

Fictionalism

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One can [say] that the atomic system behaves "in a certain relation, 'As If' . . ." and "in a certain relation, 'As If' . . .," but that is, so to speak, only a legalistic contrivance which cannot be turned into clear thinking.

Letter from E. Schrödinger to N. Bohr, October 23, 1926

Over the last few years the realism-antirealism debate has produced a few arguments (see Fine 1986) and a somewhat larger number of epithets. The residual realist groups, while divided among themselves into competing factions, are still set against views generically labeled antirealist. These antirealist views are (sometimes) differentiated as being empiricist, constructivist, instrumentalist, verificationist, or one of the three 'P's—phenomenalist, positivist, or pragmatist; and so on. When an especially derisive antirealist label is wanted, one can fall back on the term "fictionalist," coupled with a dismissive reference to Vaihinger and his ridiculous philosophy of "As If."¹ But what is "fictionalism" or the philosophy of "As If," and who was this Vaihinger?

1. SCHEFFLER'S FICTIONALISM

Within the standard literature in the philosophy of science (excluding the philosophy of mathematics²) Israel Scheffler (1963) contains perhaps the last extended discussion of a position called "fictionalism." In the context of exploring the problems and resources of a syntactical approach to scientific theories, especially the problems of the significance and justification of theoretical terms, Scheffler distinguishes between a Pragmatic Attitude (or pragmatism) and a Fictionalist Attitude (or fictionalism). Pragmatism takes the existence of effective and systematic functional relations as sufficient for rendering discourse significant, that is, capable of truth or falsity. Thus pragmatism, in Scheffler's terms, holds that there may be a language which is significant throughout and

also capable of expressing all of science. Fictionalism, by contrast, employs some criterion of intuitive clarity as necessary for significant discourse. Where this criterion is not satisfied we have a "fiction."

One kind of fictionalism is *eliminative*; it seeks to eliminate and/or to replace the fictional part of scientific discourse. The eliminative project is to construct a language that is thoroughly significant and also capable of expressing all of science. The unreconstructed language of science will not do. Another kind of fictionalism is *instrumentalist*. Instrumentalism withholds the language of truth, evidence, and belief from the fictional part of science, but holds that considerations relating to interest and utility are nevertheless sufficient for retaining that fictional component. Thus instrumentalism would suppose that any language capable of expressing all of science has a fictional (i.e., nonsignificant) component. On this view there is not much difference between pragmatism and instrumental fictionalism except over the question of whether significant discourse has to be intuitively clear. What is more important is that they both would tolerate discourse that fails to meet the criterion of clarity, provided the discourse were suitably functional.

Scheffler's discussion of fictionalism is bound to the 1960s project of telling a philosophical story about the regimentation of science as a whole. Specifically, it is tied on to that project's preoccupation with the syntax of the regimentation and the problem of meaning for so-called "theoretical terms." Thus Scheffler redrafts the concepts of pragmatism, instrumentalism, and fictionalism to suit his global, syntactic approach and his meaning-related needs. Those familiar with the American pragmatism of Peirce or James, or with the instrumentalism of Dewey, will find that Scheffler's terminology points at best to shadows of fragments of the originals. The same is true with respect to the fictionalism that was Hans Vaihinger's.

2. VAIHINGER AND LOGICAL POSITIVISM

We can begin to appreciate the importance of Vaihinger and his fictionalism for the philosophy of science by looking at the connection with the Vienna Circle that formed around Schlick, Carnap, and Neurath in the 1920s and the similar "Vienna Circle" of a decade earlier, also involving Neurath, along with the mathematician Hans Hahn and the physicist Philipp Frank. The term "logical positivism" became the catch word of the movement represented by these circles (and also the Berlin group around Reichenbach) following the article with that title by Blumberg and Feigl (1931). But that term did not originate in the manifestos of Neurath, nor in the writings of other dominant figures associated with these circles. Rather, as Philipp Frank notes (1949, 43) the first use of "logical positivism" comes from Hans Vaihinger's (1911), *The Philosophy of "As If."*³

Vaihinger described his philosophy using a number of different terms including *critical positivism*, *idealistic positivism* and also (163) *logical positivism*. Here the modifier "logical" (as also "idealistic") refers to a logic:

or mental construct and the “positivism” insists on there being a suitable observational or experimental demonstration before one associates any reality with the construct. In describing his view as a kind of positivism, Vaihinger was trying to associate himself with an empiricist approach to positive, scientific knowledge and to disassociate his view from rationalism or Platonism; indeed, from any view that would presume some reality to correspond to whatever the mind logically constructs. Thus the logical positivism that Vaihinger introduced was an anti-metaphysical position of the same general kind as the logical positivism (or empiricism) usually associated with Vienna. Despite this similarity of philosophical orientation, however, Vaihinger is seldom cited by the Vienna positivists as a precursor, and never as an ally. To the contrary, as with today’s realists, the writings of the logical positivists generally contain only the most curt and disparaging references to Vaihinger’s central ideas.

Thus in Schlick’s (1932) well-known reply to Max Planck’s attack on Machian positivism, Schlick writes “if . . . Hans Vaihinger gave to his ‘Philosophy of As If’ the subtitle an ‘idealistic positivism’ it is but one of the contradictions from which this work suffers” (Schlick, 85). At the end of that essay Schlick says explicitly that the logical positivism to which he subscribes “is not a ‘Theory of As If’ (Schlick, 107).⁴ With these faultfinding remarks Schlick attempts to distance the Vienna school from Vaihinger, and misleadingly identifies Vaihinger’s “idealistic positivism” and his “As If” as a species of idealism, rather than as marking a positivist or empiricist attitude toward *ideas*. Similarly, Philipp Frank, who acknowledges Vaihinger’s view as “the school of traditional philosophy that was nearest to [Vienna positivism] in spirit and in time” (Frank, 1949, 42), is still at pains to distinguish the two, which he does by denigrating Vaihinger as having a “complete lack of understanding” of what Frank regards as the important distinction between a coherent conceptual system and the operational definitions that connect it with the world of facts (Frank, 42–43). One can hardly read these protestations of the significant differences between Vaihinger and the logical positivists without getting a strong feeling that, indeed, they protest too much.

3. VAIHINGER AND THE PHILOSOPHY OF “AS IF”

Hans Vaihinger was born in Nehren, Württemberg in 1852. He received a religious and philosophical education at Tübingen and then did postgraduate work at Leipzig, where he also studied mathematics and natural science. He was Professor of Philosophy at Halle from 1884 until 1906, when he had to resign his position due to failing eyesight. He died at Halle in 1933. His *Philosophy of “As If”* first took shape as his dissertation of 1877. It was not published, however, until 1911. Vaihinger says that earlier he considered the time for it not ripe. The book is subtitled “A System of the Theoretical, Practical and Religious Fictions of Mankind” and the central topic of the whole work is an account of what Vaihinger calls “fictions” and “fictive judgments.”

The book underwent extensive revisions and extensions in a very large number of editions. The sixth edition was translated into English by C. K. Ogden in 1924, with a second English edition in 1935, and several reprintings thereafter. In 1919 Vaihinger (and Raymund Schmidt) initiated the *Annalen der Philosophie*, a journal originally devoted entirely to the philosophy of “As If,” and also committed to fostering interdisciplinary contributions, especially from the special sciences. The positivist Joseph Petzoldt joined as a third editor in 1927. By 1929, with Vaihinger blind and Schmidt effectively in control, the *Annalen* had fallen on hard times. After prolonged and delicate negotiations, the journal was taken over by Carnap and Reichenbach, to be reborn as *Erkenntnis*, the official organ of the logical positivist movement.⁵ Earlier Vaihinger had founded *Kantstudien*, still today a leading journal for Kant scholarship. In addition to his “As If,” Vaihinger wrote a well-known, two volume commentary on Kant’s first critique, where he developed the so-called “patchwork thesis” that distinguishes four layers relating to the subjective sources of knowledge in the Transcendental Deduction. He also wrote a work on Nietzsche and completed several other philosophical studies. Vaihinger is usually regarded as a neo-Kantian, although his reading of Kant was very idiosyncratic. For example, where Kant generally considers scientific principles as providing the possibility of objective knowledge (i.e., as constitutive) for Vaihinger in large measure (although not totally) scientific principles are fictions, functioning as regulative ideals. Overall, Vaihinger’s work, in fact, shows a strong British influence—especially due to Berkeley on the philosophy of mathematics and Hume on impressions and the imagination. We shall see that, in many respects, Vaihinger is closer to American pragmatism than to the transcendental idealism of Kant. Indeed, Ralph B. Perry, and other keepers of the pragmatic tradition, identify Vaihinger, Williams James, and Poincaré as leading pragmatist thinkers of their era.⁶

Thus, despite its current eclipse, in his own time Vaihinger’s fictionalism was widely known and, like the related work of Mach and Poincaré, it had its own strong following. Moreover, judging by the overall reaction, I am inclined to think that the impact of Vaihinger’s work then was not unlike the impact of Thomas Kuhn’s work in our time. In the 1960s and 1970s most philosophers of science reacted to Kuhn with strident criticism. The response of their logical positivist forbearers to Vaihinger, as we have seen, displayed a similarly hostile tone. Today, however, notwithstanding that critical rejection, most English-speaking scientists, and commentators on science, are familiar with Kuhn’s basic ideas about “paradigms” in science and freely employ his language. The same was true of German-speaking scientists and commentators with respect to Vaihinger’s fictions and his language of “As If” up until the Second World War.⁷ (Note, in the epigraph, Schrödinger’s use of the “as if” idiom and his only slightly veiled reference to what Vaihinger called “legal fictions.”) Except in discussions of legal philosophy,⁸ however, Vaihinger did not survive the intellectual sea change that followed the war and restructured the philosophical canon. What I should like to do here is to review the main

features of Vaihinger's work on fictions and then focus on a few central issues, showing their relevance to contemporary science and discussions in the philosophy of science.

4. FICTIONS

Vaihinger's general concern is with the role of fictional elements (or "fictions") in human thought and action. He begins with an elaborate classification of these elements and proceeds to illustrate their variety and use in virtually every field of human endeavor that involves any degree of reflective thought. Thus he illustrates the use of fictions in economics, political theory, biology, psychology, the natural sciences, mathematics, philosophy, and religion. Vaihinger acknowledges earlier treatment of fictions by Jeremy Bentham and he completes the survey by examining related conceptions that he finds in Kant, Forberg, F. A. Lange, and finally in Nietzsche. This survey is designed to achieve an effect. Vaihinger is trying to show that fictions are everywhere, that fictive thinking (like deductive and inductive thought) is a fundamental human faculty, and that—however dimly or partially—the importance of fictions has been recognized by the great thinkers. The extent to which Vaihinger's work was consumed by the philosophical public is evidence that, in good measure, he achieved the desired effect. Even his critics, like Morris R. Cohen in this country (see section 6, below), had to admit that Vaihinger had succeeded in getting people to realize the importance of fictions—reluctantly, even in science.

Vaihinger uses the term "fiction" loosely, sometimes for concepts and sometimes for propositions. He begins his account by distinguishing what he calls "real" or "genuine" fictions from what he calls "semi-fictions." Real fictions are characterized by three features: (1) they are in contradiction with reality, (2) they are in contradiction with themselves, or self-contradictory, and (3) they are generally understood to have these features when they are introduced. The semi-fictions satisfy (1) and (3) but not (2); that is, they are generally understood to be in contradiction with reality, but are not also self-contradictory. Following what one might call the Puritan principle,⁹ Vaihinger also distinguishes between virtuous and vicious fictions, those that are scientific and those that are unscientific. The scientific fictions are an effective means to certain ends; they are useful and expedient. Where this utility is lacking the fictions are unscientific. An example of the unscientific kind would be the introduction of a so-called "dormative power."

The two primary examples of virtuous and real fictions with which Vaihinger begins are atoms and the Kantian "thing-in-itself." With respect to atoms his problem seems to be the difficulty of reconciling the conception that he takes from Cauchy, Ampère, and others, that atoms are centers without extension, with the idea that they are also the substantial bearer of forces. Vaihinger regards this as "a combination . . . with which no definite meaning can be connected" (219) and so, presumably, as contradictory. Moreover, since he thinks that the idea of a vacuum is itself contradictory (following Leibniz here) the fact that

there is supposed to be a vacuum between atoms further implicates the atom in contradictions as well. Still, Vaihinger recognizes the usefulness of the chemical atom, for example, in organizing chemical combinations by definite proportions; hence the expedient and scientific nature of the atomic fiction. I will pass over the “thing-in-itself” to give some examples of semi-fictions.¹⁰ Vaihinger suggests that in eighteenth-century France the limitations and inaccuracies of Cartesian vortex theory were already known, at least to some, yet it remained a useful way to organize the motions of bodies. This may not be a very good example, since it is not clear that anyone ever understood how vortex theory was supposed to work. (So maybe this fiction is not scientific at all!) But then Vaihinger also calls attention to the status of Ptolemaic astronomy, the limitations of which he says were known by Arab scholars in the Middle Ages. Still, the Ptolemaic system was a useful (and so scientific) way to deal with the heavens—and so a scientific (semi-) fiction. Both of these examples are of what Vaihinger calls “heuristic” fictions, and they may help us understand what Vaihinger means when he says that a fiction is in contradiction with reality; namely, that it is in some measure not true to what it purports to refer. It is not so easy to understand what he has in mind, however, when he regards the genuine fictions as involving a self-contradiction. More on this shortly. First let me run through some of the fundamental distinctions that Vaihinger develops.

To begin with he classifies fictions into ten primary kinds, with a few subkinds.

1. Abstractive
2. Of the Mean
3. Schematic
 - Paradigmatic, Rhetorical, Utopian, Type
4. Analogical
5. Legal (Juristic)
6. Personificatory
 - Nominal
7. Summational
8. Heuristic
9. Practical (Ethical)
10. Mathematical

Generally the name that he uses indicates the salient fictional feature. For example, abstractive fictions neglect important elements of reality. Thus we have Adam Smith’s assumption that all human action is dictated by egoism which looks at human action as if the sole driving force were egoism; or the treatment of extended bodies as if all their mass or gravity were concentrated at a point—and so the fictions of point masses and centers of gravity. Another abstractive fiction is what we would call the fiction of Robinson Crusoe worlds. This treats language as if it developed in worlds containing only a single individual. Vaihinger, however, holds to a social conception of language which makes this idea of a private language quite impossible of realization. Other

kinds of fictions yield similar examples. These ten categories are not disjoint. Thus a personificatory fiction involves an analogy to a person, as in God the father, but this is also an analogical fiction. There are countless other overlaps as well. Nor is it clear whether this list is intended to be complete; presumably not, since for Vaihinger even the Kantian categories are not to be regarded as fixed.

Vaihinger does suggest, however, that as we move down the list we are likely to move away from semi-fictions and toward the genuine thing. By the time we get to mathematics, with its various number systems, and the limiting geometrical concepts of points, lines, surfaces—not to mention the fluxions and differentials of the calculus—we have arrived at a really fictional realm. Echoing Berkeley (and Dewey) Vaihinger writes, “Mathematics, as a whole, constitutes the classical instance of an ingenious *instrument*, of a *mental expedient* for facilitating the operation of thought” (57).

I have remarked that Vaihinger has a dynamic view of categories and classifications (as did later neo-Kantians like Cassirer, Reichenbach, and even Einstein). For example, at one point he says that the distinction between semi-fictions and genuine fictions is not stable in time. Often we learn that what we took for a contradiction with reality also involves a self-contradiction, so the semi-fictions may become real ones. Of greater importance for him is the distinction between hypotheses and semi-fictions,¹¹ for where we talk of Descartes’s vortices or Ptolemaic astronomy (or Newton’s laws, for that matter), it may seem that we are concerned with hypotheses and not with fictions at all. Vaihinger recognizes that when a scientific idea is first introduced we may not know whether it is a fiction or a hypothesis. We may begin by believing it to be the one and learn later that it is the other. What is the difference?

For Vaihinger, hypotheses are in principle *verifiable* by observation. We choose among hypotheses by selecting the *most probable*. In this way we *discover* which are true. By contrast, fictions are *justifiable* to the extent to which they prove themselves useful in life’s activities; they are not verifiable. We select among fictions by choosing the most expedient with respect to certain ends. (He does not say that we maximize utility nor use Reichenbach’s notion of *vindication*, but he might have.) Finally, fictions are the product of human invention; they are not discovered. In this connection he would have us contrast Darwin’s hypothesis of descent with Goethe’s schematic semi-fiction of an original animal archetype.

Showing his scientism, Vaihinger suggests that Goethe’s fiction “prepares the way” for Darwin (86), whose conception of evolution and the survival of the fittest is in many ways the linchpin for Vaihinger’s whole system. That system treats human thought functionally, as an evolving biological phenomenon driven by the struggle for existence. In the introduction, prepared specially for the Ogden translation, Vaihinger writes, “[A]ll thought processes and thought-constructs appear a priori to be not essentially rationalistic, but biological phenomena. . . . Thought is originally only a means in the struggle for existence and to this extent a biological function” (xlvi). Here Vaihinger

shows his engagement with Nietzsche, and the will to power, just as similar evolutionary commitments expressed by John Dewey show his engagement with Hegel.

5. WOULD IT BE A MIRACLE?

Throughout the whole discussion concerning a shift in status between hypotheses and fictions Vaihinger proceeds, as a constructivist might, without attending to the difference between something *being* an hypothesis or *being* a fiction, and our *believing* it to be so. He also does not face up to the question of what becomes of a false hypothesis; does that make it a fiction?

This much is clear. If we knowingly retain a false but useful hypothesis, we have a fiction. The informed use, for example, of Galileo's law of free fall, which postulates a constant gravitational attraction, to calculate free-fall time (or distance) would amount to a fiction, since gravity is not really constant. Similarly with the law of the simple pendulum, the perfect gas law, and so on. In all these cases where local approximations are used, in Vaihinger's terms we have a fiction. In the case of the perfect gas law, we may even have a genuine fiction.

In highlighting the idealizations and approximations commonly used in modeling physical phenomena, Vaihinger's central concern is to undo the opinion that if constructs are devoid of reality they are also devoid of utility. Put the other way around, Vaihinger regards the inference from utility to reality as fundamentally incorrect. Thus, despite his pragmatic emphasis on thought as a tool for action, he wants to distinguish his position from the Jamesian form of pragmatism that regards truth to be whatever turns out to be "good" by way of belief, for all the scientific fictions satisfy this formula. On the other hand, what concerns him more is to demonstrate, by the sheer number and range of his examples, that the inference from scientific success at the instrumental level to the literal truth of the governing scientific principles is thoroughly fallacious. I would conjecture that part of the revolutionary impact of Vaihinger's work, and a source of some antagonism to it, was to wean his generation away from what we now call the explanatory argument for realism, or (what Putnam, I believe, dubbed) the "wouldn't it be a miracle argument." As Vaihinger puts it, "Man's most fallacious conclusion has always been that because a thing is *important* it is also *right*" (69). Vaihinger was concerned that we see through this way of thinking not only in the scientific domain, but more importantly when it comes to religion. For Vaihinger took the idea of God, and the related conceptions of salvation, judgment, immortality, and the like, as fictional (indeed as genuine fictions) and yet of supreme importance in our lives, arguing that this was Kant's way too. In this area, as in the scientific, what Vaihinger preached was critical tolerance, and not skepticism.

Vaihinger, then, offers no general method, no magic criterion, that will enable one to tell whether a construct corresponds to reality or whether : principle is a hypothesis. To the contrary, his examples show that favorite:

of the realism game (in his time and ours), like fertility or unifying power, are not a reliable guide. Each case has to be looked at on its own, and only time and sensible judgment will tell, if anything will. Vaihinger does, however, suggest a rule of procedure. Namely, that we begin by supposing that we are dealing with a fiction and then go from there. Thus Vaihinger would put the burden of proof on the non-fictional foot. Part of what dictates this strategy is Vaihinger's view that we generally find it hard to tolerate the ambiguity and resultant tension that comes from acting on what we acknowledge to be a fiction. There is, he thinks, a natural psychological tendency to discharge this tension (and achieve "equilibrium") by coming to believe that some reality may actually correspond to our useful fictive constructs—"the *as if* becomes *if*"(26). Intellectual integrity, however, requires that we recognize the tendency to believe too readily and suggests a countervailing strategy to help keep us honest. Intellectual growth of the species requires that we come to terms with the tension and learn to tolerate the ambiguity. As with the historic changes that involve a public understanding of the functions and abuses of social and religious dogma, to acknowledge fictive thinking and adopt the strategy of placing the burden on the realist foot would also be a move toward liberation. Although Vaihinger never makes reference to James's will to believe, it is clear that he would have opposed it.

6. CONTRADICTIONS AND GENUINE FICTIONS

There is a sliding line between hypotheses and the semi-fictions. But the genuine fictions are something else, since they are supposed to involve a contradiction and so could not possibly be exemplified in nature. It is this conception of Vaihinger's that has generated the most controversy. M. R. Cohen simply asserts that "in every case the claim of self-contradiction rests on positive misinformation." Indeed, Cohen believes this must be so for otherwise, "no fruitful consequences could be drawn from them [i.e., the so-called genuine fictions] and they would not have the explanatory power which makes them so useful in science" (Cohen 1923, 485).

There are, I think, two related problems here. The first is how the use of a contradiction could be fruitful. The second problem concerns what it means to treat something "as if" it had contradictory properties. Thus the first issue, say for the fiction of atoms, is how they could be useful in treating chemical compounds. The second concerns what it means to treat matter as if it were composed of atoms, when the very concept of an atom is supposed to be contradictory.

These problems are not new, and certainly not peculiar to Vaihinger. For instance, in the realm of mathematical entities, Vaihinger acknowledges the lead of Berkeley who held that it was impossible for lines and figures to be infinitely divisible. Yet Berkeley also held that the applicability of these geometrical notions required that we speak of lines on paper, for example, as though they contained parts which they really do not; i.e., that we treat them

as though they were divisible. This is precisely Vaihinger's "as if," marking in this case a genuine fiction.

Cohen's way of dealing with these problems is by denial. That is, he just takes it as given that nothing fruitful could be obtained from a contradiction, and that no sense attaches to treating something "as though" it had contradictory properties. (Beineberg: "It's as though one were to say: someone always used to sit here, so let's put a chair ready for him today too, even if he has died in the meantime, we shall go on behaving as if he were coming." Törless: "But how can you when you know with certainty, with complete mathematical certainty, that it's impossible."¹²) Cohen concludes that Vaihinger's examples of genuine fictions, insofar as they are useful, *must* all be mistaken. At best, they are all semi-fictions. This conclusion is drawn too quickly, and apart from the brief examination of one case (that of $\sqrt{-1}$, which is the subject of the parenthetical dialogue) Cohen offers no argument whatsoever for it.

Vaihinger is well aware of the tendency to see difficulties here, which he describes as a "pardonable weakness" (67). Again he refers to the "psychical tension" that may be created by the "as if" (83). (Törless: "[I]t's queer enough. But what is actually so odd is that you *can really* go through quite ordinary operations with imaginary or other impossible quantities, all the same, and come out at the end with a tangible result! . . . That sort of operation makes me feel a bit giddy.") In mathematics, especially, the use of genuine fictions, according to Vaihinger, requires that we compensate for the contradiction by what he calls (109 f.) the method of "antithetic errors." Vaihinger repeats Berkeley's slogan that "thought proceeds to correct the error which it makes" (61). After drawing what Vaihinger calls "the necessary consequences" the impossible fictional premise just drops out, like the middle term in a syllogism. (Beineberg: "Well, yes, the imaginary factors must cancel each other out in the course of the operation. . . .") We use the "as if," Vaihinger also says, to construct a scaffolding around reality which we then cast off when its purpose has been fulfilled (68–69). (Compare, Törless: "Isn't that like a bridge where the piles are there only at the beginning and at the end, with none in the middle, and yet one crosses just as surely and safely as if the whole of it were there?")

With these various caveats, Vaihinger is not trying to explain how contradictions can be fruitful, so much as to reject the idea that some one generic explanation of their fertility is required. (Beineberg: "I'm not going to rack my brains about it: these things never get one anywhere.") He only wants to help free us from the idea that fictional thought is diseased, and that "impossible" concepts are somehow beyond the rational pale. This practice is not much different from what Wittgenstein came to later. Like the later Wittgenstein Vaihinger thinks if we keep in mind our human purposes we will see that by and large our ordinary ways of thinking, which involve a large amount of fictive activity, are all right. (He does remark that the wish to understand the world *a whole* is childish, because when we apply the usual categories outside of their customary home in human experience they engender illusory problems—like

that of the purpose of it all (172–73). Language on holiday?) Thus Vaihinger tries to slip out of the knot posed by the use of contradictions without suggesting a general answer to the sense of the “as if,” when a contradiction is involved, or proposing a theory to answer the Kantian question of how genuine fictions could be useful.

What Vaihinger seems to be suggesting is that one ought to reject these questions about contradictions. Instead of pursuing these, “how is it possible that” questions, simply pay detailed attention to reflective practice and notice how fictions are actually used. This optimistic naturalism is tutored by the fruitful history of a long (and, arguably, inconsistent) mathematical practice in the use of infinitesimals. The lesson that Vaihinger takes from this history is that we human animals learn by practice what can be done in a particular domain, and what must be avoided, in order to obtain results that are useful for our purposes. These days one could point to the (inconsistent) use of delta functions in quantum calculations (despite their *ex post facto* rationalization in terms of Schwartz distributions), or the hierarchy of classifications that allow for the cancellation of infinities (antithetical errors!) in quantum field theory. So what Vaihinger suggests, by example, is that we ought not demand a general theory concerning the fruitful use of contradictions as such. It is sufficient to attend to the variety of successful practices, each of which, literally, shows how it is done.¹³

Although no logic of the use of contradictions comes out of Vaihinger’s procedures, there is a conception of rationality. The picture that Vaihinger suggests is that human thinking is circuitous and will try many “roundabout ways and by-paths” (xlvii) to find something that works. Rationality, then, simply constrains this activity by imposing the general criterion of fertility. As John Dewey put it, “To suggest that man has any natural propensity for a reasonable inference or that rationality of an inference is a measure of its hold on him [is] grotesquely wrong” (Dewey 1916, 425). For Vaihinger and Dewey, there is no pre-established harmony between rationality and reality. Rather, rationality is a canon which we assemble bit by bit from experience in order to check our propensity for varied and erroneous inference.

7. ALLIES AND DIFFICULTIES

Once the new positivism took a sharply logical turn (in the hands of Schlick and, more especially, Reichenbach and Carnap) it is not difficult to understand logical positivism’s impatience with Vaihinger. His distinctions are many (I count thirty types of fictions, but that is probably not all) and scarcely crisp. Indeed, one can readily picture his relaxed tolerance toward the use of contradictions driving Carnap to distraction, all by itself—as Wittgenstein’s similar attitude seems to have done. One wonders, however, about Neurath who always had more historicist leanings. Neurath’s work shares several aspects with Vaihinger’s, including: (1) a community or social conception of language, which Neurath began to champion in the period when Vaihinger’s book was first

published, and which Neurath later urged on Carnap, (2) Neurath's opposition to "pseudo-rationalism," what we today would describe as a penchant for global meta-narratives about science—his charge against Popper's falsificationism and also against the generalizing thrust of his positivist colleagues, (3) Neurath's naturalism, which made taxonomy part of his philosophical practice, i.e., recording, classifying, and (provisionally) accepting the beliefs and behavior of scientists, repairing the boat while at sea, and (4) Neurath's pragmatic tolerance for the use of expedient means and his positive inclination to find some good in each among competing scientific ideas.¹⁴

Like Neurath, in this positive inclination, I have been trying to emphasize the good things in Vaihinger, in part by way of trying to understand what made his work of such interest in its time. In so doing, however, I need to acknowledge that there are difficulties in Vaihinger's work beyond his fuzziness. Two are conspicuous. One is that Vaihinger frequently relies on secondary sources in place of giving his own, original analysis. This problem stands out, as Cohen suggests, in the rationale he provides for the alleged contradictions in his examples of genuine fictions. For example, a case can be made to sustain Vaihinger's judgment that the number systems constitute genuine fictions, but not by citing Berkeley, or others, without supplementing that with more analysis than Vaihinger himself provides (for he does provide some). A second prominent difficulty is the way in which Vaihinger sets his discussion of fictive judgments in the context of a universal psychologicistic logic. Although he is careful to avoid the conception of the mind as a substance, opting for a more behaviorist picture, he does advance the idea that there is a general set of individual, associationist mechanisms involved in the production of fictions. Indeed he sketches some, including a "law of ideational shifts" (124 ff.). Clearly the conception of a special psychological faculty for fictive judgment suited his purpose of promoting the value (indeed the necessity) of fictions, and it outweighed his otherwise sensible resistance to proposing perfectly general theories. No doubt, quite apart from Vaihinger's special interest, the idea of universal mechanisms of cognition is also independently appealing. In Vaihinger's time (as in our own), few managed to break free of this sort of psychologism. Vaihinger was not one of them.

There is a third charge against Vaihinger, and the one most frequently encountered. It is that, besotted by the topic of fictions, he simply saw them everywhere (forces, atoms, the classical laws of motion, virtually all of mathematics—not to mention substance, free will, God, and so on) and that, taken to its logical conclusion, his system actually demands this. Concerning this latter charge, consider his distinction between hypotheses and fictions. That depends on contrasting discovery (hypothesis) with invention (fiction), verification (hypothesis) with utilitarian justification (fiction). But why, one might ask, should we take these contrasts as anything more than fictional themselves, as useful expedients in the labor of the mind?¹⁵ What gives the question its bite is that Vaihinger provides no firm grounds for sorting and grading into fictional versus nonfictional. It is part of his own scheme that

there are no general answers to such questions; that is, answers that can be derived from general subject-neutral principles. His answer about how to grade and sort, if there is one, has to be narrowly tailored, topic specific, and historicist. That is what his system demands. To charge, on that account, that Vaihinger has no answer and that therefore we are free to assimilate all thought to fiction is to impose on Vaihinger the nihilistic standard according to which if a question cannot be answered on the basis of perfectly general principles, then we are free to answer it just how we please. Since Vaihinger's whole enterprise stands in opposition to this nihilism, however, this is not an appropriate standard for the interpretation of his work. Thus, instead of showing up a deep flaw in Vaihinger, this objection exposes the tenacity with which one can cling to misplaced presuppositions about generality. This nicely illustrates what Vaihinger calls "the preponderance of the means over the ends" (which we know as Parkinson's Law). In this case, that preponderance accounts for how generality, a means to certain ends, gets displaced in the course of time into an end-in-itself. The remaining charge, that Vaihinger simply finds altogether too many fictions, has, of course, to be carefully defended and responded to on a case by case basis. Vaihinger would ask no more, nor should we damn him on the basis of anything less.

8. VAIHINGER'S REPUTATION

Despite its moderately historical veneer, my treatment of Vaihinger has been rather unhistorical. I have not asked who his readers were, with what themes of theirs his work resonated, into what larger cultural phenomena, trends, and institutions it fit, and so on. Moreover, although I believe that Vaihinger's ideas on fictions were widely influential and I can readily point to similar ideas similarly expressed over a broad intellectual terrain, I have not really traced the vectors by virtue of which those ideas were spread there. Similar social-historical work needs to be pursued to understand why Vaihinger fell out of favor just when he did, and I have not done that work either. Nevertheless, I want to address this last issue, as it relates to logical positivism, where some things can be said for sure and some conjectures can at least be raised.

For sure, Vaihinger's flaws alone do not explain the disrepute into which he has fallen. After all, of what is he guilty? He makes a lot of distinctions, difficult to keep in mind, which are not even exhaustive and complete. He is somewhat fuzzy, sometimes. He sometimes comes up short on analysis. Naively, he accepts a lot of what scholars have said, and scientists done, as correct. He subscribes to an individualistic picture of cognition that is more universal than he ought to allow. He may have made some factual errors in what he took to be fictions, and what not. I might add that he has a somewhat old-fashioned penchant for coining "laws" and for diagnosing historical trends. He also likes to moralize. Sometimes he repeats himself. In a large work, no doubt there are some inconsistencies. (I have not found a good example of this, unlike Schlick, apparently; but let us grant it.)

Examining this list, it looks like what Vaihinger mostly needed was a competent editor! Yet what he received from the logical positivists, and his legacy from them to us, has been something rather different. Put most simply, the positivists set about making Vaihinger a marginal figure. They succeeded. In today's literature, when he is mentioned at all, it is almost always in the margins—in a footnote one-liner or a parenthetical thrust. One will protest, perhaps, that in compiling my list of flaws I have not discussed the originality, quality, or viability of his ideas. Surely, in the end, that is what counts. Indeed it does, and that is my point. My omission tracks Vaihinger's positivist critics, for they do not discuss the originality, quality, or viability of his ideas either. Mainly they mock him and promptly place his "As If" in the trash. This is especially striking behavior in figures like Carnap, Reichenbach, Schlick, and allies, who were formidable critics. Precisely by not bringing Vaihinger into their critical discussions, the logical positivists made it appear that his ideas were simply not worth discussing. Since, as we have seen, many of his ideas were also theirs, that explanation of why Vaihinger was not treated seriously cannot be correct. So why did they do it?

One clue to the dynamic may be found by reflecting on Neurath. Neurath was the organizer of the logical positivist movement, the "big engine" whose energy and political skills kept the group growing and alive. Until a very recent revival of interest in Neurath, however, few have promoted him as a serious thinker on par with the others. Neurath's influence on the intellectual development of logical positivism has lain in the shadows. His ideas, especially those in opposition to the mainstream, were mostly lost from general view. I would suggest two things that might help explain this neglect. Firstly, although Neurath wrote some slogans about verifiability and meaning, he never really made the commitment to an analysis of scientific language that became a characteristic feature of logical positivism.¹⁶ Secondly, Neurath mostly stood in opposition to those tendencies in the movement that set the projects for understanding science in general terms; the projects of a general account of explanation, a general theory of confirmation, a general account of laws, or theories, and so on. Indeed, what has come down as the modern agenda of philosophy of science includes, for the most part, the very things that Neurath thought not sensible to pursue. As indicated above, the approach that Neurath advocated was more historicist, taxonomic, and naturalistic than the items on that agenda. His methodology, then, did not give pride of place to formal methods, meaning, and language. His orientation was piecemeal and particularist, self-consciously not global (the approach he mocked as "pseudo-rational"). Obviously, Neurath also had a great deal in common with his positivist colleagues. But, I suggest, by rejecting a linguistic and global orientation Neurath was easily cast as an outsider, and his reservations about these features of the program were by and large just not discussed. This was certainly not due to spite or bad feelings, but because the others had their own projects to pursue and could not be always engaged in justifying their whole approach. Like Einstein with respect to the quantum theory, Neurath suffered the fate of one who keeps questioning

fundamentals. After a while, his reservations were set aside in order to get on with things.

My point about Vaihinger should be plain; it is the same point. In contrast with Scheffler's post-war setting for fictionalism (see section 1), Vaihinger was more like Neurath in not having a linguistic and meaning-related orientation, despite some occasional philological excursions. Unlike Scheffler, he was also by and large a confirmed taxonomist and naturalist of science, not subscribing to the global projects so dear to the neo-positivist hearts. Like Neurath, these aspects of Vaihinger could not be confronted without bringing into question the whole logical positivist project. So, Vaihinger was not discussed. He was written off. In Vaihinger's case, however, there was a further problem. For, as we have seen, Vaihinger had actually anticipated and set up institutional structures to pursue a program of philosophical reform and reevaluation uncomfortably close to the project of logical positivism. Logical positivism, however, proclaimed itself a new program in the history of thought, the vanguard of a new enlightenment, the cutting edge of a new modernity. To be sure, the movement claimed the heritage of Mach and Poincaré, of Helmholtz, Hilbert, Einstein, Bohr, and (sometimes) Freud. These, however, were leading scientists of the era. With regard to existing philosophical schools, however, logical positivism acknowledged no peers, presenting itself as a fresh starting point. (Indeed, even their debt to Kant and their neo-Kantian contemporaries has to be excavated.) To cultivate the image of new-philosophical-man, they had to downplay the continuities between them and the popular Vaihinger, distancing themselves from him. So they did.

9. VAIHINGER'S LEGACY

Perhaps the dismissive attitude that logical positivism adopted to Vaihinger was overdetermined by the social and political circumstances suggested above, and probably by others as well. Whatever a better historical treatment would show, our attitude need not be bound by the judgment of those other times. With respect to general philosophical orientation, Vaihinger (and Neurath) point us toward a more naturalistic and particularistic approach to understanding science, an approach (like Vaihinger's to religion) that is at once critical and tolerant (with strong emphasis on both). This approach calls into question the viability of the universal projects of philosophy of science, demanding a hearing for a non-theory-dominated way. It also moves us away from a preoccupation with language and meaning. The approach is, broadly speaking, pragmatic in its emphasis on the importance of scientific practice in relation to scientific theory, although it is not reductive in the Jamesian way with respect to truth. This general sort of orientation is already being explored in various contemporary naturalisms, in my NOA, and also in some constructivist and broadly deflationist programs. I take these to be part of Vaihinger's legacy. What, then of fictions and the "As If"?

Vaihinger's emphasis on fictions exalts the role of play and imagination in human affairs. He finds no realm of human activities, even the most serious of them, into which play and imagination fail to enter. Surely he is right. These faculties are part of the way we think ("constructively"), approach social and intellectual problems ("imaginatively"), employ metaphor and analogy in our language, and relate to others every single day.

Within science, idealizations and approximations are an integral part of ordinary everyday procedure. The representation of three dimensions on two (that is, graphing), the conceptualization of four (or twenty-seven!) in terms of three, all call on the imagination to create a useful fiction—as does any pictorial presentation of data. The images by virtue of which whole fields are characterized ("black hole," "strings," "plates," "bonds," "genetic code," "software," "systems," "chaos," "computable," "biological clock," and so on) have the same character. Indeed, new techniques are constantly being developed for the creation of scientific fictions. Game and decision theory come readily to mind. Computer simulation, in particle physics or weather forecasting, is also a significant postwar example. Preeminently, the industry devoted to modeling natural phenomena, in every area of science, involves fictions in Vaihinger's sense. If you want to see what treating something "as if" it were something else amounts to, just look at most of what any scientist does in any hour of any working day.

In these terms, Vaihinger's fictionalism and his "As If" are an effort to make us aware of the central role of model building, simulation, and related constructive techniques, in our various scientific practices and activities. Vaihinger's particularist attitude over the question of whether and to what extent any model captures an element of the truth, warns us to be wary of overriding arguments about how to interpret (useful) scientific constructs in general. History shows us that there are no magical criteria that fix the interpretation, and no simple answers here. (History also shows that in the puzzle cases that exercise philosophers, where ordinary scientific procedures do not seem to settle the issue, science gets along perfectly well when these realist questions are not pursued. But emphasizing this fact would be to push Vaihinger toward NOA.)

By distancing itself from Vaihinger, logical positivism missed an opportunity that would have kept it in the mainstream of scientific thought throughout this century. Those who would dismiss a view by associating it with Vaihinger and his "As If" make the same error. For the dominant self-conception of postwar science has been that of science as the builder of useful models. In our century Vaihinger was surely the earliest and most enthusiastic proponent of this conception, the preeminent twentieth-century philosopher of modeling.

NOTES

An earlier version of this paper was presented to a conference at Princeton University organized by Bas van Fraassen in the spring of 1992, where there were many useful comments. Joseph Pearson and Thomas Uebel helped with the history of Vaihinger and

his fictions. Mara Beller provided me with a copy of the Schrödinger letter from which the epigraph is drawn and with encouragement to pursue my interest in Vaihinger. Thomas Ryckman offered good criticism and advice. Thanks all!

1. Thus Horwich (1991) conjures up Vaihinger's fictionalism in order to set the tone for a criticism of van Fraassen's constructive empiricism.

2. For fictionalism in mathematics see Papineau (1988), whose position resembles that of Berkeley and Vaihinger, although Papineau is not concerned to trace these antecedents.

3. Page number references to Vaihinger are to the Ogden translation (Vaihinger, 1924).

4. Ryckman (1991) notes some reversals in Schlick's attitude, which was receptive to Vaihinger early on but then turned hostile.

5. For details about the history of *Erkenntnis*, see Hempel (1975), and for its relation with Vaihinger and the *Annalen*, see Hegselmann and Siegart (1991).

6. See Gould (1970).

7. Spariosu (1989) discusses Vaihinger and draws out parallels between his fictionalism and the ideas expressed by leading thinkers in German-speaking physics prior to the Second World War. Unfortunately, many of Spariosu's philosophical or scientific conclusions and generalizations seem unsound. Still, the textual record of Vaihingerisms that he compiles is impressive evidence of the resonance of fictionalism among prominent scientists of the time. One could add the complementarity of Niels Bohr to Spariosu's list. See the epigraph.

8. The legal realism of Jerome Frank (1970), for example, makes extensive use of Vaihinger's ideas.

9. "That which is not useful is vicious." Attributed to Cotton Mather.

10. For discussions of Vaihinger and the Kantian "thing-in-itself," especially with respect to the third *Critique*, see Schaper (1965, 1966).

11. Also important are what he calls dogmas, especially given his religious and ethical concerns. I will omit his treatment of dogmas, given our concerns.

12. This citation and the others running parenthetically through this section are from Musil (1906, 106–107) whose dialogue between Beineberg and Törless struggles with exactly the issues that divide Cohen from Vaihinger, and even over Cohen's one case of imaginary numbers. Musil provides illustrations for arguments that Cohen did not find. (My thanks to Joseph Pearson for calling my attention to these passages in Musil.)

13. David Lewis (1982; 1983, 276–78) pursues a contrary tack, suggesting a quite general approach via "disambiguation" for how contradictions may fruitfully be used without harm.

14. See Uebel (1992) for a discussion of these and other features of Neurath's work.

15. This is a line pursued by Spariosu (1989).

16. Appearances to the contrary, his proposals about protocol sentences were not in aid of regimenting the language of science. Rather, Neurath was trying to display the complex range of objective, subjective, and social factors that enter into any scientific report, in part to undercut the idea that they *could* usefully be regimented. See Uebel (1991).

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