

Feigl's 'Scientific Realism'*

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This article considers the evolution of Feigl's attempt at establishing a stable form of scientific realism. I will argue that Feigl's work in that area should be appreciated for two reasons: (1) it represents a telling case against the view of there being an unbridgeable 'analytic-continental divide' in the context of twentieth-century philosophy; (2) it contradicts the idea that scientific realism is at odds with logical empiricism. It will be shown that Feigl developed his scientific realist position from within the logical empiricists' Vienna Circle. This, in turn, necessitates a fresh approach toward the contemporary scientific realism debate.

1. Introduction. It is commonly supposed that 'scientific realism' and 'logical empiricism' stand in opposition to each other. On closer scrutiny, however, it becomes obvious that there existed a strong tendency toward the aims of realism within the logical empiricist movement itself. The central figure in connection with this was Herbert Feigl (1902–88). Influenced by the early 'critical' realism of his teacher Moritz Schlick, Feigl presented his realist account of science and scientific theories as early as 1935 at the now famous First International Congress for the Unity of Science in Paris.¹ In the 1950s, Feigl transformed his scientific realism from a primarily epistemic to a primarily semantic point of view. This move allowed him to draw a sharp distinction between evidence and reference and between verification and truth.

It is the aim of this article to show that Feigl's distinctions turned out

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1. Other participants of that conference were, e.g., Rudolf Carnap, Alfred Tarski, Charles W. Morris, Hans Reichenbach, and Alfred J. Ayer. For further details, see Stadler (1997), 402–12.

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to be a decisive (but unduly neglected) step toward the more recent debate over scientific realism. Nevertheless, Feigl's own account of scientific realism ultimately remained unstable since he never made sufficiently clear how the language of science relates to the unobservable parts of the world. It is for this reason that I conclude that scientific realism only works within the framework of an explicitly articulated metaphysics. Otherwise, it would appear more plausible to accept the criticism brought forward (especially) by Philipp Frank, Ernest Nagel, and Carl Gustav Hempel—all of them arguing that a nonmetaphysical account of scientific realism is nothing else but logical empiricism.²

2. Schlick and 'Critical' Realism. It is well known that Feigl wrote his dissertation on 'Zufall und Gesetz' (1927/1994) under the Vienna Circle's founder and leading figure Moritz Schlick. Schlick himself had founded the circle in 1922, but before he came to Vienna he actually stood under the influence of a special variant of German Neo-Kantianism. Contrary to the famous Marburg School of Neo-Kantianism (Cohen, Natorp, Cassirer), the position defended by the early Schlick was inspired not by the idealist but by the realist component of Kantian theoretical philosophy. In this respect, he was a follower of Alois Riehl.³ On the view proposed by Riehl (1879–87), Kantian criticism should be supplemented by the (prima facie, rather un-Kantian) assumption of the knowability of 'things-in-themselves'. Although explicitly antimetaphysical in the sense of rejecting speculative *Naturphilosophie* à la Hegel and Schelling, Riehl's critical realism was committed to the claim that the objects of science are not 'mere appearances' but rather those things that are causally responsible for the occurrence of appearances. In the work of Schlick, especially in his magnum opus *Allgemeine Erkenntnislehre* (1918/1974), this point of view becomes elaborated into a sophisticated—'semiotic'—theory of

2. I am drawing here on Frank's, Nagel's, and Hempel's respective contributions to the April 1950 issue of *Philosophy of Science*. For further details, see sec. 6.

3. According to Michael Heidelberger, Riehl was not "an orthodox Kantian who wanted to defend Kant's philosophy at all costs. On the contrary, he maintained that Kant's philosophy has to be revised in many respects in order to become consistent and that 'the principal progress of science does not allow us to continue sticking to Kant's standpoint'" (2007, 29). Much the same holds true for the early Schlick, who, while appreciating Kant as one of the first proponents of the idea of a 'scientific philosophy' (see, in this respect, esp. Schlick [1915, 129] and the discussion in Friedman [2001, 12–14]), saw the necessity of a fundamental revision of the Kantian epistemological project (see esp. Schlick 1919, 189, 203). As Alberto Coffa has aptly put it, with the early Schlick, "we are back in the world of Kantian questions and semi-Kantian answers" (1991, 171).

scientific knowledge.⁴ For Schlick (1918/1974, sec. 10), scientific knowledge consists in the coordination (*Zuordnung*) of signs to things. This coordination is purely conceptual, that is, independent of the Kantian 'faculty' of intuition. We therefore have to "reject the phenomenalist presupposition [that we know only appearances] and assume that, on the basis of relations among appearances, something positive can be said about the mutual relations of transcendent things" (241). Cognition requires nothing more than the possibility of such a unique correlation, and it is for this reason that Schlick concludes that, for example, "Maxwell's equations disclose to us the 'essence' of electricity, Einstein's equations the essence of gravitation" (242).⁵

It is rather obvious that Feigl was heavily inspired by the critical realist tradition. Commenting on his philosophical beginnings, he reports: "Schlick soon became my favorite philosopher. I was also impressed with the book by Alois Riehl on contemporary philosophy [cf. Riehl 1903]. Riehl, whose work I still think was more important than that of the other Neo-Kantians, never received the recognition he deserved. In addition to many other important contributions and clarifications, I was immensely pleased with the sort of critical realism and its supporting arguments I found in both Riehl and Schlick" (1974/1981, 2). However, as Feigl reports elsewhere, Schlick, in the course of the 1920s, became more and more 'converted' by the influence of Rudolf Carnap and (especially) Ludwig Wittgenstein. Feigl writes: "I was acutely distressed to witness Schlick's conversion to positivism in the late twenties. This conversion was largely due to the influence of Carnap and Wittgenstein. . . . My own emancipation began in the middle thirties and was stabilized in the forties. Studies and teaching in the field of the philosophy of science helped me regain, refine, and buttress my earlier realistic position. I was also greatly encouraged by the scientific realism of Hans Reichenbach and the realistic epistemologies of my steadfast dear friends Roy W. Sellars and Wilfrid Sellars" (1963/1981, 39).

Feigl, who had emigrated to the United States in 1930, did in fact enter the American philosophical scene with an article titled "Logical Positivism: A New Movement in European Philosophy" (Feigl and Blumberg 1931). It was just around that time when the Vienna Circle was about to reach its peak in the European discussion: Carnap (1932) attacked Martin Heidegger for being a proponent of an "un-logical," irrational meta-

4. For the details of that theory, see Ryckman (1991) and Friedman (1997).

5. Gower (2000) points out that there is a close connection between the early Schlick's 'relational' account of scientific objects, on the one hand, and modern 'structural' realism (see, e.g., Worrall 1989), on the other. For a discussion of the early Schlick's indebtedness to Riehl, see Heidelberger (2006, 2007).

physics, and Feigl's former teacher Schlick, who, in 1930, had already propagated a "turning-point in philosophy" (cf. Schlick 1930/1979), declared that "talk of a metaphysical external world is meaningless" (1932/1979, 284).⁶ Still, it is important to realize that Feigl himself remained open-minded about the possibility of establishing a realist account of science and scientific theories. He was obviously impressed by Roy W. Sellars's influential books *Critical Realism* (1916) and *The Philosophy of Physical Realism* (1932). Like Riehl and the early Schlick, Sellars argued in favor of the knowability of unobservable—'transcendent'—entities. Much the same holds true for the writings of Roy's son Wilfrid Sellars (see, e.g., Sellars 1948/1949) and especially for Hans Reichenbach's seminal *Experience and Prediction* (1938).

Summing up so far, it can be said that the critical realist tradition set the stage for Feigl's philosophical development. Being an integral part of the continental, especially German, philosophical discussion in the late nineteenth and early twentieth centuries, critical realism played a similar role as the idealist, Marburgian, variant of Neo-Kantianism: it provided the fertile soil for the evolution of the logical empiricist movement.⁷ Given the impact that logical empiricism had on the analytic tradition in twentieth-century philosophy, it appears legitimate to postulate a rather continuous shift from the continental to the analytic 'style of reasoning'.⁸ This is not to say that there was no contrast between these two approaches. It is more than obvious that, for example, the 'fundamental ontology' of Martin Heidegger is hardly compatible with the aims of, say, Rudolf Carnap's *Der logische Aufbau der Welt* (1928). But there were interesting 'middle positions' located beyond the extremes. Ernst Cassirer's *Philosophy of Symbolic Forms* (1922–29) would be a good example in this respect (see Friedman 2000, esp. chaps. 6–9), and the critical realist movement—with its presence both in Central Europe and the United States—another.

3. The Continuity Thesis. According to Feigl's own reconstruction, the essential step in regaining his earlier realistic position was carried out in 1935. Feigl reports: "Having stereotyped myself (in the notorious fanfare article written in collaboration with A. E. Blumberg . . .), as a 'logical

6. To be sure, Schlick was still of the opinion that he himself was an "empirical realist" (1932/1979, 283). But it must be seen that he now completely rejected his former assumption of the knowability of transcendent things in themselves and, with it, the core assumption of critical realism.

7. For the relevant (meanwhile well-known) formative role of Marburgian 'logical idealism' (esp. with respect to Carnap), see Friedman (1987, 1992, 2000), Richardson (1992, 1998), and Mormann (1999).

8. Here, I fundamentally agree with the historical diagnoses in Dummett (1993) and Friedman (2000).

positivist,' the label has stuck to me ever since. As early as 1935, however, I abandoned the label . . . and availed myself of the alias 'logical empiricist.' This was triggered by a remark of a French philosopher at the International Congress for the Unity of Science in Paris (1935). He burst out at me: '*Les positivistes, ce sont des idiots!*'" (1963/1981, 38). Whoever this rather rabid French philosopher might have been, it is clear that Feigl saw in logical empiricism the appropriate framework for the articulation of his realist conviction that knowledge of transcendent things is possible. Interestingly enough, his own contribution to the Paris conference in 1935 did in fact concern the realism issue. In particular, Feigl's contribution had the title "Sense and Nonsense in Scientific Realism" (1936). As the title indicates, Feigl's approach toward the scientific realism issue was quite guarded. He did not argue directly for the existence of mind-independent causal forces (or other kinds of 'theoretical' entities). His aim was rather to integrate the talk about causal forces into the framework of a logical analysis of the language of science. To that effect, he thought it apt to plea for a "cautious empirical realism" according to which the original logical positivist "verifiability criterion" should be liberalized (1963/1981, 51). In its original form, the verifiability criterion was, as Feigl clearly recognized, "unnecessarily restricted by the demand for *complete* and *direct* testability" (51). By adopting a "cautious empirical realism," the weaker demand for incomplete and indirect testability would be sufficient (54).⁹

As Feigl further pointed out, it was especially Ralph Barton Perry's (1910) rejection of "the metaphysical exploitation of the so-called egocentric predicament" (Feigl 1936, 52; emphasis suppressed) that foreshadowed the proposed liberalization. Feigl's (and Perry's) alternative to that peculiar—in fact perception-centered and, in the last analysis, anti-realist—view was the postulation of a global epistemological continuity thesis. According to that thesis, all significant empirical knowledge is hypothetical and inferential in character. Whereas empirical knowledge on the 'egocentric predicament' view was restricted to individual (subjective) perception and therefore categorically distinct from any kind of theoretical elements, perception itself—on the alternative view proposed by Feigl (and Perry)—was already 'theory laden'. Or in Feigl's own words, "Just as in Physics every measurement or experiment presupposes a theory of the measuring instrument or of the apparatus used in the experiment, so in the case of ordinary perceptual knowledge we must presuppose,

9. It is interesting to note that Carnap, at the very same occasion (the Paris conference), also replaced verifiability with confirmability as part of a general liberalization of the Vienna Circle's meaning criterion started around 1932 in the context of the so-called protocol sentence debate. See Carnap (1936) and the discussion in Uebel (2007).

however crude and imperfect, a *theory of perception*. It is essentially this knowledge about the nature and conditions of normal perception which forms the nucleus of empirical realism” (52). This line of reasoning is rather common among scientific realists.¹⁰ Its central implication is that there is no privileged status for any sort of ‘observational’ or ‘protocol’ sentences (55). They are—epistemologically—not, as the ‘egocentric-predicament’ view would have it, categorically distinct from ‘theoretical’ sentences but only more directly linked to the perceptual basis and therefore easier to operationalize. Hence, the distinction between ‘the’ theoretical and ‘the’ observable is only one of degree.¹¹

In 1943, Feigl published a paper with the programmatic title “Logical Empiricism.” By again integrating the realism issue, Feigl delivered a criterion for what should be counted as ‘real’: “The term ‘real’ is employed in a clear sense and usually with good reason in daily life and science to designate that which is located in space-time and which is a link in the chains of causal relations. It is thus contrasted with the illusory, the fictitious and the purely conceptual. The reality, in this sense, of rocks and trees, of stars and atoms, of radiations and forces, of human minds and social groups, of historical events and economic processes, is capable of empirical test” (1943/1949, 16). So, reality should be ascribed to whatever is confirmed as having a place in the spatiotemporal-causal system. Since atoms, forces, and other kinds of theoretical (unobservable) entities are included by this criterion, we are led to the conclusion that the spatiotemporal-causal system is capable of serving as the explanatory basis of Feigl’s epistemological continuity thesis: the observable and the theoretical are epistemologically on par with each other because they are likewise part of the spatiotemporal-causal system.¹²

4. Scientific Realism as Semantic Realism. The aim of the remainder of this article is to elaborate how Feigl modified and refined his “cautious empirical realism” in the course of the 1950s. In doing so, I hope to provide a more well-balanced perspective on the relation between scientific realism, on the one hand, and logical empiricism, on the other. In more

10. For more recent examples, see Maxwell (1962), Shapere (1982), and Psillos (1999, 211–15).

11. It should be noted that a very similar account can already be found in Neurath (1932). For further discussion, see Uebel (2007).

12. It might be objected that the criterion of having a place in the spatiotemporal-causal system would be acceptable for a nonrealist like Carnap (or even Schopenhauer) as well. And indeed, as will be seen later, it depends on what is understood by ‘causality’ whether such a criterion can be used as a stable criterion of reality (and not, as in the case of Carnap [and Schopenhauer], as a mere criterion of organizing observations, or ‘phenomena’).

recent presentations, one can often find expressed the view that logical empiricism was effectively superseded by scientific realism (see, e.g., Chakravartty 2007; Zahar 2007). This view is, to say the least, both historically and systematically superficial. For it was in fact the logical empiricist movement by which the modern scientific realism debate was, in an affirmative sense, initiated. Apart from the groundbreaking work of Feigl himself, one should mention in this connection the relevant contributions by Eino Kaila (1936, 1942) and Hans Reichenbach (1938). However, for our concerns, Feigl's contribution is the one that needs addressing. What I wish to make plain is this: by employing the argumentative resources of semantics, Feigl prepared the ground for a conception of scientific realism that prevailed in the respective discussions during the second half of the twentieth century. In particular, it was Feigl's reflection on the concepts of truth and reference by which the debate over scientific realism became transformed from a primarily epistemological to a primarily semantic exchange of points of view. In drawing attention to this transformative move, I hope to help to reevaluate the significance of Feigl's position in twentieth-century philosophy of science.¹³

In his 1974 retrospective, Feigl describes his realist conviction as follows: "The existence of unobservable entities (subatomic particles; nuclear forces, etc.) can be resolved affirmatively. . . . Science is (contrary to classical positivist dogma) not a compendious and economical summary of experience, but an attempt at understanding (explaining) the facts of nature by means of laws, hypotheses and theories" (1974/1981, 14–15). The core of the scientific realist's position could not be stated more clearly. But as indicated above, it was semantics—and not, as before, epistemology—that, from circa 1950 on, served as the vehicle for Feigl's promotion of the realist project. By 'semantics', Feigl meant (in a nutshell) the formal scrutiny of reference and truth. As such, it had nothing to do with the concrete methods of testing hypotheses. Rather, "semantic realism," as Feigl pointed out, "is concerned only with the most abstract and formal features of the semiotic situation" (1950b, 192). This implied, in particular, two things: (1) reference must be sharply distinguished from evidence; (2) truth must be sharply distinguished from verification.¹⁴

Before discussing the details of this twofold distinction, let me briefly comment on what may be labeled the standard account of scientific realism during the second half of the twentieth century. This standard account is

13. My attempt at a reconstruction is partly indebted to the excellent discussion of Feigl's 'semantic realism' in Psillos (1999), 11–15 and 44–47.

14. Interestingly enough, exactly this distinction was made by Carnap as early as the 1935 Paris Conference (see Carnap 1936). Yet for Carnap, this distinction alone had no consequences at all for the realism issue. We will come back to this point in sec. 6.

largely due to the following characterization given by Hilary Putnam: “The positive argument for realism is that it is the only philosophy that doesn’t make the success of science a miracle. That terms in mature scientific theories typically refer (this formulation is due to Richard Boyd), that the theories accepted in mature science are typically approximately true, that the same term can refer to the same thing even when it occurs in different theories—these statements are viewed by the scientific realist not as necessary truths but as part of the only scientific explanation of the success of science and its relation to its objects” (1975, 73).¹⁵ As will be seen later, the main objection against this formulation of the standard account is that it, in Michael Devitt’s words, puts “the semantic cart before the realist horse” (1984, 4). Yet, in order to adequately describe mainstream scientific realism during the second half of the twentieth century, Putnam’s characterization can be regarded as representative (or ‘paradigmatic’).

Returning to Feigl, it now appears legitimate to claim that what he originally dubbed ‘semantic realism’ actually was the first explicit statement of the standard account. As he himself declared, semantic realism was “a semiotically more sophisticated and logically more secure form of the empirical realism which Schlick had so forcefully expounded in his *Allgemeine Erkenntnislehre* of 1918.” However, semantic realism stood in opposition to the “Aufbau or logical-construction phase of the early work of Carnap.” Therefore, Feigl saw himself as arguing in favor of a “philosophy of science which has greater affinity with critical realism than with phenomenalist positivism” (1956, 16).¹⁶

In January 1950, Feigl’s oft-quoted paper “Existential Hypotheses” was published. The central thesis of that paper was that it is possible to “avoid both the reductive fallacies of phenomenism and the redundancies and confusions of metaphysical realism” (1950a, 35). The essential tool for

15. Similar characterizations of the scientific realist’s position can be found in Hooker (1974, 409), Ellis (1979, 28), Papineau (1979, 126), and Leplin (1984, 1–2).

16. It is rather ironic that Putnam—who had completed his dissertation under Reichenbach—never seemed to have recognized the logical empiricist roots of his own semantic characterization of the scientific realist’s position. It is obviously the case that the logical empiricist movement was, for him, identical to Carnap’s early *Aufbau* phase and that his complete understanding of logical empiricism was therefore (maybe unwittingly) unfairly restricted. However, it must be conceded that the later Putnam, especially in his retrospective *Words and Life*, clearly indicated that Reichenbach was a special figure within the logical empiricist movement because his views “differed in significant respects from those of the other leading representatives of logical empiricism” (1994, 100). Reichenbach’s realist ‘heresy’ was surely one of these “significant respects,” but it must be seen that even the later Putnam is of the opinion that what Reichenbach understood by ‘realism’ (and especially what he understood by ‘truth’) was “hardly substantial” (92).

applying this 'strategy of avoidance' was semantics. By semantics, Feigl maintained, the scientific realism issue could be restated "in a new and sharpened manner." "The glib and easy dismissal of the issue as a pseudo-problem," stated Feigl, "will no longer do" (36).¹⁷

To begin with, by the "redundancies and confusions of metaphysical realism" Feigl meant the doctrine that there are transcendent entities whose existence can be 'proved', although not by the methods of science. Like the early Schlick (see, esp., 1913), Feigl associated this doctrine with the intuitionist conception of reality, as it was defended by Henri Bergson, William James, and Edmund Husserl at the beginning of the twentieth century (see Feigl 1950a, 51). By the "reductive fallacies of phenomenalism," however, Feigl meant the logical constructionist accounts of Bertrand Russell (1914) and Rudolf Carnap (1928).¹⁸ On Russell and Carnap's view, the theoretical statements of the empirical sciences were, at least according to Feigl, "considered as translatable into statements concerning the data of direct experience" (1950a, 35).¹⁹ This conception was, in Feigl's eyes, "fallacious" because the assumption of complete translatability was, he thought, semantically misguided. Theoretical sentences should be invested with what Feigl called their (so to say 'untranslatable') "surplus meaning." This surplus meaning he considered to consist in the "factual reference" of theoretical terms (48). More concretely speaking, Feigl was convinced that terms like 'atom', 'force', or 'electromagnetic field' cannot be reduced to purely observational terms describing our direct experiences. Rather, theoretical terms were supposed to refer to unobservable, mind-independent entities, so that, for example, the referent of the term 'atom' would be real atoms and not samples of 'logical constructions' out of sense data (or other kinds of directly perceivable things). Therefore, Feigl urged that "we must distinguish between the radical empiricist's meaning of 'meaning' (i.e., epistemic reduction) and another, more common-sensical meaning of 'meaning' (factual reference)" (49).

As Stathis Psillos has very aptly remarked, Feigl's "semantic realism is an anti-reductive position" (1999, 12). It is antireductive insofar as the theoretical language of science is claimed to be autonomous in relation to the observational evidence basis. Consequently, the mind independence of the 'factual referents' of theoretical terms seems to be secured by the

17. It is plausible to assume that this comment was directed immediately against the views presented in Carnap (1928) and in Schlick (1932/1979).

18. Interestingly, Feigl thereby anticipates Willard van Orman Quine's critique of the 'second dogma' of empiricism, i.e., 'reductionism' (see Quine 1951/1980, 37–42).

19. It should be noted that there are significant differences between Russell's *External World* and Carnap's *Aufbau* programs. For further details, see Friedman (1987) and Richardson (1990).

very reference relation itself: the existence of theoretical entities like atoms is obviously implied by the independent reference of theoretical terms like ‘atom’.

Furthermore, it should be noticed that Feigl’s account of factual reference is intimately linked with the concept of truth. In general, the meaning of a sentence consists, according to the theory proposed by Feigl, in its truth conditions (1950b, 191; 1963/1981, 43). These truth conditions, in turn, are treated compositionally: they obtain when, as Psillos puts it, “the referred-to entities stand in the referred-to relations” (1999, 12), that is, independently of the conditions of the corresponding scenario of verification. Accordingly, relations between the ‘factual referents’ of theoretical terms serve as ‘truth makers’ for theoretical statements. Feigl therefore concludes that by adopting a “semantic metalanguage” (as he could find it in the works of Tarski and the later Carnap) we are in a position to employ “a conceptual model in which statements as well as the states of affairs that render these statements true, can be represented” (1950a, 49).²⁰

5. The Empiricist Restriction. It should have become clear by now that Feigl in fact comes very close to what I have called the ‘standard account’ of scientific realism during the second half of the twentieth century. By taking truth and reference seriously, the semantic approach effectively undermines the reductive basis of phenomenalistic positivism: when theoretical assertions are at issue, they are about unobservable entities and their relations. They cannot be reduced to the observational evidence basis or to what is rationally believed or to any other epistemic feature. However, Feigl takes pains to separate his own semantic realism from traditional metaphysical realism. It is this aspect of his argumentation to which we shall turn now.

First of all, it is important to see that Feigl’s understanding of the metaphysical realist’s position is not constrained to the aforementioned intuitionist conception of reality à la Bergson, James, and Husserl. Rather, and more generally, metaphysical realism is, as Feigl points out, to be equated with the systematic statement of “transcendent, i.e., in principle untestable, assertions” (1956, 22). Interestingly, the philosophical position of the physicist Max Planck (who, by the way, was Moritz Schlick’s academic teacher) would be, according to Feigl, a typical case of metaphysical realism (see Feigl 1950b, 191; see also Feigl 1936, 54, and, sim-

20. It should be noted that by interpreting truth in a literal sense Feigl not only opposes phenomenalistic reductionism à la Russell and the early Carnap but also (although Feigl himself nowhere discusses this aspect at length) such positions like instrumentalism and fictionalism.

ilarly and paradigmatically, Schlick 1932/1979). But what, then, is Feigl's criterion of demarcation? Obviously, it is the testability of scientific, non-metaphysical, assertions. But this, in turn, provokes the question of whether Feigl's position was a realist account of science at all. The view established by Carnap (1936–37), for example, is perfectly compatible with Feigl's testability criterion. But was Carnap a realist? Rather not. So the question to be answered is how a realistic semantics, on the one hand, and the testability criterion, on the other, fit together.

Feigl puts the issue thus: "The semantic conception of reference does not justify (demonstrate) realism. It merely *explicitates* what a cautious empirical realism can legitimately mean by 'reference,' 'independent existence,' etc. If we handle our concepts responsibly, we can avoid metaphysical perplexities. No concrete existential hypothesis of ordinary life or of science is factually meaningful unless it is confirmable. The essential requirement of empiricism is thus safeguarded. But the very adoption of the *confirmability* criterion (in preference to the narrower *verifiability* criterion) allows as much realism as we are ever likely to warrant" (1950a, 50–51). It is exactly here where Feigl's indebtedness to Wilfrid Sellars comes into play. Like Sellars (1947a, 1947b, 1948/1949), Feigl thinks that "pure pragmatics" is the key for a stable connection of semantics and epistemology. Feigl explains: "The factual reference of not directly verifiable statements is to be construed in such a manner that it is semantically perfectly on a par with the factual reference of directly verifiable statements. The difference between the two may be dealt with in *pure pragmatics*" (49–50). Feigl, it must be said, is pretty unclear about the exact scope of "pure pragmatics." But the crucial point seems to be that the confirmability (or indirect testability) of theoretical statements is supposed to be secured by a network of nomological relations. "In the language of empirical science," writes Feigl, "all those terms (and only those terms) have factual reference which are linked to each other and to the evidential base by nomological relationships." And he continues: "Concepts or constructs that designate directly observable items of the world and those which do not, but are required for the coherent spatio-temporal-causal account to which science aspires are thus properly related to each other by means of the metalanguage of pure pragmatics and semantics" (50).

The idea is that pure (as opposed to descriptive, linguistic) pragmatics enables us to bridge the gap between the independent reference of theoretical terms and the requirement of their being, at least in principle, connectable with the corresponding observational evidence basis.²¹ But

21. According to Sellars himself, "a reconstruction of the pragmatics of common sense and the scientific outlook points to confirmation rules requiring a story to contain sentences that are confirmed but not verified. In this sense the ideal of our language

this, it seems, is only achievable by accepting a serious empiricist restriction. Feigl's most explicit articulation of this empiricist restriction is, I would say, the following one: "The realism here suggested allows for hypotheses only if they are at least indirectly confirmable, and for theoretical constructs only if they are part of the network which connects them with terms designating data of direct observation" (1956, 17). It is hard to imagine that Carnap or any other moderate nonrealist would have objected to this particular point. Both the holistic embedding of theoretical terms in a network of nomological relations and the connected demand of indirect confirmability on the basis of data of direct observation are perfectly compatible especially with mature—postphenomenalistic (i.e., post-*Aufbau*)—logical empiricism (see, in this respect, esp. Neurath 1932, 1935; Carnap 1936–37).

6. The Scientific Realist's Predicament. Scientific realism is the view that the theoretical entities of science exist. Atoms, forces, electromagnetic fields, and so on, are not merely instruments for organizing observational data but are real and causally effective. Therefore, the realist's position can be clearly distinguished from the instrumentalist's point of view. However, the scientific realist is usually eager to demarcate science from metaphysics. But do we not need metaphysics in order to establish a sufficiently stable form of scientific realism?

Feigl unfortunately never provided a clear answer to this question. At one place he writes: "According to the network analysis of scientific concepts and laws, the verifying evidence is to be viewed as causally related to the *evidenced* 'theoretical' entities. If this is metaphysics, make the most of it" (1956, 17). If we really make the most of it, then we will end up with a strong, abduction-based, conception of causality. But this would require an explanatory framework that tells us something about 'the world' (and its causal structure) and not just about the language we use in order to describe the world (and its causal structure). Yet, Feigl's "network analysis of scientific concepts and laws" is obviously not compatible with this requirement. For, in the last analysis, Feigl explicitly refused to enter the metaphysical arena. In his own words,

Semantic realism as I should like to see it understood, is free from the dangers of metaphysics precisely because it does *not* prescribe anything at all about the *nature* of the designata of our theoretical constructs. . . . Things are and will always be—as far as we can meaningfully talk about them—what they are confirmably *knowable*

is a realistic language; and this is the place of Realism in the New Way of Words" (1948/1949, 456). I cannot help but remark that Sellars' conception of "pure pragmatics" is even more opaque than the one delivered by Feigl.

as; and it is up to the advance of science, not to logical or semiotic analysis, to tell us what things are “really” like. But it is the task of logical analysis to tell us by means of what rules of our language we describe the objects of our knowledge, and . . . what we mean by the surplus of the *knowable* over the *known*. (1950b, 192)

It should be noted that this passage is quoted from Feigl's reply to criticisms brought forward by his logical empiricist colleagues Philipp Frank, Carl Gustav Hempel, and Ernest Nagel (the context being a symposium on Feigl's “Existential Hypotheses” [1950a]). Hempel, for instance, had argued that the notion of the reference of theoretical terms is “unnecessary” because it “can be eliminated, by means of Feigl's own criterion of factual reference” (1950, 173), namely, the systematic interconnections between theoretical statements on the one hand and observation sentences on the other. In a similar vein, Frank had objected that “after the introduction of the truth conditions a statement in the language of ‘semantical realism’ can no longer be distinguished from a statement in the language of ‘syntactical positivism’” (1950, 167). And Nagel had gone as far as commenting that “Feigl is pressing for a distinction without a difference.” “After all,” Nagel concluded, “‘pure pragmatics’ possesses magic powers no more than does ‘pure semantics’” (1950, 179).

I am of the opinion that Hempel, Frank, and Nagel are right in their criticism of semantic realism. Feigl's above-quoted reply is definitely too weak. To be sure, indirect testability (or ‘confirmability’) is important in its own way to justify our belief in the truth of theoretical assertions. But the crucial question is what makes a theoretical assertion true, if it is true. An empiricist can ignore—or better, refuse to answer—this question.²² But a scientific realist must articulate his ontological commitments. He must, in other words, say something about the ‘nature’ of the designata of theoretical terms. But this is exactly what Feigl rejected. Like Putnam, as well as the majority of scientific realists in the second half of the twentieth century, Feigl was unable or (maybe better) unwilling to see that “the semantic cart should not be put before the metaphysical horse” (Devitt 1984, 40).

However, would it not be more adequate to see in Hempel's, Frank's, and Nagel's criticism of semantic realism, on the one hand, and in Feigl's reply, on the other, a clear rapprochement of both sides? Would it, in other words, not make sense to claim that scientific realism and mature—postphenomenalistic—logical empiricism are much closer than commonly supposed? My answer is a partial yes, for the following reasons: first, there is an additional hint that clearly supports the assumption of a rap-

22. A prominent example in this respect is van Fraassen (1980).

prochement. Just as Hempel, Frank, and Nagel insinuate that logical empiricism is capable to absorb the semantic realist approach defended by Feigl, Feigl himself (1950b, 194; see also Psillos 1999, 45) refers the reader in his reply to an article by Carnap, where Carnap explicitly states: “I am using here the customary realistic language as it is used in everyday life and in science; this use does not imply acceptance of realism as a metaphysical thesis but only of what Feigl calls ‘empirical realism’” (1945, 528). This suggests a large agreement within the logical empiricist camp, especially since Carnap, at another place, repeats his ‘realist commitment’ by pointing out that “a closely related point of view on these questions [concerning the decision of accepting or rejecting kinds of entities]” (1950/1956, 214 n. 4) could be found in Feigl (1950a). In short, the programmatic statements of the later—postsyntactical—Carnap can be interpreted as an indicator of the compatibility of logical empiricism and semantic-scientific realism.²³

My second reason for claiming a close programmatic connection between mature logical empiricism and its putative rival, scientific realism, is rather indirect, having to do with the development of Putnam’s philosophical position. As is well known, Putnam, in the late 1970s, converted to what he called ‘internal’ realism, which he contrasted with ‘metaphysical’ realism (see Putnam 1978 and, esp., 1981). This internal realism was prefigured by the semantic impetus of his 1975 original approach toward the scientific realism issue (see sec. 4). Putnam now, in the late 1970s and early 1980s, obviously realized that when reference and truth are the leading concepts in the context of defending scientific realism, then we are not in a position to formulate a language-independent realm of on-

23. Thus, it is no wonder that Carnap declares, “If ‘realism’ is understood as preference for the realistic language over the phenomenal language, then I am also a realist” (1963, 870). What he (as well as Feigl) explicitly rejects, however, is ‘realism’ “as an ontological thesis,” that is, metaphysical realism. Yet, it is fairly irritating that Carnap continues on by stating that “Reichenbach gave to the thesis of realism an interpretation in scientific terms, as asserting the possibility of induction and prediction; a similar interpretation was proposed by Feigl. On the basis of these interpretations, the thesis is, of course, meaningful; in this version, it is a synthetic, empirical statement about a certain structural property of the world” (870). This is irritating because Feigl criticized Reichenbach for his attempt to justify the thesis of realism on inductive (probabilistic) grounds (see Feigl 1950b, 54; see also Feigl 1950a, 195). According to Feigl (as well as according to Carnap), the introduction of a framework can only be justified on pragmatic (rather than on inductive) grounds. Therefore, Feigl’s understanding of the realist thesis must not be lumped together with Reichenbach’s. Like Carnap, Feigl thought that the decision for a certain framework is a question that cannot be answered directly by the empirical (“synthetic”) methods of the inductive sciences. Rather, the justification of the realist framework entails, according to Feigl, the invocation of “a *relative or pragmatic a priori*” (1954/1981, 97).

tology. There is, in the later Putnam's (Kantian-inspired) words, no "*externalist* perspective" or "God's Eye point of view" (1981, 49). He therefore argues for an "*internalist* perspective," thereby implying that "*what objects does the world consist of?*" is a question that only makes sense to ask *within* a theory or description" (49). From here it is only a short step back to the logical empiricists' position of the 1950s. Carnap's (1950/1956) conception of 'linguistic frameworks' as well as Feigl's defense of semantic realism are of greatest relevance in this respect. For both—for Carnap and for Feigl—ontological questions (and their answers) are fundamentally dependent on a preceding conventional decision concerning the choice of an appropriate 'frame'. Here is how Feigl puts the point: "Only after the introduction of the realistic frame can we legitimately argue inductively either from the theory to the outcome of as yet unperformed experiments; or vice versa from the results of experiments to *specific* postulates of the theory. But the presupposed introduction of the realistic frame, i.e., the semantic-realistic interpretation of the theory, is a step that can be justified only instrumentally: It furnishes the very possibility of a theory that is inductively fruitful" (1950b, 195). In a similar vein, Carnap (1950/1956) famously argued that what he called 'external' questions does not fall in the range of abstract theorizing but is rather a matter of practical decision.²⁴

What does all this mean? The best specification of this question is given by Psillos: "How threatening to the cogency of the realist position is Feigl's claim that the choice of the framework of empirical realism is ultimately conventional?" (1999, 46). On Feigl's view, we have to make a choice concerning the frame. This choice is guided by conventions and therefore, in the last analysis, a practical matter. I would say that this is rather a pragmatist than a full-blown realist approach to questions of ontology. Moreover, Feigl's—like Carnap's—understanding of what it does mean to choose the realist framework is driven by a conception of philosophy as a certain form of "conceptual engineering" (Richardson 2007, 304). In

24. Or in Carnap's own words, "To be real in the scientific sense means to be an element of the system; hence this concept cannot be meaningfully applied to the system itself. Those who raise the question of reality of the thing world itself have perhaps in mind not a theoretical question as their formulation seems to suggest, but rather a practical question, a matter of a practical decision concerning the structure of language. We have to make a choice whether or not to accept and use the forms of expression in the framework in question" (1950/1956, 207). It should be noted that, as concerns the framework conception, Carnap's systematic perspective was broader than that of Feigl. While Carnap's (1950/1956) account pertains to the reality of the external world (or "thing world"), Feigl's (1950a, 1950b) account pertains exclusively to the reality of theoretical entities. Nevertheless, the programmatic aim and argumentative strategy were nearly the same.

the case of Carnap, this conception entailed the attempt to replace questions like “Do theoretical entities really exist?” with the question of whether we should prefer a realist “thing language” or (for example) a phenomenalist “language of sense-data” (see Carnap 1950/1956, 207). For Carnap, the realist “thing language” turned out as the more practical one, and he thus recommended to choose the realist framework not because he was convinced that theoretical entities exist but because of an essentially pragmatic attitude toward the questions of ontology. Feigl, however, was not so explicit at this point, but in fact his principal motives were, as we have seen, quite the same as the ones underlying “Carnapian pragmatism” (Richardson 2007). As concerns the question raised by Psillos, I would say that a ‘pragmatized’ form of realism is a fundamentally unstable form of realism. But this, I guess, is the price one has to pay for adopting the ‘internalist point of view’.²⁵

In a broader perspective, I think it is fair to conclude that scientific realism was, in the second half of the twentieth century, to a very considerable extent, a consequence of the ‘linguistic turn’. By focusing on the structure of language, the scientific realists neglected to account for the structure of the world, and I am of the opinion that this is a result of their largely ironic indebtedness to the logical empiricist movement. However, the recognition that scientific realism as semantic realism must necessarily remain unstable is, with the exception of certain ‘Australasian intuitions’ (cf. Devitt 1984), rather new within the realist camp: it is part of a more comprehensive ‘renaissance of metaphysics’ (see, in this respect, e.g., Zimmerman 2004; Chakravartty 2007; Ladyman and Ross 2007; Williamson 2007; Zahar 2007; Esfeld 2009). This ‘renaissance of metaphysics’ seems to imply a retrogression from semantic-scientific realism to what may be called a ‘metaphysical-scientific realism’.²⁶ Herbert Feigl would not have accepted this U-turn away from the linguistic turn; however, his contribution to the scientific realism debate is of fundamental importance to our understanding of what is going on today.

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25. No wonder, then, that the later Putnam’s ‘internal realism’ was explicitly denied to be a form of scientific realism at all. See, e.g., Hacking (1983), chap. 7.

26. For reasons of fairness, it should be added that metaphysics, in the context of the newest contributions to the scientific realism debate (see, in this respect, esp. Ladyman and Ross 2007; Esfeld 2009), has the character of a scientifically grounded ‘inductive’ (or ‘naturalized’) metaphysics and is therefore not to be confused with speculative *Naturphilosophie* in the sense of Hegel and Schelling.

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