays [1934], Frege [1892, 1893], Carnap [1947], Scott [1967], Grandy [1972], Olson [1987] and Strawson [1964, 1972, 1986]. One point upon which Neale insists at several places is that views that do not permit ι–CONV in extensional contexts are thereby very plausibly rendered inadequate as treatments of descriptions in natural languages. But why should we believe this? We have already noted that Neale provides no systematic investigation of empty — or otherwise "improper" — singular terms. Consequently, it is hard to see why we should be so confident that improper descriptions raise problems that are not raised by other improper singular terms, *given* the assumption that descriptions are also singular terms. [. . .] Moreover, if we can assume that

there are no improper singular terms that are not improper descriptions in natural language, what is there to stop us from assuming that there are no improper descriptions in natural language, *given* the assumption that descriptions are singular terms? If "Santa Claus" refers to something, why doesn't "the fat man with the toy factory at the North Pole" also refer to that same thing, given the assumption that descriptions are singular terms? More generally, if we introduce a proper name with the stipulation that its reference is fixed by some improper description — about whose descriptive matrix a Russellian theorist of descriptions would say either that it is satisfied by no object or that it is satisfied by more than one object — and if we insist that this proper name must refer to something (on the grounds that there cannot be empty names), then why can't we insist that the reference–fixing descriptions refer to that very same thing, given the assumption that descriptions are singular terms? (I can introduce the name "Primo" to refer to the greatest prime number. I can introduce the name "Primos" to refer to the prime numbers between 30 and 40. And so on. It is *not* obvious that we should deny that an adequate semantics for natural languages ought to be able to handle these introduced names.) [. . .] If the theories that Neale mentions fail so dismally as theories of the semantics for improper descriptions, then they also fail dismally as theories of the semantics for other improper singular terms. But, rather than conclude that this tells against referential theories of descriptions, surely we ought rather to conclude that we may need to put more work into developing semantic theories for other improper singular terms.

Neale considers obvious that we must deny that a good semantic theory for natural language should be able to handle improper descriptions, because improper descriptions does not permit the *iota* generation of DD from formulae. Indeed the expression $(\iota x)(x = a \cdot Fx)$ means "the unique object x such that x identical to a and x is F", while improper descriptions refer to more than one object or

to no object. Therefore, it is the previous acceptance of ι–CONV in extensional contexts that *a priori* excludes the hypothesis of referential treatment of DD. From Oppy's and from my point of view, it is a wrong prejudice the assumption that "in order to be taken seriously, a theory of descriptions must at least validate ι–CONV in truth–functional contexts". Moreover, why should we believe that a good semantic theory for natural language must not be able to handle improper descriptions? Only in order to accept the *iota* generation of DD from formulae? It is absurd. If a theory is able to handle the proper and *also* the improper descriptions, like the Fregean is, it is of course the best theory.

In conclusion, Oppy [2004] considers Gödel's slingshot a constraint on theories of facts, and give it more philosophical significance in comparison with Oppy [1997]. In the last essay he admits that it is easy to construct theories which violates FC. For instance, the FC is violated by Wittgenstein [1921], Prior [1948] and Wilson [1974]. However, these theories are considered by Oppy *prima facie* implausible, thus also in Oppy [2004] the significance of Gödel's slingshot is weak. FC has very little importance for friends of facts and for friends of referential treatment of DD. In accordance with Oppy, I believe that the fundamental constraint evidenced by Neale is not very important for theories of facts. However, this does not imply that Neale's work is unimportant. The problems raised by Neale have engaged scholars for fifteen years. But in my opinion we are close to a change of direction. After Davidson's death, few scholars positively accept the slingshot arguments. It is no more a weapon employed to defend holistic theories of meaning, but, as in Neale's work, a device to build *ex contrario* coherent correspondence theories of truth.

3.8. Conclusions

In *Über Sinn und Bedeutung* we read:

> If now the truth value of a sentence is its referent, then on the one hand all true sentences have the same referent and so, on the other hand, do all false sentences. From this we see that in the referent of the sentence all that is specific is obliterated. *We can never be concerned only with the referent of a sentence; but again the mere thought alone yields no knowledge, but only the thought together with its referent, i.e., its truth value.* Judgments can be regarded as advances from a thought to a truth value. Naturally this cannot be a definition. Judgment is something quite peculiar and incomparable. *One might also say that judgments are distinctions of parts within truth values. Such distinction occurs by a return to the thought.* [34, my italics]

Frege gave an account of facts, in his semantic theory, claiming that judgment always regards the truth value, but also the thought. It is thought which gives particular and *factual* shape to truth. Frege's correspondentism is based upon thought along with his answer to equiextensionality. It may seem strange that Frege felt it necessary to give an account of facts in his ontology. Indeed Gödel claims that Frege's work is the starting point of semantics in which reference of sentences is collapsed into the Eleatic True (and the slingshot argument was called "Frege's argument"). Instead Frege took into consideration the facts, but he had to theorize that the reference of a sentence is its truth value in order to maintain the similarity of linguistic expressions with mathematical formulae. In his conception the truth of a complex sentence is calculable with an exact bivalent result, through operations on the truth values of the component sentences. The calculus of a complex sentence gives truth or falseness as a result, like the calculus

of a mathematical expression can be right or wrong. This happened because, as it is clear in [1892], his priority was to theorize a compositional method. In order to assign the predicate of truth to a complex sentence, the contained sentences must also refer to truth values and not to facts. Despite Frege being the father of equiextensionality, his semantic theory is very far from the idea (contained in the slingshot) that there are no discrete facts in the world. As we see in this last quotation, Frege remains a correspondentist and a follower of the building block semantic started by Plato and Aristotle.

I propose a defence of Frege's distinction between meaning and reference (between the intensional and the extensional side of meaning) because I believe that the *point of view*, in our language, is important for semantic theories. Sentences are not pure representations of facts of the real world, but they also express the point of view of the speaker. Fregean *Sinn* is, in some way, a point of view on *Bedeutung*, on ontological reality. The theories of direct reference are instead theories of language which do not consider the speaker and the point of view. Russell's theory of meaning, involving direct reference, does not consider the speaker and the point of view. As we have seen, a critical effect of this conception of language is an inadequate concept of identity.

My discussion on identity and on the theory of facts, has highlighted that there is a need for a general clarification of the concept of identity and for the employment of a non ambiguous notation. Moreover, I believe that FIC should be substituted by CSC, a Co–referring Sentences Connective, which should have the form "The sentence () is co-referring of the sentence ()". There are no sentences which refer to identical facts but synonym sentences which

refer to the same fact. This replacement would eliminate the ambiguity sameness/identity of the "identity of facts". Perhaps a diehard fan of the slingshot could eliminate the ambiguities of identity I discussed. Then, with a coherent notation, he/she could propose a new proof against facts. However, I believe that it is an impossible task. With a clear and coherent conception (and notation) of identity — which distinguishes the identity between objects (predicate) from the identity between propositions (connective), and the identity as function from the identity as relation — it is simply absurd to try to demonstrate that two atomic sentences, *Fa* and *Gb*, whose subjects and predicates are different, refer to the same thing. The slingshot arguments are logical games which are only possible for our unripe concept of identity. In this work I hope I have shown why the slingshot arguments demonstrate the inadequacy of the present concept (and notation) of identity, and in which ways we could find a remedy for these defects.

Gödel's slingshot, and the slingshot arguments in general, are not *prima facie* interesting arguments for semantics. They entail the absurd idea that two sentences like "the grass is green" and "the snow is white" denote the same thing. My discussion on identity and Oppy's rejection of Neale's theses are only two ways to evade the slingshot arguments and to deny its importance: in literature there are many others[65]. Therefore it is clear that slingshot arguments are very weak arguments to defend a radically holistic conception of semantics (*à la* Quine and Davidson). The usefulness of the slingshot arguments is instead, *ex contrario*, in the confirmation of the efficacy of the correspondence theory of truth, with its simplic-

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65. See Barwise and Perry [1981], Stainton [2006], Restall [2004].

ity and its intuitiveness. A theory that Frege, Russell and Wittgenstein develop and that Gödel, Neale and Oppy defend against the weak shots of the slingshot.

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