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Aiming at Truth

Part I

1. INTRODUCTION¹

1.1. Theories and their functions

In science we design and apply theories.² The term “theory” as understood here does not belong to the purely logical vocabulary. Granted, some purely logical conditions are to be met: theories are logical constructs of a sort. But there is something more to it. There are functions such that it is essential for a theory to be designed with the intention that they be performed by it (the explanatory function is perhaps the most plausible example). Note that these functions can be characterized succinctly as the functions a theory is intended to perform *qua* theory, the reason being that it is not *essential* for a theory to be intended as performing this or that function unless it has been *designed* with the *intention* that this function be performed by it.

The functions a theory is intended to perform *qua* theory are closely related to the aims of science.³ Consider the category of functions such that for the aims of sci-

¹ I owe a debt of gratitude to the anonymous referee for this journal for comments that have influenced the final version of the paper.

² What is intended is science in the broadest sense, viz. science as comprising not only the natural sciences, but also the human sciences, and (to make the terminological choice even more contentious) the so called formal sciences.

³ For the legitimacy of speaking of the ‘aims of science’, cf. Popper 1979: 191. On Popper’s view, “it is the aim of science to find *satisfactory explanations* of whatever strikes us as being in need of explanation”. Accordingly, what Popper defends is speaking of ‘*the aim*’ of science, but the change to plural does not make his words less persuasive. My choice of the plural is not arbitrary, but its legitimacy seems to have no bearing on the legitimacy of the views that will be argued for.

ence to be pursued it is necessary that these functions be performed. It seems that it includes all functions that can be regarded with some plausibility as functions a theory is intended to perform *qua* theory.

The considerations to follow will often involve theory evaluation that demands relativization to functions. Such relativization will always be confined to functions a theory is intended to perform *qua* theory (provided they include the explanatory function). There will usually be no evidence for the need of further restrictions. Whenever the relativization that is intended is the relativization to *all* of the above functions, it will be omitted as understood.

Whatever functions a theory is intended to perform *qua* theory, the representation function is somehow involved. Representation is based on knowledge of similarity that, very roughly speaking, enables one to get information about some objects by considering something else. More often than not, the similarity that makes it possible is mainly or purely structural. The paradigm case is definable in terms of isomorphism (certain relations restricted to the instances which are constitutive of the given objects are isomorphic). It is not enough that some relations which establish similarity of a sort are known. The concept of representation is a structural-functional concept: there is no representation without intention to avail ourselves of the given similarity to get information.⁴

Language is a tool of representation (this is not to say that being such a tool exhausts its functional diversity). Linguistic representation may be construed, when model-theoretic sophistication is left aside, as a relative product of two relations: (i) the *describing* relation conceived as the many-one relation (function) that assigns to each sentence, and each set of sentences, the *world-as-described-by* it (it may be real or fictitious),⁵ and (ii) a ‘sufficient similarity’ relation that holds between *worlds-as-described* and what is regarded as the target of representation (identity not excluded). Instantiation of the first relation implies perfectly accurate representation established by referential relations (widely understood). The second relation is conceived so as to ensure enough similarity with respect to the aim of getting the appropriate information about the target of representation. Of course, this construal of linguistic representation raises serious ontological and epistemological objections (for the puzzles of non-being, cf. section 2), but we can hardly do without it. Observe that worlds-as-described resemble in this respect universes of discourse. The difference is that the former are structured in a way that gives them certain integrity and thus makes them ‘worlds’.

⁴ For a similar account of representation, which also focuses on the functional features, see Teller 2009.

⁵ The requirement of uniqueness makes it inappropriate to think of worlds-as-described by sentences or sets thereof as possible worlds. They can be more like Kripke’s ‘miniworlds’ posited in connection with school exercises in probability (Kripke 1980: 16). Sets of possible worlds are another possibility but rather not commendable from the heuristic point of view.

The distinction between worlds-as-described and the targets of representation is not derivable from the literal versus non-literal meaning distinction (both literal and non-literal meanings contribute to the descriptive potential of language). This is not to say that there are no interesting relationships between the two. Thus it may be conjectured that the cognitive aims that call for lack of mediation of a world-as-described, no matter whether real or fictitious (some philosophical aims are of this sort), often require representation involving metaphorical meanings.

Theories conceived as sets of sentences of a sort describe certain worlds-as-described. Note that the world-as-described a theory describes is a truth-maker of the sentences expressing its theorems. The world-as-described a theory describes stands also in close relationships with its posits. That a theory posits certain objects means that its theorems (or sentences that express them) ontologically commit to them. It has to be noticed therefore that ontological commitment connects theories with the worlds-as-described-by them, and not with the respective targets of representation (unless they happen to be the same). The posits of a theory are citizens of the corresponding world-as-described. An additional point to be made here is that what has been said about worlds-as-described, truthmaking, and posits, indirectly relates the true/false distinction in the universe of sentences to the real/fictitious distinction in the universe of posits of a theory. Section 3 will bring an elaboration that relates these distinctions directly, without the mediation of the notion of worlds-as-described.

1.2. The problem of theoretical fiction

If there are undisputable facts constitutive of scientific practice, here is one of them: it is allowed in scientific practice that there be theorems believed to be false, and, what roughly amounts to the same thing (I shall return to this point in section 3), that there be posits believed to be fictitious objects. When theories that are illustrative in this regard (all or almost all are) meet the standard criteria of usefulness,⁶ their posits that are believed to be fictitious objects are referred to as ‘useful fiction’. It should be stressed that the theories with such contribution to the universe of discourse include theories that enjoy full acceptance.⁷

⁶ What is meant here are only criteria of usefulness that are widely acknowledged. Those who oppose fictionalism (cf. below) have to admit, on pain of inconsistency, that due to some factors that have not been as yet recognized well enough the scientific practice that is at issue here is *not* fruitful after all.

⁷ I understand acceptance of a theory in a way that allows its contrasting with believing a theory to be true (van Fraassen 1980). However, I do not share van Fraassen’s view (1980: 4, 12, 88, 202) which reduces the beliefs constitutive of acceptance to believing in empirical adequacy. Observe that a fully accepted theory is not only believed to be empirically adequate (perhaps with reservations allowing for approximations), but also believed to be capable of performing certain functions, such beliefs being accompanied by (resulting in?) our willingness to use it as performing these functions (for acknowledgement of the presence of such willingness, cf. van Fraassen 1980). Now, I

Whenever it happens that the given world-as-described is believed to be a fiction,⁸ it is not this ‘world’ that is the target of representation. Representation always aims at getting in touch with reality. If a world-as-described is believed to be a fiction, it is viewed upon as merely mediating between reality and language, reality being ‘conferred’ to it in virtue of the way it is involved in representation. It is only *real by representation*.⁹ Now, that a world-as-described need not be real, but may be only real by representation, does not imply that there are cases of representation in which truth does not count at all. Nevertheless, objects which are not real but only real by representation are simply *fictitious* objects. Theorems which posit such objects are not true. They are at least *true by representation*. Theorems which are not true but only true by representation are simply *false* theorems. It gives rise to objections. Whether the above trait of research practice has to be methodologically endorsed (as fictionalism maintains), and, if not, how should the elimination of the troublesome theorems look like, is a matter of philosophical debate.¹⁰ There are many parties to it. The question of adequacy of fictionalism delineates the main background of any relevant discussion. It has to be observed in this connection that such discussion can result not only from the general concern with the aims of sci-

take it to be more intuitive to think of acceptance as comprising those additional beliefs, and not the respective willingness, or the like. Of course, I share van Fraassen’s complaints about the term “acceptance” being misleading when used in the above way (1980: 46). If it is advisable to use it in this way (and I think it is), it is only for lack of better terminological solution.

⁸ Observe that the term “fiction” is, grammatically, a mass term. It differs semantically from the term “fictitious” only in the way it ‘divides its reference’. In speaking of ‘divided reference’ here, I follow Quine (1960: §19). Besides literary fiction, there is e.g. fiction that is made up by fictitious *posits*. It will be convenient to refer to it as ‘theoretical fiction’. The term ‘theoretical falsehood’ will be used accordingly.

⁹ If Stephen Yablo can approve of the above account of representation, being real by representation can perhaps be identified with being a representational aid as he understands it (2005: 94-95). Another point to be made here is that no matter how observation is understood (in current debates in the philosophy of science), the worlds-as-described-by observation reports may also be regarded as only real by representation. The point is reminiscent of the issues about theory-ladenness. The following questions indicate, as a first approximation, what makes them relevant: (i) are some factors that make observation theory-laden essentially involved in the relevant rules of representation? (ii) which factors that make observation theory-laden systematically induce observational fiction? (iii) to what extent systematically induced observational fiction extends beyond the boundaries of theory-ladenness?

¹⁰ What is indicated here as the subject of debate does not include the particular criteria of evaluation of theories that decide what is acknowledged in scientific practice as ‘useful fiction’ (cf. section 4). Of course, if the scientific practice has to be endorsed (to the extent its above trait is concerned), some philosophical advice on these criteria may not be out of place, and a fictionalist is likely to have interest in it, but what counts directly for her position *qua* fictionalist is only that there should be *some* legitimate criteria of this sort. Incidentally, it may be observed that if she is not a scientist-practitioner, in some cases she may not be among those best prepared to contribute to improvements that are required.

ence, but also from a special concern with some function a theory is intended to perform *qua* theory. If it is the explanatory function that is in focus, one asks whether it should be allowed that the statements that make up the *explanans* be believed to be false. Thus, while it is customary for fictionalism to couch its basic tenets in terms of positing fiction,¹¹ philosophers who contribute to the debate with the issues of explanation as the background, tend to speak of falsehood. What is the degree of interchangeability? It will be assumed henceforth, anticipating the results of some later considerations (cf. section 3), that one can appeal to standpoints coached in terms of theoretical falsehood as if they were concerned covertly with theoretical fiction, and *vice versa*. However, there are strong reasons to put theoretical fiction in the foreground: this choice is closer to the idea of false sentences being true in some fictitious worlds (for the importance of this idea, cf. sections 3, 9, and 10).

The above difficulty about positing fiction is a difficulty about positing *objects believed to be fictitious*.¹² It is a methodological difficulty, and not an ontological one (the question of connections with ontological issues will reappear later). It has nothing to do with opposing ‘the great Parmenides’ in respect of contrasting being and non-being (for the source of quotation and its ontological import, cf. Plato, *The Sophist*, 237A). It has nothing to do, in particular, with accepting the Meinongian inclusion of non-being into the ultimate ‘furniture of the world’.¹³

The pressure that results from the objections to positing fiction is not so strong as to seriously interfere with the incriminated research practice, let alone make it abandoned. The situation is nonetheless in need of clarification.¹⁴ As we have seen, it gives rise to a problem. We may call it the ‘problem of theoretical fiction’.

¹¹ It is convenient in some contexts to refer to objects believed to have this or that property simply as objects that have it. The way the terms “fictitious posits”, “false theorems”, etc. will be used is illustrative in this regard. That simplification of phrasing achieved on these lines looks often natural and does not lead to misunderstandings, can be partly explained by noticing that the belief that a certain object has a certain property is *expressed* simply by saying that it has it and not by saying that one believes it to be so.

¹² One could envisage the generalization according to which the concept of being believed to be fictitious is replaced by the disjunctive concept of being believed or conjectured to be fictitious. But in the case of conjectures the difficulty seems to be somewhat less acute. Of course, however the difficulty is diagnosed, the diagnose has to accommodate the generalization at issue.

¹³ Although this inclusion bears on the strength of contrast between reality and fiction, Meinong’s theory of objects (1971; 1977: 78-80) does not abandon the real/fictitious distinction. The acceptance is not purely verbal. It is expressed (indirectly) e.g. by the conception of *Sosein* (roughly: character) as independent of *Sein* (1971: 489, 494; 1977: 78), as well as the closely related conception of *Außersein* as a feature that is beyond *Sein* and *Nichtsein* (1971: 490-494; 1977: 78-80). This is not to say that in the case of the difficulty which is our concern here Meinong’s theory of objects is appealing as a source of alleviation.

¹⁴ Much has already been done to clarify it. As regards recent works, see especially Kalderon 2005, Sainsbury 2010 and Suárez 2009b.

1.3. A glimpse at history: Vaihinger's fictionalism

The problem of theoretical fiction is closely related, both historically and in respect of philosophical content, to the ideas conveyed in (Vaihinger 1924).¹⁵ Philosophical interest in some special issues can be traced back to earlier times (Vaihinger can be helpful in such historical inquiry; cf. also Rosen 2005), but it is not before Vaihinger's book was first published that something like the problem of theoretical fiction appeared on the philosophical agenda. It is not exactly this very problem that became considered in philosophy with direct reference to Vaihinger's book, but the differences do not deserve a detailed account for present purposes.

It has to be stressed that the above appraisal of Vaihinger's achievements is concerned only with problems he raised, and not with his solutions thereof. Moreover, *The Philosophy of "As if"* deserves severe methodological criticism, the way the main problems have been posed being no exception. To be more specific, the book exhibits extreme naivety and ignorance about some special issues (see e.g. the chapter on infinity); the presentation of the vocabulary of fictionalist talk (chapter XXIII) is chaotic and gives an impression that the author's concern with the subject matter of his book is somewhat obsessive; some formulations are nebulous and/or can be accused of verbosity (see e.g. chapters XIX-XXV). Of course, these remarks are not intended as a well balanced and exhaustive appraisal of the whole book, and it has to be stressed that it exhibits more than enough originality to preclude neglecting it as a source of inspiration. There has been a marked increase of interest in Vaihinger's work in philosophy of science in recent times, with (Fine 1993) as a standard reference (Suárez 2009a: 4).

1.4. The maxim of aiming at truth

What are the aims of science? There is a well known and well worn partial answer: science aims at truth. To call it an 'answer' is perhaps to say too much. It is somewhat nebulous and tends to degenerate into a slogan. However, leaving such abuse aside, we should perhaps think of it as a methodological maxim (the *maxim of aiming at truth*) that can be claimed to convey something important only as a first approximation. If it purports to be something more, it is in need of interpretation (cf. the final section).

The maxim of aiming at truth is likely to be viewed upon *prima facie* as incompatible with positing fiction. Thus one can see in what is conveyed by it a support for

¹⁵ The book was published originally in German in 1911. The English edition I am referring to is based on the sixth German edition. The translation is due to C. K. Ogden. There is a preface written by the author especially for the English language readers. Another addition is a scientific autobiography. Moreover, there are some changes in the main text. All references in this paper are to the English edition. A later German edition (Vaihinger 1927) has been consulted.

the above philosophical objections to the current research practice. But one can also put things the other way round: in view of the research practice, the reliability of saying that science aims at truth can be challenged, the weakest accusation being that it is misleading.

The problem of theoretical fiction has been raised above without full elaboration in respect of precision and theoretical background. The first five of the subsequent sections are devoted almost entirely to the most urgent elaborations. With one important exception at the end of section 5, we will not resume looking forward until section 7.

2. ONTOLOGICAL COMMITMENT

No matter how ontological commitment is understood, it is legitimate to say: ontological commitment has a bearer. What can be said to *have* ontological commitment is usually a sentence, a single theorem, or a theory. Suppose then we speak of ontological commitment of sentences. Whatever their ontological commitment, they have it ‘in virtue’ of their meaning. Thus, when ontological commitment is understood in a way that ‘makes’ sentences its bearers, one can say that changes of the methodological status of a sentence preserve its ontological commitment. Since such invariance is important for the considerations to follow, it will be convenient to understand ontological commitment as attributable, *inter alia*, to sentences.

Recall that the phrase “ontologically commits to” occurs in contexts of two forms: “ontologically commits to *a*” and “ontologically commits to *S*-s”. In the contexts of the latter form, this phrase is not an extensional operator, let alone a predicate. As Church (1958: 1013-1014) put it:

ontological commitment to unicorns is evidently not the same as ontological commitment to purple cows, even if by chance the two classes are both empty and therefore identical.

Since the notion of ontological commitment is a modal notion (to apply it is to consider existence as a *necessary* condition of truth), it might be presumed that in contexts of the former form the phrase “ontologically commits to” is not extensional either. But we obviously use it in such contexts as an extensional operator, which suggests that we use it then with essentialist assumptions.

In view of the above syntactic distinction, one can draw the distinction between singular and general ontological commitment (respectively).¹⁶ A sentence commits ontologically to the object *a* iff the existence of *a* is a necessary condition for this

¹⁶ The concept of singular ontological commitment was explained by Quine in his essay *Logic and the Reification of Universals* published in the first edition of *From a Logical Point of View* (1953). But this concept did not fit its theoretical context in the essay. Accordingly, there is an emendation in the second edition (1980/1961b: 103; cf. the *Foreword to the Second Edition*, p. X) — an interesting testimony to the significance of the distinction that is being drawn here.

sentence to be true. A sentence commits ontologically to S -s iff for this sentence to be true it is necessary that there be an object that is an S . The use of the phrase “ontologically commits to” with the above two meanings blurs the distinction at issue, but it is convenient as making it natural to speak simply of “ontological commitment” with reference to all existential necessary conditions of truth.

The sentence “There are S -s” ontologically commits to S -s. Suppose there are exactly n S -s: a_1, \dots, a_n . Let $A(a_1, \dots, a_n)$ be a sentence with the n -place predicate A and its n arguments. This sentence ontologically commits to the objects a_1, \dots, a_n . Thus it ontologically commits to S -s. But we speak here of ontological commitment to S -s ambiguously. If ontological commitment to S -s is understood as singular, it is implied that the given sentence ontologically commits to all S -s (each of S -s) in virtue of separate reference to each of them. Hence one can insert the quantifier “all”. The sentence “There are S -s” does not meet this condition.

When we speak of ontological commitment as a feature to be studied by semantics, the way we use the term “ontological commitment” makes it grammatically a mass term. But one can also speak of ontological *commitments* understood as cases of ontological commitment. Consider singular ontological commitments. One can distinguish singular ontological commitments to fictitious objects as a special case. As regards general ontological commitments, observe that unlike the sentence “There are fictitious objects”, the sentence “There are unicorns” does not ontologically commit to fictitious objects (since the concept of unicorns \neq the concept of fictitious objects).¹⁷ However, it will be convenient to use the term “ontological commitment to fictitious objects” wider, the additional cases of applicability being all cases of general ontological commitment such that the given kind (sort) of objects is empty (e.g. the ontological commitment to unicorns, to purple cows, etc.).

Speaking of singular ontological commitments to fictitious objects can raise objections due to disagreement with the scholastic principle *Non entis nulla sunt praedicata* (see also Plato, *The Sophist*, 238A–239A). These objections naturally extend to general ontological commitments to fictitious objects (to unicorns, purple cows, etc.), if, to use the schematic mode of expression, speaking of ontological commitment to S -s ontologically commits to the respective universal. But without speaking of ontological commitment to fictitious objects the problem addressed in the present paper could not be raised with sufficient clarity, let alone systematically considered. It has to be recalled in this connection that philosophical difficulties arise at various depth of philosophical insight, and one can scarcely indicate puzzles that are more profound than the puzzles of non-being. Now, since there are no unassailable foun-

¹⁷ Recall that we are speaking now of general ontological commitments, not of singular ones. If the sentence “There are unicorns” ontologically commits to the state of affairs: that there are unicorns, and this state of affairs is a fictitious object, this sentence ontologically commits to a fictitious object, but it is not a case of general ontological commitment.

dations of philosophical inquiry, one always has to build on foundations that are more or less tentative. Let then the puzzles of non-being be left aside.

3. FICTION AND FALSEHOOD

Recall that according to the intuitions the correspondence theory of truth is appealing to, truth and falsehood are semantic correlates of existence and non-existence respectively. There are conceptions of truth that can countenance this correlation (the *truth–existence correlation*) only at the expense of advancing unintuitive conceptions of existence. However, it seems that the degree to which a conception of truth can accommodate the correlation in question is an important criterion of adequacy. The conception of the truth–existence correlation is closely akin to the idea of false sentences being true in some fictitious worlds, as well as to the closely related idea of sentences being true or false depending on whether the corresponding *world-as-described* is real or fictitious. Moreover, to the extent the truth–existence correlation holds, it must be reflected in the relationships between falsehood and ontological commitment to fictitious objects. How these relationships look like in the relevant respects? If a sentence ontologically commits to fictitious objects, it is a false sentence. Does the opposite hold too? *If* sentences ontologically commit to states of affairs (what is meant here is, to use the schematic mode of expression, that the sentence p ontologically commits to the state of affairs: that p), and non-obtaining of a state of affairs is tantamount to its being a fictitious object, the answer has to be in the affirmative. Perhaps it can remain to be in the affirmative under some other ontological assumptions. And it can be expected to be in the affirmative if one endorses the truth–existence correlation. It has to be noticed in this regard that whatever the solution to the problem of theoretical fiction, it is rather obvious that it will not contribute to the objections against the truth–existence correlation. What is more, in dealing with this problem one can hardly overestimate the importance of the idea of false sentences being true in some fictitious worlds.¹⁸

It should be mentioned here, to forestall a possible objection, that one should be wary of confusing ontological commitment with aboutness.¹⁹ Note that if the range of the variables is determined as restricted to objects of a certain empty category of

¹⁸ In view of what has been said in this paragraph it might be suggested that Suárez's (2009a: 13) distinction between assumptions concerning unreal objects, called 'fictional assumptions', and assumptions that falsely ascribe a property to a real object, called 'fictive assumptions', is, relative to its theoretical background, somewhat overstated.

¹⁹ Ontological commitment is intimately linked with aboutness, this relationship being partially responsible for the danger of confusion. Suffice it to say that ontological commitment is closely related, *via* truth conditions, to semantic reference, which, in turn, can be claimed to be preceded by aboutness in the logical order of explaining. That the latter has such priority is implied by Chisholm's 'principle of the primacy of the intentional' (1981: 43, 121, 126), as well as by Searl's contention that for a sentence to mean certain thing is just a form of 'intentionality of human agents' (1992: 79-80).

objects, universal quantifying results in sentences that are vacuously true. Such sentences do not commit to fictitious objects of any sort. And if we define universal quantification in terms of existential quantification and negation, we have to regard such sentences as covertly negative. Nevertheless they can be said to be about the fictitious objects of the given category, thus being true sentences *about* fiction. It does not follow, however, that there are true sentences which ontologically *commit to* fictitious objects.

4. THE UBIQUITOUS THEORETICAL FICTION

Positing fiction is not something marginal. On the contrary, it is almost ubiquitous. It has a wide variety of forms, some of them giving rise to an impression that in designing theories we adjust, so to speak, reality to theory, and not the other way round. Idealization is a well known example. It is most widely used in physics, where one can speak of an ideal gas, an isolated system, etc. Some clear examples come also from the area of economy and linguistics. Recall how language users are idealized in generative grammar.²⁰ Another operation to be mentioned in this connection is enlarging the universe of discourse so as to make some laws unexceptional. It is perhaps the realm of numbers that provides the best known examples.²¹

Some of the above examples come from physics (what I am going to say applies to a degree to some other scientific disciplines, but it is advisable to confine to physics as paradigmatic in the relevant respects). Physics is best known from its most general and most explanatorily fundamental theories. One of the reasons is that such theories are milestones in its development and usually have most direct bearing on philosophical issues. Thus the application of such theories may easily be viewed upon as exhausted by explaining and predicting particular facts, such view resulting in viewing scientific practice in physics as exhausted by direct heuristic, explanatory, and predictive interaction between empirical data and theories of the above sort. However, physics also involves theory building on various intermediate levels of generality and explanatory depth, with various additional theoretical assumptions.

²⁰ I think of idealization as, very roughly, contriving a fictitious ‘world’, with fictitious laws ‘supported’ empirically as an impossible limit case with respect to a sequence of possible cases. Idealization is not a sort of thing one usually has in mind when one thinks of approximation. Nevertheless, idealization is approximation of a sort (for a somewhat different, but closely akin, account of the relationships between idealization and approximation, cf. Teller 2009: 239). As for approximation in general, it is worth noticing that it is rather unusual to think of it in terms of positing *fiction*. It should be stressed therefore that the difficulties about positing fiction that have been mentioned in section 1 in a preliminary way arise in all cases of positing fiction, independently of whether fiction is posited for the sake of approximation or otherwise (cf. Rosen 2005: 15, 33).

²¹ Cf. e.g. Quine 1977b for these and other examples. Note that set-theoretic representations do not preserve the adequacy of the examples from the ontology of numbers: if all numbers are sets (classes) of a sort, the real/fictitious distinction is not likely to be seen as cutting across.

Such practice makes up much of what one has in mind when one speaks of modelling in physics (and other empirical sciences for that matter). One can hardly overestimate the importance of modelling for the assessment of the extent to which scientific practice is permeated by positing fiction. Hence the close association of modern fictionalism in the philosophy of science with the methodology of modelling (cf. Suárez 2009b).

Recall that the difficulty that gives rise to the problem of theoretical fiction is a difficulty about positing objects *believed* to be fictitious. We speak of ‘positing fiction’ for the sake of brevity. There is a certain drawback to this convention: it makes it easier to overlook that we often disagree in respect of where to draw the boundary between posits that are real and those that are fictitious, such disagreement resulting in differences (mainly on the ontological level of generality) between the parts of the universe of discourse that will be indicated as troublesome (by those who do not approve of positing fiction). It does not make the problem of theoretical fiction less urgent. It only results in disagreement about examples. One of the questions that arise naturally in this connection is the question of how much place there is for such disagreement. A better question to ask is: is there any place that is free of it? Philosophy is at a loss in respect of where to look for the ultimate reality and how to make all cases of representation clearly visible. The relevant debate has several ‘centres’. One of them is marked by the subjective/objective distinction, and the idea of transcendence as purportedly bridging the ontological gap between the two. There are many parties to the debate, including adherents of reductionist theses. Genuine solipsists are perhaps not easy to find, but there are naturalists who try to naturalize subjectivity, which, if successful, would explain it away.

As regards the sources of perplexity there is also an interesting point to be made in connection with projection from language, and other types of projection understood as an activity of mind in which certain features of the modes of apprehension of objects are being built into what is apprehended.²² Acknowledging the contribution of projection to the mechanisms of representation leaves open many questions concerning the nature of what is ‘projected’. There is a wide variety of standpoints that are relevant in this respect, including Kant’s transcendental philosophy and its ilk.²³

²² As far as projection from language is concerned, I draw on Quine (1966b: 219; 1970: 10).

²³ Kant draws the distinction between things in themselves and *the same* entities as phenomena (cf., e.g., *Critique of Pure Reason*, B XX, B XXV, B 164). But, according to Kant’s views, what characterizes these entities as phenomena should not be attributed to them when they are considered as things in themselves. An adherent of transcendental philosophy would have to admit that to make such attributions would be a case of projection. It has to be stressed that what is meant here is couching some tenets of transcendental philosophy in terms of projection, and not explaining their origin in such terms. Incidentally, some categories (possibility, necessity, causality) can be claimed to be posited by Kant due to projection, but to notice such purported cases of projection in Kant is to consider Kant’s philosophy as illustrative in different respect.

To some extent, the difficulties we have in seeing the relations that establish representation are due to the complexity of instantiations and to grand scale prejudices. As for complexity it is worth mentioning that the road to reality may involve a chain of representations. Thus possible worlds can be claimed to be posited as representing relationships in the realm of objective modality, the latter in turn representing (another contentious but legitimate standpoint) some features in the mind in virtue of projection from language.

I have indicated above two ‘centres’ of relevant debates. There are others. Some of them are important as illustrative of some points to be made later, e.g. those directly relevant to the question of the ontological status of mathematical objects. The one marked by the idea of composition is also worth mentioning. There are various modes of composition. Those which count generally for science are the following two: the summative (mereological) mode of composition and the set-theoretic mode.²⁴ The latter is obviously not metaphysically innocent (the need for the ‘limitation of size’ is the most spectacular manifestation). Arguably, the former is not innocent either (Brykczyński 2009: 61, 72-73; Rosen, Dorr 2002). The set-theoretic mode of composition once played an important role in Carnap’s attempts at *der logische Aufbau der Welt*, the building material being sense data. The attempts have failed. And there are no good prospects for success in the future (Quine 1980/1961a: 40; 1969: 76-77). But it does not exclude local reconstructions. And we cannot do in science without positing objects as composed in one of the above modes, and without making use of some building material supplied by common sense and by science itself.

The summative mode of composition seems to be involved in how physics conceives its objects in some cases of application of the term “system” (Brykczyński 2009: 62, 69-70). As for the set-theoretic mode, it is the standard mode of composition involved in representations of structure. If both are metaphysically problematic, the way we conceive the world is problematic not only because we do not know what is the building material, but also because there is no suitable concept of ‘building’. Well, there are good reasons to be at a loss. But there must be something real, and wherever there is systematically successful prediction that involves positing objects which are not real (presumably there are wide areas of such prediction), the mechanisms of representation that connect reality with reality by representation must be somehow at work.²⁵

The argument from predictive success that has been put forward in connection with the issues of representation of the ultimate reality resembles what van Fraassen once called the ‘Ultimate Argument’ (1980: 39). But unlike the latter, it is not in-

²⁴ In speaking of the set-theoretic mode of composition, I use the term “mode of composition” in a rather loose way, but it seems that there is no risk of misunderstanding.

²⁵ To mention explanatory achievements in this connection would be to beg the question of whether theorems responsible for positing fiction can be tools of explanation.

tended as supporting scientific realism. It is less specific in respect of what is acknowledged as hidden reality. Moreover, it does not endorse the present-day scientific construal of the evidential basis of science. Thus it is not assumed that if there is a hidden reality it is because the world cannot be reduced to the evidential basis of science as construed by science itself. The possibility is left that science can be accused of a misconstrual of its evidential basis.

Throughout this section particular stress has been laid on some fundamental lines of division in the whole spectrum of opinions on which posits are fictitious objects. It may be instructive to see how these lines cut across particular areas of inquiry. To take just one example, consider the posits of physics. If someone believes in the reality of bodies, particles, and fields, as well as sets, physics will be regarded as positing fiction only as a supplement to the real physical and set-theoretic world (a supplement constructed e.g. by idealization). But some of us may be inclined to think that for all its indubitable and spectacular success in prediction physics does not offer any truth, no matter whether ‘observational’ or ‘theoretical’.

5. THE MISGIVINGS ABOUT POSITING FICTION. THE OVERT COMPLAINTS²⁶

5.1. Explanation and truth

One of the theoretical settings in which positing fiction is strongly opposed is the theory of explanation. Granted, there are accounts of explanation that approve of the explanatory use of theorems that posit fiction. The one that is distinctive of van Fraassen’s (1980) constructive empiricism is perhaps the most prominent example.²⁷ But there are also accounts of explanation currently under debate that regard positing fiction to be incompatible with the explanatory aims. Hempel’s deductive-nomological account is one of them (1965: 248-249).²⁸

²⁶ It has to be underscored that the concerns of the present section do not go beyond the misgivings that have been openly articulated. There is no mention of the hidden motivations. A systematic account of such motivations will come in section 11. While the present section contributes to the statement of the problem we are concerned with (cf. section 1.4), the account of hidden motivations that will be provided in section 11 is intimately connected with the proposed solution (cf. section 5.4).

²⁷ Cf. also Bokulich 2009. The account of explanation that is set out in this essay contains an explicit acknowledgement of compatibility with positing fiction.

²⁸ For general remarks on the place of such accounts of explanation in current debates, cf. Bokulich 2009: 104 and Suárez 2009a: 7. It may be instructive to refer also to Vaihinger 1924 in this connection. The analytical table of contents contains the following summarizing formulation: “The hypothesis results in real explanation, the fiction induces only an illusion of understanding” (p. xv). Strangely enough, this point is not made as clearly and unambiguously in the respective chapter itself. What seems to come closest to the above summarizing formulation is the statement to the effect

5.2. Tarski's thesis on acceptability conditions

The theoretical support for standpoints that oppose positing fiction is not confined to the accounts of explanation. The accounts (closely related of course) of the methodological status of theories (or theories of a certain special sort) have a contribution of their own. Consider the question of how the concept of truth is involved. It is reminiscent of a certain question considered by Tarski (1944), which is phrased in terms of conditions of acceptability and with restriction to empirical theories. One can venture a guess that, except for the difference in generality, it is, roughly, the same question. Now, the answer Tarski eventually came to, after some preparatory considerations, is that it is reasonable to impose on acceptability of empirical theories the constraints stated by the following postulate (*Tarski's thesis on acceptability conditions*): "As soon as we succeed in showing that an empirical theory contains (or implies) false sentences, it cannot be any longer considered acceptable" (1944: 367). This answer is obviously at variance with the practice of positing fiction. Therefore, it is not an answer that could be given without reservations in the present-day philosophy of science. However, Tarski's thesis on acceptability conditions has a *prima facie* plausibility when regarded in isolation. Thus it might be suspected that Tarski dared say what we are inclined to think, but are reluctant to say due to the above disagreement with the research practice.

5.3. The accusation of frivolousness, doublethink, and ontological hypocrisy

No doubt an adherent of, e.g., an account of explanation that forbids positing fiction will have misgivings about positing fiction in the research practice in science. But such misgivings are also expressed, now and again, without an appeal (at least an overt one) to some special methodological theory. In presenting certain views of Henkin, pertaining to what is at issue here, Fraenkel, Bar-Hillel, and Levy (1973: 334) say:

He is certainly right that [...] using linguistic forms without accepting the conjugate ontological commitments, does look somewhat frivolous and is therefore in need of further clarification.

We find similar qualms with a different shade in Gideon Rosen's discussion of ontological commitment to possible worlds taken to be fictitious objects: "There is a great risk of doublethink in such circumstances: asserting the existence of worlds at one moment while denying it at another" (1990: 327-328). According to a supple-

that a fiction "does not create real knowledge" (1924: 88). Thus, unexpectedly, the table of contents is supplementary in this respect. There is an interesting elaboration in one of the special studies in part II, with reference to Kant's views (Vaihinger 1924: 268-269), and with explicit mention of explanation. But once again there is no direct and unambiguous denial of the explanatory role of fictions.

mentary remark, someone who does that, “suffers a debilitating anxiety at the prospect of ontological hypocrisy” (1990: 328).²⁹

Whatever the sources of the above misgivings, they do not arise independently of what one thinks of the functions of the sentences that have the given ontological commitment. It is not always clear what exactly these functions are. Admittedly, they include application of theories in argument (Rosen 1990: 327). But it is probably the explanatory function that is most often in focus:³⁰ those who have the above misgivings may not be ready to admit without reservations that theorems which posit fiction can be tools of explanation.³¹

5.4. A possible way out

The above objections about positing fiction are objections that challenge the practical wisdom of science. The practical wisdom of science is not infallible. But the objections are not compelling. They are not easily answerable either. If there is a way out, it is perhaps mainly a way of revealing hidden motivations. The principal strategy should be, one can think further, to look anew on the scientific practice from the historical perspective, one of the hopes being that it will enable to reveal some hidden burdens of history. Sections 8-10 contain the results of methodological inquiry intended to some extent as a preparatory work that takes this course. A supplementary account of misgivings about positing fiction will follow (section 11).

6. THE PROBLEM OF THEORETICAL FICTION EXPLAINED AWAY?

6.1. Genuine and spurious posits

If one puts aside non-linguistic factors such as the degree of importance and the level of difficulty, considering a problem is tantamount to raising questions. Thus, on analogy with questions, problems can be characterized as having *assumptions*. On the other hand, only questions can be said to have *answers*. In the case of problems we speak of *solutions*. A problem with false assumptions cannot be solved; but it can be explained away by undermining one or more of its assumptions. One of the ways of thus explaining away the problem of theoretical fiction is to cast doubts on the given sentences having the incriminated ontological commitments (see for instance Russell’s conception of logical fictions). In preparing the presentation of his views

²⁹ For accusation of doublethink, cf. also the presentation of Field’s fictionalism in section 7.

³⁰ Recall the close relationship between explanation and the methodological status of theories. For the relationship of the above misgivings with the explanatory task, cf. Bokulich 2009: 104.

³¹ Except, perhaps, for some heuristic factors, whatever counts for the predictive potential of a theory, is relevant to explanation. For this and other reasons, it is obvious that the above misgivings have nothing to do with prediction *as contrasted* to explanation.

on positing possible worlds, Rosen (1990: 330) complains about the all too easy attempts at explaining away the problem of theoretical fiction along these lines. I am ready to join Rosen in complaining about such attempts. As regards examples, it is perhaps worth noting that the illegitimacy of the attempts at issue in the case of taking quantification to be substitutional may be due not only to mistaken diagnosing of objectual quantification as substitutional, but also to unwarranted assumption to the effect that substitutional quantification is non-committal (Orenstein 1980).³²

6.2. Quine's conception of factuality: to be is to be posited by a theory we subscribe to

The problem of theoretical fiction is also 'in danger' of being explained away by philosophical doctrines which deny that one can *posit* something unreal. On the positive side we would have the view that the purported fictitious *posits* are real after all, or, at any rate, as real as anything can be. Recall Quine's attitude towards objects posited by theories we, as he puts it, 'subscribe to'. There is a brief characterization of this attitude in the essay *The Limits of Knowledge* (Quine 1977a: 65; italics mine):

If we *subscribe* to our physical theory and our mathematics, as indeed we do, then we thereby accept these particles [particles as posited by physical theories] and these mathematical objects as *real*; it would be an empty gesture meanwhile to cross our fingers as if to indicate that what we are saying doesn't count.

Accordingly, in a later essay Quine maintains, slightly elaborating on some points: "Truth is immanent, and there is no higher. We must speak from within a theory, albeit any of various" (1981: 21-22). This conception of truth is accompanied by a corresponding conception of factuality: "Factuality, like gravitation and electric charge, is internal to our theory of nature" (1981: 23). It has to be remarked in this connection that subscribing to a theory, as understood by Quine, seems to admit of degrees, especially when there are various alternative theories. Thus, on the above account of reality (or factuality), to be real seems to admit of degrees too, the highest degree being attributable to posits of theories with the least susceptibility to revision. Suppose then that, as Quine maintains, common-sense bodies are conceptually fundamental (1966c: 239). It follows that they are (or at least some of them are) more real than anything else.

I wonder whether Quine would endorse such grading without reservations. Perhaps he would not endorse it at all. True, in *Posits and Reality* he regards common-sense bodies as paradigmatic in respect of being real (1966c: 238-239). Moreover,

³² To try to explain away the problem of theoretical fiction on the above lines is to dismiss some purported cases of ontological commitment (cf. Russell's no-class theory of classes). No ontological reduction (*sensu stricto*) is involved. Now, one could also envisage explaining away the problem of theoretical fiction by ontological reduction, provided it reduces the given posits to something metaphysically innocent (I owe this remark to the discussion of reduction in Sainsbury 2010).

the above contention concerning common-sense bodies, namely that they are conceptually fundamental, is appealed to in this connection. But the reason why it is considered to be relevant is not (or not only) that a certain degree of being real is implied. The reason (or one of the reasons) is that the view which takes bodies of common sense to be conceptually fundamental supports the thesis that it is by reference to such objects that the notion of reality is acquired (1966c: 239). Be it as it may, to conceive reality as admitting of degrees does not exclude drawing the dichotomic real/fictitious distinction.

Thus, no matter how the above question of grading has been settled, if pushed to the extreme, Quine's conception of reality (or factuality) could be put, roughly, this way: to be is to be posited by a theory we subscribe to.³³ It seems that this conception of reality requires that we take as real, e.g., the null entity in mereology, in spite of the fact that we have consciously invented it just to smooth the theory. If somebody protested on that score against Quine's views, appealing to what common sense has to say about invention, Quine would perhaps adduce in reply a corresponding conception of the ontological status of being invented. This is not to say that there is no place for discussion here. But to make discussion possible we have to turn to the relevant assumptions. In *Posits and Reality* Quine expressed the view that sense data are 'evidentially fundamental' (1966c: 239; cf. also Quine 1969: 75). Moreover, in *Epistemology Naturalized* we are told that "all inculcation of meanings of words must rest ultimately on sensory evidence" (1969: 75). However, sense data as understood by Quine do not belong to the realm of the directly (immediately) given. They are occurrences in man's nervous system, which implies that they are posits of a sort, and are not conceptually fundamental. The property of being conceptually fundamental is attributed, as has been indicated, to common-sense bodies (1966c: 239).

³³ No posits without a theory. And, roughly, no theories outside science. However, making an *ad hoc* generalization on the basis of well visible analogies, one can say (in conformity with the spirit of Quine's epistemology): even common sense has its theories, these theories being involved in positing common-sense objects. This is, roughly, how theories have to be understood here (in the quasi-Quinean dictum this note is appended to). Observe, further, that the concept of posit has been defined in section 1 in terms of ontological commitments of theories. Thus, among the concepts that are involved, there is the concept of being real (the concept of theory is involved as mediating) and the concept of existing (the concept of ontological commitment is involved as mediating). Therefore, to say that to be is to be posited by a theory that meets certain special conditions is to reverse the logical order of explaining. Thus the concept of posit cannot be kept defined, on pain of circularity, in the way indicated above. The question of whether it could be defined so that circularity be avoided lies outside the scope of the present paper (it is a question that should be answered on Quine's behalf, provided his views have not been misrepresented). But let me remark that there is something like a guiding idea close at hand in Quine's works. It is the idea of *defining* the concept of ontological commitment along the lines indicated by Quine's famous *criterion* of ontological commitment. One of the possible objections is that, as far as circularity is concerned, this change from a formulation of a criterion to a definition is of no help. But I have to leave this question without discussion.

These views contribute to the positive side of Quine's epistemology, considered by him to be a branch of psychology. On the negative side, we have a radical abolishment of the epistemological programme (belonging to the 'old' epistemology) of searching for ultimate sources of reliability of our explanatory frameworks in the realm of the directly given. The abolishment could not be more radical in a sense: the realm of the directly given is claimed to be explainable away as misconceived.³⁴ Now, the above epistemological programme has dramatically failed to fulfil its promises. This failure is accompanied by difficulties about how to draw the boundary of the realm of the directly given (e.g. is change directly given?). But it seems that even the least restrictive of the possible solutions does not bring about good prospects for success. Anyway, we seem to be so far from success that suspicion of misconception is understandable.

On the other hand, the question as to whether the drawbacks to the above epistemological programme that are widely acknowledged nowadays, have to make us abandon it all together, can hardly be settled by arguments. At the present stage of inquiry we have to leave it, roughly, to our bare intuition. Suppose then that the realm of the directly given is *not* misconceived; that, further, it belongs to the ultimate reality (not necessarily makes up the whole of it); and that, lastly, being directly given is the ultimate evidence.³⁵ It follows that we cannot stop appealing (directly or indirectly) to being directly given, whether or not we are aware of it, and whether or not we are ready to endorse it. Thus, when we renounce it, it has to be involved in some hidden way in the justification procedures. Observe in this connection that if being directly given is the ultimate evidence, to declare that one renounces appealing to it is to declare something that implies being cognitively cut off from reality, which makes reality unintelligible. Thus, as far as the criteria of being real are concerned, pragmatic factors, such as the one Quine calls 'subscribing to a theory', have to take over. But to notice this relationship is to understand Quine (or misunderstand him), not to agree with him.

An additional point to be made here is that it is one thing for an object to count as real due to its being 'our' posit, and another one to count as real due to the purported indispensability. Thus we have to distinguish between arguments from indispensability and arguments from being a posit of a theory we 'subscribe to' (they differ independently of whether the term 'real' is being used here with two meanings). Of course, arguments from indispensability can make the problem of theoretical fiction less acute: in cases they are conclusive this problem will not arise. But they cannot explain the problem away. They can only bring about 'local' alleviation of worries about positing fiction (alleviation of worries that arise in connection with some special part of the universe of discourse).

³⁴ For this view on the directly given, cf. especially Quine 1966a: 212.

³⁵ True, such evidence is subjective, but subjectivity in applications of methods of justification does not exclude intersubjectivity of the methods themselves.

7. ELIMINATION AND NON-ELIMINATION SOLUTIONS TO THE PROBLEM OF THEORETICAL FICTION

The main line of division among possible solutions to the problem of theoretical fiction is the one that separates solutions that accept positing fiction (*non-elimination solutions*) from those that totally renounce it (*elimination solutions*).³⁶ The term “fictionalism” will be used in what follows as a generic name that could derive its meaning from speaking of fictionalisms understood as non-elimination solutions. Of course, speaking of ‘fictionalisms’ is somewhat awkward. However, once the above convention has been established, one can speak of versions of fictionalism instead. Observe that fictionalism, as understood in conformity with the above convention is a purely methodological doctrine. Contrary to what our use of the term “fiction” may suggest (for other misleading factors, cf. below), it does not advance any ontological theses. This is not to deny that it bears on ontological issues in some interesting ways. But it will be convenient to leave these relationships temporarily aside.

Arguably, the use of the term “fictionalism” in the above way combines naturalness of conceptual construction with a satisfactory degree of conformity with current usage, including Vaihinger’s legacy.³⁷ However, as regards such conformity, there is at least one discrepancy that deserves comment. Not a minor one. It is exemplified by the way the term “fictionalism” is deployed in the writings of Field and in the debate that centres around his views on the ontological status of mathematical objects. One of the theses of fictionalism as understood by Field is that mathematical objects are a fiction. Field’s fictionalism includes his nominalism about the universe of discourse in mathematics (see e.g. 1980: 2; 1991: 2, 6, 30-31, 43-45). Thus it is not a purely methodological position. But it is not a purely ontological position either. Field’s fictionalism combines ontological views (nominalism about mathematical objects) with methodological ones. The following passage partially characterizes the latter (Field 1989: 4):

³⁶ It has to be underlined, to avoid misunderstandings, that the elimination that is relevant to the semantic motivation of how the term “elimination solution” is going to be used is elimination (from the given discourse) of the troublesome ontological commitment. Granted, a successful explaining away of the problem of theoretical fiction would also be elimination of a sort. It would eliminate the problem. What is more, in the case of some purported contributions to explaining away the problem of theoretical fiction, we could metaphorically speak of elimination of the purported posits. Contributions based on, say, Russell’s conception of logical fictions offer a positive example (cf. Sainsbury 2010: 174, item 3 on the list). It may be contrasted to ontological reductions: what the given posits are reduced to is left intact. To the extent metaphoric use is allowed, every negative existential claim, e.g. that abstract objects do not exist, can likewise be characterised in terms of elimination (cf. Sainsbury 2010: 174, item 4 on the list).

³⁷ I do not remember whether I have met the term “fictionalism” (“Fiktionalismus”) in Vaihinger 1927. It does not occur in the index. It does occur, however, in Vaihinger 1924, in the *Preface to the English Edition* (p. viii).

there is certainly room for initial suspicion that for standard mathematics the only reasonable account of goodness involves truth — or, perhaps, necessary truth. I think, though, that the fictionalist can provide an alternative account: it was developed in Field 1980 and elaborated in several essays below. On this account, truth isn't required for goodness (so necessary truth isn't required either); what is required instead is something called conservativeness.

An earlier note on the same page may be seen as supplementary in respect of Field's views on the role of truth in the evaluation of mathematical theories:

Mathematical instrumentalism is sometimes differentiated from mathematical fictionalism: the instrumentalist is said to hold that mathematical claims lack truth value, while the fictionalist is said to hold that they are false. In my opinion this is totally uninteresting difference; the important point to both positions is that the acceptability of a mathematical claim is in no way dependent on any truth value it may have. In the case of mathematics (and also in the case of physics), where the applicability is evident, I will use the words 'fictionalism' and 'instrumentalism' interchangeably.

As these two passages indicate, the methodological part of Field's fictionalism is a version of fictionalism in the above purely methodological sense. However, it is very much unlike the version that will be defended later in this paper. The latter makes much stronger contrast to instrumentalism. Another difference that can easily be traced on the basis of Field's words is indicated by the following passage (1980: 1):

Since I deny that numbers, functions, sets, etc. exist, I deny that it is legitimate to use terms that purport to refer to such entities, or variables that purport to range over such entities, in our ultimate account of what the world is really like.

The version of fictionalism that will be advocated does not call for bringing to the foreground the distinction between the ultimate account of what the world is really like and the non-ultimate accounts. Whenever the ultimate account (understood of course as a limit of a sort), deserves separate attention, the question of legitimacy can be reduced, as in the case of non-ultimate accounts, to the question of convenience. To turn to a still another difference between the two versions of fictionalism that are being compared here (one of them with anticipation), recall what has been said in section 5 about the accusations of doublethink. Such accusation also seems to have been made in *Science without Numbers*, where we read (Field 1980: 2):

Most recent philosophers have been hostile to fictionalist interpretations of mathematics, and for good reasons. If one *just* advocates fictionalism about a portion of mathematics, without showing how that part of mathematics is dispensable in applications, then one is engaging in intellectual doublethink: one is merely taking back in one's philosophical moments what one asserts in doing science, without proposing an alternative formulation of science that accords with one's philosophy.

Observe that what is meant by 'intellectual doublethink' here is being 'unfaithful' to the nominalistic claims in the research practice. Thus Field's accusation of doublethink seems to express misgivings about cases of positing fiction that are not accompanied by providing a proof of non-indispensability of the given ontological

commitment. Reading between the lines, one can also get the impression that on Field's view, as soon as a proof of non-indispensability has been provided, all misgivings should vanish. Hence, Field seems to hold that to overcome the misgivings about positing fiction it is necessary — and sufficient — to provide an appropriate proof of non-indispensability. Yet, in order to deny that such relationships hold, one only needs to carefully distinguish between the question of justification of nominalism and the question of whether nominalism can endorse mathematical practice. The upshot is that Field's version of fictionalism (the version that makes up, together with Field's nominalism, fictionalism as he understands it) falls short of indicating how to overcome the misgivings about positing fiction (cf. Loux 2006: 81 for a similar complaint). Incidentally, it may be noticed that this objection against Field's 'fictionalism' leads to a certain relative appraisal of its two components: it is Field's nominalism that deserves more attention as a contribution to the philosophy of mathematics. A relative appraisal of this sort could be one of the reasons why Field's 'fictionalism' is sometimes viewed upon as a version of nominalism (cf. Loux 2006: 81, Shapiro 2005: 17), which it is not.

Observe, further, that in spite of its relative proximity to instrumentalism Field's fictionalism does not reduce the interpretation of the formalism of mathematical theories to something unofficial. But it is not clear what functions these theories are allowed to perform officially. On Loux's account, the 'core idea' is that "we should treat claims that appear to be about abstract entities in much the way we treat fictional discourse" (Loux 2006: 46, 80; cf. Shapiro 2005: 17), and that mathematical reality is to be treated as a world of make-believe (Loux 2006: 81).³⁸ Now, in view of the obvious functional differences between literary stories and theories, the similarity in question must hold only in some special respects. They have to be specified. As a matter of fact, Loux's account does not leave us without any details pertinent to this issue. Field's views are said to endorse make-believe. However, while make-believe is typical of the way we read literary stories, one can have doubts as to whether Field is inclined to endorse make-believe in mathematics: although make-believe in science does not deserve, as will be argued later, to be repudiated as 'doublethink', there is enough similarity to suggest that those who endorse make-believe are not likely to repudiate 'doublethink' without any proviso (which is, we have seen, the way Field repudiates it).

Recall that fictionalism as understood in the present paper is a purely methodological doctrine. It does not follow that it has no bearing (direct or indirect) on ontological issues. When the practice of positing fiction is not abandoned in spite of the methodological misgivings that accompany it, the latter may easily result in hidden motivation for changing the relevant existential beliefs. One can perhaps bestow add-

³⁸ What is thus characterized are not only Field's views, but fictionalism said to be a version of nominalism. The philosophy of mathematics and Field's views in particular are in focus (Loux 2006: 46, 79-81, 83).

ditional plausibility on this intuitive claim by appealing to the cognitive dissonance theory. Now, as far as we have overcome the misgivings about positing fiction, we are free of the temptations of the above sort; which may misleadingly suggest that fictionalism counters some arguments for positive existential claims, thus *arguing* against them. Such misleading suggestion arises when the distinction is blurred between the *reasons* than can be adduced to legitimize beliefs, and *motivations* of belief formation. Such confusion precludes noticing that to eradicate motivations that flout the norms of rationality is a contribution to the methodological correctness of discussions, but is not itself an argument.

An additional observation to be made in this connection is the following: although the above words of warning against confusion do not neglect indispensability arguments, they do not treat them in any special way either. But there is something special about them that deserves mention. In order to adduce indispensability arguments, one has to *affirm* that *impossibility of elimination* of some ontological commitments of theories without any loss relative to the aims of science implies existence of the given objects. Now, fictionalism *denies* something similar, viz. that *fruitfulness* of some ontological commitments of theories relative to the aims of science implies existence. Perhaps these two claims are similar enough to bring about confusion, which may misleadingly suggest that fictionalism counters indispensability arguments.

As shown by the above considerations, fictionalism is not totally neutral with respect to ontological issues. But it has no ontological *consequences*. Thus to be an adherent of fictionalism is not an excuse for claiming non-existence of some posits without considering all the pros and cons in current debates, indispensability arguments and arguments that counter them being no exception. A similar point to be made in this connection is that declaring oneself a fictionalist is not of itself taking part in metaphysical debates. But a fictionalist may be interested *qua* fictionalist in such debates, and she may take part in them, since they bear on the extent to which her position is significant for scientific practice (to be more exact: they bear on the range of occasions in which it pays to be a fictionalist).

To return to terminology, it has to be remarked that if the term “fictionalism” is to be used as applying to some doctrines that include ontological theses,³⁹ the choice of nominalism as the ontological part is rather arbitrary. Some other doctrines in ontology have equal rights in this respect, and equally disputable for that matter. Thus we should perhaps restrict the use of the term “fictionalism” to the above (or some similar) methodological doctrine.

³⁹ Such use is endorsed generally by Sainsbury’s presentation of fictionalism in Sainsbury 2010. Some features held to be characteristic of fictionalism are listed at the end of chapter 7 by way of summary of a sort. It is the ontological part of the various versions of fictionalism as understood by Sainsbury that is responsible for items 1, 4-6 on the list.

The elimination solutions recommend elimination of the incriminated ontological commitments, which (if it is not to be purely ‘negative’) requires changing the theories that introduce them (non-instrumental elimination), or reducing these theories to pure formalism (instrumental elimination). A non-instrumental elimination must consist either in reformulation of the given theory or in reinterpretation of its formalism. Elimination solutions that opt for instrumental elimination will be called ‘instrumental solutions’. Instrumentalism is a standpoint that has instrumental solutions as variants. To refer to it as ‘instrumentalism’ is restrictive with respect to the semantic motivation in *ordinary* English. Fictionalism is ‘instrumentalism’ of a sort. Note that the need for scare quotes can be accounted for, to a degree, by appealing to the temporal order of the relevant developments in the philosophy of science. For a long time instrumentalism as understood today was the only version of ‘instrumentalism’ that featured on the agenda of the philosophy of science (for some pertinent chronological data, cf. Suárez 2009a: 3-5).

The term “elimination solution” has been introduced above as applying to certain solutions to the problem of theoretical fiction, viz. the solutions that oppose fictionalism. Elimination solutions recommend elimination of the troublesome ontological commitments. Note that attempts at elimination (global or local) need not be motivated only by opposing fictionalism. Elimination of some posits (no matter whether believed to be fictitious or not) may lead to improvements in our theories in respect of efficiency and/or economy. Fictionalism does not neglect this possibility. All such improvements are welcome.

Research programmes whose aim is to contribute to an elimination of some sort (no matter how motivated) can be called ‘elimination programmes’. They have to be distinguished from research programmes whose aim is only to show that the given posits are not indispensable, i.e. that elimination is possible (*demonstration-of-non-indispensability programmes*). A fictionalist cannot have any reasons *qua* fictionalist to recommend elimination programmes. Moreover, there are at present no good prospects for developing large-scale elimination programmes that a fictionalist could approve on the basis of considerations concerning efficiency and/or economy. But there is a version of fictionalism (viz. the methodological part of fictionalism as understood by Field) that can be viewed upon by its adherents as legitimizing large scale *demonstration-of-non-indispensability* programmes.

In the case of non-instrumental elimination, the elimination programmes, and, to a lesser degree, the *demonstration-of-non-indispensability* programmes are closely akin to what William Craig once called ‘replacement programmes’ (1956: 38-39). Both the motivations behind replacement programmes and these programmes themselves have been characterized by Craig in terms of changes of languages of theories, and not changes in respect of ontological commitment of sentences that express theorems. Although changes of these two kinds need not accompany each other, in view of the character of the motivations that are at work on Craig’s account, the difference is rather insignificant. These motivations seem to be roughly the same as those that

give rise to elimination solutions. It is worth noticing that Craig intended the term “replacement programme” as applying not only to research programmes whose aim is a replacement, but also such that aim only to show that the replacement is possible (cf. the demonstration-of-non-indispensability programmes), which seems not to be in perfect match with the above motivations. This construal looks as if intending to accommodate the attitudes of those who, like Field (cf. above), have misgivings about positing fiction but try to alleviate them not by elimination but by being prepared to accomplish it on demand.

Throughout the next four sections a certain variant of fictionalism is argued for. The argumentation starts from a brief preparatory discussion of some special methodological issues: the role of belief imitation (sections 8 and 9) and the logical rules for use of the linguistic devices involved directly in positing fiction (section 10). Next comes a systematic account of the ultimate sources of misgivings about positing fiction. Some objections fictionalism has to answer will thus be indicated. Attempts at answering them follow (section 11). They draw to a degree on the results obtained in sections 8-10.

There is also another line of argumentation: in section 12 elimination programmes are evaluated in respect of the range of applications and the extent to which the respective elimination operations are functionally purposeful (*functional adequacy*). It bears on the question of whether fictionalism can be partly undermined by suspicions that are likely to arise whenever a methodological standpoint turns out to have no practical merits.

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