

SORITES

σωρίτης

An International Electronic Quarterly of Analytical Philosophy
Indexed and Abstracted in *THE PHILOSOPHER'S INDEX*
ISSN 1135-1349
Legal Deposit Registration: M 14867-1995

Editorial Board:

**Enrique Alonso, Francisco J. Ausín, Olga E. Hansberg,
Guillermo Hurtado, Peter J. King, Raúl Orayen, Lorenzo Peña**

Executive Editors:

Lorenzo Peña & Guillermo Hurtado

Assistant Editor: Raymundo Morado

Regular-Mail Address:

Prof. Lorenzo Peña
CSIC [Spanish Institute for Advanced
Studies]
Department of Theoretical Philosophy
Pinar 25
E-28006 Madrid
Spain
Fax +3491 564 52 52
Voice Tph +3491 411 70 60, ext 18

Prof. Guillermo Hurtado
Instituto de Investigaciones Filosóficas
Circuito Mtro Mario de la Cueva
Ciudad de la Investigación en Humanidades
Coyoacán 04510. México DF
México
FAX (525) 665-4991

INTERNET ACCESS:

<<http://www.ifs.csic.es/sorites/>>
<<http://www.angelfire.com/ns/sorites>>

Editorial e-mail inbox (esp. for submissions): <sorites@ifs.csic.es>
Inquiries and subscription-requests: <sorites@pinar2.csic.es>

Issue #12 — May 2001

SORITES (Σ Ω Π I T H Σ)

ISSN 1135-1349

Issue #12 — May 2001

Copyright © by SORITES and the authors

MAIN INTERNET ACCESS:

<http://www.ifs.csic.es/sorites/>

<sorites@ifs.csic.es> (Editorial e-mail inbox, esp. for submissions)

<sorites@pinar2.csic.es> (Inquiries and subscription-requests)

From the Americas the following URL may be more convenient:

<**<http://www.angelfire.com/ns/sorites>**> _____

Please send both your Regular-Mail contributions and books for review to our
editorial address <sorites@ifs.csic.es>

SORITES

ISSN 1135-1349

BOARD OF EDITORIAL ADVISORS:

Rainer Born Johannes-Kepler Universitaet Linz (Austria)
Amedeo Conte University of Pavia (Italy)
Newton C. A. da Costa University of São Paulo (Brazil)
Marcelo Dascal University of Tel Aviv (Israel)
Dorothy Edgington Birbeck College (London, UK)
Graeme Forbes Tulane University (New Orleans, Louisiana, USA)
Manuel García-Carpintero University of Barcelona (Spain)
Laurence Goldstein University of Hong Kong (Hong Kong)
Jorge Gracia State University of New York, Buffalo (USA)
Nicholas Griffin McMaster University (Hamilton, Ontario, Canada)
Rudolf Haller Karl-Franzens-Universitaet Graz (Austria)
Terence Horgan University of Memphis (Tennessee, USA)
Victoria Iturralde Univ. of the Basque Country (San Sebastian, Spain)
Tomis E. Kapitan Northern Illinois University (USA)
Manuel Liz University of La Laguna (Canary Islands, Spain)
Peter Menzies Australian National University (Canberra, Australia)
Carlos Moya University of Valencia (Spain)
Kevin Mulligan University of Geneva (Switzerland)
Jesús Padilla-Gálvez Johannes-Kepler Universitaet Linz (Austria)
Philip Pettit Australian National University (Canberra, Australia)
Graham Priest University of Queensland (Brisbane, Australia)
Eduardo Rabossi University of Buenos Aires (Argentina)
David-Hillel Ruben London School of Economics (London, UK)
Mark Sainsbury King's College (London, UK)
Daniel Schulthess University of Neuchâtel (Switzerland)
Peter Simons University of Leeds (Leeds, UK)
Ernest Sosa Brown University (Providence, Rhode Island, USA)
Friedrich Stadler Institut «Wien Kreis» (Vienna, Austria)

SORITES

ISSN 1135-1349

Issue #12 — May 2001

TABLE OF CONTENTS

- Abstracts of the Papers. Pp. 3-4.
- «From Paraconsistent Logic to Universal Logic», by Jean-Yves Béziau. Pp. 5-32.
- «God and His/her Act of Creation: Leibniz and the «Why-not-sooner» Argument», by Abel B. Franco Rubio de la Torre. Pp. 33-54.
- «Impossibility of Two-Valued Logic to Be Universally Valid», by Ardeshir Metha. Pp. 55-59.
- «Meaning, Normativity and Reductive Naturalism», by Deborah C. Smith. Pp. 60-65.
- «Frankfurt on Personal Failure», by Alan White. Pp. 66-69.
- «Dispositionalism and Meaning Skepticism», by Silvio Pinto. Pp. 70-86
- Copyright Notice and Legal Disclaimer. Pp. 87-88.
- Release Notice. P. 89.

SORITES (ΣΩΡΙΤΗΣ), ISSN 1135-1349

Issue #12 — May 2001. Pp. 3-4.

Abstracts of the Papers

Copyright © by SORITES and the authors

ABSTRACTS OF THE PAPERS

FROM PARACONSISTENT LOGIC TO UNIVERSAL LOGIC

by Jean-Yves Béziau

For several years I have been developing a general theory of logics that I have called *Universal Logic*. In this article I will try to describe how I was led to this theory and how I have progressively conceived it, starting my researches about ten years ago in Paris in paraconsistent logic and the broadening my horizons, pursuing my researches in Brazil, Poland and the USA.



God and His/her ACT OF CREATION: LEIBNIZ AND THE «WHY-NOT-SOONER» ARGUMENT

by Abel B. Franco Rubio de la Torre

The question about how to conceive God's act of creation in a fashion compatible with Leibniz's own thought is in itself a cluster of complex and interrelated issues. I will discuss only three aspects (or conglomerates of aspects) of the issue: (1) Leibniz's view of how God actually created the world, and within this and more specifically, (2) his arguments to reject the «why-did-God-not-create-the-world-sooner» question as not applicable to this case, and (3) the consequences of those arguments for the concept of time. I will argue that, given Leibniz's own view of creation and time, (1) the question about why God did not create the world earlier or later is a legitimate one despite his explicit efforts in the opposite sense, and, furthermore, (2) an answer to the question within Leibniz's thought would fall prey of fatal contradictions and inconsistencies.



IMPOSSIBILITY OF TWO-VALUED LOGIC TO BE UNIVERSALLY VALID

by Ardeshir Metha

If two-valued logic is assumed to be universally valid, it leads to a paradox, for a proof can thereby be found that it is impossible for two-valued logic to be universally valid. This consequence results in some very significant philosophical implications for the physical sciences and mathematics, especially since they are both based exclusively on two-valued logic.



MEANING, NORMATIVITY AND REDUCTIVE NATURALISM**by Deborah C. Smith**

In «The Normativity of Meaning», Eric Gampel argues that the capacity to justify a linguistic usage is essential to meaning and suggests that this fact entails that naturalistic theories of meaning must take a non-reductive form if they are to be viable. I will argue that reductive and non-reductive naturalisms stand or fall together in the face of Gampel's argument that meaning plays an essential justificatory role. I will further argue that, if they fall, the lesson to be learned is not that we should avoid reductionism, but rather, that we should steer clear of physicalism in our meaning theory; if Gampel's argument is cogent, any theory of meaning will have to make reference to at least some abstract objects.

**FRANKFURT ON PERSONAL FAILURE****by Alan White**

Over the years there have appeared a number of theoretical and metatheoretical broadsides against Harry Frankfurt's familiar arguments denying that a free moral agent have alternatives in some real sense as a necessary condition for her moral responsibility. In what follows I will attempt to focus on a particular defensive strategy of Frankfurt's, which, when analyzed, yields evidence that such attacks, particularly the metatheoretical ones, are not misplaced.

**DISPOSITIONALISM AND MEANING SKEPTICISM****by Silvio Pinto**

In a recent thought-provoking paper on skepticism concerning meaning (1997), Scott Soames claims that Kripke's and Quine's arguments that there are no facts about meanings are flawed for similar reasons. According to Soames, both of them are based on a confusion about how a certain kind of fact determines another (for instance, what it takes for a dispositional fact to determine a particular linguistic meaning). Soames' strategy to refute the skeptical arguments advanced by Kripke and Quine involves distinguishing two notions of determination both of which, if applied unambiguously and consistently throughout the formulation of the above skeptical reasonings, would fall short of licensing the far-reaching and devastating skeptical conclusions that their proponents intended them to have. This paper is an attempt to vindicate the problem raised by the meaning skeptic, and to show that Soames' suggested dispositional account cannot even partially solve it.

SORITES (ΣΩΡΙΤΗΣ), ISSN 1135-1349

Issue #12. May 2001. Pp. 5-32.

From Paraconsistent Logic to Universal Logic

Copyright © by SORITES and Jean-Yves Béziau

FROM PARACONSISTENT LOGIC TO UNIVERSAL LOGIC*

by Jean-Yves Béziau

«The undetermined is the structure of everything»

Anaximander

1. Paraconsistent Logic (Paris, 1989-91)

1. 1. Discovery and interest

My first contact with paraconsistent logic was a one page article in the French psychoanalysis magazine, *L'âne*, entitled something like «Paraconsistent logic: a logic for the unconscious». This was in fact an interview with da Costa. It was of quite general nature, paraconsistent logic was presented in a totally informal way, just as a logic violating the principle of contradiction.

But it was enough to strongly attract me. Why? Some people are attracted by paraconsistent logic, via contradictions, i. e. they think that contradictions are fundamental and therefore are naturally interested in a logic which does not reject them, but deal with them.

This was not my case. I was attracted by paraconsistent logic because I was interested in the question *What is logic?* Traditionally the principle of contradiction is taken as a fundamental pillar of logic. The idea is that reasoning is not possible without it. Paraconsistency goes against this idea. And if paraconsistent logic is rightly a logic, therefore what are the ground principles of logic, if any?

At this time I was studying logic at the department of mathematics of the University of Paris 7. Daniel Andler was giving there a graduate course on non-classical logics including modal logic, temporal logic, non-monotonic logic, etc. Linear logic was also in the air. But none of these logics attracted me as much as paraconsistent logic did.

It is clear that a logic like e. g. *linear logic* is far to be as challenging as paraconsistent logic. Informal motivations for linear logic are based on a few attractive and funny examples involving cigarettes and food, but they are not connected with a serious philosophical analysis (much the same as the penguin case for non-monotonic logic). Moreover there is a big gap between these informal motivations and the technical aspects of Girard's logic. Until now there are no convincing intuitive interpretations of linear logic operators.

Linear logic is tightly connected with the so-called structural rules of sequent calculus and it had a key role in the emergence of the new research field of substructural logics.¹ Of course there is a huge amount of nice technical problems related to linear logic. But it is true also for Kripke semantics and matrix theory.

1. 2. First Researches

I looked for da Costa's works at the university's library and started to work with few materials (the very sketchy notes of the CRASP, and some papers published in NDJFL).² My objective was to study thoroughly the paraconsistent logic C_1 .

My attention was directed to the common ground between C_1 and classical logic. These two logics are very different and my intuition was that the very essence of logic should not lie in any of their specific differences but on their common features.

The semantics for C_1 is at first sight very strange, because it is a blend of known and unknown materials. On the one hand it looks like semantics for classical logic because it is *bivalent*, on the other hand it looks very different because it is *not truth-functional* and in particular you cannot start with distributions on atomic formulas and then extend them to bivaluations on the whole set of formulas.

The common feature is that both are characteristic functions of maximal sets. In fact when you have a logic, you can always consider the class of characteristic functions of maximal sets, this makes sense even in the case where they are not at the same time homomorphisms, like in the classical case. Moreover this notion of maximal set can be defined in a purely abstract way. Often a maximal set is called a maximal consistent set and its definition depends on negation. But this must be different in paraconsistent logic, because a theory can be inconsistent without being trivial (one can in fact find paraconsistency on this distinction). The common ground notion of paraconsistent logic and classical logic is the *abstract notion of non trivial maximal set*.

This notion plays a key role in the completeness theorem of many logics. Studying a lot of non-classical logics, I saw plenty of completeness theorems and apparently there was an invariant kernel and this was related to *Lindenbaum's extension lemma* saying that every consistent set can be extended in a maximal consistent one.

The completeness theorem often appears as a kind of magic link connecting two different ontological fields: proof and truth. A close study of Lindenbaum's lemma helps to understand better this magic. Moreover if the notion of proof is defined with a sequent calculus instead of an Hilbert's style system, the completeness effect is not so spectacular.

Sequent calculus was quite popular at that time in Paris mainly because of linear logic. I remember a course of Girard presenting simultaneously and comparatively classical,

¹. On substructural logics see Dosen/Schröder-Heister (1993). This field is in fact not new, just the name for it. For example Avron (1988) shows that there are some striking resemblances between linear logic and relevant logic.

². Da Costa's works were first published in the *Comptes Rendus de l'Académie des Sciences de Paris* (CRASP, first note (da Costa 1963), the references of other notes can be found e. g. in D'Ottaviano (1990)), through Marcel Guillaume (see Guillaume 1996). At this time I wrote to the latter who kindly sent me a joint work of him with da Costa published in Brazil that I was not able to find in France. Later on da Costa started to publish in *Notre Dame Journal of Formal Logic* (NDJFL) where a lot of papers on paraconsistent logic have appeared along the years.

intuitionistic and linear systems of sequents and giving very intuitive hints on how sequent calculus works and on the cut-elimination theorem. I got very interested in the subject and learned it thoroughly by myself reading Gentzen's original paper.

Therefore it was natural for me to try to build a sequent system for C_1 and prove *cut-elimination* for it. There had been an aborted tentative in the late sixties for doing this by Raggio³. I built a set of sequent rules for C_1 using an *intuitive transposition of semantical conditions*. Only four years later I was able to prove a general completeness theorem which explains why this intuitive transposition was working.

I then verified that monstrous rules with three premisses and without the subformula property were not conflicting the sophisticated machinery of the cut-elimination theorem, showing that necessary conditions for this theorem are of a quite general nature, and that in particular the subformula property is not one of them.

My study of C_1 was presented in my Master thesis supervised by Daniel Andler, at the department of mathematics of the University of Paris 7.⁴ I then started a PhD with him in the same line and projected, with his support, to go to spend sometimes in Brazil with da Costa. I was lucky to meet da Costa just at this time, in January 1991, when he was visiting Paris and I was needing intuitive interest and a formal letter in order to go to Brazil.

I saw da Costa for the first time when he was presenting a memorable lecture in Paris during which, so enthusiastically animated, he performed a spectacular jump, nearly breaking his legs. I was introduced to him after the lecture and the contact was quite good. I gave him a kind of abstract of my Master thesis about C_1 which he liked very much and we met again several times. He asked me why I was interested in paraconsistent logic and was satisfied with my answer. My trip to Brazil was projected for august.

In fact just before meeting da Costa, my interest had already shifted definitively from paraconsistent logic to *general logical stuff* (at this time I had no name for this kind of thing, I had heard about *general abstract non sense* for category theory and I liked the expression).

This had arised mainly due to two influences. The first one was a line of research developed by da Costa himself under the name *theory of valuation*, which I knew through his paper with A. Loparic: «Paraconsistency, paracompleteness and valuation» (see Loparic/da Costa 1984). In this paper there is a first part which is a general form of completeness theorem which is then applied to a particular logic, inspired on C_1 , which is both paraconsistent and paracomplete (i. e. neither the principle of contradiction nor the principle of excluded middle hold). After easily working out a sequent version for this system⁵ I was eager to understand the essence of this general theorem, which would take me about one year.

The other one was the study of a little book by Curry, *Leçons de logique algébrique* (Curry 1952). I spent one month with it in the West Indies and came back quite enlightened. In this book Curry presents, among other things, a study of four kinds of negation. To carry out this study he develops a quite general framework based on such general notion as

³. See Raggio (1968). Raggio was a former student of Bernays who worked on cut-elimination for natural deduction before Prawitz. At the same time of my work, W. A. Carnielli built a tableau system for C_1 and proved cut-elimination for it (see Carnielli 1990).

⁴. See (B 90a), the main results of it were later published in (B 93a).

⁵. This turns into my first published paper (B 89).

relational algebra and gives results such as a general form of the *replacement theorem*.⁶ Over the years I kept on meditating on Curry's book which was an important source of inspiration for me.⁷

2. *Abstract logic (Brazil, 1991-92)*

2. 1. Saturation and valuation

I arrived in São Paulo, Brazil, in August 1991, where I was to stay about one year.

Arriving there I started to work on a series of problems that will turn into my paper «Recherches sur la logique abstraite: les logiques normales» (B 98h) which is itself a preliminary draft of the first chapter of my math PhD (B 95e), published separately as (B 95f).

At this time I already had decided to work only at the general level, and to use the terminology *Abstract Logic* to emphasize this and the fact that I was working independently of any specifications of languages and logical operators. I used the expression «logic» both as a generic term and also as a specific term. I defined an abstract logic to be a consequence relation on a given undetermined set. I stated this definition with no axioms for the consequence relation, even if my work was concerned mainly with what I called *normal logics* in which the three basic properties (reflexivity, monotony, transitivity) hold. My motivation and my terminology were taken from Birkhoff's famous notion of *abstract algebra*, that I found in *Lattice theory* (cf. Birkhoff 1940), which is just a set with a family of operations. My idea was already that the basic foundations of logic were not more principles for the consequence relation than principles for connectives, like the principle of contradiction. I reached the idea that we must throw out all principles altogether, that *logic is not grounded on any principles or laws*. In fact at this time I also launched the notion of *Alphabar logics*, which are abstract logics for which the *law of autodeductibility* (a formula is a consequence of itself) does not hold.⁸

An intuitive example of such a logic was given to me as an adaptation of da Costa's paraclassical logic.⁹

Within this framework of abstract logic I was tackling the general completeness theorem of da Costa's theory of valuation, according to which *every logic is two-valued*. The central notion in this theorem is the notion of *saturated set*¹⁰ and not maximal set and I was

⁶. According to Curry, this is a special case of an even more general result to be found in MacLane's PhD (cf. MacLane 1934).

⁷. I discovered later on that da Costa had also been influenced by this book, in particular to develop the algebraic counterparts of his C-systems, which he called «Curry algebras» (see da Costa 1966).

⁸. This work was later published (B 97e) in a joint paper with D. Krause a disciple of da Costa working mainly in Schrödinger logics, i. e. logic for which the principle of identity does not hold in general, the motivation being that according to Schrödinger the micro-objects of quantum physics do not obey this law (see da Costa/Krause 1994). The principle of identity is also one fundamental law of logic whose study and rejection have attracted me over the years (see B 96b).

⁹. On this logic see de Souza (1997).

¹⁰. A set of formulas is saturated iff there is a formula not deductible of it but deductible of any extension of it. A saturated set is maximal iff it is saturated for any formula outside of it. Saturated sets are also called relatively maximal sets, especially in the Polish school.

wondering why. I succeeded to find an answer that satisfied me after a precise and detailed study of the abstract version of Lindenbaum's extension lemma. I distinguished four kinds of Lindenbaum's extensions (two involving the concept of maximal set, two the concept of saturated set), all equivalent in classical logic but that I proved to be all distinct at the abstract level. Moreover I succeeded to prove that *the semantics of saturated sets is minimal*.¹¹

I also tried to make a connection between the fact that all saturated sets are maximal (in such a case a logic is said to be *absolute*, intuitionistic logic is not absolute) and the presence of certain logical connectives. By doing so I wanted to give an abstract characterization of logical operators. I succeeded to prove that both the existence of a classical negation or of a classical implication imply that a logic is absolute.¹²

This work was purely abstract in nature and no concrete examples of logics were given, nor did I deal with the notion of systems of deductions (rules and proofs). It was complemented by a paper that I wrote with da Costa, which was the fruit of our collaboration during this year.¹³

The starting notion of da Costa's theory of valuation is a highly idealized version of an Hilbert's style system of deduction, simply called a *calculus*. The nature of the objects is not specified and the rules are just pairs with *no restrictions of recursivity or cardinality*. It is easy to see that in fact such a calculus, due to the definition of Hilbert's style notion of proof is the same thing as a normal abstract logic. Da Costa's definition fits better if one has the intention to apply general stuff to concrete Hilbert's style logical calculi.

By valuation, da Costa means generally any bivaluation, i. e. function which attributes true or false to formulas. His theory of valuation is a kind of generalization of his semantics for C_1 (see da Costa/Alves 1977), based on the fact that once truth-functionality is dropped, bivaluations can be used as a semantics for any calculus.

My paper with da Costa has two parts. One dealing with generalities, including some results without proofs about abstract logics, but also some abstract results about rules and proofs, definitions of these extended in order to catch Gentzen's style systems as well as Hilbert's ones. The second part is on applications and shows how concrete cases of completeness can be elegantly and easily obtained from general results. An important point is that with this method it is possible to give a proof of the completeness theorem for classical logic connective by connective (therefore this theorem is the disjoint union of all completeness theorems for classical connectives). There is a sketchy indication of how to apply this method

¹¹. This result was not new in the sense that there is an algebraic version of it which is known for years. However the logical version of this theorem apparently was not known or properly understood (cf. Suszko 1977), nor the consequences of it, for example the fact that intuitionistic logic cannot be characterized by maximal sets. This result shows also that the standard semantics for propositional classical logic is minimal, since it is made of maximal sets and classical logic is absolute.

¹². David W. Miller proved independently the result about implication. He visited da Costa during my stay in São Paulo and turned to be interested in my work, due to the fact that at this time he was working on the question of the quantity of maximal extensions of a set. The expression «absolute logic» was suggested to me by David Makinson.

¹³. See (B94c). This paper is the first extensive exposition of da Costa's theory of valuation. A shorter and simpler exposition is to be found in Grana (1990).

for logics of any order.¹⁴ It also includes da Costa's result about the characterization of truth-functional bivalent logics.

In another paper writing at this time (B 90b) I show how it is possible to generalize da Costa's methods for C_1 in order to construct a family of paraconsistent, paracomplete and non-alethic logics. Before arriving in Brazil, I already had the idea of extending naturally C_1 in a logic strictly stronger that I called C_{1+} . I didn't wrote at this time a paper devoted exclusively to this logic because I had already lost interest for the study of such or such system for its own sake. Therefore I presented C_{1+} in a paper among many other logics all generated by the same guiding ideas.¹⁵

In the same paper I also introduced the notion of *non truth-functional many-valued semantics*. My initial idea was to construct a non truth-functional three-valued semantics for C_1 in order to get the subformula property. The equivalence between this semantics and the standard one was given by a theorem showing how *to reduce any semantics to a bivalent one*.¹⁶ As this example shows, such a reduction theorem does not necessarily mean that non bivalent semantics are useless. They can be useful, for technical reasons or philosophical interpretations.

2. 2. Logic as structure

During my stay in Brazil I was to realized that my views on abstract logic were strongly connected with other works and ideas, mainly with Bourbaki and the Polish school of logic.

Da Costa was interested in Bourbaki since his youth. As it is known A. Weil, J. Dieudonné and A. Grothendieck spent each one about two years at the University of São Paulo during post-war time. They contributed strongly to the development of modern mathematics in Brazil. Da Costa's master, E. Farah was a close friend of Weil and the first Brazilian to work on set theory.¹⁷ During the late eighties, da Costa's interest for Bourbaki was renewed by his research program, developed with F. A. Doria, on the axiomatization of Physics, which leads them to various incompleteness results for physical theories¹⁸.

Therefore when I arrived in São Paulo, the Bourbakian concept of structure was in the air and da Costa spoke many time about this subject and indicated us bibliographical references such as Corry (1992) which very rightly points out an important heterogeneity between the Bourbakian informal notion of structure as it is presented in «The architecture of mathematics» (Bourbaki 1950) and the formal definition presented in *Theory of sets* (Bourbaki 1968). In my opinion this duality reflects perfectly that Bourbaki's idea to take the notion of structure as the fundamental notion of mathematics is independent of his formalist option

¹⁴. This has been developed in more details in my philosophy PhD (B 96a).

¹⁵. An individual study of C_{1+} was later on presented in (B 95c) and also in my math PhD (B95e).

¹⁶. This result is presented in (B 98h) (B 96a) and (B 95e). The relation with da Costa and Suszko's reduction results is discussed in (B 96c).

¹⁷. Farah proved the equivalence between the axiom of choice and the general distributivity law (see Farah 1955).

¹⁸. See e. g. da Costa/Doria (1991). They in fact mainly use Suppes predicate which is a kind of adaptation of Bourbaki's notion of structure (see da Costa/Doria 1994).

chosen in *Theory of sets*, which can be considered as an accidental feature motivated by the circumstances of the time and which was later on rejected by his main promoter (see Chevalley 1985). In fact «The architecture of mathematics» ends with a rather anti-formalist tone with the quotation of Lejeune-Dirichlet's motto: «to substitute ideas for calculations».

Learning more about Bourbaki, my impression was that my idea of abstract logic fitted perfectly well with the mathematical spirit of the General expressed by the slogan *From the general to the particular*.¹⁹ And reflecting on Bourbaki's bright idea which revolutionized mathematics, my idea was to consider, within the architecture of mathematics, *logical structures as mother fundamental structures* but different from the three Bourbakian ones (algebra, topology, order).

In fact at this time I discovered at the library of the university of São Paulo a book by the French logician Jean Porte published in 1965 (the year I was born) and entitled *Recherches sur la théorie générale des systèmes formels et sur les systèmes connectifs*, with the same leading idea. Porte wrote:

«Formal systems» considered here will be some mathematical structures (the word «structure» is taken here with a meaning close to the one given by Bourbaki, but slightly different), not much, not less «fundamental» than the class of algebraic structures for example. (Porte 1965, p. 2)

In many other points Porte's objective and methodology were the same as mine with my «abstract logic». His idea was to work in the spirit of abstract modern mathematics avoiding denotational and terminological complications often met in the formalist approach and trying to dissipate confusions by establishing a general framework providing clear structuralist definitions of the basic notions of logic.

Porte didn't have a name for his general theory but he rejected the name «metamathematics» in particular because, as he wrote (Porte 1965, p. 3) his work was not restricted to formal systems representing mathematical reasoning.

Porte's book includes a lot of results of Polish logic. It is a bright exposition of the main achievements of the Polish school, such as Lindenbaum's results on matrices, at a time when these works were not well known abroad. But the book contains also a lot of Porte's own contributions. It is much in the spirit of the Polish school (as Porte says, p. 4, like Tarski, he will allow himself to use all the methods of reasoning that the standard mathematician uses) improved by a straight Bourbakian structuralist perspective.

¹⁹. I learned a lot about Bourbaki in Brazil but of course I already had heard of him before! In fact I was part of the generation of school boys who have been Bourbakized by ultra-bourbachic pedagogues. But when I went at the University of Paris, the Bourbakian ideology was already widely dismissed. People were making the bill of the alleged disastrous effect of modern mathematics and the high-school programs had been changed in order to come back to 19th century pre-Bourbakian mathematics and get rid of abstract non sense, viewed as anti-democratic (sic). Moreover Bourbaki was not well considered among French logicians who had been persecuted by him. However, as an exception, my first course on set theory was given by M. Eytan and was based on Bourbaki and category theory (this course was considered as a monstrosity and was later on suppressed for «technical» reasons).

However Porte's work appeared to be actually quite distinct from what I was doing, especially due to the fact that he was working with more specific structures (distinguishing three classes of logical structures).²⁰

The other important discovery for my work was *Polish logic*. The expression «Polish logic» is ambiguous, in fact it does not denote logic in Poland but a kind of logical studies which are mainly developed in Poland and not well-known abroad. R. Wójcicki has summarized these works in his book *Theory of logical calculi* (Wójcicki 1988). A first version of this book was written when he was in Brazil in the late seventies and published by Ossolineum under the title *Lectures on propositional calculi* (Wójcicki 1984).

The connection between da Costa and Polish logicians is old and is due in particular to Jaśkowski. Jaśkowski is a famous logician of the Lvov-Warsaw school of logic who is known as the creator of natural deduction (independently of Gentzen) and also for his result about intuitionistic logic (soon after Gödel's result showing that intuitionistic logic cannot be characterized by a finite matrix, Jaśkowski in his 1936's paper showed that it can be characterized by a infinite class of finite matrices). But in 1948 Jaśkowski also wrote a paper which is now considered as an important step in the history of paraconsistent logic. Jaśkowski's work on paraconsistent logic was rediscovered by da Costa, and he started, working jointly with some Polish logicians, the study of this forgotten work of Jaśkowski. During the seventies da Costa and other Brazilians such as A. I. Arruda went to Poland and Polish logicians, like J. Kotas, L. Dubikajtis and R. Wójcicki, went to Brazil.

Da Costa was therefore acquainted with the main concepts of Polish logic such as matrix theory and the theory of consequence operator. He used to present the consequence operator as an equivalent formulation of his notion of calculus.²¹

This is therefore through da Costa that I myself got soon acquainted with the basic notions of Polish logic. It seemed to me that it was very close in spirit to what I was doing and that I should investigate it seriously. Hence, as soon as december 1991, I had already decided that my next destination after Brazil would be Poland.

In August 1992, I went to the IX Latin-American Symposium on Mathematical Logic in Bahía Blanca, Argentina and presented there a little lecture on my work with da Costa on the theory of valuation (B 93c). By coincidence there was there a prominent Polish logician, Stanislas Surma, who presented a very interesting talk (see Surma 93). I had a conversation with him on the train back to Buenos Aires and as I told him I will soon be in Poland, he draw me a map of logic in Poland (names of cities and logicians). Unfortunately the difficult Polish language didn't help my memory and when I arrived in Poland I didn't remember anything.

²⁰. Porte's book is quite unknown and had no influence. It was several years ahead of his time. Porte himself spent most of his career in Algeria. I tried to contact him in Paris but he was already in a senile state.

²¹. The interplay between the Brazilian school and the Polish school was in fact limited, for example Kotas/da Costa (1980) is rather a juxtaposition of valuation and matrix than a work of synthesis. The terminology is generally different, with some random similarities. Funny enough, Wójcicki used as a key word «logical calucli» in the title of his books rather than the typical Polish expression «consequence operator» which shows up only timidly in the subtitle of his 1988's book. On the connection between da Costa and Suszko's results on bivalent semantics see Batens (1987).

3. From abstract logic to universal logic (Poland: 1992-93)

3. 1. More abstraction

I arrived in Wrocław, Poland, by the beginning of October 1992. This Silesian town was given back to Poland after second world war, after several centuries of German occupation, known then as Breslau. Anyway soon after the war it became one of the most important university centers of Poland in particular due to the fact that most of the city of Lvov, which itself became part of Soviet Union, was transported there.

Famous logicians started to work in Wrocław right after the war, J. Łoś (whose famous monograph (cf. Łoś 1949) on matrix theory which is the first extensive exposition of Lindenbaum's results about matrices was published by Wrocław University Press) and also R. Suszko, J. Śłupecki, etc.

I was received there by the director of the department of logic, Jan Zygmunt, a man with a huge knoweldge of the Polish school of logic, keeping the old tradition of this school alive and who turned to be a very good guide for me.

Arriving in Wrocław I continued to develop the idea of abstract logic by presenting it and discussing it.

I wrote soon two «philosophical» papers in French about my conception of abstract logic: «De la logique formelle à la logique abstraite» (B 94a) and «La logique abstraite au sein de la mathématique moderne» (B 93d), this last one being a lecture presented at Lodz University that I was happy later on to see published in *Ruch Filozoficzny*, the journal founded by Twardowski in 1911 and where Łukasiewicz in 1920 presented his famous paper on many-valued logic.

Already in Brazil, I had found out that the Polish logician Roman Suszko had also used the expression «abstract logic» in « series of works carried out at the end of the sixties and the beginning of the seventies, together with two American mathematicians D. J. Brown and S. Bloom.²² By an «abstract logic» he meant a consequence operator defined on an algebra. It was a slight generalization of the notion of *structural consequence operator*, notion which has been canonized by himself and J. Łoś in their famous paper «Remarks on sentential logics» (Łoś/Suszko 1958).

The basic logical structure which Polish logicians are working with is indeed not really fixed. The fundamental point is to consider a logic as a consequence operator rather than as a set of tautologies (keeping Tarski's original idea). Properties of this consequence operator may vary as well as the set on which it is defined. The standard approach is to consider rather a structural consequence operator than an abstract logic in the sense of Suszko. Moreover, even if it is not explicitly said, the replacement theorem is also generally required in addition to the theorem of substitution, in Polish terminology: a logic must not be only structural but also *self-extensional* (see Wójcicki 1988, p. 200).

In fact, as it is known, when Tarski first developed the theory of consequence operator at the end of the twenties (cf. Tarski 1928), he didn't specify the structure of the underlying set, taking such a set to be just a set of «meaningful sentences» in the sense of Lesniewski.

²². The main results of these investigations are to be found in Brown/Suszko (1973) and Bloom/Brown (1973). Suszko was in a sense quite an isolate figure in Poland and his work on «abstract logic» has not been pursued there, neither in the USA, but it was recently revived by the Barcelona **DATE** s logic group (see Font/Jansana 1996).

Without doubt the notion of consequence operator as developed by Tarski was inspired by *topology*, which was highly popular at this time in Poland (cf. Kuratowski with whom Tarski worked).

From the Bourbakian perspective, Tarski's original proposal falls into topology and Suszko's abstract logic appears as a «carrefour de structures» (algebraico-topologic), as well as Łoś-Suszko's notion of structural consequence operator. In all the cases, logical structures are a by-product of the three fundamental Bourbakian structures.

My proposal was clearly distinct, because I was considering logical structures as different from the already known structures and because by so doing I was defining them in a very abstract way, in particular without stating any axioms for the consequence relation.

One can find indeed examples of logic which are not structural such as the logic of P. Février²³ or not self-extensional (this is the case of the paraconsistent logic C_1). Moreover there is no good philosophical reasons to consider that the domain of a logic should be an algebra. The fact that logical operators are represented by functions is a mathematical representation that can be rejected: in natural language, there are sentences which are distinct negations of one given sentence, therefore negation appears rather as a relation than a function.²⁴

As for the axioms for the consequence operator, what did Tarski when he developed the theory of consequence was to axiomatize the notion of logical consequence as defined by Hilbert's style notion of proof. For such a notion, Tarski's axioms hold. But when we generalize the notion of proof, this is not necessarily the case.

In fact in Polish logic there seems to have a confusion between proof-theoretical notions and concepts related to the theory of consequence operator. This happens mainly because proof-theory did not develop by its own in Poland but was incorporated within the theory of consequence operator.²⁵ People working outside of Poland inspired by the theory of consequence operator but substituting a consequence relation denoted by the Fregean symbol \vdash for the consequence operator, usually denoted by Cn , have went worse into the confusion. These two concepts are in fact equivalent, but the confusion arises when people are mixing the concept of consequence relation together with Gentzen's sequent calculus as a general setting and employing the Fregean symbol as well for Gentzen's sequents, and using the same names for structural rules of sequent calculus and axioms for the consequence relation (reflexivity, monotony, cut).²⁶ The matter is even worse when one generalizes the consequence relation, keeping the Fregean symbol to denote it, to relation admitting sets of formulas on

²³. P. Février developed a three-valued logic in order to deal with Heisenberg's indeterminacy principle (see Février 1937). This logic has been rightly considered as «quasi-formal» by J.-L. Destouches (see Destouches 1948). Discussion about this can be found in (B 95 g).

²⁴. For a discussion of these topics, see (B95b). In (B 96a) I proposed to consider the domain of a logic as any kind of structure, results which do not depend on this structure being properly abstract results.

²⁵. More generally, the *metamathematics* of Hilbert was replaced by the *methodology of deductive science*, with different objectives and methods, in particular, by contrast with Hilbert, Tarski allowed himself to use any mathematical tools at the «meta» level.

²⁶. As it is known, Gentzen originally used the arrow for sequents (under P. Hertz's influence). For this discussion see (B 99b).

both sides (the so-called multiple conclusion logic), which resembles even more to Gentzen's concept of sequent. This is for example as D. Scott proceeds in (Scott 1974b).

This leads to a confusion between two notions of different natures: the notions of *rule* and of *law*. For example when someone calls *cut rule* the law of transitivity for the consequence relation, he is making a confusion which leads to a misunderstanding of the cut-elimination theorem which shows in fact that a transitive logic can be generated by a sequent system without the cut rule. Scott for example wrote that «In many formalizations a great deal of effort is expended to eliminate cut as a primitive rule; but it has to be proved as a derived rule. In general, cut is not eliminable.» (Scott 1974b, p. 414). But as it is known one cannot prove cut-elimination for LK by proving that cut is a derived rule of LK without the cut rule, simply because the cut rule is not a derived rule of this system. The cut rule in this system is a *permissible non derivable rule*. The cut-elimination theorem shows therefore that there are some permissible rules which are not derived rules.²⁷

Discussing this with Zygmunt and trying to clear up all these confusions, I wrote a paper entitled «Rules, derived rules, permissible rules and the various types of systems of deduction» (B 99b) intended to be, among other things, a remake of D. Scott's paper «Rules and derived rules» (Scott 1974a). In this paper I tried to develop a kind of *abstract proof theory*, defining the central notions of proofs and rules at the abstract level, i. e. independently of the nature of the objects. This has some connections with Hertz's *Satzsysteme* (Hertz 1929), work which was the basic source of inspiration of Gentzen's sequent calculus and cut rule.

3. 2. Universal algebra and universal logic

I decided to change the name abstract logic for universal logic at the beginning of 1993. It was a consequence of learning more about *universal algebra* and its connection with Polish logic.

I soon realized that universal algebra was very popular among people working in Polish logic. Suszko himself considered «abstract logic» to be a part of universal algebra and it seems that it turned out to be a common idea in Poland, as suggests the following comment by S. L. Bloom: «Roman taught us the Polish view of logic — as a branch of universal algebra (a novel outlook for us)» (Bloom 1984, p. 313).

The connection in fact goes back to the golden years of the Polish school of logic when Tarski and Lindenbaum transformed the notion of matrix, introduced originally by Łukasiewicz for many-valued logic, into a central tool for a general theory of zero-order logics (i. e. sentential logics). By thus doing they were developing universal algebra independently of Birkhoff. We must also recall that logic was first introduced in Poland via *algebra of logic*, as Wolenski notes (Wolenski 1989, p. 82).

Birkhoff developed his notion of universal algebra to unify two disjoint approaches: Noether's school with groups and rings on one side and algebra of logic and lattice theory on the other side, as well explained in (Birkhoff 1976)²⁸.

²⁷. It seems that it is also a confusion between permissible and derived rules that Łukasiewicz made in his odd paper about intuitionistic logic (Łukasiewicz 1952), as pointed out by Legris/Molina (200?).

²⁸. (Birkhoff 1987), Birkhoff explains that he took the expression «universal algebra» from Whitehead (1898) but recalls that the creator of this expression is J. J. Sylvester; Corry (1996) erroneously states that it is Whitehead. Birkhoff also says that it is in (Birkhoff 1940), his famous *Lattice theory*, that he decided to use this expression to denote a general study of algebras. The first systematic exposition

No doubt that there is a strong connection between logic and universal algebra. Algebra of logic is one fundamental root of *abstract* algebra, because Boole was the first to deal with algebras whose objects are not quantity, and of *universal* algebra because the laws for logical operators such as involution are totally different from the laws for numbers; one therefore can understand why Birkhoff's unification was not possible by stating some «universal laws» which would hold for all algebras. As explained by Scott (1974b), Tarski developed *model theory* via the kind of universal algebra which has emerged in Poland as a general metatheory for zero-order logics, which transformed itself in Poland after the war into the *mathematics of metamathematics* (cf. Rasiowa/Sikorski 1963). Later on universal algebra and model theory were applied back to the general theory of zero-order logics leading to *algebraic logic*.²⁹

Despite all these relations between logic and algebra, I think that to consider a general theory of logics as part of universal algebra is wrong. In fact many people who are doing that are confusing universal algebra with the general theory of structures. Polish general approach to zero-order logic is highly mathematized comparatively to a standard Western approach according to which zero-order logic is presented in a rather linguistic informal way. But to make an extensive use of mathematical tools for the study of logic does not necessarily mean algebraization. It is true that algebraic tools are important but they are not the only ones. Moreover, if a wide class of logical structures can be reduced to algebraic structures via factorization, it is not the case of all logical structures, in particular those in which there are no non trivial congruence relations (*simple logics*), like what happens with the logic C_1 , as shown by Mortensen (1980). In my paper «Logic may be simple» (B 97h) I discuss all this in details and argue that there are no good reasons to reject such simple logics out of the sphere of logic.

As Suszko's notion of abstract algebra was understood as part of universal algebra and as this expression was therefore already used with a different meaning, I thought better to shift the terminology and the expression *universal logic* seems to me perfectly appropriate. Universal logic stands in the same position with regards to the multiplicity of logics as universal algebra with the multiplicity of algebras. Moreover, as my original idea of a naked logical structure was inspired by Birkhoff's definition of algebraic structure, I thought a good idea to use a similar terminology in logic as the one promoted by Birkhoff in algebra, who is «universally» recognized as the father of modern universal algebra.

The terminology «universal logic» shows clearly that universal logic is different from universal algebra (and in particular not part of it), but at the same time shows also the spiritual connection.

I think that the independency of universal logic with regards to universal algebra is much of the spirit of the Polish school of logic itself whose success was borne out the consideration of logic as an autonomous field as recalled by Wolenski and Zygmunt: «the logicians of the Warsaw school always emphasized the autonomy of logic as a discipline and

of the subject was (Birkhoff 1946) whose title is simply «universal algebra».

²⁹. Czelakowski (1980), Blok/Pigozzi (1989) and Font/Jansana (1996). The road leading from the algebra of logic to algebraic logic is an interesting object of study for the historian of modern logic which has yet to be fully examined. Curry stands in the middle of the road, he was the first to use the expression «algebraic logic» in (Curry 1952) and not Halmos as erroneously stated in (Blok/Pigozzi 1991, p. 365), but what he meant by it was still close to algebra of logic. Halmos introduced this expression rather to denote the algebraic treatment of first-order logic, but nowadays the expression «algebraic logic» is used to include both the zero and the first-order levels.

this ideology, regardless of its justification, was one of the pillars of the success of the Warsaw school of logic» (Wolenski/Zygmunt 1989, p. 403).

4. *Universal Logic onwards (Around the world 1994-99)*

4. 1. A lecture, a paper and a PhD

Back from Poland by the end of 1993, I stayed a couple of months in Paris where I developed some philosophical ideas related to universal logic in a short monograph entitled «universal semantics» (B 98c). In June 1994 I went to Czech Republic to present a lecture entitled «Universal Logic» at an international conference on logic at the Liblice castle. The reception was good and I wrote the full version back to São Paulo in August, improved by some comments of R. Sylvan who was visiting Brazil at that time. It was subsequently published in the proceedings of the conference (B 94b).

The paper contains in a first part, a full description of what I mean by universal logic, including reference to the Bourbakian architecture of mathematics and a short story of universal algebra,³⁰ illustrated, in a second part, by the example of an improved abstract form of the completeness theorem I was able to present, just having found an important result working on my PhD.

This result connects rules of sequent calculus with conditions for bivaluations in such a way that it is possible to instantaneously derive from it various completeness theorems. This result is purely abstract and does not depend neither on self-extensionality nor on truth-functionality. I achieved this result by putting together da Costa's theory of valuation, Lindenbaum-Asser's abstract form of Lindenbaum's extension lemma (Asser 1959) and abstract sequent calculus. The hint of my theorem was given to me by the study of Gentzen's first paper dealing with Hertz's *Satzsysteme* (Gentzen 1932). This theorem arrived at the right time in order to link works that I was putting together to form my math PhD, which I decided to entitle *Recherches sur la logique universelle (Excessivité, négation, séquents)* (B 95e).

Excessivity was the word that I had decided to use instead of «saturation» or «maximal relativization», because I thought «saturation» improper due to the fact that this terminology was already used in model theory with a different meaning and «maximal relativization» was much too lengthy. Moreover I found appropriate to introduce a virgin name to denote a concept that my researches had revealed fundamental. In particular the above central result depends on the fact that excessive sets respect rules of a certain class of systems of sequents. To specify this class and also for a general version of the cut-elimination theorem given there, I presented a deconstructional analysis of the sequent calculus.³¹ These general results are applied to the paraconsistent logic C_1+ . In this work I therefore follow the Bourbakian motto «from the general to the particular», in an inverse route that led me from paraconsistent logic to universal logic. My *study of negation* does not limit to paraconsistent logic but extends to a reformulation of Curry's theory of negation (Curry 1952). I was able to prove an interesting result showing that intuitionistic negation collapses into classical negation if we slightly modify the morphological feature of negation by admitting not only positive negations but also

³⁰. I was therefore jointly presenting two different tendencies, Bourbaki and universal algebra, which historically, for some odd reasons, have been conflicting.

³¹. I prefer the terminology «sequent system» than «sequent calculus», because a sequent calculus is not necessarily a calculus, in the algorithmic sense, if it is undecidable. More generally, I think that the word «calculus» in logic is inappropriate. It suggests that logic'algorithm, a thesis dismissed by the fall of Hilbert's program.

negative ones. I was led to this result by observing that the two forms of the *reductio ad absurdum* are quite the same (one increases the number of negations, the other one decreases it) and that therefore there were no good reasons that they should induce two different negations (this part of my PhD has been published as B 94d).

4. 2. Los Angeles

After finishing to write my PhD and send it to Paris, I stayed a while in Brazil where I concluded a translation of one book of da Costa in French including a preface and two appendices written by myself (one about paraconsistent logic (B 97a), the other about the theory of valuation (B 97b)).

At the beginning of 1995, I left São Paulo from Paris and then flew to Los Angeles where I was to stay a couple of months at UCLA. I attended lectures and seminars there both at the philosophy and mathematics departments but I was surprised to see so few logic, I mean logic for its own sake. Y. Moschovakis rightly described me the situation by a joke saying that there was no logic at UCLA, but on one side philosophy of language on the other side a lot of set theory.

Anyway I presented a talk at the math department «Universal logic: some results in abstract completeness.» A Polish logician, emigrated to the US, told me that of course he had heard about the theory of consequence operator when he was in Poland, but that he rejected it due to the fact that it fails to capture non-monotonic logics. I think that this rejection is common nowadays due to the success of these logics. However I don't think that it is a definitive argument against Polish logic. Most of the results of consequence operator theory can be in fact adapted to the non-monotonic case and Wójcicki wrote a paper apparently just to prove that (Wójcicki 200?). Non-monotonic logics just show, in my opinion, that Polish logic must be widened into a true universal logic.³²

I wanted also to present a talk at the philosophy department on the comparison between category theory and set theory as foundations of mathematics which would include comments on Bourbaki and universal algebra. But D. A. Martin told me that it would be a mess because on one hand people of the philosophy department would not understand the talk due to their very poor knowledge of this matter and on the other hand only «big names» were able to attract people in a lecture at this department. I realized therefore that analytic philosophy was not so much different than continental philosophy in the sense that in both cases the man is more important than the stuff he is speaking about. The argumentation of the analytic philosopher is not enough rigorous to have a value by its own, independently of who expresses it, as it may happen in mathematics. I realized also that analytic philosophers were using terms from logic without knowing their exact technical meanings, and that therefore they were speaking rather metaphorically, in a way not so much different to Lacan, Deleuze or Derrida.

I left L. A. at beginning of July 1995 at the time when the airport was under threat by the Unabomber and arrived in Paris to defend my math PhD. I left Paris after escaping for short of the bomb who killed many people in the RER subway at *Saint-Michel*.

³². Apart of Wójcicki's work on non-monotonic logics, there are some works by G. Malinowski where the axioms for the consequence operator are weakened (Malinowski 1990).

4. 3. The world of possible logics

Back to Brazil, I worked on two papers «What is many-valued logic?» (B 97f) and «What is paraconsistent logic?» (B 99e)³³ which are in a spirit of a project I had with da Costa to write a book entitled *The world of possible logics*³⁴ in which the most famous non-classical logics would be presented from the perspective of a general framework. The idea is really to use this kind of perspective to clear out the many confusions related to each given logic.

For example, people generally think that intuitionistic or modal logic are not many-valued but they are not really able to sustain their assertion, to turn explicit the matrix background of it. Even less are they able to explain, if by chance they know it, the challenging result according to which it is possible to give a bivalent semantics to most logics including Łukasiewicz's logic L_3 (see Suszko 1975).

As regard to paraconsistent logic, generally people just give a negative definition of it, the exclusion of the *ex-falso sequitur quodlibet*. But such a negative definition is meaningless as long as it is not complemented by a positive one. However there is not only one possible answer because several positive criteria may be incompatible together. I think that we can make a good job in this direction only if we have a general framework which allows us to compare rightly the various logical and metalogical properties. Working on this direction, I was able to show that there are no De Morgan full paraconsistent negations which are self-extensional (B 98b).

In a dialectical interplay, I worked on general problems and particular logics, and developed further paraconsistent logics (B 97g) including a self-extensional one (B 00a). I also used da Costa's theory of valuation to study connectives which are *between conjunction and disjunction* (B 98i). This is related to some problems in Biology on which I was working with M. V. Kritz at the LNCC. I think that nowadays logic is more and more connected with all the fields of knowledge³⁵ and that universal tools will help us to built *the right logic for the right situation*.

Another interesting question which links clearly abstract questions of universal logic with concrete cases is the question of *translations* between logics. As it is known classical logic can be translated into intuitionistic logic which at the same time is included in classical logic. How to explain this paradox? What is the exact status of «translations» between logics? Are they embedding? Working with an example of a logic even simpler than intuitionistic logic in which classical logic can be translated,³⁶ I showed that the question was not simple and was involving different notions such as the concept of identity between mathematical structures

³³. These two papers were presented respectively at the 27th International Symposium on Multiple-Valued Logic (Antigonish, Canada, May, 1997) and at the First World Congress on Paraconsistency (Ghent, Belgium, July 1997). My researches on many-valued logic started with a discussion with da Costa and O. A. Bueno (B 96c) about (Malinowski 1993).

³⁴. This nice title was suggested to us by Michel Paty.

³⁵. N. C. A. da Costa since more than ten years has started to work on the connections between logic and physics, logic and biology, logic and economy, etc. (see da Costa 1997).

³⁶. I found this logic by studying the paracomplete dual of C_1 and mentioned it in my math PhD (B 95e).

in general and the difference between real and nominal definitions (it is da Costa, once again, who introduced me to the subtlety of the theory of definitions, see (B 98f)).

I also started to develop the philosophical side of my universal logic's project which shows in particular that the formalist approach cannot any longer seriously be sustained; see (B 98e), (B 99f).

5. Universal logic in perspective

5. 1. A theory of our time

Universal logic corresponds to the spirit of our time. The number of new logics has increased these last years due to the need of computer sciences, artificial intelligence, cognition, and all the stuff of our cybertime. There is a need for systematization in order to put an unifying order in the chaos of the multiplicity.

Several books and papers have been recently written in this spirit presenting various methodologies and technical tools. Gabbay edited a book (Gabbay 1994) which collects a series of essays which are supposed to answer the question *What is a logical system?*

In his Mathematical Review of it [96k: 03008], Walter Carnielli rightly points out that the book misses a central question, the question of translations between logic. I think he is perfectly right. We must unify the «inconsistent multiplicity» of logics, to use Cantor's expression, in a Category of logics, and study the morphisms between logics, of which translations are particular cases. This is certainly a key point for a general theory of logics.³⁷

Another trouble with the book is the formulation of the question. The shorter question «What is a logic?» would be better. The expression «logical system» tends to focus on logics considered as proof-theoretical formal systems. It is much out of date and too narrow a view for full abstraction, as shown clearly by Barwise and Hammer's paper (Barwise/Hammer 1994) dealing with diagrams, an old visual approach to logic, which was considered in the past heuristical at best, but which has been taken seriously recently.³⁸

Despite of this, the proof-theoretical tendency is quite strong nowadays, in particular due to the crucial role of sequent calculus in linear logic, and in substructural logics in general. Some people are mixing this framework with the consequence operator's one and this is generating some confusions in the same line as those found in Scott years ago.³⁹

What is a substructural logic? One can say that it is a sequent system lacking some structural rules or whose sequents have not the same structure as the classical ones (cf. the intuitionistic case). Very good, very clear. But we must distinguish this system from the logic,

³⁷. The translation problem was not eschewed by the Polish school, people such as Wójcicki worked on it and Suszko and his collaborators were probably the first to work on a «category of logics». In Brazil, the logic group of Campinas has few years ago taken this subject as a main subject research (see Carnielli/D'Ottaviano 1997).

³⁸. In order to get an intuitive idea about the paraconsistent negation of C_1 , I worked with diagrams (B 98d).

³⁹. confusions have proliferated recently, see e. g. (Dunn/Hardegree 200?). The expression «substructural» was put forward by people working within a proof-theoretical framework with probably very few knowledge of Polish logic in which the expression «structural» is used since many years with a totally different meaning. On the other hand, Gentzen's work was not well-known in Poland and people were no aware that Gentzen already used the expression «structural rule» in a different context.

the consequence relation, it induces. This system can lack weakening rules, and the consequence relation can be monotonic (in fact monotony always holds for a consequence relation induced by a system of sequent, due to the very definition of «induced», which however can be modified). So what is a non-monotonic logic? Is a non-monotonic logic substructural or not? Is linear logic non-monotonic?

Gabbay in his own approach⁴⁰ to the subject does not avoid the confusions. For him, at first, a logical system is a consequence relation together with a proof system generating it, he says that he is compelled to this second part due to «the central role which proof theoretical methodologies play in generating logics» (Gabbay 1996, p. 3). Gabbay takes a second step by dropping monotony for the consequence relation and considering instead of a simple proof system, what he calls a LDS proof system (Gabbay 1996 p. 11).

No doubt that *Labelled Deductive Systems* is a nice technique which has innumerable applications, as shown by Gabbay in his book. However it is not simple enough to be as general as one may need. Firstly, why dropping just monotony? Secondly this proof-theoretical approach has some drawbacks. For example the complement of the underlying consequence relation of a logical system in the Gabbay's sense, cannot always be considered as the underlying consequence relation of a logical system (i. e. the case of first-order logic). Mathematically speaking, this class of logical systems is not closed under complementation. It is also not closed for a lot of other operations on a class of structures.

The proof-theoretical approach is limited and there are no good reasons to give priority to it. One may prefer a *semantical approach*. This is the case of Epstein (1990)⁴¹.

Although Epstein and Gabbay's approaches are based on two different methodologies, their works bear the same defects. On the one hand some general machinery is introduced with few important significative abstract results, on the other hand they present a huge quantities of examples to which their general methodologies apply more or less happily. Moreover working only on one side of the logical business, completeness is not a central question, which seems rather odd.

In view of these works we can say that the present state of research in the systematization of logic is much the same as the pre-Birkhoff period of universal algebra, well-illustrated by the «monstrous» book of Whitehead, which collects a lot of things together, without a serious methodology and without important results; as noted by Grätzer, Whitehead «had no results», though he «recognized the need for universal algebra.» (Grätzer 1979, p. vi).

If we want to go further on, I think we must follow the method that has always shown to be right in the history of mathematics: we must jump into abstraction. We must stop for a while to be preoccupied by such or such logic and work the abstraction for its own sake. This is what Birkhoff did with universal algebra and this is what must be done in logic in order to develop a real universal logic.

The general theory of logics which is emerging is of course in some sense contrasting with the traditional line of reserach in logic that can be «labelled» by the expression

⁴⁰. Presented as one chapter in (Gabbay 1994) and fully developed in (Gabbay 1996).

⁴¹. A general abstract semantical approach can already be found in (van Fraassen 1973). A less abstract semantical approach is related to «Abstract model theory» which includes such results as Lindström's theorem, see e. g. (Barwise 1974).

foundations of mathematics. One can say that the new trend is about *foundations of logic*⁴². Gabbay presents these two tendencies as opposed:

Unfortunately, the traditional logic community are still very conservative in the sense that they have not even accepted non-monotonic reasoning systems as logics yet. They believe that all this excitement is transient, temporarily generated by computer science and that it will fizzle out sooner or later. They believe that we will soon be back to the old research problems, such as how many non-isomorphic models does a theory have in some inaccessible cardinal or what is the ordinal of yet another subsystem of analysis. I think this is fine for mathematical logic but not for the logic of human reasoning. (Gabbay 1996, pp. 3-4).

But is mathematical logic not the logic of human reasoning? Maybe reasoning about transfinite is beyond computers minds but Cantor's paradise has been investigated by human brains. Anyway, I don't think that the gap between foundations of mathematics and the general theory of logics is so big. There are some connections as shown by the equivalence between the abstract formulation of Lindenbaum's extension lemma and the axiom of choice (see Dzik 1981). Even if in Poland this duality has increased after the war, people like Łoś and Suszko have made important contributions on both sides, pursuing the way of their masters, and in particular Tarski, who considered logic as a whole.

5. 2. Universal logic and philosophical logic

Nowadays the gap between mathematical logic and philosophical logic is striking. *Philosophical logic* (an ambiguous expression) itself is divided in two parts. On the one hand it is the study of non-classical logics such as relevant logic, modal logic, etc. If at the beginning these logics were motivated by philosophical preoccupations (hence the name), nowadays most of the works are of purely technical nature without even a pinch of philosophy. The adjective «philosophical» is in fact used here sometimes negatively, to qualify these works, by logicians working in «hard» foundations of mathematics and who are looking for mathematical recognition and don't want their work to be confused with something they regard as easy meaningless games for philosophers. But if it is true that these games exist, work in e. g. relevant logic, even at the propositional level, can be as difficult, mathematically speaking, as «hard» foundations.

On the other hand there is *philosophy of logic*, which has concentrated mainly on questions of reference (related to the famous «denotational» works of Frege and Russell), and which has turned in fact into *philosophy of language* where technical terms are used only metaphorically, the technical knowledge of these philosophers being in general reduced to truth-tables. And this may generate confusion.

I will give just an example. A lot of «philosophical logicians» are speaking about *intensionality* and it is standard to say that modal logics are intensional. But how can someone claim that a self-extensional logic is intensional? Explanation: on the one hand there are some people who are doing technical work on modal logic and know that these logics are *self-extensional* but they don't know exactly what is the problem of intensionality and use this name to conform to the usually way of speaking, on the other hand there are some people who

⁴². Curry was already using this expression: he wrote a book entitled *Foundations of mathematical logic* (Curry 1963), which was a kind of augmented version of (Curry 1952) which, as we have seen, also bears a prophetic title.

know «Sinn und Bedeutung» and «On denoting» by heart but are not aware that current modal logics are self-extensional and what this means.⁴³

One (maybe the original) reason why modal logics are called «intensional» is because the modal operators are *not truth-functional*. But if non truth-functionality may be considered as a necessary condition for intensionality, it is not at all a sufficient condition, as show indeed modal logics which are self-extensional: self-extensionality clearly conflicts with intensionality as the name rightly points out.⁴⁴

What is needed for good philosophical discussions about logic is clear definitions of the central features of logic. Therefore we can see why universal logic can be useful if not indispensable. The definitions philosophers need involve *mathematical abstract conceptualization* rather than symbolic formalisation. This is what they are maybe not aware of after logicism and formalism which gave a deformed vision of mathematics, according to which mathematics is a game which consists mainly of the manipulation of strings of signs following specific rules.

To understand truth-functionality, one must learn matrix theory, to understand such result as Gödel's result showing that intuitionistic logic cannot be characterized by a finite matrix, the reason why intuitionistic logic is said to be non truth-functional. To understand self-extensionality, one must know what is a congruence relation. Someone who doesn't understand these notions cannot seriously speak about the intensionality/extensionality problem.

Universal logic can give a new direction to the philosophy of logic, because it provides via modern mathematics, rigour and abstraction, without which philosophy of logic is only metaphorical discussion, bad poetry in the sense of Carnap.⁴⁵

5. 3. Paraconsistency and universal logic: a final word

G. Priest thinks that paraconsistent logic is the most important event in logic in the XXth century because it is kicking out a principle which was taken as the basis of reasoning during more than two thousands years. He uses the word *transconsistent* (Priest 1987) by comparison with the tranfinite's phenomenon (funny enough paraconsistent logic has been used also to defend a finitist point of view, see e. g. (van Bendegem 1993)).

In some sense he is right, the philosophical import of paraconsistent logic cannot be ignored, but I don't think that paraconsistent logic is the new paradigm.⁴⁶ What we know nowadays, after paraconsistent logic, is that logic is not founded on the principle of contradiction, that logic is still logic without this principle. In this sense logic is truly transconsistent. Paraconsistent logic has clearly shown that triviality is more fundamental than

⁴³. On this question see (B 93f).

⁴⁴. Unfortunately this name is not very used outside Poland.

⁴⁵. Suszko liked to say that «abstract mathematics can be a genuine philosophy». His ideas about philosophy of logic are similar to the one defended here, cf. (B 00e). In this paper we show how the mathematical concepts developed by the Polish school of logic can be a basis for a new approach in philosophy of logic, less formal or symbolic in style, but conceptually more mathematical.

⁴⁶. Nor a blend of paraconsistency and relevancy, or any other system which will play the role of a «universal» system; see (B 99d).

consistency, as da Costa (1958) already strongly emphasized, and has thus led us to more abstraction.

In the work of Vasiliev⁴⁷, considered with Łukasiewicz as the main forerunner of paraconsistent logic, we can find also some bright ideas, although his work is not technical in nature. Vasiliev argued that the principle of contradiction is *empirical*, that it is not a real fundamental formal principles of logic. He said that his *Imaginary Logic* which is a logic without the principle of contradiction just showed this, that this principle is accidental, independent (in the same way that Lobatchevski had shown with its Imaginary Geometry that Euclide's parallel postulate is). What Vasiliev said is that logic is grounded as a deeper level, which he called metalogic.⁴⁸

Łukasiewicz himself started his investigations which would lead to matrix theory and the general study of zero-order logics by accurate criticisms to Aristotle's defense of the principle of contradiction (Łukasiewicz 1910).

All this shows that paraconsistent logic has played a fundamental role towards universal logic, by dismissing the last and the more sacred principles of logic, showing that logic is grounded at a more abstract level, where no principles hold.

6. Bibliography

6. 1. General works

- Andréka, H., Gergely, T. and Németi, I.: 1977, «On universal algebraic constructions of logic», *Studia Logica*, 36, 9-47.
- Arruda, A. I.: 1990, *N. A. Vasiliev e a lógica paraconsistente*, CLE, Campinas.
- Asser, G.: 1959, *Einführung in die mathematische Logik*, Teil 1, Aussagenkalkül, Teubner, Leipzig.
- Avron, A.: 1988, «The semantics and proof theory of linear logic», *Theoretical Computer Science*, 57, pp. 161-184.
- Barwise, J.: 1974, «Axioms for abstract model theory», *Annals of Mathematical Logic*, 7, pp. 221-265.
- Barwise, J. and Hammer, E.: 1994, «Diagrams and the concept of logical system» in (Gabbay 1994, pp. 73-106).
- Batens, D.: 1987, «The semantically motivated enrichments to relevant logic» in Perzanowski, J. (ed.), *Essays on philosophy and logic (Proceedings of the XXXth Conference on the History of Logic, Dedicated to Roman Suszko)*, Crakow, pp. 65-74.
- Bazhanov, V. A.: 1990, «The fate of a forgotten idea: N. A. Vasiliev and his imaginary logic», *Studies in Soviet Thought*, 37, 143-151.

⁴⁷. On Vasiliev see (Bazhanov 1990) and (Arruda 1990).

⁴⁸. One could think that it will be a good idea to call «metalogic» what we have called «universal logic», but on the one hand the suffix «meta» has different meanings and has been already used in such expression as «metaphysics» and «metamathematics» with a meaning not corresponding to our intention, on the other hand the expression «metalogic» is already used and has already been used in various different ways. In fact one can find it, even before Vasiliev, but with a similar meaning in Schopenhauer. On this question see (B 92) and (B 93b).

- van Bendegem, J. P.: 1993, «Strict, yet rich finitism» in Wolkowski, Z. E. (ed), *First International Symposium on Gödel's Theorems*, World Scientific Press, Singapore, pp. 61-79.
- Birkhoff, G.: 1940, *Lattice theory*, AMS, Providence.
- Birkhoff, G.: 1946, «Universal algebra», in *Comptes Rendus du Premier Congrès Canadien de Mathématiques*, University of Toronto Press, Toronto, pp. 310-326.
- Birkhoff, G.: 1976, «The rise of modern algebra to 1936» in *Man and Institutions in American Mathematics*, Graduate Studies, Texas Technical Studies, 13, 65-85.
- Birkhoff, G.: 1987, «Universal algebra», in Rota, G.-C. and Oliveira, J. S. (eds.), *Selected Papers on Algebra and Topology by Garret Birkhoff*, Birkhäuser, Basel, pp. 111-115.
- Blok, W. J. and Pigozzi, D.: 1989, «Algebraizable logics», *Memoirs of the American Mathematical Society*, 396.
- Blok, W. J. and Pigozzi, D.: 1991, «Introduction», *Studia Logica*, 50, 365-374.
- Bloom, S.: 1984, «Roman Suszko: a reminiscence», *Studia Logica*, 43, 313.
- Bloom, S. and Brown, D. J.: 1973, «Classical abstract logics», *Dissertationes Mathematicae*, 102, 43-52.
- Bourbaki, N.: 1950, «The Architecture of Mathematics», *American Mathematical Monthly*, 57, 221-232.
- Bourbaki, N.: 1968, *Theory of Sets*, Addison-Wesley, New York.
- Brown, D. J. and Suszko, R.: 1973, «Abstract logics», *Dissertationes Mathematicae*, 102, 9-41.
- Buchsbaum, A. and Pequeno, T.: 1993, «Uma família de lógicas paraconsistentes e/ou paracompletas com semânticas recursivas», Preprint, Institute for Advanced Studies, São Paulo.
- Carnielli, W. A.: 1990, «Reasoning about Inconsistent Knowledge», Preprint, Institut de Recherche en Informatique de Toulouse, Toulouse.
- Carnielli, W. A. and D'Ottaviano, I. M. L.: 1997, «Translations between Logical Systems: A Manifesto», *Logique et Analyse*, 67-81.
- Chevalley, C.: 1985, «Nicholas Bourbaki, collective mathematician, an interview with Claude Chevalley», *Mathematical Intelligence*, 7, 18-22.
- Corry, L.: 1992, «Nicolas Bourbaki and the concept of mathematical structures», *Synthese*, 92, 315-348.
- Corry, L.: 1996, *Modern Algebra and the Rise of Mathematical Structures*, Birkhäuser, Basel.
- da Costa, N. C. A.: 1958, «Note sobre o conceito de contradição», *Anuario da Sociedade Paranaense de Matemática*, 1, 6-8.
- da Costa, N. C. A.: 1963, «Calculs propositionnels pour les systèmes formels inconsistants», *Comptes Rendus de l'Académie des Sciences de Paris*, 257, 3790-3793.
- da Costa, N. C. A.: 1966, *Algebras de Curry*, University of São Paulo.

- da Costa, N. C. A.: 1997, *O conhecimento científico*, Discurso, São Paulo.
- da Costa, N. C. A. and Alves E. H.: 1977, «A semantic analysis of the Calculi Cn», *Notre Dame Journal of Formal Logic*, 16, 621-630.
- da Costa, N. C. A. and Doria F. A.: 1991, «Undecidability and incompleteness in classical mechanics», *International Journal of Theoretical Physics*, 30, 1041-1072.
- da Costa, N. C. A. and Doria, F. A.: 1994, «Suppes Predicates and the Construction of Unsolvable Problems in the Axiomatized Sciences» in P. Humphreys (ed.), *Patrick Suppes: Scientific Philosopher*, vol. 2, Kluwer, Dordrecht, pp. 151-193.
- da Costa, N. C. A. and Krause, D.: 1994, «Schrödinger logics», *Studia Logica*, 53, 533-550.
- Curry, H. B.: 1952, *Leçons de logique algébrique*, Gauthier-Villars, Paris & Nauwelaerts, Louvain.
- Czelakowski, J.: 1980, *Model-theoretic methods in methodology of propositional calculi*, Polish Academy of Sciences, Warsaw.
- Czelakowski, J. and Malinowski, G.: 1985, «Key notions of Tarski's methodology of deductive systems», *Studia Logica*, 44, 321-351.
- Destouches, J.-L.: 1948, *Cours de logique et philosophie générale*, Centre de documentation universitaire, Paris.
- Dosen, K. and Schröder-Heister, P.: 1993, *Substructural logics*, Clarendon, Oxford.
- D'Ottaviano, I. M. L.: 1990, «On the development of paraconsistent logic and da Costa's work», *The Journal of Non-Classical Logic*, 7, 10-72.
- Dunn, J. M.: and Hardegree, G.: 199?, «Algebraic Methods in Philosophical Logic», to appear.
- Dzik, W.: 1981, «The existence of Lindenbaum's Extension is Equivalent to the Axiom of Choice», *Reports on Mathematica Logic*, 13, 29-31.
- Epstein, R. L.: 1990, *The Semantic Foundations of Logic*, vol. 1, Kluwer, Dordrecht.
- Farah, E.: 1955, *Proposições equivalentes ao axioma da escolha*, PhD, University of São Paulo, São Paulo.
- Février, P.: 1937, «Les relations d'incertitude d'Heisenberg et la logique» in *Travaux du IX^e Congrès International de Philosophie*, VI, Hermann, Paris, pp. 88-94.
- Font, J. M. and Jansana, R.: 1996, *A general Algebraic Semantics for Sentential Logics*, Springer, Berlin.
- Gabbay, D. M. (ed.): 1994, *What is a Logical System?*, Clarendon, Oxford.
- Gabbay, D. M.: 1996, *Labelled Deductive Systems*, vol. 1, Clarendon, Oxford.
- Gentzen, G.: 1932, «Über die Existenz unabhängiger Axiomensysteme zu unendlichen Satzsystemen», *Mathematische Annalen*, 107, 329-350.
- Grana, N.: 1990, *Sulla teoria delle valutazioni di N. C. A. da Costa*, Liguori, Napoli.
- Grätzer, G.: 1979, *Universal Algebra*, Springer, Berlin.

- Guillaume, M.: 1996, «Regard en arrière sur quinze années de coopération douce avec l'école brésilienne de logique paraconsistante», *Logique et Analyse*, 153-154, 6-14.
- Hertz, P.: 1929, «Über Axiomensysteme für beliebige Satzsysteme», *Mathematische Annalen*, 101, 457-514.
- Jaśkowski, S.: 1936, «Recherches sur le système de la logique intuitionniste» in *Actes du Congrès International de Philosophie Scientifique*, Vol. 6, Hermann, Paris, pp. 58-61.
- Jaśkowski, S.: 1948, «Rachunek zdan dla systemow dedukcyjnych sprzecznych», *Studia Societatis Scientiarum Torunensis, Sectio A.*, 1, 55-77.
- Kotas, J. and da Costa, N. C. A.: 1980, «Some problems on logical matrices and valorization» in A. I. Arruda et al. (eds.), *Proceedings of the Third Brazilian Conference on Mathematical Logic*, A. I. Arruda et al. (ed), SBL, São Paulo, pp. 131-146.
- Legris, J. and Molina, J. A.: 200?, «Intuitionistic Logic Considered as an Extension of Classical Logic: Some Critical Remarks», to appear.
- Loparic, A. and da Costa, N. C. A.: 1984, «Paraconsistency, paracompleteness and valuations», *Logique et Analyse*, 106, 119-131.
- Łoś, J.: 1949, O matrycach logicznych, *Travaux de la Société des Sciences et des Lettres de Wrocław, Série B*, 19.
- Łoś, J. and Suszko, R.: 1958, «Remarks on sentential logic», *Indigationes Mathematicae*, 20, 177-183.
- Łukasiewicz, J.: 1910, *O zasadzie sprzeczności u Arystotelesa*, Crakow.
- Łukasiewicz, J.: 1920, «O logice trójwartościowej», *Ruch Filozoficzny*, 5, 170-171.
- Łukasiewicz, J.: 1952, «On the intuitionistic theory of deduction», *Indigationes Mathematicae*, 14, 202-212.
- MacLane, S.: 1934, *Abgekürzte Beweise im Logikkalkül*, PhD, Göttingen.
- Malinowski, G.: 1990, «Q-consequence operation», *Reports on Mathematical Logic*, 24, 49-59.
- Malinowski, G.: 1993, *Many-valued Logics*, Clarendon, Oxford.
- Mortensen, C.: 1980, «Every quotient algebra for C_1 is trivial», *Notre Dame Journal of Formal Logic*, 21, 694-700.
- Porte, J.: 1965, *Recherches sur la théorie générale des systèmes formels et sur les systèmes connectifs*, Gauthier-Villars, Paris & Nauwelaerts, Louvain.
- Priest, G.: 1987, *In contradiction*, Nijhoff, The Hague.
- Raggio, A. R.: 1968, «Propositional sequence-calculi for inconsistent systems», *Notre Dame Journal of Formal Logic*, 9, 359-366.
- Rasiowa, H. and Sikorski, R.: 1963, *The Mathematics of Metamathematics*, Polish Academy of Sciences, Warsaw.
- Scott, D. S.: 1974a, «Rules and derived rules» in S. Stenlund (ed.), *Logical Theory and Semantical Analysis*, Reidel, Dordrecht, pp. 147-161.

- Scott, D. S.: 1974b, «Completeness and axiomatizability in many-valued logic» in L. Henkin (ed.), *Proceedings of the Tarski Symposium*, AMS, Providence, 1974, pp. 411-435.
- de Souza, E. G.: 1997, «Remarks on paraclassical logic», Preprint, University of São Paulo, São Paulo.
- Surma, S. J.: 1993, «Alternatives to the consequence-theoretic approach to metalogic», in *Proceeding of the IX Latin American Symposium on Mathematical Logic (Part 2)*, South National University, Bahía Blanca, pp. 1-30.
- Suszko, R.: 1975, «Remarks on Łukasiewicz's three-valued logic», *Bulletin of the Section of Logic*, 4, 87-90.
- Suszko, R.: 1977, «The Fregean axiom and Polish mathematical logic in the 1920's», *Studia Logica*, 36, 377-380.
- Tarski, A.: 1928, «Remarques sur les notions fondamentales de la méthodologie des mathématiques», *Annales de la Société Polonaise de Mathématiques*, 7, 270-272.
- Van Fraassen, B.: 1973, *Formal Semantics and Logic*, MacMillan, New-York.
- Whitehead, A. N.: 1898, *A treatise of Universal Algebra*, Cambridge University Press, Cambridge.
- Wójcicki, R.: 1984, *Lectures on Propositional Calculi*, Ossolineum, Wrocław.
- Wójcicki, R.: 1988, *Theory of Logical Calculi* (Basic theory of consequence operations), Kluwer, Dordrecht.
- Wójcicki, R.: 200?, «An axiomatic treatment of non monotonic arguments», to appear in *Studia Logica*.
- Wolenski, J.: 1989, *Logic and Philosophy in the Lvov-Warsaw School*, Kluwer, Dordrecht.
- Wolenski, J. and Zygmunt, J.: 1989, «Jerzy Śłupecki (1904-1987): Life and work», *Studia Logica*, 68, 401-421.

6. 2. My works (including joint works)

- [B 89] Béziau, J.-Y.: 1989, «Calcul des séquents pour logique non-aléthique», *Logique et Analyse*, 125-126, 143-155.
- [B 90a] Béziau, J.-Y.: 1990, *La logique paraconsistante C_1 de Newton C. A. da Costa*, Master thesis, Department of Mathematics, University of Paris 7.
- [B 90b] Béziau, J.-Y.: 1990, «Logiques construites suivant les méthodes de da Costa», *Logique et Analyse*, 131-132, 259-272.
- [B 92] Béziau, J.-Y.: 1992, «O princípio de razão suficiente e a lógica segundo Arthur Schopenhauer», in F. R. R. Évora (ed.), *Século XIX: O Nascimento da Ciência Contemporânea*, Cle, Campinas.
- [B 93a] Béziau, J.-Y.: 1993, «Nouveaux résultats et nouveau regard sur la logique paraconsistante C_1 », *Logique et Analyse*, 141-142, 45-58.
- [B 93b] Béziau, J.-Y.: 1993, «La critique Schopenhauerienne de l'usage de la logique en mathématiques», *O Que Nos Faz Pensar*, 7, 81-88.

- [B 93c] da Costa N. C. A. and Béziau, J.-Y.: 1993, «La théorie de la valuation en question», in *Proceedings of the Ninth Latin American Symposium on Mathematical Logic*, vol. 2, South National University, Bañha Blanca, pp. 95-104.
- [B 93d] Béziau, J.-Y.: 1993, «La logique abstraite au sein de la mathématique moderne», *Ruch Filozoficzny*, 50 (1993), pp. 289-293.
- [B 93e] da Costa, N. C. A. and Béziau, J.-Y.: 1993, «Carnot's logic», *Bulletin of the Section of Logic*, 22, 98-105.
- [B 93f] Béziau, J.-Y.: 1993, «Du Pont's paradox and the problem of intensional logic», in Kolar, P. and Svodoba, V. (eds.), *Logica'93 — Proceedings of the 7th International Symposium*, Philosophia. Prague, pp. 62-65.
- [B 94a] Béziau, J.-Y.: 1994, «De la logique formelle à la logique abstraite», *Boletim da Sociedade Paranaense de Matemática*, 14, 41-50.
- [B 94b] Béziau, J.-Y.: 1994, «Universal Logic», in T. Childers & O. Majer (eds), *Logica'94 — Proceedings of the 8th International Symposium*, Philosophia, Prague, pp. 73-93.
- [B 94c] da Costa, N. C. A. and Béziau, J.-Y.: 1994, «Théorie de la valuation», *Logique et Analyse*, 146, 95-117.
- [B 94d] Béziau, J.-Y.: 1994, «Théorie législative de la négation pure», *Logique et Analyse*, 147-148, 209-225.
- [B 95a] da Costa, N. C. A., Bueno, O. A. S. and Béziau, J.-Y.: 1995, «What is semantics?», *Sorites*, 3, 43-47.
- [B 95b] Béziau, J.-Y.: 1995, «Negation: what it is and what it is not», *Boletim da Sociedade Paranaense de Matemática*, 15, 37-43.
- [B 95c] da Costa, N. C. A., Béziau, J.-Y. and Bueno, O. A. S.: 1995, «Aspects of Paraconsistent Logic», *Bulletin of the Interest Group in Pure and Applied Logics*, 4, 597-614.
- [B 95d] da Costa, N. C. A., Béziau, J.-Y. and Bueno, O. A. S.: 1995, «Paraconsistent Logic in a Historical Perspective», *Logique et Analyse*, 150-152, 111-125
- [B 95e] Béziau, J.-Y.: 1995, *Recherches sur la logique universelle (Excessivité, négation, séquents)*, PhD, Department of Mathematics, University of Paris 7.
- [B 95f] Béziau, J.-Y.: 1995, «La véritable portée du théorème de Lindenbaum-Asser», Preprint 19, Institute of Advanced Studies, University of São Paulo.
- [B 95g] Béziau, J.-Y.: 1995, «Éléments pour un tractatus logico-physicus», Preprint 26, National Laboratory for Scientific Computing, Rio de Janeiro.
- [B 96a] Béziau, J.-Y.: 1996, *Sobre a verdade lógica*, PhD, Department of Philosophy, University of São Paulo.
- [B 96b] Béziau, J.-Y.: 1996, «Identity, logic and structure», *Bulletin of the Section of Logic*, 25, 89-94.
- [B 96c] da Costa, N. C. A., Béziau, J.-Y. and Bueno, O. A. S.: 1996, «Malinowski and Suszko on many-valued logics: On the reduction of many-valuedness to two-valuedness», *Modern Logic*, 6, 272-299.

- [B 96d] da Costa, N. C. A. and Béziau, J.-Y.: 1996, «Théorie paraconsistante des ensembles», *Logique et Analyse*, 153-154, 51-67.
- [B 97a] Béziau, J.-Y.: 1997, «La logique paraconsistante» in da Costa, N. C. A., *Logiques classiques et non classiques*, Masson, Paris, pp. 237-255.
- [B 97b] Béziau, J.-Y.: 1997, «Théorie de la valuation» in da Costa, N. C. A., *Logiques classiques et non classiques*, Masson, Paris, pp. 256-272.
- [B 97c] Béziau, J.-Y.: 1997, «A lógica universal» in da Costa, N. C. A., *O conhecimento científico*, Discurso, São Paulo, pp. 146-150.
- [B 97d] Béziau, J.-Y.: 1997, «Teoria das valorações» in da Costa, N. C. A., *O conhecimento científico*, Discurso, São Paulo, pp. 150-152.
- [B 97e] Krause, D. and Béziau, J.-Y.: 1997, «Relativizations of the principle of identity», *Logic Journal of the Interest Group in Pure and Applied Logics*, 5, 327-338.
- [B 97f] Béziau, J.-Y.: 1997, «What is many-valued logic?», in *Proceedings of the 27th International Symposium on Multiple-Valued Logic*, IEEE Computer Society, Los Alamitos, pp. 117-121.
- [B 97g] da Costa, N. C. A. and Béziau, J.-Y.: 1997, «Overclassical Logic», *Logique et Analyse*, 157, 31-44.
- [B 97h] Béziau, J.-Y.: 1997, «Logic May be Simple — Logic, Congruence and Algebra», *Logic and Logical Philosophy*, 5, 129-147.
- [B 97i] Krause, D., J.-Y. Béziau and O. A. S. Bueno: 1997, «Estruturas em Ciência», *Boletim da Sociedade Paranaense de Matemática*, 17, 91-111.
- [B 98a] da Costa, N. C. A., J.-Y. Béziau, O. A. S. Bueno: 1998, *Elementos de Teoria Paraconsistente de Conjuntos*, CLE, Campinas.
- [B 98b] Béziau, J.-Y.: 1998, «Idempotent Full Paraconsistent Negations are not Algebraizable», *Notre Dame Journal of Formal Logic*, 39, 135-139.
- [B 98c] Béziau, J.-Y.: 1998, «Sémantique Universelle», Preprint, Institute for Advanced Studies, University of São Paulo.
- [B 98d] Béziau, J.-Y.: 1998, «Paranormal Spaces», Preprint, National Laboratory for Scientific Computing, Rio de Janeiro.
- [B 98e] Béziau, J.-Y.: 1998, «Do Sentences have Identity?», in *The Paideia Project — Proceedings of the XXth World Congress of Philosophy*, <http://www.bu.edu/wcp/MainLogi.htm>.
- [B 98f] da Costa, N. C. A. and J.-Y. Béziau: 1998, «Définition, Paraconsistance et Théorie des Objets», *Theoria*, 32, 367-379.
- [B 98g] Béziau, J.-Y.: 1998, «Applications de la Logique Paraconsistante à la Justice et au Droit», in *Anais do V Congresso Brasileiro de Filosofia*, vol. 2, Brazilian Institute of Philosophy, São Paulo, pp. 1119-1128.
- [B 98h] Béziau, J.-Y.: 1998, «Recherches sur la Logique Abstraite: les Logiques Normales», *Acta Universitatis Wratislaviensis, Logika*, 18, 105-114.

- [B 98i] Béziau, J.-Y.: 1998, «Neojunction: between Disjunction and Conjunction», Preprint, National Laboratory for Scientific Computing, Rio de Janeiro.
- [B 99a] Béziau, J.-Y.: 1999, «Classical Negation can be Expressed by One of its Halves», *Logic Journal of the Interest Group in Pure and Applied Logics*, 7, 145-151.
- [B 99b] Béziau, J.-Y.: 1999, «Rules, Derived rules, Permissible Rules and the Various Types of Systems of Deduction», in E. H. Haeusler and L. C. Pereira, (eds.), *Pratica — Proof, Types and Categories*, PUC, Rio de Janeiro, pp. 159-184.
- [B 99c] Béziau, J.-Y.: 1999, «A Sequent Calculus for Łukasiewicz's Three-Valued Logic Based on Suszko's Bivalent Semantics», *Bulletin of the Section of Logic*, 28, 89-97.
- [B 99d] Béziau, J.-Y.: 1999, «The Future of Paraconsistent Logic», *Logical Studies*, 2, 1-17, <http://www.logic.ru/LogStud/02/No2-01.html>.
- [B 99e] Béziau, J.-Y.: 1999, «What is Paraconsistent Logic?», to appear in D. Batens et al. (eds.), *Frontiers in Paraconsistent Logic*, J. Wiley, London.
- [B 99f] Béziau, J.-Y.: 1999, «The Mathematical Structure of Logical Syntax», W. A. Carnielli, and I. M. L. D'Ottaviano (eds.), *Advances in Contemporary Logic and Computer Science*, AMS, Providence, pp. 3-15.
- [B 99g] Béziau, J.-Y.: 1999, «A Logical Analysis of Singular Terms», *Sorites*, 10, 6-14, http://www.ifs.csic.es/sorites/Issue_10/item02.htm.
- [B 99h] da Costa, N. C. A. and J.-Y. Béziau: 1999, «La Logique Paraconsistante», in J. Sallantin and J. J. Szczeciniarz, *La Preuve à la Lumière de l'Intelligence Artificielle*, Presses Universitaires de France, pp. 107-115.
- [B 99i] Béziau, J.-Y.: 1999, «Ruth Barcan Marcus est-elle la Mère du Fils de Wittgenstein? (Considérations Existentialistes sur la Formule de Barcan)», *Manuscrito*, 22, 11-27.
- [B 99j] Béziau, J.-Y.: 1999, «Was Frege Wrong when Identifying Reference with Truth-Value?», *Sorites*, 11, 15-23, http://www.ifs.csic.es/sorites/Issue_11/item04.htm.
- [B 00a] Béziau, J.-Y.: «The Paraconsistent Logic Z — A Possible Solution to Jaśkowski's Problem», paper presented at the Jaśkowski's Memorial Symposium — Torun 1998, submitted.
- [B 00b] Béziau, J.-Y.: «Sequents and Bivaluations», submitted.
- [B 00c] Béziau, J.-Y.: «Paraconsistent Logic!», submitted.
- [B 00d] Béziau, J.-Y.: «S5 is a Paraconsistent Logic and so is First-Order Classical Logic», submitted.
- [B 00e] Béziau, J.-Y.: «The Philosophical Import of Polish Logic», paper presented at the 11th International Symposium on Logic, Methodology and Philosophy of Science B Cracow 1999, submitted.
- [B 00f] Béziau, J.-Y. and M. V. Kritz: «Théories et Modèles», submitted.

[B 00g] Béziau, J.-Y.: «A Survey of General Abstract Logic», submitted.

* Work Supported by a Grant of the Swiss National Science Foundation

Jean-Yves Béziau

**Center for the Study of Language and Information
Stanford University, Stanford, CA, 94305-4115, USA**

<jyb@csl.stanford.edu>

SORITES (ΣΩΡΙΤΗΣ), ISSN 1135-1349

Issue #12. May 2001. Pp. 33-54.

God and His/her Act of Creation: Leibniz and the
«Why-not-sooner» Argument

Copyright © by SORITES and Abel B. Franco Rubio de la
Torre

GOD AND HIS/HER ACT OF CREATION: LEIBNIZ AND THE «WHY-NOT-SOONER» ARGUMENT

by Abel B. Franco Rubio de la Torre

Introduction

The question about how to conceive God's act of creation in a fashion compatible with Leibniz's own thought is in itself a cluster of complex and interrelated issues. I will discuss in the following pages only three aspects (or conglomerates of aspects) of the issue: (1) Leibniz's view of how God actually created the world, and within this and more specifically, (2) his arguments to reject the «why-did-God-not-create-the-world-sooner» question as not applicable to this case, and (3) the consequences of those arguments for the concept of time. I will argue that, given Leibniz's own view of creation and time, (1) the question about why God did not create the world earlier or later is a legitimate one despite his explicit efforts in the opposite sense, and, furthermore, (2) an answer to the question within Leibniz's thought would fall prey of fatal contradictions and inconsistencies.

This problem is not new in the history of philosophy. As far as I know the issue was for the first time clearly faced and introduced into the philosophical discussion by Augustine of Hippo (354-430). Interestingly enough, both Augustine and Leibniz were «forced» to face the problem by their contemporary opponents while dealing with other issues, as if they did not feel the question deserved attention in itself or did not feel comfortable dealing with it. Whereas Augustine was defending a correct interpretation of the Scriptures against the objections of the Manichees to the Old Testament, Leibniz found himself facing the problem of a possible earlier creation in the famous correspondence with Clarke while attacking Newton's absolute time. Both thinkers coincided too in defending similar views on some of the crucial ideas involved in the discussion: both defended, for example, a world in which time is, at least in some sense, dependent upon change, and, more important, both believed God is the timeless creator of a temporal world. The former idea — time as the measure of motion (but dependent on it) — was put forward by Aristotle in the fourth book of his

*Physics*¹ and still enjoyed good health in seventeenth-century thinkers like Descartes² and Hobbes.³ The latter view — a temporal creation by an timeless being — represents in itself a major philosophical difficulty: how can both be compatible, i. e. the timelessness of the creator and the temporality of the created world? how can it be possible at all that a timeless being creates something temporal? This difficulty can be explored by dividing and reformulating it from two of its basic premises, namely, that God creates a *temporal world*, and that he *makes a decision* to do so — both Leibniz and Augustine agree on this. We would have, then, two basic questions to answer:

1) Which is the content of God's eternity, i. e. his *occupation* in that eternity, especially before creating the world? We can narrow this question more: how much of that occupation can we say from the very fact that he decided to create the world? and is that enough to talk about the existence of time? If time is the measure of motion (as both Leibniz and Augustine believe), the exploration of that pre-creation *state* in God may help to find out whether we can talk or not about time in a *world* in which only God existed.

And 2) which relation does God's (timeless) existence maintain with his own *act* of creation (not with the created world)? If we, in fact, admit — and Leibniz, in particular, is quite explicit about this, especially because God is free —, at least, that God *made a decision* to create the world — as opposed, for example, to Plotinus' necessitarian view of a God creating by necessity, or to Descartes' unification of God's only act

¹. «Time is the dimension of movement in its before-and-afterness, and is continuous (because movement is so)» (Aristotle, *Physics* 4. 11. 220a25 ff., trans. P. Wicksteed and F. Cornford [Cambridge, Mass.: Harvard University Press; London: W. Heinemann Ltd, 1980], vol. I, p. 395).

². «Now some attributes or modes are in the very things of which they are said to be attributes or modes, while others are only in our thought. For example, when time is distinguished from duration taken in the general sense and called the measure of movement, it is simply a mode of thought. For the duration which we understand to be involved in movement is certainly no different from the duration involved in things which do not move. This is clear from the fact that if there are two bodies moving for an hour, one slowly and the other quickly, we do not reckon the amount of time to be greater in the latter case than the former, even though the amount of movement may be much greater. But in order to measure the duration of all things, we compare their duration with the duration of the greatest and most regular motions which give rise to years and days, and we call this duration «time». Yet nothing is thereby added to duration, taken in its general sense, except for a mode of thought» (Descartes, *Principles of Philosophy* 57, in *The Philosophical Writings of Descartes*, vol. I, trans. J. Cottingham, R. Stoothoff, and D. Murdoch [New York: Cambridge University Press, 1985], p. 212).

³. For example in his *De corpore*: «As a body leaves a phantasm of its magnitude in the mind, so also a moved body leaves a phantasm of its motion, namely an idea of that body passing out of one space into another by continual succession. And this idea, or phantasm, is that, which (without receding much from the common opinion, or from Aristotle's definition) I call *Time*. [...] A complete definition of *time* is such as this, *TIME is the phantasm of before and after in motion*; which agrees with the definition of Aristotle, *time is the number of motion according to former and later*; and *time is a phantasm of motion numbered*. But that other definition, *time is the measure of motion*, is not so exact, for we measure time by motion, and not motion by time» (Thomas Hobbes, *De corpore* [Concerning body], in *The English Works of Thomas Hobbes*, vol. I, collected and ed. Sir William Molesworth in 1839 [London: Scientia Aalen, 1962], II. vii. 3, p. 95).

with his will and with the expression of his own freedom⁴ — then the exploration of how to understand that very act of making a decision may also help resolve the issue of whether it in itself implies the existence of time or not. I believe these are the two crucial questions, not fully faced by either Augustine or Leibniz, whose answer will solve the matter of time before creation. And I also believe that, given Augustine's and Leibniz's view of creation, both of them lead to an affirmative response: there is time before creation. Let us see.

I

Leibniz does not devote much time to the details of how the world was created. Certain passages openly suggest that for him to understand the very act of creation does not seem to be *a priority*, or even a possibility:

PHIL. Many words, which seem to express some action, signify nothing [but the cause and the effect]; v. g. *creation, annihilation*, contain in them no idea of the action or manner..., but barely of the cause, and the thing' which is produced.

THEO. I admit that in thinking of the creation one does not — and indeed cannot — conceive of any process in detail. But one thinks of something in addition to God and the world, for one thinks that God is the cause and the world the effect, i. e. that God has produced the world. So obviously one does also think of action.⁵

Creation is a word which «contains in it *no idea of the action or manner...*, but barely *of the cause, and the thing which is produced*» (my italics). But notice that Leibniz is clearly referring to creation as a «word». The problem, in these terms, seems to be simply one of the reference of the word creation: since it does not refer to a particular process the term simply

⁴. «In reality the decrees could not have been separated from God: he is not prior to them or distinct from them, nor could he have existed without them. So it is clear enough how God accomplishes all things in a single act» (Descartes, *Conversations with Burman* 50, trans. and intro. John Cottingham [Oxford: Clarendon Press, 1976]). «In God, willing, understanding and creating are all the same thing without one being prior to the other even conceptually» (Descartes, Letter to Mersenne, 27 May 1630, in *The Philosophical Writings of Descartes* vol. III, trans. J. Cottingham, R. Stoothoff, and D. Murdoch [Cambridge, UK: Cambridge University Press, 1985]). «I do not see why God should not have been able to create something from eternity. Since God possessed his power from all eternity, I do not see any reason why he should not have been able to exercise it from all eternity» (*Descartes' Conversation with Burman* 23, p. 15. The reasons why Descartes eliminates the temporal distance between God and his creation

(i. e. the priority in time of the former) seems to be analogous to the elimination of that distance in the case of God's creation of himself. Arguing for the latter, Descartes writes: «I think it is necessary to show that, in between «efficient cause» in the strict sense and «no cause at all», there is a third possibility, namely «the positive essence of a thing», to which the concept of an efficient cause can be extended. [...] I thought I explained this in the best way available to me when I said that in this context the meaning of «efficient cause» must not be restricted to causes which are prior in time to their effects or different from them. For, first, this would make the question trivial, since everyone knows that something cannot be prior to, or distinct from, itself; and secondly, the restriction «prior in time» can be deleted from the concept while leaving the notion of an efficient cause intact.» (*Fourth Set of Replies* 239-40, in *Philosophical Writings* II pp. 167-68). And also: «The answer to the question why God exists should be given not in terms of an efficient cause in the strict sense, but simply in terms of the essence or formal cause of the thing. And precisely because in the case of God there is no distinction between existence and essence, the formal cause will be strongly analogous to an efficient cause, and hence can be called something close to an efficient cause. (*Fourth set of Replies* 243, in *Philosophical Writings* II, p. 169).

⁵. Leibniz, *New Essays on Human Understanding*, trans. and ed. Peter Remnant and Jonathan Bennett (New York: Cambridge University Press, 1996), p. 216.

does not say anything about that process. But in other places the problem becomes more than a linguistic one: it is an epistemic-ontological one. We cannot really know much about creation, in any case, Leibniz says, because of its own nature. Creation, according to Leibniz, is a good example of a «miracle,» one of those phenomena which «cannot be explained by the nature of bodies». ⁶ And although «there are miracles of an inferior sort, which an angel can work» (like «make a man walk upon the water without sinking»), ⁷ creation can only be done by God, which places it even further from our comprehension. «There are miracles, which none but God can work; they exceeding all natural powers. Of which kind, are creating and annihilating». ⁸

Statements like these in Leibniz's writings obviously contribute to deter anyone from trying to make manifest his view on how God created the world. If «thinking of the creation,» as we have just read, «one does not conceive of any process in detail,» and if, furthermore, that action is a «miracle» (and, therefore, beyond «all natural powers»), then, there is, in fact, not much to say about it. Leibniz does, however, say something about it. But these words help explain why there is — if not a total absence of thoughts on the question in his writings — at least a notable lack of a somehow organized and systematic treatment of it. This is not the case of the philosophical problems related to how creation is possible — that is the problem of how something could come into existence from nothing, which for Leibniz is equivalent to the problem of why there is something rather than nothing ⁹ —, and why God created *this* particular world rather than another. These issues do have a lengthy place in Leibniz's writings. But they do not abound in details on how God brought the world into existence.

When God is referred to as a creator, he is depicted as a «mathematician» («a kind of divine mathematics or metaphysical mechanism is used in the origin of things» ¹⁰) or as an

⁶. Leibniz's third letter to Clarke 17, in H. G. Alexander, ed., *The Leibniz-Clarke Correspondence* (Manchester: University of Manchester Press, 1956), p. 30. I must confess that I do not understand the use of certain punctuation signs in this translation, in particular the use of commas, semi-colons and the colons. If we follow them strictly the reading of the book, which by itself is not specially difficult, sometimes becomes unintelligible. I will not, however, modify the punctuation given in Alexander's edition.

⁷. Leibniz's fourth paper to Clarke 44, in *ibid.*, p. 43.

⁸. *Ibid.*

⁹. «I certainly grant you can imagine that the world is eternal. However, since you assume only a succession of states, and since no reason for the world can be found in any one of them whatsoever (indeed, assuming as many of them as you like won't in any way help you to find a reason), it is obvious that the reason must be found elsewhere. For in eternal things, even if there is no cause, we must still understand there to be a reason. In things that persist, the reason is the nature or essence itself, and in a series of changeable things (if, *a priori*, we imagine it to be eternal), the reason would be the superior strength of certain inclinations, as we shall soon see, where the reasons don't necessitate (with absolute or metaphysical necessity, where the contrary implies a contradiction) but incline. From this it follows that even if we assume the eternity of the world, we cannot escape the ultimate and extramundane reason for things, God» (Leibniz, «On the Ultimate Origination of Things,» *op. cit.*, p. 150).

¹⁰. Leibniz, «On the Radical Origination of Things,» in *Philosophical Papers and Letters*, vol. II, selec., trans., and ed. Leroy E. Loemker (Chicago: University of Chicago Press, 1956), p. 792.

«architect»¹¹ who was looking for the best solution to the problem of how to create the world. The «problem» for him was to produce the maximum amount of perfection,¹² a task for which mathematics could provide the reasons to build a perfect mechanism.¹³ And although the world is not only «the most wonderful mechanism» but is also «the most perfect [world] morally,» Leibniz reminds several times that «moral perfection is truly natural».¹⁴ In any case, in order to produce a *physical* world the mathematician must be something else. He must *act* on matter. And this is what we want to know about here.

One of the few places where Leibniz faces openly and at some length aspects of the question about how God actually created the world is in his letters to Clarke (and, therefore, to Newton too), in particular the third and fifth ones. There Leibniz deals with the very specific problem of why God did not create the world earlier or later. He attempts, in particular, to refute the view of those who think it possible that God could have created the world sooner.¹⁵ He divides the problem in two cases: (1) the possibility that God could have created this *same* world sooner, and (2) the possibility that he could have created *a* world sooner.

¹¹. For example, in Leibniz, *Monadology* 87 and 89, trans. N. Rescher (Pittsburgh: University of Pittsburgh Press, 1991), p. 29.

¹². «Once having assumed that being involves,ore perfection than nonbeing, or that there is a reason why something should come to exist rather than nothing, or that a transition from possibility to actuality must take place, it follows that, even if there is no further determining principle, there does exist the greatest amount possible in proportion to the given capacity of time and space (or the possible order of existence), in much the same way as tiles are laid so that as many as possible are contained in a given space» (Leibniz, «On the Radical Origination of Things,» p. 792).

¹³. «We can now understand in a wonderful way how a kind of divine mathematics or metaphysical mechanism is used in the origin of things and how the determination of the maximum takes place. So the right angle is the determined one of all angles in geometry, and so liquids placed in a different medium compose themselves in the most spacious figure, a sphere. But besr of all is the example in ordinarymechanics itself; when many heavy bodies pull upon each other, the resulting motion is such that the maximum possible total descent is secured. For just as all possibilities tend with equal right to existence in proportion to their reality, so all heavy objects tend to descend with equal right in proportion to their weight. And just as, in the latter case, that motion is produced which involves the greatest possible descent of these weights, so in the former a world is produced in which a maximum production of possible things takes place» (ibid., p. 792).

¹⁴. «[...] the world is not only the most perfect naturally or, if you prefer, metaphysically --in other words, that that series of things has been produced which actually presents the greatest amount of reality --but also that it is the most perfect morally, because moral perfection is truly natural in minds themselves. Hence the world not only is the most wonderful mechanism but is also, insofar as it consists of minds, the best commonwealth, through which there is conferred on minds as much felicity or joy as possible; it is in this that their natural perfection consists» (ibid., pp. 794-795). «As we have already established a perfect harmony between two natural realms, the one of efficient and the other of final causes, we must here also recognize a further harmony between the physical realm of nature and the moral realm of grace, that is, between God considered an architect of the mechanism of the universe, and God considered a monarch of the divine city of spirits» (*Monadology* 87, op. cit., p. 28).

¹⁵. H. G. Alexander, ed., *The Leibniz-Clarke Correspondence* (Manchester: University of Manchester Press, 1956), 55-59 & 106. I must confess that I do not understand the use of certain punctuation signs in this translation, in particular the use of the commas, the semi-colons and the colons. If we follow them strictly, the reading of the book, which by itself is not specially difficult, sometimes becomes unintelligible.

Regarding the former, Leibniz's answer does not leave any room for doubts. Anyone claiming that God could have created this world sooner is either «saying nothing that is intelligible» or «supposing a chimerical thing.»¹⁶ His main reason for such a clear rejection is that «there is no mark or difference whereby it would be possible to know that this world was created sooner».¹⁷ That mark is supposedly a temporal mark and without it we would not be able to «know» about a sooner or later. We should notice two things here: (1) Leibniz is not saying that *there is not* a sooner but simply that we cannot «know» it; and (2) the verb «to know» seems to have «we» as subject. But it could have also another subject, namely, God. We could think of a possible mark only knowable to God. This is interesting to note because, taking in all its generality Leibniz's statement that the necessary mark cannot be known, then he is clearly rejecting both possibilities: the mark cannot be known by us or by anybody else, namely, God.

But Leibniz does not simply reject an «earlier creation» from an epistemological perspective. It is also rejected ontologically. In which conditions would that mark exist? That mark would exist, according to Leibniz, only if we admitted an absolute time independent (a) of the created world *or* (b) of God. And both possibilities must be rejected. Let us see. An absolute time as independent upon the created world is rejected because time exists only if there are created things. «Time, without things, is nothing else but a mere ideal possibility.»¹⁸ The lack of «things» before creation, in this case, means that there is no time before creation and, therefore, no mark to talk about sooner or later. The why-not-sooner question does not apply.¹⁹ As to the second possibility, a time independent of God is rejected because nothing in the world is out of his dominion and, according to Leibniz, for God to be in time means that he depends on it. God cannot have «the property of being in time» because that would make him «depend upon time and stand in need of it».²⁰ Thus, if time were taken for something «real and absolute without bodies,» Leibniz writes, it would be «a thing eternal, impassible, and independent upon God,»²¹ which for him is enough to reject that possibility.

Thus, we have two reasons why God did not create the world earlier: (1) he did not have a «reason» to do so; and (2) he could not even have a reason because time did not exist then. God did not have enough reason to create at a particular instant because before creation there are not two different instants then. Instants is, strictly speaking according to Leibniz, the

¹⁶. Ibid., p. 75.

¹⁷. Ibid., p. 75.

¹⁸. Ibid., p. 75.

¹⁹. «Supposing any one should ask, why God did not create every thing a year sooner; and the same person should infer from thence, that God has done something, concerning which «tis not possible there should be a reason, why he did it so, and not otherwise: the answer is, that his inference would be right, if time was anything distinct from things existing in time. For it would be impossible there should be any reason, why things should be applied to such particular instants, rather than to others, their succession continuing the same» (Leibniz's third paper to Clarke 6, in *Leibniz-Clarke Correspondence*, op. cit., pp. 26-27).

²⁰. Leibniz's fifth paper 50, in op. cit., p. 73: «If the reality of space and time, is necessary to the immensity and eternity of God; if God must be in space; if being in space, is a property of God; he will in some measure, depend upon time and space, and stand in need of them.

²¹. Ibid. 36, p. 66.

only thing of time that exists. «Nothing of time does ever exist, but instants; and an instant is not even itself a part of time» which means that «time can only be an ideal thing».²² But since two instants cannot be distinguished before time is created, Leibniz's principle of the identity of indiscernibles forces to conclude that, in fact, there are not two instants. «If two things perfectly indiscernible from each other did exist, they would be two [...] is false and contrary to the grand principle of reason».²³ Thus, «one must not say [...] that God created things in what particular space, and at what particular time he pleased. For, all time and all spaces being in themselves perfectly uniform and indiscernible from each other, one of them cannot please more than another».²⁴ And, therefore, God could not have «good reasons» to create the world sooner.²⁵

Leibniz extends further the consequences of his principle of indiscernibles. He talks sometimes about an «ideal time» which supposedly exists only in God's mind — and, therefore, it *does* exist before creation. «If there were no creatures, space and time would be only the ideas of God.»²⁶ But even in this case it would be meaningless for Leibniz to talk about different instants because we are referring to «ideal things». «The parts of time or place, considered in themselves, are ideal things; and therefore they perfectly resemble one another like two abstract units. But it is not so with two concrete ones, or with two real times, or two spaces filled up, that is, truly actual.»²⁷ There is, however, at least one place where Leibniz talks about time (and place), not as dependent on the world or on God, but as a sort of precondition for creation:

It is very clearly understood that, out of the infinite combinations and series of possible things, one exists through which the greatest amount of essence or possibility is brought into existence. There is always a principle of determination in nature which must be sought by maxima and minima; namely, that a maximum effect should be achieved with a minimum outlay, so to speak. And at this point time and place, or, in a word, the receptivity or capacity of the world, can be taken for the outlay, or the terrain on which a building is to be erected as commodiously as possible, the variety of forms corresponding to the spaciousness of the building and the number and elegance of its chambers.²⁸

Although this time as the «receptivity of the world» seems to be independent of God — unless God is taken as responsible for that receptivity — it does not mean, however — following Leibniz's previous argument — that we have a mark to talk about sooner or later.

²². Leibniz's fifth paper to Clarke 49, in *op. cit.*, p. 72.

²³. *Ibid.* 26, p. 62. And a clarification must be added: «When I deny that there are two drops of water perfectly alike, or any two other bodies indiscernible from each other; I don't say, «tis absolutely impossible to suppose them; but that «tis a thing contrary to the divine wisdom, and which consequently does not exist» (*ibid.* 25, p. 62).

²⁴. *Ibid.* 60, p. 77.

²⁵. «One cannot say [...] that the wisdom of God may have good reasons to create this world at such or such a particular time: that particular time, considered without the things, being an impossible fiction; and good reasons for a choice, being not to be found, where everything is indiscernible» (Leibniz's fifth paper to Clarke 58, pp. 76-77).

²⁶. Leibniz's fourth paper to Clarke 41, in *ibid.*, p. 42.

²⁷. *Ibid.* 27, p. 63.

²⁸. Leibniz, «On the Radical Origination of Things,» *op. cit.*, p. 791.

It could still not be real time but only ideal, as the possibility is to the existence in Leibniz's larger view of creation.²⁹

Let us observe some of the implications of this argument so far. It has been an important implicit statement that it is by creating the things of this world how God brought time into existence. In other words, the created things and time started existing simultaneously:

Thus it appears how we are to understand, that God created things at what time he pleased; for this depends upon the things, which he resolved to create. But things being once resolved upon, together with their relations; there remains no longer any choice about the time and the place, which of themselves have nothing in them real, nothing that can distinguish them, nothing that is at all discernible.³⁰

This is also the reason why the only real time is the «time of things» (i. e. the time of the world), why time is dependent upon things, and why Newton's absolute time should be rejected. «Space in itself is an ideal thing, like time; space [and time] out of the world must needs be imaginary [...]».³¹ And consequently, also, we cannot talk either about «instants» before creation. «Instants, consider'd without the things, are nothing at all; and they consist only in the successive order of things».³² What about the moment of creation itself? Did it take place in the «first instant»?

In a letter to Louis Bourguet written at about the same time he is maintaining his correspondence with Clarke, Leibniz discards «the necessity of conceiving a primary instant» arguing that «there is no one point whatsoever in nature which is fundamental with respect to all other points and which is therefore the seat of God, so to speak.»³³

Notice two things: (1) that he rejects only the «necessity» of a first instant, which means that «[he] do[es] not venture to deny that there may be a first instant»;³⁴ and (2) that the first instant for Leibniz is, in a sense, «the seat of God.» The latter is quite ambiguous in this context. In which sense would that first instant, if it existed, be «the seat of God»? One interpretation would be the one given above, namely, that without God the first instant would not be measurable as such. But would that not be the opposite, God as «the seat of time»? Why talk here about the «seat of God»?

Let us see how Leibniz deals with the second part of the why-not-sooner problem as it was outlined above in his own words — the possibility that *a* world, any possible world, was created earlier. The argument he uses to reject this possibility is not very different. Leibniz proposes to imagine a prolongation backwards of a possible world already created by

²⁹. «For it must be that, if there is a reality in essences or possibilities, or indeed in eternal truths, this reality be founded in something existent and actual, and consequently in the existence of the Necessary Being, in whom essence includes existence, or in whom being possible suffices for being actual» (*Monadology* 44, op. cit., p. 22).

³⁰. Leibniz's fifth paper to Clarke 57, p. 76.

³¹. Ibid. 33, op. cit., p. 64.

³². Ibid., p. 27.

³³. Leibniz, Letter to Louis Bourguet, August 5, 1715, in *Philosophical Papers and Letters*, vol II, op. cit., p. 1079.

³⁴. Ibid., p. 1080.

God, so that it would be *a world created sooner*. Now, can this actually happen? No, according to Leibniz. For although he admits that «one may conceive that such a world began sooner» he denies that such an augmentation «be reasonable and agreeable to God's wisdom...[for] otherwise God would have made such an augmentation.»³⁵ In other words, although that world could exist in our imaginations it could never have come into existence in actuality because it would not have been «reasonable» for God to create it then (i. e. sooner). Thus, as in the previous case of the possible creation of *this* world sooner, Leibniz concludes here that God *could not* even have had a «reason» because the possibility of an earlier creation was not even available. God was not even facing a dilemma among (temporal) choices where none of them looked «better» to his eyes. He actually did not have a choice, and, therefore, no reason to prefer the creation of the world at such or such particular point in time. Or in other words, since the possibility for any differentiation of temporal points is based on the existence of time, that differentiation could not exist before the world came into existence.

Both possibilities, then, regarding an earlier creation — either of this world or another one — have been rejected by Leibniz on the basis of a similar argumentation, namely:

One cannot say [...] that the wisdom of God may have good reasons to create this world at such or such particular time; that particular time, considered without the things, being an impossible fiction; and good reasons for a choice, being not to be found, where everything is indiscernible.³⁶

And with the rejection of these two possibilities, the problem seems to be exhausted for Leibniz.

Let us note again that Leibniz's resistance to accept the possibility of a world created sooner goes considerably beyond his rejection of an absolute time. The price one would have to pay is also too high for his metaphysics, in particular, for the «order of things» and for the «divine wisdom.» Both would be altered, Leibniz believes, because that possibility would shake two of the pillars of his ontology, namely, the principle of the identity of the indiscernibles and the principle of sufficient reason.

This supposition of two indiscernibles, such as two pieces of matter perfectly alike, seems indeed to be possible in abstract terms; but it is not consistent with the order of things, nor with the divine wisdom, by which nothing is admitted without reason.³⁷

An earlier creation lacks «sufficient reason». And that want of sufficient reason is based, precisely, on the identity of all the possible temporal points in which God could have placed the creation of this world. That is, the want of sufficient reason is based on the identity of the indiscernibles and, therefore, the identity or indiscernibility of the different «points in time» eliminates the possibility of God's choice. The denial of the other basic principle — the sufficient reason — brings about «chimeras such as an absolute real time or space.»³⁸

³⁵. Leibniz's fifth paper to Clarke, p. 76.

³⁶. Ibid., pp. 76-77.

³⁷. Ibid., p. 61.

³⁸. Ibid., p. 96. This is the whole fragment in defense of the principle of sufficient reason and, in particular, against Newton's absolute time, which Leibniz places at the end of the Fifth Paper:

He pretended, that I have been guilty of a *petitio principii*. But, of what principle, I beseech you? Would to God, less clear principles had never been laid down. The principle in question, is the principle of the want of sufficient reason; in order to any thing's existing, in order to any event's happening, in order to any truth's taking place. Is this a principle, that wants to be proved? [...] — I dare say, that without this great

Leibniz's further clarification about what he understands by «this world» helps to complete his view of the issue:

When I speak of *this world*, I mean the whole universe of material and immaterial creatures taken together, from the beginning of things. But if any one mean only the beginning of the material world, and suppose immaterial creatures before it; he would have somewhat more reason for his supposition. For time then being marked by things that existed already, it would be no longer indifferent; and there might be room for choice. For, supposing the whole universe of immaterial and material creatures together, to have a beginning; there is no longer any choice about the time, in which God would place that beginning.³⁹

From these words several problems arise. Firstly, Leibniz is admitting here that if there were «things that existed already» before this world was created, they could serve as a mark and, then, «there might be room for [God's] choice.» It could be argued that since «the beginning of this world» refers to the beginning of the «whole universe of material and immaterial creatures» it could be the case that some immaterial things existed before the material ones and they would serve as marks — or vice versa. But even if this were the case (i. e. that material and immaterial things do not come into existence simultaneously) we would not solve the problem with it. We would be just postponing it because the why-not-sooner question applies to whatever was first, whether immaterial or material. In other words, even if there are different levels of reality, we still have to face the problem of the beginning of the *created* world.

Second, Leibniz seems to assume — here and in previous statements — that God, in order to be able to create this world, existed «before» the world was created. He does, in fact, clearly separate in several places God and his act of creation by the mediation of a decision to create, which makes that separation temporal. This is supported, explicitly, by his above «God places the beginning of the world» and in other places.⁴⁰ But in some places, similar to Descartes, Leibniz argues that this is not the only way to save God's freedom with respect to the act of creation:

We therefore have the ultimate reason for the reality of essences as well as existences in one being, which must necessarily be greater, higher, and prior to the world itself, since not only the existing thing which compose the world but also all possibilities have their reality through it. But because

principle, one cannot prove the existence of God, nor account for many other important truths. — Has not everybody made use of this principle, upon a thousand occasions? 'Tis true, it has been neglected, out of carelessness, on many occasions: but that neglect, has been the true cause of chimeras; such as are (for instance,) an absolute real time or space, a vacuum, atoms, attraction in the scholastic sense, a physical influence of the soul over the body, [and of the body over the soul] and a thousand other fictions, either derived from erroneous opinions of the ancients, or lately invented by modern philosophers. [...] — To deny this great principle, is likewise to do as Epicurus did; who was reduced to deny that other great principle, viz. the principle of contradiction; which is, that every intelligible enunciation must be either true, or false. (*The Correspondence...*, pp. 95-96).

³⁹. *Ibid.*, 77.

⁴⁰. That God made a decision is clear, for example, in the following passage: «Since the designs of God which concern this whole universe are all interrelated in conformity with his sovereign wisdom, he made no decision about Adam without taking into consideration everything which has any connection with him. It is therefore not because of the decision made about Adam but because of the decision made at the same time about everything else (to which the decision made about Adam involves a perfect relation) that God makes up his mind about all human events. There seems to be no fatal necessity in this, or anything contrary to God's freedom, any more than in the generally accepted hypothetical necessity to which God himself is subject, of carrying out what he has resolved» (Letter to Arnauld, July 14, 1686, in Leibniz, *Philosophical Papers and Letters*, 2nd ed., sel., trans., and intro. Leroy E. Loemker [Dordrecht, Holland: D. Reidel Publishing Company, 1956, 1970], pp. 331-32).

of the interconnection of all these things, this ultimate reason can be found only in a single source. It is evident, however, that *existing things are continuously issuing from this source and are being produced and have been produced by it*, since no reason appears why one state of the world should issue from it rather than another, that of yesterday rather than today's. It is clear, too, how God acts not merely physically but freely as well, and how there is in him not only the efficient but the final cause of the world. Thus we have in him the reason not merely for the greatness and power in the world mechanism as already established, but also for the goodness and wisdom exerted in establishing it.⁴¹

In this and other places Leibniz concentrates his efforts so much in rejecting any sort of reason in God to create the world earlier or later that his account of creation seems to come quite close to a form of emanationism. Notice, however, that despite the fact that all «existing things are continuously issuing from the source» «God acts not merely physically but freely as well.»

Thirdly, the problem of the nature of the «mark» which enables us to talk about time is not sufficiently discussed by Leibniz. We have seen above that Leibniz rejected this mark both epistemologically «it cannot be known» and ontologically «it cannot exist». Indeed, if we assume that the mark is «part of the world» we will never find the appropriate reference, obviously. For in order for a reference to be valid to establish a moment «earlier to the creation of this world» it must be external to that world, i. e., must exist outside «this (created) world.» And if the mark must be «outside the world,» then, assuming with Leibniz that time only exists with the world, there cannot be a mark because there is no time then (at least, as we have seen not a real time). But, is this all there is? There is still another possibility, not taken into account by Leibniz. Why cannot God himself serve as the mark we need?

For Leibniz, God cannot have «the property of being in time» because that would make him «depend upon time and stand in need of it».⁴² And he, in fact, refers to God as «extramundane,» which for him means, unambiguously, «beyond the world, beyond the collection of finite things.»⁴³ Thus, to place God in time would result in accepting that God is a subordinate being. And since this is impossible, according to Leibniz, we must reject that there is time before creation. (This does not deny that God is, in a sense, also *in* the world — «To say that God is above the world, is not denying that he is in the world»⁴⁴ — but that is

⁴¹. Leibniz, «On the Radical Origination of Things,» in *Philosophical Papers and Letters*, op. cit., p. 794. (My italics)

⁴². Leibniz's fifth paper to Clarke 50, in op. cit., p. 73: «If the reality of space and time, is necessary to the immensity and eternity of God; if God must be in space; if being in space, is a property of God; he will in some measure, depend upon time and space, and stand in need of them.

⁴³. «Beyond the world, that is, beyond the collection of finite things, there is some One Being who rules, not only as the soul is the ruler in me, or, better, as the shelf is the ruler in my body, but also in a much higher sense. For the One Being who rules the universe not only rules the world, but also fashions or creates it; he is above the world, and, so to speak, extramundane, and therefore he is the ultimate reason for things» (Leibniz, «On the Ultimate Origination of Things,» 23 November 1697, in *Philosophical Essays*, ed. and trans. R. Ariew and D. Garber [Indianapolis, IN: Hackett, 1989], p. 149). [I have used two different editions of «The Ultimate Origination» for the only reason that I discovered some pages missing in the copy I was using.]

⁴⁴. Leibniz's third paper 15, op. cit., p. 29.

another matter and does not affect directly our problem here.)⁴⁵ God, however, has eternity for Leibniz as one of his defining features. And this does not make him temporal because «eternity» does not mean either «in time»: «The immensity of God is independent upon space, as his eternity is independent upon time [...] I don't admit that if God existed alone, there would be time and space as there is now: whereas then, in my opinion, they would be only in the ideas of God as mere possibilities.»⁴⁶ That God is «independent upon time» means, then, that he is independent upon the time *of this world*. It means too that his «eternity» is either timeless (again, taking time as «time of the world») or that, if there is any time at all in it (in his eternity), it is a different kind of time (not the time of the world). Leibniz opts for the former of this two understandings:

It cannot be said that [a certain] duration is eternal but [it can be said] that the things which continue always are eternal, [gaining always a new duration.] Whatever exists of time and of duration, [being successive] perishes continually: and how can a thing exist eternally, which (to speak exactly,) does never exist at all? For, how can a thing exist, whereof no part does ever exist? Nothing of time does ever exist, but instants; and an instant is not even itself a part of time.⁴⁷

Now, is this compatible with Leibniz's view of time? Given his relational view of time, which is the justification to think of the possible relation between God and time as one of dependence? If time exists as long as two things exist, why should it mean dependence of any of them on time? Leibniz could avoid this question by saying that it does not apply if only God existed. In that case there would be no possibility of a «relation» to be established between two things and, therefore, we still would not be allowed to talk about time. But do we really need two things — one of which should be *outside* God — to talk about time? Why aren't changes in God himself enough to talk about time? Aristotle already considered changes in thought as sufficient for the possibility of time (and Leibniz seems to share his view in time). Changes in God's thought (or in his personality if we want) is all we need to have «two things» before creation — and therefore time. Now, is this at all a possibility? It seems to be, in fact, more than a possibility. It is rather a conclusion from two of the premises in Leibniz's reasoning, namely, that God *made the decision* to create the world and that he is prior to the world. If he made the decision, we should assume that *something* must have preceded and led to that decision, whatever that something is — we can probably venture to say that it might have been a certain process of thought.

The possibility that time existed before creation has been suggested by Leibniz as we have seen above. It was not, however, time in its «real» form but only «ideal» — something consistent with his view regarding the way we should understand «existence» of things before they are created: «if there were no creatures, space and time would be only the ideas of God.»⁴⁸ But would this, in any case, imply that God, in fact, may then have had certain

⁴⁵. This becomes quite clear, for example, a few lines earlier in the same letter to Clarke and it is not very different, at least in its general formulation, from the common view which defends the presence of God in the world: «God is not present to things by situation, but by essence: his presence is manifested by his immediate operation» (Leibniz's third paper to Clarke 12, op. cit., p. 28). And later some specification of that «presence»: «I never gave any occasion to doubt, but that God's conservation is an actual preservation and continuation of the beings, powers, orders, dispositions, and motions of all things [...]» (ibid. 16, p. 29).

⁴⁶. Ibid., 90.

⁴⁷. Leibniz's fifth paper 49, pp. 72-73.

⁴⁸. Leibniz's fourth paper to Clarke 41, p. 42.

reasons to choose time A instead of B to create the world? Or at least that we can talk about time before creation? If «ideal» is mere possibility then no. But Leibniz does not explore neither discards the possibility of looking for the «two things» in God himself — the condition which would allow us to talk about time in the Leibnizian relational sense. The fact that God is «independent upon time» does not mean that he cannot be the «mark» we need to know about the passage of time. On the contrary, it could mean that God is probably the best possible mark of the passage of time since he fulfills the basic requirement to be it: he is «outside» of that time and he himself (given that he is a being who decides and acts, i. e. in whom changes occur) suffices to talk about Leibniz's relational time.

There are, of course, several other questions which would require an answer if this issue were to become clear in Leibniz. He has not fully, convincingly, and satisfactorily resolved the numerous questions about the relationship between a being out of time and a world created by that being which is from its very beginning in time. Is the moment of creation itself «in time» or not? How are we to understand the creation of the world — and with it of time — by a timeless being? How can a being «out of time» create time? Which is the relationship between a God «out of time» and the temporal world? It could simply be said that God does not create time but *things* (and once we have things we have time). But the question would still remain. We would just need to reformulate it in a different manner: how can a timeless being create things (which, again, once created happen to be temporal)? Is creation itself in time or out of time? Does God not have certain duration? Leibniz has denied this explicitly. Even if God is excluded from «the whole universe of material and immaterial creatures,» as we read above in Leibniz, it was Him who made the decision to create the world. Is that decision too «out of time»? Is that decision not one of the «acts» which have «a place» in *God's own history*, at least? In other words, is it possible to conceive a being which (1) makes a decision to do something, and (2) does something, without temporality in him/her?

Let us now, before starting a further discussion of them, take a look at the problem from a wider historical point of view.

II

The problem arisen by Leibniz in the 18th century was first formulated and faced by Augustine of Hippo (354-430) who, seemingly, was the first thinker in positing clearly the salient issues here.⁴⁹ After reminding that the current problem is presented only to «those who agree that God is the Creator of the World,» Augustine places the «difficulties about the time of its creation» at the same level than the «difficulties we might raise about the place of its creation.»⁵⁰ In fact, both problems seem to be very similar. Both of them look for a reason why the world was «placed» here and not there. «As they demand why the world was created then and no sooner, we may ask why it was created just here where it is, and not elsewhere.»⁵¹ Both problems stimulate also, according to Augustine, parallel questions on the limits of God's

⁴⁹. Augustine deals with the problem of a possible earlier creation and God's decision, mainly, in three books: *The City of God* (XI,5,6); *Two Books on Genesis Against the Manichees* (1,2) and *Confessions* (XI).

⁵⁰. *The City of God*, trans. M. Dods (New York: Random House, 1950), p. 349.

⁵¹. *Ibid.*, p. 349.

omnipotence and omnipresence. And, as a consequence, both lead us to ask about God's occupation before creating the world.

For if they imagine infinite spaces of time before the world, during which God could not have been idle, in like manner they may conceive outside the world infinite realms of space, in which, if any one says that the Omnipotent cannot hold His hand from working, will it not follow that they must adopt Epicurus' dream of innumerable worlds? with this difference only, that he asserts that they are formed and destroyed by the fortuitous movements of atoms, while they will hold that they are made by God's hand, if they maintain that, throughout the boundless immensity of space, stretching interminably in every direction round the world, God cannot rest, and that the worlds which they suppose Him to make cannot be destroyed.⁵²

Consequently both problems — the possibility of a world created at a different moment and in a different place — deserve, according to Augustine, a parallel answer. Leibniz did also maintain a constant parallelism between his conclusions regarding space and time on this issue. To start with, for Augustine God did have a reason to create the world when he did and to place it where he did place it. God did not «set the world in the very spot it occupies and no other by accident rather than by divine reason.»⁵³ This means that, unlike Leibniz, Augustine believes that God had a choice and did choose a particular point in time to create the world. And he did so even if «there was no merit in the spot chosen to give it the precedence of infinite others.»⁵⁴ But if «there was no merit in the spot chosen,» what about God's divine reason? Can we actually know anything about God's reasons to create the world at a particular moment in time? No, we cannot, according to Augustine. The reason God had to choose that moment was, as said, a «divine reason» which «no human reason can comprehend.»⁵⁵ Therefore, human curiosity cannot be satisfied in this regard. Augustine separates the realms of God's and human reasoning up to the point of denying our access to any divine reasons. Leibniz's principle of sufficient reason, on the other hand, allowed humans, at least, to put limits to God's actions in terms of what must be «reasonable» to God. Augustine does not think that he even has the right to enter that field.

Furthermore, even if for Augustine God had «reason» to create the world when he did, it is not possible to talk about time before the world was created. Time applies to the world only. With respect to God we have to talk about eternity. Their difference is very clear: «Time

⁵². Ibid., p. 349. Augustine continues: «For here the question is with those who, with ourselves, believe that God is spiritual, and the creator of all existences but Himself. As for others, it is a condescension to dispute with them on a religious question, for they have acquired a reputation only among men who pay divine honours to a number of gods, and have become conspicuous among the other philosophers for no other reason than that, though they are still far from the truth, they are near it in comparison with the rest. While these, then, neither confine in any place, nor limit, nor distribute the divine substance, but, as is worthy of God, own it to be wholly though spiritually present everywhere, will they perchance say that this substance is absent from such immense spaces outside the world and is occupied in one only, (and that a very little one compared with the infinity beyond,) the one, namely, in which is the world? I think they will not proceed to this absurdity» (ibid., 349).

⁵³. Ibid., p. 350.

⁵⁴. Ibid. The «lack of merit of the chosen spot» was precisely the reason Leibniz found to deny even that God could have a preference for a particular point in time to place the world at.

⁵⁵. Ibid.

does not exist without some movement and transition, while in eternity there is no change.»⁵⁶ Two conclusions from this. First, God's reasons cannot be considered temporal (at least in this sense). The «reason/s» God had to create this world had nothing to do with placing the world in this or that moment in time. Strictly speaking, the «temporal considerations» could not even take place in God's mind. His reasons must have been of other kind⁵⁷. Second, God created the world not *from time* but *from eternity*.

Since, then, God, in whose eternity is no change at all, is the Creator and Ordainer of time, I do not see how He can be said to have created the world after spaces of time had elapsed, unless it be said that prior to the world there was some creature by whose movement time could pass.⁵⁸

Third, the world was not made «in time» but «simultaneously with time» (Leibniz will repeat this as we saw). And change came into existence at that very moment too. The former simultaneity — creation of the world and beginning of time — is explained by arguing that «that which is made in time is made both after and before some time.» And, since in this case there is no «before,» as we have already discussed, we must conclude that the world was not created «in time.» Regarding the latter simultaneity — beginning of time and beginning of change — it «seems evident from the order of the first six or seven days [of creation, according to the Scriptures].»⁵⁹ Thus, the absence of a «before» and the simultaneity of the beginning of change and time are the reasons to affirm the simultaneous beginning of the world and time. The «sacred and infallible» Scriptures are for Augustine a good guide in this regard.

And if the sacred and infallible Scriptures say that in the beginning God created the heavens and the earth, in order that it may be understood that He had made nothing previously — for if He had made anything before the rest, this thing would rather be said to have been made «in the beginning» — then assuredly the world was made, not in time but simultaneously with time. For that which is made in time is made both after and before some time — after that which is past, before that which is future. But none could then be past, for there was no creature by whose movements its duration could be measured. But simultaneously with time the world was made, if in the world's creation change and motion were created, as seems evident from the order of the first six or seven days. For in these days the morning and evening are counted, until, on the sixth day, all things which God then made were finished, and on the seventh the rest of God was mysteriously and sublimely signalized. What kind of days these were it is extremely difficult, or perhaps impossible for us to conceive, and how much more to say!⁶⁰

Some of Augustine's contemporaries, however, did not follow this «infallible» conclusion from the Scriptures. Among them were the Manichees who had some trouble

⁵⁶. Ibid., p. 350.

⁵⁷. Leibniz saw in the indiscernibility of two moments in time before the world was created the argument to deny the existence of a sufficient reason in God to create the world at a particular moment.

⁵⁸. Ibid.

⁵⁹. This reference to the Scriptures here is a little bit surprising. Instead of it, it is expected his claim that time is dependent on movement (as we have just read). By referring to the sacred text, Augustine 1) could be telling that the Scriptures have more authority than his thought (when both show the same truth) or 2) he could be expressing problems in making compatible his «time does not exist without some movement» and his idea of time as *distentio animi*. By doing the latter he would be, at the same time, providing one more of the many texts where scholars have found difficulties in reaching an agreement on the «degree of dependence» of time on movement.

⁶⁰. Ibid., p. 350.

finding meaning in certain claims that can be read in the Old Testament, in particular, that God created the world «in the beginning.» Augustine addresses directly to them in order to answer two of their main objections:

The Manichees are accustomed to find fault in the following way with the first book of the Old Testament, which is entitled, Genesis. About the words, «In the beginning God made heaven and earth,» they ask, «In what beginning?» They say, «If God made heaven and earth in some beginning of time, what was he doing before he made heaven and earth? And why did he suddenly decide to make what he had not previously made through eternal time?»⁶¹

These two last questions presented by the Manichees go beyond the temporal one — why God did not create the world sooner. The objections arise from the very fact that God created the world — whether in time or out of time — and that such an action must have been preceded by a certain kind of «decision.» Leibniz, as we saw, did not face directly this question.

Before attempting to answer those questions Augustine corrects the Manichees on the appropriate manner of understanding the expression «in the beginning.» He does it in two senses; both try to show that there is no temporal content in the expression. On one hand, he gives a particular interpretation of the words «in the beginning» in the Biblical text. To those with doubts, «we answer them,» he says, «that God made heaven and earth in the beginning, not in the beginning of time, but in Christ. For he was the Word with the Father, through whom and in whom all things were made. For, when the Jews asked him who he was, our Lord Jesus Christ answered, «The beginning; that is why I am speaking to you.»⁶² Thus, the adequate way to understand «in the beginning,» in the Scriptures, is as meaning «in Christ.» No temporal content must be perceived in the expression.

Augustine gives a second sense in which the expression «in the beginning» has been misunderstood by the Manichees. He does this by referring to his claim, already mentioned, that time was created simultaneously with the world. «In the beginning» cannot be read as implying «in time» because time did not exist before the world was created. They came into existence simultaneously.

And here is also the basis for Augustine's answer to the first question of the Manichees, namely, «what was he doing before he made heaven and earth?» In the *Confessions* we read:

At no time then hadst Thou not made any thing, because time itself Thou madest. And no times are coeternal with Thee, because Thou abidest: but if they abode, they should not be times.⁶³

And in the *Two books Against the Manichees*, this is his reasoning:

But even if we believe that God made heaven and earth at the beginning of time, we should certainly realize that there was no time before the beginning of time. For God also made time, and thus there was no time before he made time. Hence, we cannot say that there was a time when God had not yet made anything. For could there be a time that God had not made since he

⁶¹. «Two Books on Genesis Against the Manichees» in *Saint Augustine on Genesis*, trans. Roland J. Teske (Washington, D. C.: The Catholic University of America Press, 1991): pp. 45-141, p. 49.

⁶². *Ibid.*, p. 49.

⁶³. Augustine, *Confessions*, XI, 14, trans. E. B. Pusey (New York: Dutton; London: Dent, c1907, 1966), p. 262.

is the maker of all time? And if time began to be with heaven and earth, there cannot be found a time when God had not yet made heaven and earth.⁶⁴

God was not doing anything before creating the world because there was no time. Although a literal interpretation of this conclusion seems to be the most appropriate, let us concede a wider margin for meaning and consider three ways of understanding the words above.⁶⁵ We could read in that fragment that Augustine is rejecting the question the Manichees have posed as a whole just for introducing temporal content (through the verb «was doing,» for example) where it is not possible to do so properly — because «God also made time, and thus there was no time before he made time.»

Moreover, God's eternity does not accept past or future.⁶⁶ But the fragment quoted could also be understood as meaning that the inexistence of time keeps God from making anything at all in the world. This would imply that before creation God simply *was*; or, even better, he just *is* (if this serves as an attempt to avoid the distinction between past and present). He would not be the author of any action whatsoever, including any thought. This possibility is even less satisfactory if, again, we take into account that that same «paralyzed» God (1) precedes creation and, while preceding it at the same time (2) he is the «potential creator» of this world.

In other words, his creation seems to be part of his history. And from an *a posteriori* view, is the fact that he created the world not enough to doubt about this supposed previous paralysis? Was he not in that previous stage, at least, planning the creation? And, is that planning not based, in its turn, on some other considerations (i. e. some other, say, 'thoughts')? How can we make compatible that «frozen stage» of God with his own future «decision» to create the world? When and why does that decision occur in him? How can any decision, in general, take place at all without any «change» in the being deciding?⁶⁷ There is still a third manner of understanding Augustine's claim that God was not doing anything before creating the world. It could be read that the inexistence of time would keep God from doing *certain things*, among them intervening in the material world.

As to the second question asked by the Manichees — «why did he suddenly decide to create the world?» — Augustine answers by taking advantage of the presence of a temporal term in it, namely, «suddenly.» His answer is somehow expected. Those who show this kind of doubts «speak as if some time passed during which God produced nothing. But a time could not pass that God had not already made, because he cannot be the producer of time

⁶⁴. Augustine, *Two Books on Genesis Against the Manichees*, I,2,3, op. cit., p. 50.

⁶⁵. John F. Callahan, in his *Four Views of Time in Ancient Philosophy* (Cambridge, Mass.: Harvard University Press, 1948) is more interested in the concept of time itself and in this regard, like an introduction, he simply paraphrases Augustine without any further reflection: «When there was no time, therefore, St. Augustine insists, God had not made anything, because He is the author of time itself. No expanse of time is co-eternal with God, because He persists in eternity, while time by its very nature cannot persist in the present» (p. 150).

⁶⁶. «Thou art the same, and Thy years fail not. Thy years neither come nor go; whereas ours both come and go [...] Thy years are one day; and Thy day is not daily, but To-day, seeing Thy To-day gives not place unto to-morrow» (*Confessions*, I,13, pp. 261-62).

⁶⁷. All these problems are enclosed in Augustine's words «God, in whose eternity is no change at all, is the Creator and Ordainer of time» (*The City of God* XI,6, trans. Marcus Dods; Intr. Thomas Merton [New York: The Modern Library, 1950], p. 350).

unless he is before time.»⁶⁸ The use of «suddenly» here is not legitimate for there is no temporal background against which it may make sense. This way of arguing, however, could be counterproductive for Augustine. He himself is making the same mistake of using temporal terms where he has said it is not possible to do so. God, he says, «cannot be the producer of time unless he is before time.»⁶⁹

How are we to understand that «before»? Has Augustine not said that «before» is a word with no referent if there is no world (outside God)? Why does it not make any sense to ask about God's «sudden» decision and at the same time it is acceptable to say that «he cannot be the producer of time unless he is *before* time» (my italics)? Augustine seems to be aware of that the relationship between God and the created world, if it is not «temporal,» requires new non-temporal terms to be referred to. And, however, despite noting the inconvenience caused by the absence of that language, he does not seem to be making a great effort to overcome it.

Augustine does not stop there. He goes further. He shows that he is not trying to avoid the real problem and faces the same question the Manichees asked after removing the word «suddenly.» The question then to be answered, he believes, will simply be: «Why did God create the world?»⁷⁰ Thus formulated, however, Augustine thinks that it cannot be answered; it is beyond human understanding. If, anyway, someone wants an answer the only one a human being can provide will be: «because he willed to.»

But if they say, «Why did God decide to make heaven and earth?» we should answer them that those who desire to know the will of God should first learn the power of the human will. They seek to know the causes of the will of God though the will of God is itself the cause of all that exists. For if the will of God has a cause, there is something that surpasses the will of God — and this we may not believe. Hence, one who asks, «Why did God make heaven and earth?» should be told, «Because he willed to.» [...] Hence, let human temerity hold itself in check, and let it not seek what is not lest it not find what is.⁷¹

This is not satisfactory. Whether the term «suddenly» is or is not in the question, it is still very difficult not to think about creation as, at least, an «act.» And as such, it would have a place among other acts — within a succession of other acts, someone's life or a world history. I do not see how this minimum can be denied, or even avoided. And if that is the case we need to answer still another question which will be an intermediate one between «Why did God suddenly decide to create the world?» and «Why did God create the world?» We can accept that the former must be «cleaned up» in a certain way to make it fully legitimate — according to Augustine's thought — by avoiding temporal assumptions in the question. But it is not either the latter question the one we are exactly interested in here. Although our inquiry falls into its extent, this question «why creation?» still asks too much. Moreover, the inquiry about the «reasons» why God created this world, unlike the why-not-sooner question, may be satisfied by many answers. Not so our question. We need, then, to reformulate the question, without using temporal terms. The question should ask (1) about the reasons for that

⁶⁸. *Against the Manichees*, p. 50.

⁶⁹. An even clearer expression of this contradiction can be found in *Two Books on Genesis Against the Manichees* (Bk. 1,2): «God who is the maker of time is before time» (op. cit., p. 50).

⁷⁰. *Ibid.*, p. 50.

⁷¹. *Ibid.*, pp. 51-52.

decision in relation to God's occupations before creating the world, and (2) about the (temporal) relationship between God and the world.

In the same books against the Manichees, and within the same discussion about the time of creation, Augustine reminds us again about the different ways in which the world and God are related to any notion of time. He uses in this case the idea of eternity to show their difference. And he adds further clarifications about this idea. Although we have previously read in his *Confessions* that only God can be said to be eternal, he now says that the world too can be considered eternal, but not in the same sense. Furthermore, God's eternity also has duration — something explicitly denied by Leibniz — but, again, is not the same duration the world has. This seems to be an attempt to extend the wordly language, with appropriate modifications, in order to make it meaningful to refer with it to God.

We do not say that this world has the same duration as God, for this world does not have the same eternity that God has. [...] Time is not eternal in the same way that God is eternal, because God who is the maker of time is before time.⁷²

Times can be eternal in the sense that they are everlasting, but God is eternal in the sense that his duration is not stretched out, but is all at once.

Nor dost Thou by time, precede time: else shouldest Thou not precede all times. But thou precedest all things past, by the sublimity of an ever-present eternity; and surpassest all future because they are future, and when they come, they shall be past; *but Thou art the same, and Thy years fail not.* Thy years neither come nor go; whereas ours both come and go, that they all may come. Thy years stand together because they do stand; nor are departing thrust out by coming years, for they pass not away; but ours shall all be, when they shall no more be. Thy years are one day; and Thy day is not daily, but To-day, seeing Thy To-day gives not place unto to-morrow, for neither doth it replace yesterday. Thy To-day, is Eternity; therefore didst Thou beget the Coeternal, to whom Thou saidst, *This day have I begotten Thee.* Thou hast made all things; and before all times Thou art: neither in any time was time not.⁷³

Augustine's attempt to adapt the old language to the new necessities is not enough. He is still having many problems to talk about the «place» of the world with respect to God without using temporal terms. «Temporal,» in its first meaning as Augustine is using it, only applies to the world and not to God. Thus, if time is to be applied to both God and the world it could never mean the same in both cases — the same must be said about «eternity,» «duration,» etc. In a like manner, all those time-related terms such as «before,» «now,» «then,» and «later» should be prohibited when talking about God, for they cannot mean the same when we are dealing with time (world created) and eternity (God).

The difference time/eternity is for Augustine prior in thought to the definition of time itself. To grasp the idea of eternity does not offer, for him, as many problems as to express the meaning of time does. It is just after giving the above account on eternity when Augustine suddenly finds himself swimming in the famous sea of doubts about what time is.

If no one asks me, I know: if I wish to explain to one that asketh, I know not: yet I say boldly that I know, that if nothing passed away, time past were not: and if nothing were coming, a time to come were not; and if nothing were, time present were not. Those two times then, past and to come, how are they, seeing the past now is not, and that to come is not yet? But the present, should it always be present, and never pass into time past, verily it should not be time but eternity. If time present (if it is to be time) only cometh into existence, because it passeth into time past, how can

⁷². Ibid., p. 51.

⁷³. Augustine, *Confessions*, l. 13, trans. E. B. Pusey (New York: Dutton; London: Dent, 1966), pp. 261-62.

we say that either this is, whose cause of being is, that it shall not be; so, namely, that we cannot truly say that time is, but because it is tending not to be?⁷⁴

His further reflection on the concept of time⁷⁵ will lead him to his idea of time as *distentio animi*. We know now that time comes into existence simultaneously both with the world and with change. This does not mean, however, that time for Augustine is dependent on motion.⁷⁶ It is true that Augustine, when he considers time as a physical phenomenon (e. g. to demonstrate that the world was created *cum tempore*), he associates it with material mutability and formal change,⁷⁷ but time itself is independent of motion, a *distentio animi* produced by the spiritual operations of the perceiving consciousness.⁷⁸

It is in thee, my mind, that I measure times. Interrupt me not, that is, interrupt not thyself with the tumults of thy impressions. In thee I measure times; the impression, which things as they pass by cause in thee, remains even when they are gone; this it is which still present, I measure, not the things which pass by to make this impression. This I measure, when I measure times. either then this is time, or I do not measure times. What when we measure silence, and say that this silence hath held as long time as did that voice? do we not stretch out our thought to the measure of a voice, as if it sounded that so we may be able to report of the intervals of silence in a given space of time?⁷⁹

Russell, in his *History of Western Philosophy*, considers that Augustine, not finding time out there as a reality his mind can lay hold of, he turns within and makes time into a creation of his own mind.⁸⁰ This interpretation is not at all evident. The dependence or independence of time with respect to movement has received much attention among scholars

⁷⁴. *Confessions* 1,14, p. 262.

⁷⁵. Cf. Aristotle, *Physics* (IV, x-xiv). The Greek philosopher presented exactly the same doubts as part of the «opinion of those who do not believe in the existence of time.» It could have perfectly been a parallel thought since Augustine may not have known of *Physics*. This book was not known in the West until the first half of twelfth century through different Latin translations.

⁷⁶. This is the main difference between time as «the number of motion» (Aristotle) and Augustine's «distention of the man's soul».

⁷⁷. See *De Genesi*, 5,5,12; *Confessions* 12,8; and *Civitas Dei*, 11,6.

⁷⁸. Augustine, *Confessions*, 11,14-30. See John F. Callaghan, *Four Views of Time in Ancient Philosophy* (Cambridge: Harvard University Press, 1948), 149-87; and Étienne Gilson, *The Christian Philosophy of Saint Augustine*, trans. L. E. m. Lynch (New York: Random House, 1960), 193-95.

⁷⁹. Augustine, *Confessions*, p. 273.

⁸⁰. Bertrand Russell, *A History of Western Philosophy* (New York: Simon and Schuster, 1945), p. 353.

and there are notable disagreements among them.⁸¹ And, however interesting those discussions might be, we should not enter into them here since we are not directly affected by them.

Final comments

We have so far found two main kinds of problems in our inquiry. The first series of problems include those problems related to the formulation of the appropriate questions themselves — the questions which «show» where the problems are and along which paths our inquiry must proceed. The second series of problems, obviously, have to do with the answer, or answers, to the question.

Regarding the first group of difficulties, we have found, after the discussion above, that the original formulation of the two main questions causes too many problems. Those questions were: «What was God doing before creating the world?» and «why did he suddenly decide to create the world?» Both Augustine and Leibniz have prohibited us to «impose» on God any idea of time which is only valid for the world. Both have pointed out the independence of God with respect to the time of the world. God is not «in time»; he is eternal, out of time (where «time» means the time of the world). Consequently, we cannot ask about the actions of God in reference to the act of creation by using terms such as «before,» «then,» «suddenly,» etc. And, although we have not read any explicit reference to verbs, we should also assume that their tenses must also be used carefully. However, neither Leibniz nor Augustine has provided the necessary «new language» to deal with God's eternity and its relation to the world. For now, the original question could be formulated as follows, avoiding the old «temporal» terms: which are the actions God performs insofar as he is, at the same time, *both* ontologically prior to this world *and* potentially Creator of the latter?

Neither Leibniz nor Augustine have resolved either the difficulties in understanding the relationship between God's eternity and the temporality of the world. This is especially remarkable since both have admitted that the latter «the temporality of the world», unlike the former, has a «beginning» (creation), and, therefore, a point of confluence is accepted. In other words: (1) the «independence» of God's eternity and the time of the world cannot be «total» if God is the creator of the time of the world, i. e. there must be some relationship between them; (2) if creation is an act of God — and not the only — does it not mean, at least, that there is «succession» in God's acts?; and (3) if there is succession in God, is it not true that he has his own «history» and, therefore, there is prior and posterior in him in a certain sense? And is it not true that he would be, then, «temporal» too?

The absence of a discussion of the relationship eternity/time of the world is a serious handicap in this debate. A further clarification of it would make much easier to find, first of all, the «new language» to talk, *from the created world*, about God before creation, i. e. to talk about God despite the fact that we are in the time of the world. It would make it easier also

⁸¹. Wetzel is one witness of this disagreement: «Interpreters disagree over whether Augustine offered a definitive answer to the question of time's nature and even more so over whether any putative answer of his stands up to scrutiny» (James Wetzel, «Time After Augustine,» *Religious Studies* 31, 3 [September 1995]: 341). Wetzel himself thinks that «It is misleading at best, but more likely mistaken, to think of Augustinian inwardness as a retreat to subjectivity. If time is in the mind, as Augustine seems to conclude, it does not follow that time must be an item in a mental inventory, or an artifact of immaterial creativity. / Just what does follow, on the other hand, is not easy to determine» (ibid., p. 341). In that article he opposes Russell's view of Augustine's thought on time to Wittgenstein's. The latter's view, in Wetzel's words, can be summarized like this: «The answer he supposes Augustine to suggest to the philosophical question of time is not a piece of speculation, a subjective theory of time, but a life returned to time, secured from its original estrangement» (ibid., p. 343).

to talk about all this despite the fact we are humans. For to accept simply that our inquiry is useless, as human beings, since we cannot know anything about God's eternity and its relationship with the world (i. e. similarly to other «divine matters») is not satisfactory. Why should we allow philosophy to adopt a premise like the creation of the world without demanding an explicit account of what is implicit in that premise when the author who assumes it demands absolute rigor of thought after that moment?

Both in Augustine and Leibniz, the question why God did not create this world sooner seems to be legitimate if indeed he believes that God *made the decision* to create the world. And the fact that God is independent upon the created world and time does not mean that he cannot be the «mark» we need in order to know about the passage of time. On the contrary, as discussed, it could mean that God is probably the best possible mark of the passage of time since he fulfills the basic requirements to be it: he is «outside» of that time and there are, at least, «two things» in him (given by the process of thought or changes in his personality before creating the world). If so, it is «reasonable» to think that he could have created this world «sooner» because we could talk about a change of events (or thoughts) in God leading to the moment of creation. This would allow us to talk about time before the creation of the world. But couldn't Leibniz use at this point the criterion of perfection to argue that God created the world, even if there was time, at exactly the moment in which he considered the world could be created perfectly? This, again, is not so evident. If God is omniscient and all-powerful, what could he be pondering with respect to that perfection before creating the world? why would God need to think about which one is the best moment to create the world?

Abel B. Franco Rubio de la Torre

Department of History and Philosophy of Science

University of Pittsburgh

1017 Cathedral of Learning

Pittsburgh, PA 15260, U. S. A.

<abfst6+@pitt.edu>

SORITES (ΣΩΡΙΤΗΣ), ISSN 1135-1349

Issue #12. May 2001. Pp. 55-59.

Impossibility of Two-Valued Logic to Be
Universally Valid

Copyright © by SORITES and Ardeshir Metha

IMPOSSIBILITY OF TWO-VALUED LOGIC TO BE UNIVERSALLY VALID

by Ardeshir Metha

Two-valued logic cannot be a universally valid method of reasoning. This can be established using two-valued logic itself, under which, if it is assumed, for the sake of argument, that two-valued logic is a universally valid method of reasoning, it leads to a self-contradiction — indeed, to a paradox.

The argument is as follows.

- [1] Assume that two-valued logic is a universally valid method of reasoning.
- [2] In that case, every proposition must be either true or false — no other alternatives are allowed.
- [3] Now consider the proposition «Free will exists» (or, synonymously, «Choice exists»).
- [4] Under two-valued logic, this proposition must be either true or false.
- [5] Assume now that the proposition «Free will exists» is false.
- [6] In that case, free will (or, synonymously, choice) cannot exist.
- [7] This means that whatever is believed would be believed simply because there is no choice in the matter as to what is believed.
- [8] If everything that is believed is believed simply because there is no choice in the matter as to what is believed, it can never be known (or proved) whether any belief is true.
- [9] As a consequence of all the above, it can never be known that free will does not exist.
- [10] Under two valued logic, if it cannot be known that free will does not exist, then its opposite, namely that free will does exist, can be known or proved to be true — there is no other alternative.
- [11] Thus the assumption made at [5] above — namely that the proposition «Free will exists» is false — is itself false. Or, in other words, under two-valued logic free will must exist.
- [12] If free will exists, any proposition that deals with the future must be neither true nor untrue: for what the future will turn out to be will depend on how free will is exercised.
- [13] This contradicts [2] above. Or in other words, [2] above must be false.
- [14] If [2] above is false, then [1] above must also be false.

[15] Therefore two-valued logic cannot be a universally valid method of reasoning.

Q. E. D.

Previous Arguments Made in This Regard

It is to be noted that the above argument was to some extent foreseen by Aristotle himself — the «founder», if one may so call him, of two-valued logic. He wrote words to the effect that the proposition «There will be a sea-battle tomorrow» can be neither true nor untrue.

However, the venerable Stagirite never argued his case by showing that under the assumption that two-valued logic is universally valid, free will must exist, and that is why it is impossible to speak of the truth or falsehood of any proposition which speaks of events in the future. Indeed, as far as is known to the author of this paper, no one has made such an argument before.

Some Counter-Arguments Refuted

It has been argued, in an attempt at countering the argument given at the beginning of this paper, that it is possible for two-valued logic to be rendered universally valid by using «If ... then ...» statements: such as «If I were rich I'd be driving a Porsche Carrera» (but I'm not rich, so I drive a Honda Civic ... which is by no means a bad car, but is by no means a Porsche Carrera either!). Under such conditions, although it is not true that as things stand I drive a Porsche Carrera, it is true that if I were rich I'd be driving one. In this way, future contingencies can be dealt with in the present by disjoining all contingencies and reasoning separately about each.

However, this counter-argument can itself be countered using the following counter-counter-argument:

Let a proposition p be enunciated as follows:

p : «I will pick up this pen within the next ten seconds».

Then

$\sim p$: «I will not pick up this pen within the next ten seconds».

However, since by two-valued logic, free will must exist, neither p nor $\sim p$ can possibly be true: or in other words, we get

$\sim(p \vee \sim p)$

— which goes directly counter to the axioms of two-valued logic.

Of course one could always enunciate another proposition — let it be called q — as follows:

q : «If I choose to do so, I will pick up this pen within the next ten seconds».

In this case q might be regarded as true and $\sim q$ as false. however, the proposition q is not the proposition p ! The propositions p and q are two very different propositions.

Essentially, if two-valued logic is to be universally valid, it has got to apply to all propositions, without a single exception. But it doesn't, so it isn't.

Besides — and to elaborate further on the above argument — even if I do choose to pick up the pen I might not actually pick it up: someone might decide to prevent me from doing so, or something else might come in the way: for countless reasons during the next ten seconds events might come to pass which would result in my not picking up that pen, and it would be impossible to foresee them all. For that matter, I might choose not to pick it up but might be compelled to pick it up nevertheless (say, by a threat, or as a result of an epileptic seizure), or I might change my mind at the last moment. The pen might even slip my fingers against my will.

Whatever the case, even the answer:

«If you choose to pick it up you will, otherwise you won't»

is untrue. And it doesn't seem possible to see how one could account for and reason separately about every possible future contingency, which is what would really be needed for an «If ... then ...» statement to be true. How could one ever be sure that absolutely no contingency has been missed? Obviously one couldn't. Thus the only true answer would be:

«If in the end you do pick it up you will have picked it up»

which is just two ways of saying the same thing, and thus is really no answer.

And as a clincher, the following proposition p' may be considered:

p': «I will choose to pick up this pen within the next ten seconds».

Of course it will be agreed that such a proposition can be neither true nor false: indeed, even I don't know whether I will choose to do something or not in the next ten seconds. But it is to be noted that in addition, p' is also incapable of being disjoined into yet further contingencies! No further «If ... then ...» statements about the matter can be made at this stage.

In other words, the «free will buck stops here», as it were. (And there has to be a point where it stops, because otherwise free will would not really be free, now would it.)

This should clinch the above argument that two-valued logic cannot be universally valid.

Some Philosophical Implications of the Above Reasoning

It is to be noted that the above reasoning implies some very significant philosophical conclusions. I will outline two of them here below. I am sure others will occur to my readers as well.

1. One conclusion is, that since all science depends on the results of experiments, and since at the beginning of any experiment the results thereof can be available only in the future, and since by the above reasoning the future can never be predicted with 100% certainty, one can never be one hundred per cent sure that any experiment will turn out as predicted, no matter how scrupulously or carefully it is performed! There must always remain a small but finite possibility that the outcome of any experiment will be the result, not exclusively of the laws of science as they are known to be at any given time, but of the action of free will interfering with those laws.

As a result, no scientific experiment can establish its results absolutely conclusively.

It is to be noted, by the way, that clause [12] of the argument given at the beginning of this paper refers to all propositions that deal with the future. This is because it is impossible

to predict with 100% certainty that free will will not be able to come into play in any given realm. It is of course normally accepted that where the human influence is negligible — such as in the movements of large astronomical bodies — free will does not come into play. This is why it is possible to predict the movements of planets years, decades, centuries and even millennia in advance. However, from a purely technical point of view, it is possible even to jiggle the orbit of Jupiter from here on Earth, albeit by an imperceptible amount, by simply shining a flashlight in the direction of that giant planet: the slight push imparted to Jupiter by the beam of light would imperceptibly push that planet farther away from the Earth, whence the light beam originates. (Indeed by Newton's Third Law of Motion, such an action would jiggle the orbits of both Jupiter and the Earth.)

And of course, with the passage of time, human technology is likely to advance to such an extent that it will likely be possible for us to jiggle the orbit of Jupiter quite perceptibly ... or even break it up altogether, along with all the other planets, and make a giant «Dyson Sphere» out of the raw material so obtained: as is foreseen by the eminent astrophysicist Freeman Dyson of the Institute for Advanced Study, Princeton!

Thus to be absolutely precise, it is possible to bring free will into play in any experiment, theoretically involving even the most remote and most massive quasars ever detected.

And of course, here on Earth itself, it is recognised that free will cannot entirely be ruled out in any system, even one as impersonal as the global weather system: for as the well-known «butterfly effect» of climatology asserts, it is possible for a butterfly to choose to flap its wings in Hong Kong, and for a typhoon to result therefrom in California.

2. Mathematics is based entirely on two-valued logic, in the sense that every theorem of mathematics uses two-valued logic to attain its proof. There is only one true answer to any mathematical question, and all other answers are false: and there is no other alternative. (For example, the sum of two plus two must be four, and no other number.)

Thus if two-valued logic is not universally valid, it is impossible for mathematics to be so either.

However, mathematics is the basis of all of modern physics; and modern physics is the basis of all the other physical sciences: chemistry, biology, geology, astronomy, etc., etc.

This implies that if two-valued logic cannot be universally valid, then neither can any of the physical sciences be universally valid: indeed, not even all the physical sciences taken together — with mathematics thrown in for good measure — can be universally valid!

Philosophically this conclusion gives rise to a most interesting question: if mathematics and the physical sciences cannot be universally valid, then what mental discipline — or combination of mental disciplines — can be universally valid? At present there does not seem to be a clear and unequivocal answer to this question. Of course there are many separate and sometimes conflicting assertions in this regard. Some say it is Religion — or a particular Religion — that is universally valid; others assert that it is Reason (using that term in the broadest possible sense, as encompassing the underlying principles common to all possible logics, if any such may be found) that is universally valid; yet others affirm that it is Divine Revelation, not such as is contained in any scripture, but as is Revealed from time to time by the Supreme Mind Itself to a living, breathing human being, that is universally valid. Of course there always remains yet another alternative — that it is Analytical Philosophy that is universally valid: or at least we who read and contribute to *Sorites* may hope it is. But there

is no universal agreement as to the answer to the question: on the contrary, there is almost universal disagreement — to the extent that there is a saying in India that it is impossible to find two gurus who will agree with one another. (Perhaps the same thing can be said about analytical philosophers! ... just kidding.)

Conclusion

It seems clear that two-valued logic cannot be universally valid. As a result, it also seems clear that neither mathematics nor the physical sciences — nor both of them taken together — can be universally valid. However, it is a question yet to be answered as to what mental discipline is universally valid. Perhaps there is none.

Comments are Welcome

The author would appreciate comments to this paper: whether adverse or sympathetic. Indeed cogent and constructive criticism is more welcome than uncritical accolade! He can be reached via e-mail at either one of his e-mail addresses:

<ardeshirmehta@myself.com>

and

<ardeshir@sympatico.ca>

— or by snail-mail at his postal address:

Ardeshir Mehta

414 Kintyre Private

Carleton Square

Ottawa, Ontario

CANADA K2C 3M7

— or via Fax at:

(613) 225 0244(Country code 1)

— or via his Web site at:

<<http://homepage.mac.com/ardeshir/education.html>>

MEANING, NORMATIVITY AND REDUCTIVE NATURALISM

by Deborah C. Smith

In 'The Normativity of Meaning', Eric Gampel argues that the capacity to justify a linguistic usage is essential to meaning and suggests that this fact entails that naturalistic theories of meaning must take a non-reductive form if they are to be viable. I will argue that reductive and non-reductive naturalisms stand or fall together in the face of Gampel's argument that meaning plays an essential justificatory role. I will further argue that, if they fall, the lesson to be learned is not that we should avoid reductionism, but rather, that we should steer clear of physicalism in our meaning theory; if Gampel's argument is cogent, any theory of meaning will have to make reference to at least some abstract objects.

According to Gampel, the fact that constitutes the meaning of linguistic expression *x* in language game *L* sets a standard for correct and incorrect usage of *x* in *L*. That is, the meaning of a linguistic expression is like a rule in that it defines a difference between correct and incorrect linguistic usage of that expression, and thus provides a potential justification for a subject's linguistic usage of *x*. Given that a subject *S* intends¹ to play language game *L*, he *ought* to use *x* in such and such a way. He is justified in using *x* in some ways, not in others. Gampel argues that this justification is hypothetical and neutral in that the meaning of *x* 'does not tell us whether or why we ought to play the language game' (Gampel, 1997, 227-228). That is, the meaning of *x* in *L* cannot by itself give me a reason to play the language game (this is the sense in which the justification is hypothetical) and there is no specific requirement or restriction on the kind of reason (e. g. moral, epistemic, etc.) that would serve as my justificatory basis for playing the language game (this is the sense in which the justification is neutral). Gampel dubs the thesis that meaning plays an essential justificatory role the EJRM.

After formulating and explaining the EJRM, Gampel goes on to argue that such a condition puts pressure on the naturalist. This argument can be outlined as follows:

1. Any adequate theory of meaning must a) not conflict with the EJRM and b) provide an explanation of the essential justificatory role of meaning. (Gampel, 1997, 230)
2. Reductive forms of naturalism conflict with the EJRM
3. Thus, reductive forms of naturalism are inadequate theories of meaning.
4. Genuinely non-reductive forms of naturalism (which limit themselves to token/token identity claims) do not conflict with the EJRM.
5. Therefore, any adequate form of meaning naturalism must be genuinely non-reductive.

¹. Here I want to ignore any worries concerning what would count as a subject's intending to play one language game rather than another.

The pressure put on naturalistic theories of meaning by the EJRM is, according to this argument, that they must take a non-reductive form if they are to be viable theories. Naturalism is not ruled out entirely by the EJRM, according to Gampel; rather, the EJRM puts restrictions on what shape a naturalist theory can take.

The support provided by Gampel for premise 2 of the argument in some ways resembles some of G. E. Moore's arguments for ethical non-naturalism and in other ways resembles arguments against the identity theory (indeed, any materialist theory) of mind. This argument, which he calls the 'normativity argument' can be outlined as follows:

1. Suppose that the EJRM is correct: having the capacity to (hypothetically) justify a linguistic use is essential to meaning.
2. No natural fact has *as an essential property* the capacity to (hypothetically) justify linguistic use. [Actually the claim Gampel makes is stronger. See e. g., pp. 231-2, 'it is not essential to such facts to have any sort of normative role...']
3. So, meaning facts are not identical with (reducible to) natural facts (by the substitutivity of identity).
4. Thus, if the EJRM is correct, reductive forms of naturalism are false. Reductive forms of naturalism fall afoul of the EJRM.

The objections to this argument which he considers and the replies to those objections he offers similarly mirror objections and replies in the ethical debate over naturalism and over materialism in philosophy of mind. For this reason, I would like to focus instead on another aspect of Gampel's analysis of the pressure the EJRM allegedly puts on the naturalist.

Gampel makes it clear that he takes it to be the reductive aspect of reductive naturalism and not its commitment to naturalism that makes it run afoul of the EJRM.

If a theory of meaning is non-reductive it would escape the above argument. For instance, a token-identity theory such as Davidson's need not run afoul of essential normativity, since the token, in being a token of a meaning as well as a token of some naturalistic kind, is essentially normative. (Gampel, 1997, 232)

However, I am less than sanguine about the possibility of a non-reductive naturalism faring any better than reductive naturalism in the face of the EJRM, if the non-reductive naturalist is claiming that there are true genuine identity statements of the form 'x=y' where 'x' denotes a meaning token and 'y' a naturalistic token. Just as it is difficult to see how any naturalistic type could have an essentially normative role, it is difficult to see how any naturalistic token could have such an essential normative role. Compare this point to the metaphysical paradox of the marble and the statue. It is an individual token of a statue form which is tentatively identified with an individual chunk of marble. The problem is that the statue seems to have certain essential properties (e. g. a particular shape) which the chunk of marble does not. And it does not seem to sufficiently resolve the metaphysical paradox to be told that, in being a token of the statue form the chunk of marble has its shape essentially. At any rate, if the non-reductive naturalist can make his view accord with the EJRM, I see no reason in principle why the reductive naturalist could not do so as well. If a naturalistic token can play an essentially normative role, why not an entire naturalistic type? After all, if some form of reductive naturalism about meaning is correct, then every token of the naturalistic type will be a token of meaning, and hence, essentially normative. The reductive and non-reductive forms of naturalism seem to stand or fall together given the EJRM.

But perhaps we should not construe the non-reductive naturalist's claim as the claim that every meaning token is numerically identical with some naturalistic token. Perhaps his claim is merely that meaning tokens supervene on or are in some other way correlated with but distinct from naturalistic tokens. Perhaps this is why non-reductive naturalism need not fall with reductive naturalism. In this case, I fail to see how the non-reductivist counts as a meaning *naturalist* at all. Not only is there no reduction of meaning to any set of naturalistic facts, but we still seem to have non-natural meaning facts in the account. If this wouldn't count as a form of meaning non-naturalism, I'm afraid that I don't see what would.

I think that a quick digression concerning the criteria for a naturalist view is in order here. Often, a view is called a form of naturalism if it (i) reduces some type A of (putative) entity, property or fact to another type B of entity, property or fact and (ii) type B is a naturalistic type (roughly, a type that would be recognized by the natural sciences). However, it is clear that Gampel, in allowing non-reductive forms of naturalism, is construing meaning naturalism in a very different way. What exactly is meant by the term 'naturalism' as Gampel uses it? It is somewhat hard to tell. However, his reference to Davidson's token/token identity theory² as a form of non-reductive naturalism makes it seem plausible to interpret Gampel as holding the view that a natural object or process will be a concrete, physical object or process.³ It would appear that, on this view, what we might call meaning physicalism (the view that meaning tokens are concrete, physical tokens even if no nomic regularities correlate the two types and so no reduction is possible) is definitive of meaning naturalism.

What I want to claim is that, if the reductive naturalist's view does run into trouble with the EJRM, it is his *physicalism* and not his reductionism that is the cause of the trouble. If this is correct, the claim that the EJRM puts pressure on the naturalist is a bit of an understatement, to say the least. On this construal of naturalism, the truth of the EJRM and the cogency of the normativity argument entail that naturalism is false. The lesson to take away from Gampel's normativity argument is not to avoid reductive forms of naturalism, but to avoid naturalism altogether when constructing a meaning theory.

Does the EJRM give us any reason to shy away from *reductionist* accounts of meaning in general? I think not. And, indeed Gampel indicates as much in his discussion of functionalism. We are reminded that 'functional accounts of speaker meaning, often called «non-reductive» because they allow the functional kinds to be realized in any of a number of ways, are still ruled out by the normativity argument, *so long as the accounts attempt to define the relevant function in naturalistic terms*' (Gampel, 1997, 233, my italics). It is not hard to see that a non-physicalist, and hence, non-naturalist functionalism would not run afoul of the EJRM. Suppose that I reduce meaning facts to facts about functions thought of as purely non-natural, abstract objects.⁴ Let us suppose that '+' means what we ordinarily take it to mean — addition. The meaning of '+' can be thought of as a certain abstract function (call it the

². Actually, it is Davidson's theory of mental states that is a token/token identity theory, not his theory of meaning. Davidson is something of a nihilist about meaning given that he holds, with Quine, that what a speaker means by an utterance will be ineluctably indeterminate. See Davidson, 1984.

³. Here, I want to count such things as fields and energy as physical whether or not they count as physical *substances*.

⁴. It is easy to see how this would go with the meaning of a mathematical symbol such as '+', much harder with ordinary material object terms such as 'cat', but, so as not to beg the question against meaning functionalism, I will suppose that there is no in principle impossibility in providing such a reduction.

addition function) which takes pairs of natural numbers as its argument and yields for every such pair a determinant natural number and which satisfies the recursion laws for '+': $(x)(x+0=x)$ and $(x)(y)(x+Sy=S(x+y))$, where all this is understood in the usual way.⁵ Such a function will be essentially normative in the way a rule is. If one is intending to compute the addition function, the function sets a standard for correct and incorrect computation. Given that I intend to compute the addition function, I am justified in answering '125' to '68+57' (to use Kripke's example). I am not justified in answering 'x' where 'x' denotes any natural number other than 125. Notice that this by no means guarantees that I *will* answer '125'. I might make an error in my computation, or, as Kripke suggests, suffer from some mental frenzy which would prevent my getting the correct answer. But, the relevant meaning fact, the abstract addition function, in conjunction with my intention to embody that function, is essentially normative; it tells me what I *ought* to answer. Such a theory, although reductive, accords with the EJRM.

Compare this to a theory in which the meaning of '+' is reduced to a function thought of not as an abstract object but as a wholly physical state of affairs. To see how this would go, let's begin by thinking of the abstract addition function as a program or set of instructions (again, thought of as an abstract object and not a series of symbols in a particular machine language). Then, let us imagine some physical system which computes the abstract addition function whenever it encounters problems of the form 'x+y' where x and y are natural numbers. We can say that the physical object embodies or instantiates the abstract addition function. To turn this picture into a purely physicalistic functionalism, we need to drop reference to the abstract function out of the analysis of the meaning of '+'. We need to identify the meaning of '+' not with the abstract function — which (if there is any such thing) might not have been computed by any physical system at all, but rather with the function thought of as *instantiated* or *embodied* by the physical system. That is, the meaning of '+', on this view, is the function as computed by the physical system. Now our analysis makes reference to only physical objects and processes; meaning facts are identified with a type of physical fact.

Unfortunately for the physicalistic functionalist (if Gampel is correct), this fact will prove troublesome given the EJRM. For, it is hard to see how any fact about what a physical system *does yield* as answer to a given question could have any bearing on what it *ought to yield* without further appeal to an intention to compute a function thought of as an abstract object. It is at this point that Gampel's normativity argument ties up with certain of Wittgenstein's points concerning the machine as symbol for a function as discussed by Kripke in his development of Wittgenstein's skeptical paradox.

First, the machine [no matter what we take it to be so long as it is a natural object] is a finite object, accepting only finitely many numbers as input and yielding only finitely many as output — others are simply too big. Indefinitely many programs extend the actual finite behavior of the machine.... Second, in practice it is hardly likely that I really intend to entrust the values of a function to the operation of a physical machine, even for that finite portion of the function for which the machine can operate. Actual machines can *malfunction*: through melting wires or slipping gears they may give the wrong answer. (Kripke, 1982, 34)

If indefinitely many functions extend the actual finite behavior of any physical system, then either the physical system is not justified in yielding any particular answer to a new

⁵. Actually, if physicalism is not a necessary condition for naturalism, I am not entirely sure why this view should not count as a form of meaning naturalism.

problem involving ‘+’ or it will be justified no matter what answer it yields. The former directly conflicts with the EJRM if we are to identify meanings with the workings of the physical system. The latter conflicts with the very plausible assumption that, if the notion of a physical system’s correct functioning (its being justified in yielding the answers that it does) makes any sense at all, there must be something which would count as incorrect functioning.

So, again we see that, if Gampel is largely correct about the difficulties for some forms of meaning functionalism given the EJRM, it would appear that it is the physicalism of these forms and not the reductionism that is the problem. Both the physicalistic and the non-physicalistic functionalisms considered reduce meaning facts to facts about functions and get some explanatory juice out of doing so. But, it is only the physicalist whose view runs afoul of the EJRM.

To sum up, reductive naturalisms and genuine token/token identity naturalisms stand or fall together in the face of the EJRM. If they fall, the lesson to be learned is that we should steer clear of physicalism in our theory of meaning; any theory of meaning will have to make reference to at least some abstract objects (whether or not they constitute an autonomous set of irreducible meaning facts) in order to properly accord with the EJRM. Since naturalism seems to require what I have called physicalism, this has obvious implications for meaning naturalism; it entails that meaning naturalism is false (and not merely that the forms which it may take are restricted). However, the truth of the EJRM does not entail that we cannot have a theory of meaning that makes an interesting and explanatorily useful reduction of meaning facts to facts that involve other abstract objects such as sets or functions. After all, such a reductive non-physicalist might argue, if we need to postulate, e. g., abstract functions for other purposes, why postulate in addition to such functions, meaning facts? We achieve an advantage of theoretical simplicity by reducing the number of primitives we need to postulate in our total theory by reducing the meaning facts to facts about abstract functions. Of course we could reduce the number of primitives postulated by our total theory even more if we could reduce these abstract functions to the workings of various physical systems, thereby yielding a reductive physicalism. But that reduction can occur only if the EJRM is false or if there is something else wrong with the normativity argument.

REFERENCES

- Davidson, Donald. 1984. *Inquires Into Truth and Meaning*. Oxford: Clarendon Press.
- Gampel, Eric. 1997. The Normativity of Meaning. *Philosophical Studies* Vol 86: 221-242.
- Kripke, Saul. 1982. *Wittgenstein on Rules and Private Language*. Cambridge: Harvard University Press.

Deborah C. Smith
Kent State University
<dcsmith@kent.edu>

SORITES (ΣΩΡΙΤΗΣ), ISSN 1135-1349

Issue #12. May 2001. Pp. 66-69.

Frankfurt on Personal Failure

Copyright © by SORITES and Alan White

FRANKFURT ON PERSONAL FAILURE

by Alan White

Over the years there have appeared a number of theoretical and metatheoretical broadsides against Harry Frankfurt's familiar arguments denying that a free moral agent have alternatives in some real sense as a necessary condition for her moral responsibility.¹ In what follows I will attempt to focus on a particular defensive strategy of Frankfurt's, which, when analyzed, yields evidence that such attacks, particularly the metatheoretical ones, are not misplaced.

I

Peter van Inwagen's now-familiar strategy to refute Frankfurt's thesis involves (among others) two claims.² The first general claim is that Frankfurt's framing of the issue, in a principle called PAP (for Principle of Alternative Possibilities) is overly simple. Thus, instead of Frankfurt's PAP:

(PAP) One is morally responsible for one's acts only if one could have done otherwise than one did.

Van Inwagen wishes to substitute his own PPA (Principle of Possible Action) specifically for instances of moral failure:

(PPA) One is morally responsible for failing to perform an act only if one could have performed that act.

Secondly, van Inwagen proposes an example of PPA that results in an agent's lacking responsibility. He hypothesizes that an apathetic agent who knows of a crime in progress fails to call the police. Coincidentally, it turns out that the only phone he could have used is broken. Therefore, that agent is not fully responsible by PPA for the fact that the police were not called. In Frankfurt's analysis, this is so because while van Inwagen's agent's behavior was *sufficient* for the fact of his failure to call the police, it was not *necessary* in virtue of the further fact that the phone was broken. (I should note that Frankfurt resists the conclusion that the apathetic agent was not fully responsible for *trying* to call the police. Nevertheless, he continues to analyze conditions of responsibility here for the objective state of affairs that the police were not called.)

¹. Frankfurt, Harry G., *The Importance of What we Care About*, (New York: Cambridge University Press, 1988), 95-103. Cited in text hereafter as «(Frankfurt, x)».

². Van Inwagen, Peter, «Ability and Responsibility», *Philosophical Review*, 87 (1978), 201-224.

Thus, Frankfurt proposes the following revision to reconcile PAP with PPA. That is that one must distinguish *personal* from *impersonal* failure. Van Inwagen's case of failure was of the latter kind — his agent in some sense *inevitably* failed because of states of affairs or events beyond his control. Then Frankfurt contrasts this case with another of his own construction, namely a *personal* failure of an agent Q who, because he voluntarily looks to the left at some crucial moment while driving, fails to keep his eyes on the road despite the fact that there are present (though actually otiose) overdetermining conditions which would have otherwise kept Q's eyes looking left. Unlike van Inwagen's case, Frankfurt holds Q personally and thus fully responsible for this failure because it is fully his act, even though there are overdetermining conditions which did not in fact influence Q's actions.

Frankfurt then provides a defense of his distinction between his case of personal failure and van Inwagen's impersonal case. To reinforce his claim that Q is indeed fully responsible for his failure, Frankfurt states:

Notice that Q is *fully* responsible for his failure. Failure to keep one's eyes straight ahead is exclusively a matter of what movements a person makes; it is *constituted* by what the person does, and what the person does is therefore both a sufficient and a necessary condition for it. It cannot be said, then, that Q's failure would have occurred no matter what he had done — i. e., regardless of what bodily movements he made. If he had not moved his eyes to the left at all he would not have failed. (Frankfurt, 101)

One can sympathize with the sense of Frankfurt's claim here. His argument is an attempt to show that proper counterfactual analysis cannot remove or absolve Q's role in originating and causing the act of which he is accused. I wish to argue, however, that Frankfurt's use of this counterfactual claim as a basis to refute (his clarified version of) PAP cannot stand close scrutiny, because such a use of that claim relies upon equivocations on key terms.

II

It will be convenient to label Frankfurt's key claim as:

(F) If he [Q] had not moved his eyes to the left at all he would not have failed.

Since this is a counterfactual statement containing key moral terms, interpreting it requires explicit semantics, modally and otherwise. Perhaps the most convenient here for the modality of the statement is a Lewisian-style (L) account, since this allows an accounting of individuals in terms of closest possible worlds (to the actual one) by reference to those individuals' counterparts. (I should note here my confidence that any appropriate semantics will yield the same critical insights I offer below.)

Placing on (F) one such (L) account, and further elucidating the moral content of «failed» we have:

(RC/Remote Counterpart) If Q* had not (in that world actually) turned his eyes to the left at all, (then) he would not have failed (not have turned his eyes left and thus be not morally responsible for doing so).

(RC) posits a possible world in which an individual counterpart of Q, Q*, does nothing himself to move his eyes left (or anywhere else than on the road), and thus the state of affairs of his eyes-turned-left (or anywhere else) does not obtain. Note that the fact that the state of affairs of eyes-turned-left (E-T-L) does not obtain in Q*'s world entails that there is no overdetermination of that state of affairs (at that time) in that world. But, since Q*'s case is invoked precisely to justify Q's responsibility under overdetermined conditions in the actual

world, the plausible relevance of PAP or PPA to Q*'s situation as one involving *free action/free will* is of no use in evaluating the responsibility of Q in the actual world where PAP or PPA doesn't apply. The very question is whether Q's action *is* a free and responsible one in spite of the inapplicability of PAP or PPA.

However, another (L) account of (F) is available:

(CC/Close Counterpart) If Q** had not (in that world actually) turned (or tried to turn) his eyes to the left at all, but nonetheless had done so because of overdetermination, then he would not have failed (would have not been responsible for what happened).

(CC) posits a possible world in which an individual counterpart of Q, Q**, does nothing himself (personally) to move his eyes to the left (or anywhere else), but overdetermining (impersonal) forces make him do just that, so the state of affairs of E-T-L does obtain. Q**'s world, like Q's, is an overdetermined one, but also one in which the actual functioning of the overdetermination results in the state of affairs of E-T-L. Like Q, Q** is thus also subject to conditions precluding PAP or PPA, although here that coincides with an evaluation of Q**'s *lack* of responsibility. Hence, it is plausible that this judgment of Q**'s lack of responsibility in part relies on the fact that the overdetermining conditions violate PAP and/or PPA. If so, then (CC) is of no use in supporting Frankfurt's apparent reading of (F). (It should be obvious that Frankfurt himself would challenge the relevance of PAP/PPA to Q**'s lack of responsibility, since this would be a case of impersonal failure. That is quite aside the point, however, that (CC) cannot itself be used to leverage (F) against PAP or PPA.)

III

No doubt Frankfurt would greet my analysis thus far with something akin to an incredulous stare. What of the fact that neither (RC) nor (CC) backs (F) against PAP or PPA? That's not the job (F) was meant to do! Rather, (F) is only to uphold the claim that Q and Q alone *produced* the state of affairs of E-T-L, which is then described as a failure. Recall that Frankfurt says above that «[f]ailure to keep one's eyes straight ahead is exclusively a matter of what movements a person makes; it is *constituted* by what the person does, and what the person does is therefore both a sufficient and a necessary condition for it.» Clearly this language is metaphysical, as particularly evident in its assertion that the failure is «*constituted*» by Q's movements. So here «failure» refers *merely* to the physical movements of Q as described by the state of affairs E-T-L (or looking anywhere else than on the road). On the basis of such a purely metaphysical meaning, Frankfurt's subsequent statements that culminate in (F) are consistent and true — though in that case resulting on the triviality of (F) as meaning only

(F*) If he [Q] had not moved his eyes to the left at all, he would not have moved his eyes to the left at all.

However, should Frankfurt protest that (F) means more than (F*), and specifically that Q (or more precisely, some counterpart of Q) «would not have failed» *by* avoiding E-T-L in the relevant world, then he explicitly invokes «fail» in an *evaluative* sense — in the sense connotative of moral responsibility. But in that case (F) then reads as (RC), which cannot support the same evaluative sense of «fail» as originally occurs in (F) because of the plausible evaluative role of PAP/PPA in Q*'s world, where overdetermination does not occur. Although (CC) likewise involves an evaluative meaning of «fail», clearly it fares no better in supporting such a sense in (F) that favors Frankfurt's use of the term against PAP or PPA in overdetermined circumstances similar to Q's where overdetermination does not function.

There is only one conclusion to be drawn from this analysis: «failure» and all its cognates are used in Frankfurt's above quote in two senses, sometimes separately, sometimes combined. There is a clear purely metaphysical use, putatively evaluative uses, and arguably mixed uses. Labeling these respectively (M), (E) and (ME) we have:

Notice that Q is *fully* responsible for his failure (E)/(ME). Failure (M) to keep one's eyes straight ahead is exclusively a matter of what movements a person makes; it is *constituted* by what the person does, and what the person does is therefore both a sufficient and a necessary condition for it. It cannot be said, then, that Q's failure (M)/(E)/(ME) would have occurred no matter what he had done — i. e., regardless of what bodily movements he made. If he had not moved his eyes to the left at all he would not have failed (E)/(ME). (Frankfurt, 101; my additions)

Note that the penultimate cognate of «fail» as «failure» is the vaguest — although its use as (M) both yields the strongest and the most trivial reading of (F) as (F*) simultaneously. Excluding that, a pure (E) reading of (F) evokes the controversy of (RC) or the irrelevance of (CC), and a (ME) reading does as well.

IV

Quo vadimus? The first conclusion is that Frankfurt has work to do to show that Q is fully responsible for his failure E/(ME). There is no doubt that Q *caused* his failure (M) as it so happened, but it remains for Frankfurt to supply an account that sweepingly supports Q's *complete* failure (E)/(ME). After all, one could plausibly argue that Q «had the deck stacked against him» — that although he did in fact fail (M)/(ME) due to his own efforts, surrounding circumstances *required* him to fail (M)/(ME) come what may, *pace* Frankfurt. As well, one may plausibly reduce the responsibility of Q in direct proportion to what is felt to be the conspiratorial nature of the overdetermination. (Accidental entrapment by these circumstances versus God's deistic enforcement of them, say.) The point is that any such overdetermination is a factor that is not easily morally disregarded.

The second conclusion is that such parallel vagaries might contaminate Frankfurt's more familiar arguments against PAP. The general scenario of an effete entrapment is the staple of Frankfurt-style counterexamples, after all, and the problems that besiege (F) similarly plague analogous defenses of those counterexamples. Typically Frankfurt's strategy emphasizes the actual ineffectuality of the overdetermination, which subtly evokes similar counterfactual circumstances in which, like (RC), overdetermination doesn't apply. But such implied comparisons may well rely on an intuitive sense that PAP is tacitly applicable in those insinuated circumstances. Thus a silent appeal to PAP may well be used to explicitly dispose of PAP. And that, in other words, would be tantamount to an equivocation on key terms of responsibility in the compared cases.

V. Alan White

University of Wisconsin Colleges

<awhite@uwc.edu>

SORITES (ΣΩΡΙΤΗΣ), ISSN 1135-1349

Issue #12. May 2001. Pp. 70-86.

Dispositionalism and Meaning Skepticism

Copyright © by SORITES and Silvio Pinto

DISPOSITIONALISM AND MEANING SKEPTICISM

by Silvio Pinto

1 Introduction

In a recent thought-provoking paper on skepticism concerning meaning (1997), Scott Soames claims that Kripke's and Quine's arguments that there are no facts about meanings are flawed for similar reasons. According to Soames, both of them are based on a confusion about how a certain kind of fact determines another (for instance, what it takes for a dispositional fact to determine a particular linguistic meaning). Soames' strategy to refute the skeptical arguments advanced by Kripke and Quine involves distinguishing two notions of determination both of which, if applied unambiguously and consistently throughout the formulation of the above skeptical reasonings, would fall short of licensing the far-reaching and devastating skeptical conclusions that their proponents intended them to have.

This paper is an attempt to vindicate the problem raised by the meaning skeptic, and to show that Soames' suggested dispositional account cannot even partially solve it. I leave the problem of the indeterminacy of translation aside for lack of space as well as because of my greater familiarity with the literature related with Kripkean skepticism. In section 2, the skeptical problem is introduced from a slightly different perspective from which it is usually presented. I interpret Kripke's problem as possessing both constitutive and epistemological dimensions; it requires of the prospective meaning-constitutor to satisfy two conditions: a) to be able to account for the kind of normativity that is attached to meaning; b) to allow for an explanation of our knowledge of meaning. Section 3 contains Kripke's most damaging objection to dispositionalism as a solution to Kripke's problem: the objection of the normative non-adequacy. In section 4, Soames' version of the skeptical problem is presented; he separates it into two distinct questions: a) that of finding non-intentional facts which epistemologically determine meaning, and b) that of finding non-intentional facts which metaphysically determine meaning. According to him, although there may be no solution to the first question, there are dispositional facts that correctly answer the second question. Section 5 contains my criticism of Soames' rendering of the skeptical problem, and finally section 6 expounds my argument against his claim that there are dispositional facts which metaphysically determine meaning.

2 The skeptical problem about meaning

Kripke introduces the problem of meaning skepticism with the following simple example. He invites us to imagine a subject (S) who is a competent English speaker and has access to all there is to know about his present and past mental life, behavior and brain. One could almost certainly say that S uses the expression '+'¹ to refer to the arithmetical operation

¹. Or 'plus'.

of adding two natural numbers; whenever S uses 'plus' he is applying the mathematical rule: *add the numbers m and n*. The idea that naturally comes to mind when we think of a rule like this is that of an algorithm determining a unique value for any two arbitrary natural numbers. But the rule of addition is not the one that interests Kripke; what concerns him is rather the linguistic rule: *S uses the word 'plus' to refer to addition*. As S will have applied this latter rule to finitely many cases, we can always imagine him in a situation where he has to apply the rule to a new case. Kripke suggests that this situation is that of answering the question «68+57=?»; S is supposed to have never used 'plus' in situations involving numbers equal to or greater than 57 before.

Suppose, Kripke says, that S is presented with the sign «68+57=?» and his reaction consists in uttering the word '125'. Suppose also that S is quite confident of having given the right answer. Now imagine that S encounters a skeptic — let us call him K — who questions the certainty of S's answer in what Kripke calls the metalinguistic sense; K raises doubts about S's knowledge of the meaning of '+' and not about his knowledge of arithmetic. This last knowledge is taken for granted in Kripke's dialectic. Skepticism about S's understanding of '+' creeps in as follows. One of the hypotheses of the example is that S uses '+' now in the same way as he did before; if he intended it to refer to *addition* in the past then S means the same in the present. But how does S know, K insists, that, in applying the term '+' in the past, he meant the adding function and not, say, the quadding function (that we will henceforth symbolize by '*')? The definition of '*' goes like this:

$x*y = x+y$, if $x, y < 57$

$x*y = 5$, otherwise.

After all, K goes on, all his previous uses of '+' fit perfectly well his meaning quaddition by '+' rather than addition. But if there is room for skepticism concerning what '+' meant for S in the past, then it obviously extends to its present meaning for him as well.

According to Kripke, two aspects must be distinguished in the skeptical challenge. First of all, there is the question of whether any fact about S determines which function — addition or quaddition — he means when he uses '+'. That is, what constitutes S using '+' to mean addition rather than quaddition? This is the metaphysical or constitutive aspect of the skeptical problem. But there is also the problem of what justifies S in believing that the word '+' in his idiolect means *plus* rather than *quus*; how does he know that it means *plus* rather than anything else? This is the epistemological aspect of the skeptical problem. Kripke also describes the two sides of the problem in the following way:

An answer to the skeptic must satisfy two conditions. First, it must give an account of what fact it is (about my mental state) that constitutes my meaning plus, not quus. But further, there is a condition that any putative candidate for such fact must satisfy. It must, in some sense, show how I am justified in giving the answer '125' to '68+57'. (Kripke 1982, p. 11)²

It seems to me that the separation between a constitutive and an epistemological questions within Kripke's problem is extremely relevant for a thorough understanding of the reasons why some of the suggested solutions to it are not acceptable. However, most commentators have claimed that the appearance of an epistemological dimension to meaning

². See also Kripke 1982, pp. 38-9, where it is explicitly stated that meaning skepticism is not merely epistemological. I take this to mean that the skeptical problem about meaning and intention is also a constitutive one.

skepticism is misleading.³ Paul Boghossian, for example, uses the following argument against the purported epistemological character of Kripkean skepticism. One of the assumptions of Kripke's problem is that S is an idealized subject; he is by hypothesis not subject to the limitations of our cognitive capacities. If his sense organs never deceive him, his memory works perfectly, his mind does not create illusory representations such as dreams or hallucinations and so on, then there can be, according to Boghossian, no room for epistemological skepticism concerning S's access to what he means by his words.

Yet, Boghossian's argument loses sight of a more radical variety of skepticism which, in my opinion, underlies Kripke's problem. After all, is it not possible that S, although not subject to our cognitive limitations, found himself at a loss in his attempt to justify his belief about what '+' means to him? Imagine, for example, that in response to the skeptic S mentioned the mental state he is in while using '+' with understanding. Given the faultlessness of his memory, perhaps S could appeal to it in order to justify his beliefs about his past understanding of '+'. The suggestion is that the constitutive fact would be an occurrent mental state that accompanies every competent use of '+', and that the subject's grasp of this state is mediated by memory for all his past applications of '+' and by introspection for his present uses of this word. But how could memory or even introspection enable someone to recognize a certain state as that of meaning *addition* by '+'? Someone might be tempted to say that such a state possessed some qualitative feature which could distinguish it from similar states of meaning like that of using '+' to refer to *quaddition*. It is plausible to think, however, that, unlike occurrent mental states (e. g. a sensation), dispositional mental events such as that of understanding a linguistic expression in a specific way do not exhibit any phenomenology that could allow the subject to distinguish it via introspection from, say, a slightly different understanding of the same expression. This objection to the suggestion that linguistic understanding is constituted by a qualitative mental state can be found in Kripke.⁴ It poses an epistemological difficulty to those who believe that states of understanding are qualitative. Now, if meaning skepticism did not have an epistemological dimension — that is, if the question of the subject's access to that which constitutes his linguistic understanding was no part of the skeptical problem — then the above objection could not be raised. The fact that it is part of Kripke's strategy against the advocate of the qualitative character of states of understanding confirms, I think, the claim that there is also an epistemological aspect to meaning skepticism.

That this suggested separation between a constitutive and an epistemological question correctly represents Kripke's problem is also corroborated by his insistence on the requirement that the putative meaning-constituting fact justifies the subject's beliefs about what he means. Thus, while considering the question of whether appeal to a linguistic disposition can justify the subject in answering as he did to the addition problem, Kripke says:

I know that '125' is the response you are disposed to give (...), and maybe it is helpful to be told — as a matter of brute fact — that I would have given the same response in the past. How does any of this indicate that — now *or* in the past — '125' was an answer *justified* in terms of instructions I gave myself, rather than a mere jack-in-the-box unjustified and arbitrary response? Am I supposed to justify my present belief that I meant addition, not quaddition, and hence should answer '125', in terms of a *hypothesis* about my *past* dispositions? (Kripke 1982, p. 23)

³ For example, Paul Boghossian (1989, p. 515), Ruth Millikan (1990) and Barry Smith (1998).

⁴ In Kripke 1982, pp. 41-51.

Another important clarification to make at this stage is that, in assuming that S's cognitive capacities are always reliable, we are not automatically committing ourselves to the assumption that the objective criteria for the truth of his beliefs about what he means or about how he intends to use a word are available to him. On the contrary, that from the perspective of the speaker there can be no criteria for objective attribution of meaning and intention is precisely one of the lessons of Kripke's variety of skepticism. This means that the distinction cannot be drawn between a speaker meaning something by a word and him merely thinking that he means it, if the perspective of the speaker is isolated from that of any external observer. Since, according to the meaning skeptic, the speaker himself cannot ultimately justify his own semantic beliefs, a solution to the skeptical problem, if there is one, would also require an explanation of first-person knowledge of linguistic meaning and intention which can account for the lack of objectivity of such a knowledge.⁵ If these considerations are correct, then it is hard to see how one could deny an epistemological dimension to meaning skepticism.

3 Meaning Skepticism and Dispositionalism

One of Kripke's preferred targets with respect to the skeptical problem is the so-called dispositional account. Against it, he aims a number of objections the most harmful of which is what I will be calling here the objection of the normative non-adequacy. It goes like this. Linguistic meaning requires norms for the correct use of words and sentences. Yet, linguistic dispositions fail to capture these norms. Therefore, linguistic dispositions cannot constitute meaning.⁶

Kripke certainly does not exhaust nor claims to have exhausted all the possible versions of dispositionalism. He considers, however, two quite representative varieties of the dispositional approach. The first, which I will call straightforward dispositionalism, consists in spelling out S's add-disposition towards '+' in terms of the following counterfactual: if S were presented with any expression of the form «*m+n=?*» (where 'm' and 'n' stand for any two numbers) he would have responded with 'p' (where 'p' stands for a number which is the sum of m and n).⁷ According to Kripke, straightforward dispositionalism fails to capture the normative relation between meaning and use because from the supposition that S is add-disposed towards '+' no norms concerning how he *should* use the word in any given case follows (that is, how it would be correct for him to apply it in these cases). What we can infer from the disposition's corresponding counterfactual is only how S *would* have used it, had he been exposed to the relevant stimulus.⁸

The second kind of dispositional account discussed by Kripke is what I shall call here *cæteris paribus* dispositionalism. This account is tentatively proposed in his book as a way

⁵. To say that self-knowledge of meaning an intention is not objective is simply to claim that the subject lacks the objective criteria for attribution of such a knowledge to himself.

⁶. Kripke 1982, pp. 34-5, 37.

⁷. Soames notes that the counterfactual should be spelled out without the use of any intentional notions if we are to avoid smuggling into the disposition any problematic concept involving content, and therefore opening ourselves to a similar skeptical challenge concerning the new concept. I take it that the above counterfactual is free from this objection, but even if it was not entirely satisfactory, we could always reformulate it so as to bring it into line with Soames' *desideratum*.

⁸. Kripke 1982, p. 37.

of responding to the well-known objection to straightforward dispositionalism that human dispositions are finite. The new approach (*cæteris paribus* dispositionalism) eliminates the gap between human capacities and the infinite dispositions postulated within the straightforward approach by idealizing human dispositions. The trouble is that by doing this, says Kripke, the theorist of dispositions has rendered his account of that which constitutes meaning circular. In order to see why, let us look at how the new approach constructs the counterfactual associated with the add-disposition towards the word '+'. Kripke represents it in the following way: if S were given the means to carry out his intentions towards numbers that are presently too large for him to add (or to grasp), and if he were to carry out these intentions, then if queried about the result of $m+n$ for some large m and n , he would respond with their sum.⁹ This modified variety of dispositionalism is not subject to the normative non-adequacy objection but only because it builds into the relevant counterfactual an intention to use a word in a certain way, an entity of the same problematic kind as that of meaning something by the word. This new intentional item would be another easy target to Kripke's skeptic.¹⁰ Besides, the explanation of linguistic meaning in terms of a linguistic intention would constitute no advance in our understanding of what constitutes meaning because, in order to account for what fulfills a linguistic intention, one would have to appeal to a linguistic meaning, and that would render such an explanation evidently circular.

4 Soames' Interpretation of Meaning Skepticism

In apparent agreement with most commentators, Soames seems to admit only a constitutive dimension to Kripke's problem. According to him, the problem would be solved if we could exhibit some fact that determined what S means by his uses of the word '+'. This is one of his formulations of the problem:

So, if it is a fact that we mean so and so by a given word w , then some fact about us must determine in advance how w properly applies in new cases. This much seems undeniable. The surprise comes when we examine potential candidates for such a determining fact and find that none fills the bill. Because of this, the skeptic concludes, we have no choice but to admit that it is not a fact that we mean anything by w after all. (Soames 1997, p. 212)

The formulation of the constitutive problem in terms of the determination of facts about meaning or intention in terms of facts of another nature plays a crucial role in Soames' discussion of meaning skepticism. He sees Kripke's problem as that of specifying non-intentional facts which determine (in a sense that we are going to consider below) the mental facts that correspond to the meaning the subject assigns to his words and to his linguistic intentions towards these words. In the specification of these non-intentional facts, Soames claims, appeal can be made to intentional facts (like representations, mental images, sensations and so on) provided that their content is not assumed to be already established.¹¹ A way of understanding this proviso is the following: intentional facts are allowed to occupy a meaning-determining position if they are described non-intentionally. Here I will suppose that this is what Soames has in mind; the reasons for this assumption will be apparent in the ensuing discussion.

⁹ Kripke 1982, p. 28.

¹⁰ Concerning this, see also note 7.

¹¹ Soames 1997, p. 216: n. 6. The reason for this constraint is given in note 7.

The skeptical problem about meaning seems to be forcing upon us a pessimistic solution, namely: the conclusion that there are no such things as meanings or linguistic intentions. According to Soames, the argument produced by Kripke in order to justify this conclusion is the following:

- P₁ If there is a fact that S meant *addition* by ‘+’ in the past, then either: i) this fact is determined by non-intentional facts of such and such kinds (for example, the set of all his past linguistic dispositions towards ‘+’)¹² or ii) the fact that S meant *addition* by ‘+’ in the past is a primitive fact (i. e. not determined by any non-intentional fact).
- P₂ Non-intentional facts of the kind mentioned in (i) do not determine that S meant *addition* by ‘+’.
- P₃ What S meant by ‘+’ is not a primitive fact — that is, it is determined by non-intentional facts.

Therefore, there is no past fact about what S meant by ‘+’ and no fact either about what he means by it now; and generally there is no fact about what he or anybody else means by his or her words.¹³

Soames complains that the above argument falls into a fallacy of equivocation: it trades illicitly on two concepts associated with the term ‘determination’, that occurs in premises 1, 2 and 3. This is why the skeptical argument seems so forceful. Once we distinguish the two concepts of determination as below and employ either of them consistently throughout the argument, its apparent high persuasiveness vanishes. The first is the notion of epistemic determination which is characterized by the following constraint: a fact that P determines *a priori* (or epistemically) the fact that Q only if knowledge of P allows one to demonstrate Q without recourse to any other empirical facts; Q is said in this case to be an *a priori* consequence of P.¹⁴ Applied to the case under consideration, the constraint of epistemic determination generates the following condition that any candidate non-intentional fact for determining the meaning fact which corresponds to using ‘+’ to refer *addition* must satisfy:

- (N_E) The non-intentional fact that P determines epistemically that one means addition by ‘+’ only if knowledge of P provides one in principle with a sufficient basis for concluding that one ought to give the answer ‘125’ to the question «What is 68+57?»¹⁵

N_E states that a necessary condition for the epistemic determination of a meaning fact by a given non-intentional fact is that knowledge of the latter be sufficient for the speaker to derive *a priori* (i. e. without the help of any bit of empirical knowledge) the norms of meaning.

Now, if ‘determination’ is understood epistemically (i. e. if the relation of determination is identified with that of *a priori* consequence), then, according to Soames,

¹². This is the kind of non-intentional meaning-determining fact suggested by Soames. We will be elaborating on these facts in section 6.

¹³. Soames 1997, p. 232. The passage is slightly modified for stylistic reasons but its content remains unchanged.

¹⁴. Soames 1997, pp. 223-4.

¹⁵. Soames 1997, pp. 220-1.

while P_2 may be accepted as true, it is not plausible to say the same of P_3 . As far as the truth of P_2 is concerned, it is reasonable to accept it, he goes on, because the non-intentional facts mentioned in P_1 most probably will not satisfy condition N_E . The reason why such facts will not satisfy N_E is that S might be aware of all his linguistic dispositions towards '+' without having any clue about whether his use of '+' in the new case is correct or not. As to P_3 , Soames justifies its implausibility by saying that the norms of meaning are probably not deducible *a priori* from the conjunction of propositions describing any set of non-intentional facts.¹⁶

Soames claims that the second notion of determination involved in the skeptical argument is that of metaphysical determination. According to him, the fact that P determines metaphysically the fact that Q only if Q is a necessary consequence of P , which means that all possible worlds containing P must also contain Q . From this general characterization of metaphysical determination, Soames extracts the following condition that any putative non-intentional fact must satisfy if it is to determine metaphysically the fact a speaker uses '+' with the intention of adding:

(N_M) The fact that P metaphysically determines that one means addition by '+' only if in any possible world in which it is the case that P , '125' is the answer one ought to give to the question «What is $68+57$?».¹⁷

N_M says that a necessary condition for the metaphysical determination of the fact that the speaker means *addition* when he uses '+' by a non-intentional fact is that the norms corresponding to this specific meaning must be a necessary consequence of the proposition that expresses P ; in all possible worlds where P obtains, the norms for the use of '+' are those which accord with the attribution of the content *addition* to this word.

Now, if the relation of determination is to be equated with necessary consequence (that is, if the skeptic is talking about metaphysical rather than epistemic determination), then the reverse is the case, namely: it makes sense to attribute truth to P_3 but not to P_2 . The former is plausibly true because, although, as Soames admits, some dispositional facts probably will not comply with condition N_M , he is convinced that there must be non-intentional facts (for instance, the complex fact mentioned in P_1) which would finally satisfy N_M .

Soames grounds his firm belief that the above-mentioned dispositional facts will satisfy N_M , and therefore render P_3 true, on an alleged supervenience of meaning facts on these non-intentional facts. According to him, if a meaning fact (M) supervenes on certain non-intentional facts (P), then in all possible worlds where P are the case M is also the case, and therefore the proposition which describes M follows necessarily from the ones that describe P .¹⁸ Moreover, P_2 must be false if 'determine' in it means the same as in the true P_3 .

From these considerations, Soames draws at least two conclusions. The first is that the alleged skeptical argument is unsound. The second is that the skeptic has not demonstrated that there are no facts about what we mean by our words. What he has probably established

¹⁶. Soames 1997, pp. 230-1.

¹⁷. Soames 1997, p. 227.

¹⁸. In section 6, I will discuss the plausibility of the thesis that the supervenience of one kind of fact upon another implies the relation of necessary consequence between a description of the latter fact and a description of the former.

is the epistemological non-determination of facts about meaning by any kind of non-intentional facts. But, as this sort of non-determination is compatible with the metaphysical determination of meaning facts by strongly construed dispositional facts¹⁹ and as, according to Soames, the skeptic has not shown that no non-intentional fact can determine meaning metaphysically, the claim that there are no meaning facts is so far unjustified. Soames goes even further: this claim is not merely unjustified but altogether false, since there is a version of dispositionalism that will meet the condition of metaphysical determination (N_M). If Soames is right, then Kripke must have misjudged the merits of dispositionalism with respect to its adequacy for generating the norms of meaning.

5 Criticism of Soames' interpretation of Kripke's problem

According to Soames, skepticism about meaning is just based on a confusion; the thesis actually established by the skeptic is much weaker than he intended it to be. The bold and far-reaching character of Soames' anti-skeptic conclusions calls for a more careful examination of his argument. Let me start with the question of the correction of his interpretation of Kripke's problem.

Perhaps what Soames wants to contemplate with his distinction between an epistemic and a constitutive condition of determination (N_E and N_M , respectively) is the existence of both an epistemological and a metaphysical (or constitutive) challenge of explaining the kind of normativity that attaches to meaning. Since linguistic meaning and intention are essentially normative notions, and, moreover, notions called upon by others and by ourselves in order to justify our intentional behavior, any prospective explanation of meaning and intention must account not only for what constitutes the norms that are associated with them but also for our access to these norms. If this is so, then Soames and myself would be on the same side against interpretations of the skeptical problem which recognize only a constitutive dimension to it. Recall, however, that the constitutive and the epistemological facets of Kripke's problem are intimately related; they should be seen as two constraints on prospective solutions to it rather than constituting two different problems.

Yet, Soames seems to think that there are two separate problems — the problem of showing that facts of some kind metaphysically determine meaning and the problem of demonstrating that the former facts determine meaning epistemologically — such that a solution to the first problem does not depend upon the solution one gives to the second problem. Thus, he claims against Kripke that a version of dispositionalism can solve the problem of the metaphysical determination of meaning even though the problem of the epistemological determination of meaning is most probably insoluble. And he also believes that, in order to convince us that dispositions in general cannot constitute meaning, the skeptic would need to show, although he does not, that these dispositions fail to satisfy the constitutive condition of determination.

However, to conceive the skeptical problem as two unrelated questions misrepresents Kripke's purposes; it leads to the false view that in order to give a negative answer to the problem you need to answer both questions negatively. If we see meaning skepticism as Kripke does — that is, as a problem with two inseparable conditions — then the rejection of

¹⁹ Here Soames appeals to Kripke himself, part of whose seminal work was dedicated precisely to show that necessary and *a priori* are not equivalent notions (Kripke 1980). Applied to the case in question, this implies that there may be necessary consequences of a proposition p (which is made true by the dispositional fact cited in P_1) which are not *a priori* consequences of p (these consequences are made true by the meaning fact corresponding to the dispositional fact in question).

a prospective meaning-determining fact requires only a demonstration that it does not comply with one of the conditions of the problem. Hence, if, as Soames maintains, the skeptic had concluded that a dispositional fact falls short of constituting meaning because it cannot accord with the epistemological requirement of determination, his argument would be quite correct.

Nevertheless, the skeptic does not argue this way! For Kripke dispositions are no use for explaining meaning precisely because they cannot adequately generate the norms which we associate with the notion of linguistic meaning.²⁰ But even if it was granted that the skeptic has not demonstrated that any disposition will fail to metaphysically determine meaning, Soames' concession that such a disposition would probably not meet the condition of epistemological determination indicates that his interpretation of meaning skepticism diverges a lot from Kripke's. Otherwise, Soames should have concluded that, because dispositionalism cannot meet one of the conditions of the problem, it therefore is not apt to solve the skeptical problem.

Soames also believes that the meaning skeptic demands that the prospective meaning-determining fact be non-intentional. The motivation for such a demand is already familiar: to suppose that an intentional fact could determine meaning is to invite a new skeptical problem concerning the determination of the intentional content of such a fact.²¹ If we are not after an empty explanation of the normativity of meaning, then the candidate for meaning-determining fact should be required not to possess the kind of normativity we are seeking to explain (that is, the normativity that is associated with the intentional items such as beliefs, meanings and desires). On the other hand, to require that the meaning-constituting fact be non-intentional is to open oneself to the objection that facts with which no normativity of the relevant sort is associated can neither generate nor explain the norms of meaning. Call this latter the objection of the normative non-adequacy for its similarity with Kripke's most important charge against dispositionalism.²² Philosophers who are more sensitive to the problem of the reiteration of meaning skepticism have proposed a reductionist account of the normativity of meaning and the other intentional items (i. e. an account of the intentional in terms of non-intentional items). This is the position of Michael Dummett in his first paper on what a theory of meaning is (1974). Others have felt the power of the normative non-adequacy of the non-intentional items much more acutely; they have thereby suggested a non-reductionist account of the normativity of the mental. For example, Colin McGinn in his book on Wittgenstein (1984). The two requirements — that the meaning-determining fact should not be subject to a new skeptical challenge and that it be such as to generate and explain the norms of meaning — seem to be in blatant conflict. Neither intentional nor non-intentional facts appear to be capable of satisfying these requirements simultaneously.

Some theorists would nonetheless claim that their suggested meaning-determining facts attend the above apparent conflicting requirements and hence escape the dilemma. I assume Soames would want to make this claim about his robustly construed linguistic dispositions. Hence, his position deserves to be evaluated in the light of the question of whether it actually

²⁰. See section 3.

²¹. See the last paragraph of section 3 and note 7.

²². See section 3.

satisfies these two requirements.²³ But, as a prolegomenon to the evaluation of Soames' position, something more substantial needs to be said about the sort of normativity that is specific to meaning and the other mental items.

We mentioned in section 3 that there is a normative relation between the meaning a speaker assigns to a word of his idiolectic and this person's linguistic performances involving the word; some of these performances will be evaluated as correct, while some others will be assessed as incorrect uses of the word. Moreover, in cases of meaning attribution as well as the attribution of other mental items the subject must be credited with the awareness of such norms (or criteria of correctness), as he can often be observed to respond to correctness. This reflects the idea that the intentional behavior of human beings is normally within the field of their consciousness so that they are capable of voluntarily and purposefully guiding this sort of behavior. This feature of the normativity characteristic of human speech and action does not belong to the norms with which other, non-intentional activities are evaluated. For instance, the behavior of a heart or that of a carburettor can be judged as in accord or in conflict with the function these objects were designed and built to discharge. Thus, a criterion for the correct operation of a carburettor is that it mixes petrol and air in a certain proportion; otherwise we will normally say that it fails to perform its function. It would not make sense, however, to demand of the latter type of norms that the object whose performances are supposed to be under its jurisdiction should be aware of, and intentionally guide its behavior by, them. Awareness of the norms for assessing the correctness of their performances can only be assumed in the case of the intentional behavior of human beings.

Let me consider first the following question: do Soames' two normativity conditions take into account the *desideratum* discussed in the last paragraph? The constitutive condition (N_M) does not even mention this epistemological constraint of the normativity that applies to human intentional states. Perhaps his epistemic condition (N_E) is better suited to represent the latter type of normativity. N_E states that knowledge of the meaning-constituting fact corresponding to any word of his language must be sufficient for the speaker to infer *a priori* the norms for the correct use of the word.

But is it plausible to suppose that first-person knowledge of meaning and motive is inferential? Ordinary intuition seems to point in the opposite direction, namely: that normally the speaker's access to the norms associated with what he means or to how he intends to use an expression is non-mediated rather than inferential. Wittgenstein was perhaps the first to capture the intuition of the ultimate immediacy of first-person knowledge of meaning. Thus, in discussing the question of whether reasons are needed in order to justify first-person access to linguistic rules, he says the following:

How can he [the rule-follower] *know* how he is to continue a pattern by himself — whatever instructions you give him? — Well, how do I know? — If that means «Have I reasons?» the

²³ Soames' overall position is actually more complex than I have been portraying it so far. Besides thinking that properly construed dispositions are apt to determine what S means by '+', Soames also believes that S's beliefs and intentions towards '+' are adequately explanatory of his meaning (Soames 1998, pp. 335-38). However, as he does not take the skeptic to be demanding an explanation for our linguistic competence but only asking for the non-intentional basis of meaning and content in general, the part about the explanatory role of beliefs and intentions for mental states like meaning is irrelevant for his strategy to deal with the skeptical problem.

answer is: my reasons will soon give out. And then I shall act, without reasons. (Wittgenstein 1953, § 211)²⁴

Wittgenstein's denial that first-person knowledge of the norms of linguistic meaning is inferred from some other piece of knowledge the speaker possesses — *a priori* or *a posteriori* — relates to another thesis of his that self-knowledge about meaning is practical rather than theoretical. I cannot discuss this latter thesis here.²⁵ Suffice it to say, however, that the speaker's impossibility of ultimately justifying his linguistic behavior does not, according to Wittgenstein, license the conclusion that such a behavior cannot be justified altogether. As he put it: «to use a word without a justification does not mean to use it without right» (Wittgenstein 1953, par. 289). I take Wittgenstein to be thereby suggesting that, although the speaker cannot definitively justify his use of words because he lacks objective criteria to judge about the correctness of such a use, someone else — a suitably positioned and informed observer — might be able to produce the reasons that will finally justify the speaker's intentional behavior towards the words of his language.²⁶

Davidson has also emphasized the normally non-inferential and criterionless character of self-knowledge about the mental.²⁷ One of his main concerns was to show — much more explicitly than Wittgenstein — that the ungroundedness of such knowledge from the perspective of the subject undermines neither the authority of the first person with respect to the majority of the subject's mental states (including those of understanding a word) nor the entitlement of his sincere avowals about these states to constitute knowledge.

So, if Wittgenstein and Davidson are right about the normally non-inferential character of first-person knowledge of meaning then N_E cannot be taken as providing a satisfactory requirement with which to evaluate the adequacy of a prospective meaning-constituting fact for explaining self-knowledge about meaning. N_E must be deemed unsuitable for functioning

²⁴. The same point comes expressed in different ways in various passages of Wittgenstein's later remarks. For example, concerning the question of whether our access to the linguistic rules we follow is mediated by an intuition (a kind of inner voice), he says: «how can we tell how a rule which has been used for fourteen steps applies at the fifteenth? (...) We might as well say that we need, not an intuition at each step, but a *decision*. — Actually there is neither. You don't make a decision: you do a certain thing. It is a question of a certain practice» (Diamond 1975, p. 237). See also Wittgenstein 1953, par. 217.

²⁵. I discuss Wittgenstein's position about self-knowledge of meaning and linguistic intention in chapter 3 of my PhD dissertation (Pinto 1998).

²⁶. The topic of the interpreter, or foreign explorer, who goes to a foreign land and there finds a tribe speaking a language he knows nothing about is recurring in Wittgenstein's later writings. See, for example, Wittgenstein 1953, pars. 205-207. According to him, such an observer may come to a stage where he will be able to interpret the members of the tribe as speaking a certain language if some conditions are satisfied. This means that the interpreter will be able to justify their use of words by appeal to the norms of their language which he will have eventually discovered if the method of interpretation succeeds. The topic is too vast to be discussed here.

²⁷. For example, in Davidson 1984a and Davidson 1987.

as such a requirement because it misrepresents first-person access to the norms of meaning; our access to these norms is usually not inferred *a priori* from another piece of knowledge.²⁸

6 Criticism of Soames' Solution to the Problem

Let us move now to the question of whether the enhanced non-intentional facts proposed by Soames can actually evade Kripke's normative adequacy objection. Recall that according to Soames the skeptic fails to demonstrate that these dispositional facts do not metaphysically determine meaning; he does not prove that such facts do not satisfy the metaphysical condition of normativity (N_M). If, as Soames claims, meaning facts really supervene on this sort of dispositional facts, then the latter must comply with N_M .

The normative non-adequacy objection against dispositions, let us not forget, was that these items cannot constitute the sort of normativity that is attached to meaning. So, quite independently of whether they could comply with the epistemological constraint of the skeptical problem, dispositions can be safely dismissed as meaning-constituting facts, this is what Kripke would say, because they fail to accord with its constitutive constraint. Yet, Soames insists that at least the dispositions he is proposing can indeed satisfy this constraint — understood as the condition of metaphysical determination. Who is right here? Let us take a more detailed look at the issue.

According to Kripke, the reason why dispositions in general — excluding the *cæteris paribus* ones, which are subject to another problem (see section 3) — cannot constitute meaning is that the notions of correct or incorrect use of a word, which are crucial for linguistic meaning, remain uncaptured by dispositional facts. Suppose, for example, that it makes sense to attribute to Kripke's subject — call him Smith — a certain understanding of the word '+'; he means *addition* by '+'. Suppose, moreover, that in the case in which Smith has to answer the question «68+57=?» — i. e. in the new use of '+' — he responds with the word '125'. A rational justification of Smith's intentional behavior might be the following: Smith answered that way because he understood the expression «68+57=?» as the question of what the sum of the numbers 68 and 57 amounts to. If Smith understands the sign '+' as referring to addition then there is a normative relation between this meaning of the word and a specific group of uses of numerical expressions (which the use of '125' in the above context belongs to): these latter uses are correct answers to questions involving the sign '+' if it means addition. The normative relation between meaning and use is what licenses the appeal to a certain meaning in the rational justification of Smith's linguistic behavior. Now, suppose that the justification of Smith's response resorts to a disposition to add. Could such a disposition rationalize Smith's linguistic deed? No, Kripke would say, because the relation between a linguistic disposition and any of the uses of words that are in accord with that disposition is merely causal; a disposition simply describes how the subject would respond if exposed to stimuli of a certain type.

Soames might protest that the dispositions discussed by Kripke are too simple; human linguistic dispositions, Soames might insist, are much more complicated than those. Let us construe the disposition to use in order to add then in the way he envisages, that is: as a

²⁸ Elsewhere, Soames seems to agree with this pre-theoretic intuition and with Wittgenstein and Davidson (see, for example, Soames 1997, footnote 25, p. 241). If this represented what he really thinks, then Soames should be agreeing with me on the inadequacy of N_E to represent first-person knowledge of meaning. Yet, I suspect he would prefer to regard such inadequacy as another reason to reject the framework of the skeptical problem rather than to abandon his parsing of the problem as inappropriate.

disposition to produce numerals in response to questions ‘What is $n+m$?’ plus «dispositions covering cases in which I ‘check and revise’ my work, dispositions to insist on one and only one ‘answer’ for any given question, dispositions to strive for agreement between my own answers and those of others, and so on».²⁹ Recall that, according to Soames, this complex disposition must be conceived as non-intentional. The question is whether the resulting dispositional fact³⁰ could finally capture the notion of a criterion (or norm) for the correct use of a word.

Soames is positive about the prospects of ED-facts to generate the norms of meaning. And we know already his reason for maintaining that such dispositional facts cannot fail to capture the norms of their respective meaning facts: the supervenience of the latter facts on ED-facts guarantees that ED-facts determine metaphysically their corresponding meaning facts.³¹ The notion of metaphysical determination is explained in terms of possible worlds: a fact that P determines another fact that Q metaphysically if and only if all possible worlds containing P must also contain Q. Another way of describing the metaphysical determination of Q by P would be to say that the sentences which express Q follow necessarily from the linguistic expressions of P and only from these. Notice that the relation of necessary consequence being used here is parasitic on that of a possible world: a sentence q follows necessarily from p if and if in all possible worlds where p is true q is also true. What is being asserted by the above thesis of metaphysical determination is that the norms of meaning corresponding to the word ‘+’ must follow necessarily and solely from the sentences which express the above suggested complex disposition towards ‘+’. But is it true that the supervenience of M-facts on ED-facts is as strong as to imply that the norms associated with the meaning of a certain word follow necessarily from the expressions of the ED-fact which corresponds to this word? Why, if mental facts supervene on physical facts, should it be concluded that the latter metaphysically determine the former?

A more or less consensual account of the supervenience of the mental upon the physical would be this: a class of mental properties is said to supervene on a class of physical properties with respect to a certain domain of objects — events, states or individuals — if and only if it is impossible for any two elements of the domain to be indistinguishable relative to all their physical properties and yet differ in at least one mental property. In other words: any change in the mental attributes of an object must correspond to a change in some of its physical attributes.³²

One source of divergence among philosophers who defend the supervenience of the mental upon the physical concerns the way the modal operator should be understood. For some, the above impossibility must be understood metaphysically. This is probably the way Soames wishes supervenience to be taken. For other philosophers, the impossibility that helps to define supervenience is weaker than metaphysical impossibility; in this sense, two individuals of the mentioned domain cannot differ in all their mental attributes without being

²⁹. Soames 1997, p. 229.

³⁰. Henceforth ED-fact, for enhanced dispositional fact.

³¹. M-facts, for short.

³². This is the characterisation of supervenience that one can extract, for example, from Davidson 1970, p. 214; Davidson 1973, pp. 253-4; Fodor 1987, pp. 30-33; Kim 1978, pp. 152-154; Stich 1978, pp. 346-348; as well as from many other authors.

distinguishable in at least one of their physical attributes provided that the method of assignation of mental properties to human subjects remains the same. It is not inconceivable though that such a relation of supervenience might fail to hold if the procedure for identifying psychological properties was different from the one we currently use. This is the view associated with the philosopher who introduced the term ‘supervenience’ into the philosophical debate: Donald Davidson.³³ Of course, there will be as many notions of supervenience as different notions of necessity can be distinguished. But the purposes of the present discussion do not require an exhaustive examination of every one of them; a review of the consequences of adopting each one of these two alternative notions of supervenience will suffice.

Let me start with the Davidsonian supervenience. According to the author of *Inquiries into Truth and Interpretation*,³⁴ the mental attributes of an individual (or event) supervene upon all of his (its) physical attributes, including the relational attributes with the environment around him (it). In spite of admitting this sort of determination between mental descriptions or facts upon the physical facts conceived broadly, Davidson has always insisted that the former descriptions are not reducible to the latter: there can neither be empirical laws connecting psychological properties to physical ones nor definitions affirming the synonymy or the co-extensionality between them. The reasons Davidson offers for maintaining that these co-relations between the mental and the physical are not forthcoming come down to the following: there is a normative, externalist and holistic dimension to the attribution of mental properties (in the interpretation of speech and action) with no parallel in the physical domain.³⁵

The stronger supervenience — that which entails the metaphysical determination of the physical upon the mental — requires something like a definitional relation between mental properties and the physical properties that constitute the former’s supervenience basis. Neither the co-extensionality nor the extensional inclusion of properties of the second kind in those of the first kind could guarantee that all possible worlds where a set of physical properties are simultaneously instantiated by an object will contain the instantiation by the same object of the mental properties which supervenes upon them. Co-extensionality or extensional inclusion between properties in this world is obviously compatible with their not being co-extensional, or the extensional inclusion not obtaining, in other possible worlds.

The following example will make things clearer. Suppose someone said that the fact that John’s C-fibers are firing metaphysically determines the fact that John is in pain. This could only be the case if the proposition that pain is C-fibers firing is metaphysically necessary. That is, if the link between these two properties were anything less than that of metaphysical necessity, no relation of metaphysical determination could obtain between facts like the firing of John’s C-fibers and John’s being in pain. A way of spelling out this strong relation between the property of being in pain and that of the firing of a brain’s C-fibers would be to say that the second defines the first. Another would be to say that the predicates ‘X is in pain’ and ‘X has his C-fibers firing’ are synonymous. How specifically one chooses to spell out the metaphysically necessary connection between pain and C-fiber firing is not so important for our discussion. What matters is that mere co-extensionality between them would not suffice for the metaphysical determination of a mental property like pain by the property of a brain’s C-fibers firing.

³³. See, for example, Davidson 1970; Davidson 1973; Davidson 1980a and Davidson 1995.

³⁴. Davidson 1984b.

³⁵. This is explicit, for example, in Davidson 1995, pp. 4-6.

The trouble is that the strongest relation one can hope to establish between the properties of the supervenient class and those of its supervenience basis is that of co-extensionality, and this only under the special circumstance where the domain of objects to which both sets of properties apply is finite (or equivalently, that there are finitely many properties in the supervenience basis).³⁶ But if this is so, then the prospects of the supervenience of the mental on the physical securing the metaphysical determination of the mental by the physical look really dim.

The ball is therefore on Soames' side; he must show that supervenience entails not only that for each mental property there is a physical property with the same extension, but also that their co-extensionality obtains across possible worlds. Meanwhile I think we are warranted in being skeptical about the ability of the facts proposed by him (ED-facts) to satisfy the constitutive condition of the skeptical problem and therefore, if my reading of the skeptical problem is correct, to solve the problem.

7 Conclusion

If I am right about how to conceive meaning skepticism, then the way Soames construes it is mistaken. Firstly, there are no two separate problems — one of finding non-intentional facts that epistemically determine meaning and the other of finding non-intentional facts that metaphysically determine meaning — but just one problem with a metaphysical and an epistemological constraint: to find a fact that can, on the one hand, constitute meaning and, on the other hand, justify our beliefs about what we mean. Secondly, his proposed meaning-determining facts are not up to the task of generating meaning facts (i. e. of conforming to the metaphysical condition of the problem). Thirdly, even if they were, that would not have solved the skeptical problem because such non-intentional facts cannot satisfy the problem's epistemological condition.

8 Bibliography

- Boghossian, P. 1989; «The Rule-Following Considerations» in *Mind* (98): 507-549
- Davidson, D. 1970: «Mental Events» in Davidson 1980b
- Davidson, D. 1973: «The Material Mind» in Davidson 1980b
- Davidson, D. 1980a: «Towards a Unified Theory of Meaning and Action» in *Grazer Philosophische Studien* (II): 1-12
- Davidson, D. 1980b: *Essays on Actions and Events* (Oxford: Oxford University Press)
- Davidson, D. 1984a: «First Person Authority» in *Dialectica* (38): 101-11
- Davidson, D. 1984b: *Inquiries into Truth and Interpretation* (Oxford: Oxford University Press)
- Davidson, D. 1987: «Knowing One's Own Mind» in *Proceedings and Addresses of the Aristotelian Society* (60): 441-58
- Davidson, D. 1995: «Could There Be a Science of Rationality?» in *International Journal of Philosophical Studies* (3): 1-16
- Diamond, C. 1975: *Wittgenstein's Lectures on the Foundations of Mathematics, Cambridge 1939* (Chicago: The University of Chicago Press)

³⁶. This result is proved in Kim 1978, pp. 152-54. It is also mentioned in Davidson 1973, p. 249.

- Dummett, M. 1974: «What is a Theory of Meaning?» in Guttenplan, S 1975: *Mind and Language* Wolfson College Lectures, 1974 (Oxford: Clarendon Press)
- Fodor, J. 1987: *Psychosemantics* (Cambridge: The MIT press)
- Kim, J. 1978: «Supervenience and Nomological Incommensurables» in *American Philosophical Quarterly* (15): 149-156
- Kripke, S. 1980: *Naming and Necessity* (Cambridge: Harvard University Press)
- Kripke, S. 1982: *Wittgenstein on Rules and Private Language* (Cambridge: Harvard University Press)
- Lycan, W. 1990: *Mind and Cognition* (Oxford: Basil Blackwell)
- McGinn, C. 1984: *Wittgenstein on Meaning* (Oxford: Basil Blackwell)
- Millikan, R. 1990: «Truth Rules, Hoverflies and the Kripke-Wittgenstein Paradox» in *Philosophical Review* (99) 3: 323-353. Reprinted in Millikan 1993
- Millikan, R. 1993: *White Queen Psychology and other Essays to Alice* (Cambridge: the MIT Press)
- Pinto, S. 1998: *Wittgenstein, Meaning and Mathematics* PhD dissertation (London: London University)
- Smith, B. 1998: «Meaning and Rule-Following» in *The Encyclopedia of Philosophy* ed. E. Craig (London: Routledge)
- Soames, S. 1997: «Skepticism about Meaning: Indeterminacy, Normativity, and the Rule-Following Paradox» in *Canadian Journal of Philosophy* Supplem. Vol. 23: 211-249
- Soames, S. 1998: «Facts, Truth-Conditions, and the Skeptical Solution to the Rule-Following Paradox» in *Philosophical Perspectives* (12): 313-348
- Stich, S. 1978: «Autonomous Psychology and Belief-Desire Thesis» in *The Monist* (61): 573-91. Reprinted i Lycan, W. 1990
- Stich, S. 1983: *From Folk Psychology to Cognitive Science* (Cambridge: Bradford Books/the MIT Press)
- Wittgenstein, L. 1953: *Philosophical Investigations* (Oxford: Basil Blackwell)
- Wittgenstein, L. 1978: *Remarks on the Foundations of Mathematics* 3rd. Edition (Oxford: Basil Blackwell) 1st. Edition 1956
- Wright, C. 1980: *Wittgenstein on the Foundations of Mathematics* (Cambridge: Harvard University Press)

Silvio Pinto

Universidad Autónoma del Estado de Morelos (Mexico)

<silvio@filosoficas.unam.mx>

SORITES

An Electronic Quarterly of Analytical Philosophy

ISSN 1135-1349

COPYRIGHT NOTICE AND LEGAL DISCLAIMER

© 1996 The SORITES Team

Please, read!

- (1) **SORITES** is not in the public domain. In accordance with international Law (especially the Berne Convention for the Protection of Literary and Artistic Works and the Universal Copyright Convention), this issue of **SORITES** is Copyright-protected throughout the Planet.¹
- (2) The Copyright of this issue of **SORITES** taken as a whole is held by the electronic publisher (the SORITES team).
- (3) The Copyright of the papers published in **SORITES** is retained by the individual authors, except that: (i) no part of any such paper may be printed or displayed elsewhere or incorporated into a book, an anthology or any other publication of any sort until **SORITES** has accorded the author(s) permission to that effect [which will be done routinely and quickly, provided **SORITES** is therein clearly and explicitly mentioned as the primary source]; and (ii) the authors agree to abide by the other terms and conditions contained in this Copyright Notice.
- (4) The authors of the included papers and the electronic publisher, the **SORITES** team — whether jointly or separately, as the case may be — hereby reserve all rights not expressly granted to other parts in this Copyright Notice.
- (5) In compliance with Spanish Law, this issue of **SORITES** has been legally registered, three diskette-copies being deposited with the competent authorities, namely the «Deposito Legal» office of the Autonomous Provincial Government of Madrid, c/ Azcona 42. (Legal Deposit Registration: M 14867-1995.)
- (5) A licence is hereby granted without fee for anybody to freely make as many unmodified copies as they wish of this issue of **SORITES IN ITS INTEGRITY**, give such copies to anyone, and distribute this issue of **SORITES** via electronic means or as printed copies, **PROVIDED** no part thereof is altered or omitted, and especially **NEITHER THIS COPYRIGHT NOTICE NOR THE COPYRIGHT BOXES ON TOP OF THE DIFFERENT PAPERS ARE REMOVED, AMENDED, OR OBSCURED.**
- (6) In this context, *the issue of SORITES as a whole* is meant to consist in: either (i) a single file (be it its official version as a WordPerfect 5. 1 document or any unofficial version released by the **SORITES** team as an undivided file); or (ii) a collection of files produced by slicing one of the entire-file versions in order to facilitate handling, browsing or downloading. In the latter case, the conveyor is bound to distribute the whole collection. (In this context printed copies of this issue of **SORITES** are taken to be equivalent to electronic copies, their distribution being subject to the same conditions.)

¹. The reader may find an excellent discussion of copyright-related issues in a FAQ paper (available for anonymous FTP from rtfm.mit.edu [18.70.0.209] /pub/usenet/news.answers/law/Copyright-FAQ). The paper is entitled «Frequently Asked Questions about Copyright (V.1.1.3)», 1994, by Terry Carroll. We have borrowed a number of considerations from that helpful document.

- (7) This issue of **SORITES** may be sold for profit or incorporated into any commercial material only with the previous explicit consent granted by the **SORITES** team. Otherwise, no fee may be charged for its circulation. An exception is granted to non-profit organizations, which are hereby authorized to charge a small fee for materials, handling, postage, and general overhead.
- (8) Private copying of single papers by any lawful means is allowed only when done in good faith and for a fair use, namely for purposes of teaching, study, criticism or review; but no part of this issue of **SORITES** may be conveyed to another individual or to a gathering — whether in writing or through oral teaching or by any other means — unless the source is clearly and explicitly acknowledged.
- (9) In particular, no part of this issue of **SORITES** or of any paper therein included may be conveyed to others by means of reproduction, quotation, copy or paraphrase, without a clear and explicit acknowledgement of the issue of **SORITES** and its date, the author's name and the paper's full title. Whenever the quotation occurs within a publication, it is also mandatory to mention the official pages (as shown within the Copyright box on top of the paper), the ISSN (1135-1349) and the official home site of electronic display, namely <http://www.ifs.csic.es/sorites/>.
- (10) Any perpetration of, or complicity with, unfair use of copies or partial copies of this issue of **SORITES**, or of papers therein included, especially forgery or plagiarism — being, as it is, an infringement of the authors' and the electronic publisher's rights — is in any case a civil tort, but may even be a crime under current legislation.
- (11) This issue of **SORITES** is provided «as is», without any guarantee of any kind. The electronic publisher, the **SORITES** team, disclaims all warranties, whether expressed or implied, including, without limitation, the implied warranties of fitness for any particular purpose with respect to the papers included in this issue. By furnishing this document, the **SORITES** team does not grant any license or endorses any commitment except in so much as explicitly set forth in the present Copyright Notice.
- (12) The electronic publisher, the **SORITES** team, does not necessarily agree with the authors' views or arguments. The electronic publisher cannot certify the accuracy of any quotations or references contained in the papers.
- (13) Each author vouches alone for the originality of the papers they submit to **SORITES** and for their compliance with established Copyright laws. Acceptance of a manuscript is done in good faith under the assumption the originality claim is truthful. The electronic publisher — i. e. the **SORITES** team — does not pledge itself for the accuracy of such declarations.
- (14) The **SORITES** team cannot be responsible for any real or imaginary damages suffered as a result of downloading, reading, using, quoting or circulating any materials included in this issue of **SORITES**. The user assumes, at their own risk, full responsibility for the proper use of this issue of **SORITES**.
- (15) Downloading, reading or in any other way using this issue of **SORITES** or any part thereof entails full acceptance of the hereinabove stated terms and conditions. If, after downloading a file containing this issue of **SORITES** or a part thereof, a user fails to agree to the conditions and terms contained in this Notice, they must discontinue using the material and irrecoverably erase or destroy the downloaded file, so as not to occasion any third-part's unfair use thereof.
- (16) Although, thanks to a permission kindly granted by the system's administrators, this electronic journal is displayed at the internet host <www.ifs.csic.es/sorites/> (hostname whose current official IP is 161.111.10.61), which belongs to the Spanish institution CSIC, the journal is not published or sponsored or endorsed by the CSIC, the only owner and publisher being the **SORITES** team.

(17) A specific licence is hereby granted for this issue of **SORITES** — and all future issues of the journal as well — to be freely displayed by any Internet site, provided all conditions stated above are fully adhered to. No previous consent of the **SORITES** team is required for such a display.

Madrid. April 10, 1995

(Updated: December 31, 1996; April 27 1998; May 31 2001)

The **SORITES** Team

RELEASE NOTICE

This issue of *SORITES* is made available under several formats, but its only official version is the binary WordPerfect 5.1 document released with filename:

sorite12. wp

which is the only file within the archive **sori12wp.zip**. A PDF file (**sorite12.pdf**) is also produced and has been generated from the file **sorite12.wp**.

Web-browsable versions of the papers included in this issue of *SORITES* may be provided, too, but — owing to inner HTML language limitations — they do not faithfully reflect the official WordPerfect 5.1 version. Due to their technical content and to the profusion of special symbols, HTML renderings of certain papers may be either not made available at all (except as abstracts) or else truncated.

Although the official version — as initially released today (31 May 2001) by the **SORITES** team — is an entire seamless file, it may be chopped up into chunks in order to facilitate downloading, browsing, transferring or e-mailing. In such cases, the unity of this issue of **SORITES** as a whole must be preserved by keeping the ensuing collection intact.