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The Constitutive A Priori and Epistemic Justification

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Take up, therefore, the staff of experience, and leave behind the history of all the vain opinions of philosophers. To be blind and yet believe that you can do without this staff, is blindness at its darkest. . . . One can and should admire even the most useless efforts of those lofty geniuses: the Descarteses, Malebranchés, Leibnizes, Wolffs, etc.; but what benefit, I ask you, has anyone gathered from all their profound meditations and works?

—LA METTRIE, *Man-A-Machine*

1. Introduction

In one of its forms the recent revival of the interest in and the defense of a priori knowledge has borrowed significantly from both Kant and from traditional conventionalism. Michael Friedman (1999, 2000, 2001, 2002a, 2002b), Graciela DePieris (1992), Robert DiSalle (2002), and David Stump (2003) have all presented and endorsed the view that some propositions in the networks that represent our belief structures (especially in the context of physical theory) have a special status that amounts to their being accepted a priori. These propositions are alleged to be a priori in virtue of their special function and they are supposed not to be subject to empirical refutation in quite the same way that garden-variety empirical propositions are. This claim is made in direct opposition to the Quinean model of the web of belief, wherein, due to the alleged collapse of the analytic/synthetic distinction, all propositions face the tribunal of experience in the same way and differ only in terms of how deeply entrenched in the web they are. Moreover, as Friedman in particular is all too clear (2002b, 172), this claim is also intended to constitute a strong rejection of naturalized epistemology.

The view endorsed by Friedman and the other constitutivists holds that a priori principles are constitutive in their function, hence the expression

'constitutive a priori'. Such principles serve as framework principles in the manner suggested by Kant, Poincaré, Carnap, Reichenbach and, to some degree, Kuhn. They are principles without which theories could neither be formulated nor applied to real world phenomena. Most importantly such principles are alleged to function so as to make possible the formulation of certain law statements and, in virtue of their role in connecting theory to data, these principles thus make empirical testing possible. However, unlike Kant, and in accord with Carnap and Kuhn, the defenders of the constitutive a priori hold that these principles are rationally revisable. Like Kant, however, and unlike Carnap and Kuhn, the constitutivists appear to argue that such principles are epistemically justifiable in some substantial sense.¹ So while the conventionalist element of the constitutivist view allows for the possibility that radically different core assumptions can govern the constitution, operation, and extension of theories, the Kantian element of the constitutivist view is supposed to block the charge of irrationality typically leveled at purely conventionalist views.

Here it will be granted to the defenders of the constitutive a priori that such principles do serve a function within the structure of our belief systems that is appreciably different from that of more pedestrian empirical propositions, but what will be critically scrutinized here are the following claims: (1) that such principles are, or can be, justified in any coherent sense of the term, (2) that such principles are rationally revisable in any substantive sense and (3) that given points (1) and (2) the constitutivist view poses no threat to a thorough-going naturalism. Specific attention will be paid to Friedman's particular treatment of the constitutive a priori, but the main critical points to be raised in the sequel can be applied to the views of the other defenders of the constitutive a priori given a bit of creative extrapolation.

2. The A Priorist Resurgence and the Constitutivist View

Prior to the presentation and critique of the constitutivist view, it will be both instructive and useful to step back and look at the broader epistemological context in which this philosophical theory has been proposed, especially as constitutivism is a rather new view that may be unfamiliar to many. The constitutivist view arose, as many views of the a priori recently have, as a critical reaction to the wave of naturalized epistemologies developed in the last few decades as extensions of Quine's views presented most notori-

¹ Stump (2003) is perhaps notable for his rejection of the latter point.

ously in his 1951 "Two Dogmas of Empiricism," his 1960 *Word and Object*, his 1969 "Epistemology Naturalized" and, with Joseph Ullian, in their 1970 *The Web of Belief*.² It is, however, a view that has been developed by paying careful positive attention to a number of scientific and philosophical sources, including the works of some traditional, positivistic, and post-positivistic thinkers. Specifically, Friedman's (1992, 1999, 2000, 2002b) and DePierres's (1988) treatments of Kant and Friedman's (1999, 2001) treatments of Kuhn, Carnap, and Reichenbach ground the view philosophically. In taking Kuhn seriously, in particular, the constitutivist's at the same time pay careful attention to the historical analysis of philosophy and to the details of actual physical theories and their historical genesis, most obviously to Newtonian and relativistic mechanics. That this is so, of course, should not be too surprising given the particular character and interests of the influences just noted. What the constitutivist view then amounts to is a very powerful scientific, historical and philosophical reaction to Quinean holism as the best theory of the structure and dynamics of scientific knowledge, both in the historical and the normative senses.³ In so far as Quine's naturalism is more or less welded to his holism, the constitutivist view then also poses a serious threat to Quinean naturalism.⁴

So, while awareness of the context in which the constitutive view was developed and the influences which it incorporates amply demonstrates that it is first and foremost a reaction to holistic naturalized epistemology, it also amply demonstrates that it is an importantly different, more scientifically inspired, sort of reaction than most other contemporary, and more narrowly philosophical, reactions to epistemology naturalized such those defended by, for example, Laurence Bonjour (1998), George Bealer (1992, 2000), or Christopher Peacocke (2000, 2004).⁵ Those reactions to naturalized epistemology are more generally concerned with directly showing that there is substantial knowledge justified without appeal to experience. The constitutivists, however, drawing heavily on Reichenbach's view of the a priori, are more concerned with a priority in the more literal sense of contingent propositions that are necessary presuppositions of some theory.⁶ This does not, of course, imply that the

² See Kornblith 1994 and Boghossian and Peacocke 2000 for various perspectives on the matter.

³ See Friedman 2000 and 2001 for the most explicit statement of this aspect of the constitutivist view.

⁴ Friedman is especially clear about this in his 2001 and his 2002b.

⁵ The main manner in which Friedman's view differs from these other views is derived from the view of the a priori that is found in Reichenbach 1920. Reichenbach adopts the view that the a priori is to be identified with relatively necessary propositions that are constitutive of the objects of scientific knowing.

⁶ See Reichenbach 1920/1965, 48-60.

constitutivists must necessarily disagree with those who defend more philosophical views of the a priori when it comes to accepting the possibility of a priori knowledge. In any case, as the constitutivist view is more scientific in origin it appears, at least prima facie, to pose a rather more worrying threat to holistic naturalized epistemologies than that posed by the sorts of more philosophical defenses of the a priori just mentioned. That it does so can be attributed primarily to the claim that careful attention to the details of actual physical theories and the history of science supports the view that some propositions that constitute scientific theories have the status of a priori and not a posteriori propositions. If this is indeed correct, then it challenges the core thesis of many forms of naturalized epistemology, that there is only one kind of knowledge—a posteriori scientific knowledge, on the very basis of science itself.

3. The Function of Constitutive A Priori Principles and Empirical Propositions

Friedman's constitutivism is based on the fundamental recognition that different sorts of propositions serve different sorts of functions within the context of a given scientific theory; that theories have a stratified and therefore nonholistic functional structure. Most importantly, he presents and defends the antinaturalist view that certain types of propositions within such structured physical theories are a priori in nature. Such propositions are supposed to be a priori in the sense that they are not subject to immediate empirical revision and this is due to their special function within such theories. Moreover this immunity to empirical revision is not held to merely be the result of a greater degree of entrenchment. As such, Friedman borrows the notion of the functional a priori from Arthur Pap's rather sadly neglected 1946 monograph, *The A Priori in Physical Theory*, and he seeks to draw parallels between this work and the view of the nature and function of a priori propositions defended in Reichenbach's 1920 *The Theory of Relativity and A Priori Knowledge* and so the constitutivist views builds also on Reichenbach's concept of coordinating principles.

The crucial basic thesis Friedman defends in his novel theory of knowledge is, again, that different types of propositions serve different epistemic functions in physical theories and he specifically identifies three distinct functions that types of propositions have in the context of such theories, one of which importantly is alleged to entail that such principles are a priori in nature. In any case, despite Quine's attack on the analytic/synthetic distinction, Friedman still subscribes to something like the early Carnapian belief that we can identify a sort of logical division of labor among the propositions that make up a theory based on the purely functional differ-

ences between those propositions (2001, 33). The three functionally different types of propositions in our belief systems that Friedman identifies are as follows: properly empirical laws of nature, constitutive principles, and philosophical metaframework propositions. Propositions of each type then subserve different, but interrelated, roles within scientific research programs (i.e. theories) and these specific functions are to be understood as follows.

First, properly empirical laws are assertions about the way the world is and they are judged via conformity to observational evidence by rigorous empirical testing. Second, constitutive a priori principles are (a) the sorts of coordinating principles mentioned above (2001, 76–80) and (b) principles of pure mathematics. They are basic principles of mathematics, mechanics, and geometry that allow us to render precise the crude objects of sensory perception. Moreover, they are supposed to be necessary relative to a given empirical theory in the sense that without them there would be insufficient structure to the theoretical objects posited by a theory to formulate, apply or test properly empirical laws. Constitutive a priori principles are, most essentially, structure-generating tools required for the formulation of properly empirical concepts and hypothetical objects. Thus, within a given theory constitutive principles are presupposed, as without them there would *per se* be no such theory (2001, 74), at least qua empirical theory. In any case, the crucial function of such principles is to unify abstract, purely mathematical, structures and concrete empirical phenomena (2001, 76–83), thus endowing the mathematical structures with empirical content. The other primary function they have in this respect is to provide adequately precise mathematical structure to describe the qualitative theoretical objects posited by the theory so that they can be effectively tested. The coordinating principles and the purely mathematical structures are not, however, supposed to be subject to direct empirical refutation or confirmation in response to empirical testing of the properly empirical laws of nature that they make possible (2001, 80–81). Friedman's preferred examples of such constitutive a priori principles are Newton's laws in the context of Newtonian mechanics and the principle of equivalence in the context of relativistic mechanics. As the constitutivists see it, these principles, as well as, for example, mathematical principles like those that constitute the theory of Riemannian manifolds, are simply not implicated when the relevant mathematized empirical theories are confronted with the result of empirical observation, at least not directly.⁷ They are, however, subject to refutation and revision in the sense that when a whole research program is ultimately rejected due

⁷ Friedman 2001, 83–92.

to its empirical inadequacy both the retention and classification of such principles is up for grabs. Finally, philosophical metaframeworks are the overarching philosophical propositions that allow both for the generation of new theories and for the rational transition from one research program to another, and without which science would be crippled as a progressive endeavor. Essentially what such philosophical principles are supposed to do is to assure that prior theories are retained as special cases of later theories and that there is some source from which new theories can be naturally generated from old ones (2001, 23). In other words, this is essentially the assumption of Bohr's famous correspondence principle, or that of convergence in light of theoretical novelty coupled with the idea that new theories grow naturally out of older theories by a series of continuous transformations. Such philosophical principles are needed because the nature of scientific research is supposed to be cumulative and continuous, and so science progresses via a process of conservative revision whereby we retain as much of past empirical successes as we can while conjecturing new theories that correct the empirical inadequacies of prior theories. Such philosophical principles are supposed to guarantee a sense of understanding of prior theories by the members of later research programs despite the kind of Kuhnian incommensurability that inevitably arises from the breakdown of the shared network of presuppositions within a research program that occurs during radical theory change.⁸

However, Friedman is clear that despite his dual rejection of Quinean naturalism and holism in favor of his notions of this tripartite stratification of knowledge and the constitutive a priori, he concurs with Quine on one crucial point. Specifically, all of these three types of propositions just noted are revisable (2001, 46 ff.). It is also crucially important to for us to be clear that the identification of constitutive principles as being a priori in nature does not imply some greater degree of epistemic security (2001, 46). So rather, like Carnap, Kuhn, Reichenbach, and Kant, Friedman claims that certain core propositions necessary for the conduct of empirical science under the aegis of a research program requires our accepting certain principles as being regarded as a priori within that research program. However, they are not immune to revision in the sense that such research programs cannot be themselves rejected and replaced, but constitutive principles are not subject to direct empirical refutation because, as just described, they are not ordinary claims about empirical reality per se.

⁸ This philosophically grounded sense of understanding that allows for rational theory change is a form of what Friedman calls communicative rationality, although in revision of whole research programs it is a very different sense of communicative rationality than that shared within a research program.

So while it is true that when revolutionary theory change occurs those propositions treated as being functionally a priori in an earlier research program can be either wholly rejected in a later research program or can change their status with respect to how they are categorized in terms of the tripartite functional distinction referred to above, this is supposed to be the kind of change that Carnap regarded as involving external questions and hence which are essentially conventional in nature. For example, a proposition categorized as constitutive and hence a priori relative to an earlier research program can come to be regarded as a properly empirical proposition in a later research program if that is what the new framework adopted by the scientific community requires. Friedman (2001, 2002a) and DiSalle (2002) point to a number of examples from the history of physics in support of this aspect of the constitutivist view and the alteration in the status of the principles of physical geometry in the context of the shift from Newtonian mechanics to relativistic mechanics serves as the primary example in both cases. In any case, with this rather brief and schematic introduction to the constitutivist view out of the way, attention can now be turned to its critique. Of course, the main reason for this critical examination of the constitutivism is to defuse this particular threat to a thoroughgoing epistemological naturalism of the sort endorsed by Quine and other naturalized epistemologists.

4. The Justification of Constitutive A Priori Propositions

The first critical point to be raised here against Friedman in particular and the other constitutivists in general concerns the application of the concept of epistemic justification to constitutive a priori principles. Recall that, due to their function, constitutive a priori principles are not justified in virtue of any empirical evidence but they not unrevisable either. Such principles are to be regarded as presuppositions of properly empirical laws of nature in the sense that they make the formulation and testing of theories possible. However, as described earlier they can be rejected when a research program as a whole becomes empirically indefensible. Whatever the plausibility of this view about the nature and function of constitutive principles, some troubling problems arise when we consider how such principles might be epistemically justified or rationally revised. This is especially troubling when one grants that Quine's attack on the analytic/synthetic distinction is successful. If it is, as Friedman perhaps grudgingly admits (2001, 33), then we cannot treat constitutive principles as being justified in the way that analytic propositions are supposed to be justified. This leaves then only two apparent options. First, the constitutivists might hold

that such principles are empirically justified and, second, they might hold that they are conventional and so by their very nature are not epistemically justified.⁹

Friedman clearly rejects the first option outright even though he notes that such principles have some sort of empirical significance (2001, 84) and so it would appear that he must, on pain of incoherence, accept the second option. It then appears that Friedman's view implies that the adoption of constitutive principles is essentially a nonrational, or at least nonepistemic, endeavor. This contention is supported by much of what he has to say about the adoption of such principles. In speaking of these sorts of principles in the context of Einstein's revolutionary rejection of Newtonian mechanics, he says, "It is precisely here that an essentially nonempirical element of 'decision' must intervene, for what is at issue, above all, is giving a radically new space-time structure a determinate empirical meaning—without which it is not even empirically false but simply undefined" (2001, 88). However, both Friedman and DiSalle (2002) attempt to avoid outright conventionalism by claiming that such principles are necessary in the sense that they are presupposed by properly empirical laws and hence are necessary components of the theory with special status; they are required before any empirical testing of any part of a theory can be done because they make the theory empirically meaningful (2001, 74 and 83). As a result, although they are not strictly speaking empirically contentful in the sense of being testable, they are alleged to have some sort of empirical significance if only in the meager sense that they are involved in applying theories to empirical phenomena.¹⁰ As such, the implication is that while they are supposed to be conventions, they are not "mere" conventions in the pure sense as understood by, for example, Carnap and Poincaré. Rather, the advance of empirical research dictates their adoption even though they are not empirically testable. Echoing Friedman, DiSalle, specifically, argues for the following account of constitutive principles

they are interpretive claims rather than empirical claims, for they propose certain characteristic physical phenomena be interpreted through certain geometrical structures. Yet these definitions are in no sense mere conventions. Instead, each arises from a conceptual analysis of procedures of spatiotemporal measurement; in each case the definition is not chosen from among empirically equivalent alternatives, but discovered to be implicit in current empirical principles at a critical moment in the history of physics. (2002, 194, my italics)

⁹ See DiSalle 2002, 197.

¹⁰ DiSalle (2002, 170) thus regards them as essentially interpretive and definitional in character, and so attempts to argue that such principles are conventional, a priori, but neither analytic nor synthetic in the ordinary senses of those terms.

As such, the constitutivists believe that these principles are supposed to be rationally held, although not rationally held in the manner that ordinary empirical propositions are held. Holding such principles is presumed to be rational in something like the following sense. It is supposed to be rational to adopt such principles because they are something like the presuppositions of a current theory that arose out of the ashes of earlier theories, or that they are principles that are implicit in some currently held theory.

Whatever its historical merits, this view of the constitutive a priori is perplexing to say the least, and, on closer scrutiny, it turns out to be painfully short on crucial epistemological details. What Friedman and the other constitutivists appear to hold is that empirical testing requires the assumption of various constitutive, quasi-empirical, principles and that absent such principles one would have a theory that is part of pure mathematics rather than a theory that is a part of empirical science. In a real sense, these principles serve to define what it is for a theoretical claim to be empirically contentful and so they are empirically significant in this rather rarified sense. As Friedman explains, "A constitutive framework thus defines a space of empirical possibilities (statements that can be true or false), and the procedure of empirical testing against the background of such a framework then functions to indicate which empirical phenomena are realized" (2001, 84). But, so described how are such principles then themselves the objects of rational acceptance? Why choose one set of constitutive principles rather than another?

Following Poincaré's work we should all be aware that for purely logical reasons, relative to one set of empirical phenomena there will often be a number of constitutive frameworks adequate to the task of rendering that theory empirical and testable by endowing the phenomenon with an adequately precise structure.¹¹ As such, the question of the epistemic justification of constitutive principles is an acute one and simply claiming that they are partly conventional and partly empirical in the manner suggested above will simply not do. Absent some coherent theory of the justification of constitutive a priori principles, the only answer open to Friedman and the other defenders of the constitutive a priori is that such propositions really are mere conventions despite their protestations to the contrary.¹² However, it is then hard to see how the constitutivist view is anything more than a nominally disguised and rather traditional conventionalist view like that of Poincaré or Duhem, or perhaps a form of more modern

¹¹ In his 2002a Friedman attempts to sidestep this issue by noting that in the particular case of relativistic mechanics, the choice of constitutive principles was limited to one set and forced and not a matter of arbitrary choice. Nevertheless, this neither shows how that principle is epistemically justified nor is it clear that the case generalizes.

¹² See Friedman 2002a and DeSalle 2002 in particular.

conventionalism like that of the Carnap of "Empiricism, Semantics and Ontology." More interestingly, since such propositions appear to be nothing more than disguised conventions, it is not at all clear that epistemological naturalists would need to disagree with anything Friedman and the other constitutivists claim concerning the a priori. Presumably, as conventionalists, such propositions are not epistemically justified in any way and so they are not a kind of non-a-posteriori knowledge, because they are not a kind of knowledge at all. If this is so, then so much for the radical rebellion against naturalism that Friedman, in particular, makes so much of. Nevertheless, on a more positive note, what Friedman and the other constitutivists may have constructively pointed out is that naturalists might well want to avail themselves of some of the tools of conventionalism if that view is indeed defensible.¹³

5. The Revision of Constitutive A Priori Propositions

The second critical point to be raised here against Friedman and the other constitutivists concerns the account of the rationality of the revision of constitutive a priori principles. Perhaps while there is no coherent sense in which constitutive principles are epistemically justified with respect to empirical data in the static sense, maybe there is some sense in which their revision is rational or rule governed so as to make their adoption something more than arbitrary. Friedman, specifically, appeals to the role of philosophical metaframeworks and to Jurgen Habermas's concept of communicative rationality in order to ground the claim that such revisions are not merely anarchical and essentially arbitrary in the way that the adoption of mere conventions is. This possibility seems promising as Friedman explicitly states that the main merit of the constitutivist view is that it makes better sense of the dynamic history of science than Quine's holistic naturalism does (2000, 373).

However, when we grant his claim that even philosophical metaframework propositions are revisable, it is difficult to see how there can really be any substantial and non-Whiggish sense in which such transitions could be epistemically rational. The point is not overly difficult to see and simply amounts to the recognition that if philosophical metaframework propositions are themselves required to make rational changes in properly empirical law propositions and constitutive principles, then how can the revision

¹³ Stump (2003) is more candid about the identification of the constitutive a priori with the conventional, but he still stubbornly resists accepting that the view is only nominally different than Quine's. See Ben-Menahem 2001 and DiSalle 2002, as well as Friedman 2002a for discussions of conventionalism.

of philosophical propositions be rational without inviting viscous regress? If there are no unrevisable philosophical framework propositions and such propositions are not themselves empirical, then the very possibility of the justification of such principles is thrown into serious question. To wit, these philosophical principles seem as if they may simply be arbitrary and parochial in the manner that Peirce suggested in "The Fixation of Belief" and which Kuhn built his early philosophy of science on. Peirce famously tells us of the a priori method of fixing belief that, "It makes of inquiry something similar to the development of taste; but taste, unfortunately, is always more or less a matter of fashion" (1877, 119). More crucially that the constitutivists fail to offer even a rudimentary theory of justification with respect to philosophical framework propositions merely exacerbates the problems concerning the justification of constitutive a priori principles in the sciences discussed in the previous section, and the epistemic bonafides of such constitutive principles can be challenged from above as well as from below. If there are no conditions on the rationality of the principles by which constitutive propositions are revised and the acceptance of philosophical metaframework principles is nonrational then there is simply no compellingly rational reason to adopt one set of constitutive principles rather than another.

Nevertheless, from a retrospective perspective Friedman tells us that science is, by its nature, a continuous, cumulative, and convergent endeavor (2000, 379–81), even if there is more than one series by which this convergence could be achieved. This idea of how science progresses amounts to the claims that science obeys the following norms:

C1 [*continuity*] — any given series of temporally ordered theories in a given domain *should* exhibit continuous evolution (i.e. the historical progression of theories in any given domain should have no gaps).

C2 [*cumulativity*] — for any two theories related as precursor and successor, the successor theory *should* be the most conservative revision of the precursor theory that eliminates the precursor theory's empirical inadequacy (i.e. more sophisticated theories, should be minimally revised, corrected, versions of less sophisticated theories).

C3 [*convergence*] — the process of continuous and conservative revision should ultimately result in the production of a unique theory.¹⁴

¹⁴ Friedman accepts this norm in a restricted sense. Specifically, he leaves the possibility open that there may be more than one such convergent sequence branching out as science progresses. So he accepts it only in the sense that for each continuous and conservative sequence that can be relatively isolated from other branches of the overall sequence, it will converge to some terminal theory (2001, 68).

The claim that properly conducted science obeys these norms is made in direct opposition to the purely relativistic interpretation of Kuhn, and Friedman argues that Kuhn himself was ultimately forced to concede that there were essential features of science (2001, 47–68). More importantly, the fact that science is supposed to be a series of theories exhibiting these features is precisely the reason why a sufficient degree of communicative rationality is preserved across revolutionary changes. Consider Friedman's claim:

Let us first remind ourselves that, despite the fact that we radically change our constitutive principles in the revolutionary transition from one conceptual framework to another, there is still an important element of *convergence* in the very same revolutionary process of conceptual change . . . key elements of the preceding paradigm are preserved as approximate special cases in the succeeding paradigm.

This type of convergence between successive paradigms allows us to define a *retrospective* notion of inter-framework rationality based on the constitutive principles of the later conceptual framework: since the constitutive principles of the earlier framework are contained in those of the later as an approximate special case, the constitutive principles of the later framework are thus fully contained in the earlier framework. (2000, 379)

Such changes are supposed to be rational because we can, from the perspective of a latter theory, capture the mathematical structure of the former theory as a special case, even if the theories are, from the perspective of content, incommensurable (2001, 379, 381). Moreover, once this is admitted Friedman then allows for a prospective account of the rationality of theory change. This essentially amounts to the claim that new constitutive frameworks grow naturally out of old theories by a series of continuous and conservative transformations governed by the specific philosophical metaprinciples in place at the time (2000, 379–83, 2001 60–68). Of this aspect of philosophy with respect to the sciences Friedman himself says that,

Science, if it to continue to progress through revolutions, therefore, needs a source of new ideas, alternative programs, and expanded possibilities that is not itself scientific in this sense—that does not, as do the sciences themselves, operate within a generally agreed upon framework of taken for granted rules. For what is needed here is precisely the creation and stimulation of new frameworks of paradigms—new conceptions of what a coherent rational understanding of nature might amount to—capable of motivating and sustaining the revolutionary transition to a new first-level scientific paradigm. (2001, 23)

But, why should we accept these particular philosophical principles about theory change? More importantly why should we suppose either that

they are justified or that they justify the resultant constitutive frameworks that they give rise to? This is especially troubling as metaframeworks are revisable and not necessarily true in the conventional sense of the expression. If, on the one hand, we interpret the commitment to C1–C3 in the sort of Quinean manner suggested in the passage above, i.e. that we simply accept that that is how science works (at least as it is currently understood),¹⁵ then Friedman is again guilty of masquerading what appear to be pure philosophical conventions as rationally grounded principles at the level of philosophical frameworks. If, on the other hand, we take it not as a sort of definitional claim, but rather as a claim descriptive of actual practice, then, as Laudan (1981) in particular has so forcefully shown, the retrospective claim is simply false of the history of science and it is well known that theory revision does not necessarily yield unique results. Consequently, the prospective notion of rationality does little in the way of offering a concept of justification appropriate for constitutive principles that would yield the results desired by the constitutivists. With respect to this latter issue, consider Friedman claims that,

the present conception of scientific rationality need not imply the elimination of contingency from scientific progress, in the sense that there is a single pre-ordained route through the set of all possible constitutive principles, as it were, which the evolution of science necessarily follows at each stage. On the contrary, we can, if we like, imagine a branching tree structure at every point, so that *alternative future evolutions of our fundamental constitutive principles are always possible.* (2001, 68, my italics)

So Friedman and the other constitutivists cannot seemingly accept the descriptive tactic if they are to maintain that their methodological account of science is superior to its competitors on the basis that it offers a better explanation of the dynamic history of science. As a result, it appears as if the constitutivists must accept the former view.

The obvious consequence of this is then that the particular picture of science as prospectively continuous and retrospectively cumulative and convergent is at best a parochial convention that may happen to be in place at a given time, and thereby the various specific constitutive principles of scientific theories accepted at various periods in the history of science are accepted neither on the basis of direct empirical testing nor are they (necessarily) the result of the outcome of some fixed and rational rule-governed evolution. This must be the case because according to the constitutivists philosophical principles themselves are not fixed and unreviseable, and so at best what we have are something like relative, or instrumental, standards of

¹⁵ See Shaffer and Warnick 2004 for discussion of Quine's view of science.

The only other options appear to be either that in such periods we simply accept certain philosophical principles without question or that they are a priori self-justified in some more substantial nonconstitutive sense. However, the latter option is not one that is obviously open to constitutivists as they appear to reject the view that such truths are necessary and that they are knowable a priori in the more traditional sense (i.e. independent of any empirical justification). What we are left with then is either an almost thoroughly skeptical conventionalism from top to bottom. As such, the illusion of objective rationality as it applies to constitutive principles is preserved *only* by the arbitrary imposition of C1-C3 as a panacea against radical incommensurability and dynamic anarchy, but in the same breath we are told (at least by implication) that those principles are ultimately up for grabs! So we are left with the view that it is "rational" to adopt certain constitutive principles of specific empirical theories at certain times because they contain prior rejected theories as special cases and out of which they smoothly evolved, and not because they are empirically verified. Why is this so? The adoption of such constitutive principles is supposed to be rational and not conventional because science is continuous, cumulative and convergent. Why is science like this? We are to suppose that it is (which is just false) and we are also asked to suppose that it need not really have this character as philosophical principles are revisable and cannot, without inviting regress, be rational in the scientific or philosophical sense.

6. An Awkward Balancing Act

So, it should be clear that while the constitutivists have attempted to offer a new, scientifically grounded, theory of a priori knowledge in opposition to the holistic naturalized epistemology of Quine and his intellectual followers, the account they offer is ultimately unsatisfactory from an epistemological perspective, whatever its historical merits. This seems to be the case, because they have failed to even address the issue of the justification of a priori propositions. In attempting to balance their view on the knife-edge between pure conventionalism and an outright Kantian acceptance of the synthetic a priori, they have inherited the worst aspects of both views. We are left with what amounts to a deeply skeptical view of a science saturated with conventions governed by arbitrary, and highly dubious, philosophical principles. As a result, the constitutivist view appears to be nothing more than a nominally disguised form of the most radical conventionalism, and, as such, in that it fails to show that a priori principles are at all epistemically justifiable, it poses no threat to a thorough-going

rationality adopted arbitrarily to appeal to as guiding science and it is surely a serious question whether that is any sort of rationality at all.¹⁶ More importantly, it should be obvious that there is then a serious tension, if not outright, contradiction, in the constitutivist view. Science is supposed to be rational and our adoption of constitutive principles nonarbitrary because science is defined by the philosophical principles C1-C3 so that a minimal sense of communicative rationality is preserved across revolutions, but those philosophical principles are neither themselves the object of rational acceptance nor need science have this character, because the principles are themselves revisable. In other words science is supposed to be defined by C1-C3, but these principles are not, at the same time, essential features of science. Moreover, absent C1-C3 science would be anarchical and on a par with all sorts of allegedly less rational endeavors in the most extreme Feyerabendian sense. But, more importantly yet, without some justification for adopting these philosophical principles, there is simply no sense in which constitutive principles, and hence empirical laws, in the actual sciences are anything but conventions derived, but not even uniquely derived, from the arbitrary assumption of those philosophical principles.

Thus Friedman appears to be claiming that the adoption of constitutive principles is rational because science is governed by the philosophical principles C1-C3, but those principles are not (and cannot be) independently justified.¹⁷ Moreover, what could we appeal to in order to justify the kind of epistemic conservatism suggested by these principles? Given the constitutivist view we cannot appeal to more philosophical reasons in order to justify philosophical metaframework principles without inviting a regress of arbitrary stipulations, and no empirical reasons can possibly do the job because Friedman tells us that,

it is folly for philosophy to try to incorporate itself into the sciences (as a branch of psychology, say, or mathematical logic), for its particular role is precisely to articulate and stimulate new possibilities at the meta-scientific level, as it were, and it cannot, on pain of entirely relinquishing this role, itself assume the position of a normal science. (2001, 24)

¹⁶ See Siegel 1996.

¹⁷ To be sure, the simple undermining of the constitutivists view in the manner pursued here is not itself alone sufficient to warrant the endorsement of Quinean naturalized holism. If the arguments here show that the constitutivist view is really nothing more than a disguised version of Carnapian-style conventionalism, then that is still a far cry from Quine's view. To turn such an argument into a more thorough and supportive argument in favor of the Quinean view would require a serious rebuttal of Carnapian conventionalism. That is, however, not the purpose of this particular paper.

naturalism.¹⁸ What is not justifiable cannot be knowledge and what is not knowledge, cannot ipso facto be nonnaturalistic knowledge.¹⁹

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¹⁸ The issue of how apparently philosophical normative principles of this sort can be justified in discussed in Shaffer 2007.

¹⁹ The author would like to thank Hal Brown, Michael Veber and the participants of the A Priori Knowledge in Contemporary Epistemology conference arranged by the Canadian Society for Epistemology, Sherbrook, Québec, Canada 2004, where an earlier version of this paper was presented.

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