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On Naturalized Epistemology: Doctrine, Induction, and Philosophical Progress

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Abstract. In this paper, we argue that Quine never endorsed replacement naturalism. We offer a new explanation for the widespread confusion about Quine's position in "Epistemology Naturalized." On our view, Quine located evaluative claims on what he called the doctrinal side of epistemology. But in "Epistemology Naturalized," he had essentially nothing to say about the doctrinal side. Rather, Quine's focus was almost entirely on what he called the conceptual side. We suggest that Quine could have cut off the standard misreading of his essay if he had given serious attention to the doctrinal side of epistemology. So, in the rest of our paper, we reflect on two claims about the doctrinal side of epistemology that Quine advanced in "Epistemology Naturalized." The first, which we will call Quine's *stagnation thesis*, was that there had been no progress on the doctrinal side of epistemology since Hume. The second, which we will call Quine's *slogan*, was that the Humean predicament is the human predicament. We argue that if Quine's slogan is true, his stagnation thesis is false.

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On Naturalized Epistemology

Quine's proposal for naturalizing epistemology has been widely misunderstood and mischaracterized. According to the standard account, Quine initially advanced a very strong *replacement naturalism* on which all normative, evaluative claims were to be eliminated from epistemology in favor of descriptive, causal claims in psychology and related sciences.[1] Sometimes the standard account is supplemented (as in Feldman 2012) with the claim that Quine quickly moderated his position in order to readmit normativity in epistemology. In this paper, we argue that Quine never endorsed replacement naturalism and had no need to change his position. We then offer a new explanation for the widespread confusion about Quine's position in "Epistemology Naturalized."

On our view, Quine located evaluative claims on what he called the *doctrinal side* of epistemology. But in "Epistemology Naturalized," he had essentially nothing to say about the doctrinal side. Rather, Quine focused on what he called the *conceptual side*. We will say more about the distinction between conceptual and doctrinal studies in Section 2, but roughly, conceptual studies in epistemology have to do with *meaning* and doctrinal studies have to do with *truth*. With respect to the doctrinal side, Quine advanced two claims. The first, which we will call Quine's *stagnation thesis*, was that there had been no progress on the doctrinal side of epistemology since Hume. The second, which we will call Quine's *slogan*, was that the Humean predicament is the human predicament. Quine did not argue for either claim. Nor did he articulate them in anything like sufficient detail. We will argue later that the two claims are importantly different. Moreover, we will argue that if the slogan is true, the stagnation thesis is false. Since Quine focused so much on the conceptual side of epistemology and said so little

[1] See Sosa (1983, 69-70), Kim (1988, 388), Maffie (1990, 285), Kornblith (1995, 239-240), Pojman (2003), Johnsen (2005, 78-79), Feldman (2012), and Rysiew (2020) for examples.

about the doctrinal side, what he said about the conceptual side is easily misread as applying to the whole of epistemology. We think Quine could have cut off the standard misreading of his essay by describing the Humean predicament in detail and arguing for the claim that there had been no progress on the doctrinal side since Hume.

Here is how we proceed. In Section 1, we describe the standard account of Quine's project in "Epistemology Naturalized." In Section 2, we prepare the ground for our account by discussing Quine's division of epistemology into conceptual and doctrinal studies, and we help to situate our view in relation to recent Quine scholarship by Verhaegh (2017 and 2018) and by Ebbs (2019). In Section 3, we argue that Quine never endorsed replacement naturalism. We offer a new explanation of the widespread misreading of Quine's paper, and we contrast our explanation with Johnsen's (2005) account. In Section 4, we begin our assault on Quine's stagnation thesis. We discuss what might be meant by saying that philosophy does or does not make progress, and we give preliminary reasons for thinking that Quine's stagnation thesis is false. In Section 5, we complete our assault on the stagnation thesis. We consider four ways of understanding Quine's slogan that the Humean predicament is the human predicament, and we argue that on each possible interpretation, the stagnation thesis is false. Finally, in Section 6, we make some concluding remarks on the prospects for naturalized epistemology.

Section 1. Quine in the Popular Press

In an influential edited collection of readings in epistemology, Pojman (2003) describes Quine's naturalized epistemology as follows (287):

> The new epistemology-psychology turns into the descriptive examination of the relation "between the meager input [of sensory stimulation] and the torrential output [our three-dimensional picture of the world]." With the demise of "old epistemology" go all concerns about normativity or justification.

In their excellent introductory volume on epistemology, Goldman and McGrath (2015, 162) say that "Quine proposed that philosophy, or at least epistemology, should be considered *a chapter of psychology*," and they go on to say that Quine "was not interested in the 'analysis' of knowledge, or justification, or rationality." In his 2012 Stanford Encyclopedia article, "Naturalized Epistemology," Feldman writes:

> The Quinean view that we should abandon epistemology for psychology is not widely accepted by contemporary naturalists in epistemology. Even Quine's later views were more moderate. Perhaps this is because questions about the quality of our reasons for our beliefs about the world strike even naturalists as perfectly good questions, questions deserving of investigation and analysis.

Feldman (2012) uses the term *Replacement Naturalism* to describe the view he attributes to Quine. According to replacement naturalism, "we abandon the effort to show that we do in fact have knowledge and that we instead study the ways in which we form beliefs" (Feldman 2012). In a more recent Stanford Encyclopedia article on "Naturalism in Epistemology," Rysiew (2020) observes that "Quine appears to be recommending replacement naturalism and, consequently, the elimination of terms of epistemic appraisal in favor of descriptions of psychological goings-on." Understood as advocating for replacement naturalism, Quine replaces the *normative* concerns of traditional epistemology with *descriptive* concerns.[2]

The standard reading is by no means unmotivated. What Quine says in "Epistemology Naturalized" could very naturally be read as advocating for replacement naturalism. For example, after discussing Carnap's project of rational reconstruction, Quine writes the following (1969b, 75):

> But why all this creative reconstruction, all this make-believe? The stimulation of his sensory receptors is all the evidence anybody has had to go on, ultimately, in arriving at

[2] Johnsen (2005) points to several other writers who give the standard reading when introducing Quine's work in anthologies on epistemology, including Sosa and Kim (2000), Bernecker and Dretske (2000), and Pollock and Cruz (2000).

> his picture of the world. Why not just see how this construction really proceeds? Why not settle for psychology?

And later, he writes (83):

> The old epistemology aspired to contain, in a sense, natural science; it would construct it somehow from sense data. Epistemology in its new setting, conversely, is contained in natural science, as a chapter of psychology.[3]

So, it seems—at least on its face—that Quine really did think we should replace the old epistemology with psychology and make the whole of epistemology a part of descriptive, natural science.

The standard reading leads to a standard criticism, leveled by Kim (1988) and by Stich (1993). According to Kim and Stich, the old epistemology was centrally and essentially concerned with normative questions, so that "purely descriptive epistemology" would be a contradiction in terms. Moreover, the normative questions at the heart of traditional epistemology are important and ought to be addressed. But psychology cannot answer such normative questions. So, replacement naturalism is conceptually confused and practically unsatisfying: the old epistemology cannot be replaced by psychology.

Along with the normative criticism, the standard reading introduces a puzzle, first pointed out by Putnam (1982) and then taken up in greater detail by Johnsen (2005). The puzzle is this: How can we reconcile what Quine says in "Epistemology Naturalized" with his subsequent assertions (e.g. in Quine 1986, 1992, 1994, and 1995) that naturalized epistemology *does have* a normative part and with his philosophical writings on such topics as rational belief (e.g. in Quine 1970)? As Johnsen (2005, 78) puts it:

[3] Quine repeats his claim that "naturalism does not repudiate epistemology, but assimilates it to empirical psychology," in two versions of an abbreviated essay (1981a and 1981b) on the history of empiricism and the pragmatists' place in that history. The substantive content of the essays is essentially the same as his discussion of the conceptual side of epistemology in "Epistemology Naturalized."

> No one, to my knowledge, would dispute these characterizations of the burden of Quine's "Epistemology Naturalized" and its role in "the move toward naturalism in epistemology." Yet every student of Quine knows that as early as "Two Dogmas of Empiricism" and as late as *Pursuit of Truth* he pursued normative epistemological investigations that cannot sensibly be seen as falling within the purview of natural science or, more particularly, psychology. Hilary Putnam, the only philosopher I know to have considered how this glaring conflict might be resolved, was forced to throw up his hands; although Quine repeatedly assured him that he did not mean to "rule out the normative," Putnam could find no way of reading "Epistemology Naturalized" except as a proposal to do exactly that.

Johnsen defends a reading of "Epistemology Naturalized" that would solve the puzzle by supposing that Quine made a serious error in his presentation. We agree with Johnsen in thinking that Quine's presentation was deficient, but we think there is a better solution to the puzzle. To understand Johnsen's reading and our alternative, we need to talk about Quine's division of epistemology into conceptual and doctrinal studies.

Section 2. Conceptual and Doctrinal

According to Quine, epistemology has two sides: conceptual and doctrinal. Setting aside nuance, which we will develop in this section, the conceptual side is about *meaning*, and the doctrinal side is about *truth*.[4] In this section, we elaborate on Quine's distinction and draw out some complications. We also situate our view in relation to some recent literature. Then in Section 3, we describe Johnsen's (2005) proposal for how to read "Epistemology Naturalized" and propose an alternative.

[4] Peirce (1878a) seems to have the same distinction in mind at the end of his essay, "How to Make Our Ideas Clear," when he says, "We have, hitherto, not crossed the threshold of scientific logic. It is certainly important to know how to make our ideas clear, but they may be ever so clear without being true. How to make them so, we have next to study. How to give birth to those vital and procreative ideas which multiply into a thousand forms and diffuse themselves everywhere, advancing civilization and making the dignity of man, is an art not yet reduced to rules, but of the secret of which the history of science affords some hints" (302).

Quine begins his essay by drawing a parallel between epistemology and the foundations of mathematics. Just as we would like to reduce all of mathematics to logic, we would like to reduce all of our knowledge about the natural world to sense experience—to show that everything we know about the world is based somehow on the evidence of our senses. Quine elaborates slightly, writing (71):

> This means explaining the notion of body in sensory terms; here is the conceptual side. And it means justifying our knowledge of truths of nature in sensory terms; here is the doctrinal side of the bifurcation.

According to Quine, each side of epistemology has a "remote" Cartesian motivation (Quine 1969b, 74; Quine 1992, 19). On the conceptual side, concepts are to be defined in terms of clearer ones and those in terms of concepts that are clearer still, so that ultimately, every concept is either perfectly clear and distinct or defined in terms of concepts that are perfectly clear and distinct. On the doctrinal side, theories are to be proved on the basis of more obvious theories and those in terms of still more obvious ones, so that ultimately, every theory we accept is either self-evidently true or proved from self-evident truths.

Quine's characterizations of the conceptual and doctrinal sides of epistemology are not always especially careful, and the lack of care obscures some important difficulties, especially on the doctrinal side. So, at this point, we want to be a bit more precise about the conceptual and the doctrinal in order to bring out some complications and prepare the way for what we say later on. On the conceptual side, the goal is *to determine the meanings* of our statements.[5] Quine argues that ultimately, the meanings of our statements must be connected to sensory stimulation, because language learning requires "the keying of sentences to shared [external] stimulation" (1969b, 81). As he says in another part of his essay (75), "The stimulation of his sensory

[5] One might put the project a bit more liberally by saying that the goal is to determine not just the meanings of our statements but the meanings of our concepts, terms, statements, and the like.

receptors is all the evidence anybody has had to go on, ultimately, in arriving at his picture of the world." But for Quine, the conceptual side of epistemology is not supposed to be normative: there is no privileged, *correct* way of connecting our statements with sensory stimulation. According to Quine, if Carnap had succeeded (in the *Aufbau*) in constructing our "physicalistic discourse" in terms of sense data, logic, and set theory, there would have been no point to asking whether the construction was *right* or *wrong* since, "Any construction of physicalistic discourse in terms of sense experience, logic, and set theory would have been seen as satisfactory if it made the physicalistic discourse come out right" (1969b, 75). Hence, we agree with Ebbs (2019) in thinking that "the norms of Quine's epistemology are exclusively doctrinal, not conceptual" (115). According to Ebbs, "the goal of the conceptual side of epistemology is not to theorize about normative relations of evidential support, but to trace the actual links between sentences and impacts at the nerve endings" (124). The conceptual side of epistemology is not normative for Quine since conceptual studies do not criticize the functional relation that holds between our sensory stimulation and our discourse. Conceptual studies simply aim to describe that relation.

Some caution is called for here, since even by Quine's lights, there is some distinction between right and wrong in conceptual studies. Some proposed constructions are *admissible* in the sense that they *correctly* describe the links between sentences and stimuli. They make our ordinary, physicalistic discourse *come out right*. Perhaps it would be better to say that for Quine, the conceptual side of epistemology is *weakly* normative. No real trouble arises that way provided one understands that every admissible construction is equally good with respect to the goal of conceptual studies in epistemology and that even admissible constructions do not automatically provide justifications for our theoretical claims.

How to characterize the doctrinal side for Quine is not so obvious. Here, we offer two possible interpretations. First, one might take the goal of doctrinal studies in epistemology to be simply *to justify our statements*. This formulation fits nicely with what Quine says at the beginning of "Epistemology Naturalized" about doctrinal projects in the philosophy of mathematics. At the beginning of his essay, Quine seems to be saying that the doctrinal side is about establishing laws by proving them (69). Similarly, taking the goal of doctrinal studies to be justifying our statements lines up with Quine's characterization of the doctrinal toward the end of his essay, where he says that the doctrinal side of epistemology is about knowing whether our hypotheses are true (88-89). Put differently, in order to give it a structure parallel with our characterization of the conceptual side, we might say that the goal of doctrinal studies in epistemology is *to determine the truth-values of our statements*.

Although there are reasons to like the characterization of the doctrinal side of epistemology as concerned with the determination of the truth-values of our statements, we think it is better to say that on the doctrinal side, the goal is *to justify that our statements constitute knowledge*. We take this characterization to be the most charitable way of understanding what Quine meant when he said that the doctrinal side was "the justification of our knowledge of truths about nature" (71). (In order to clearly fit our first characterization of the doctrinal side, Quine would have needed to say rather that the doctrinal side was the justification of our *statements* about nature.) Moreover, we think it fits with the way he describes the doctrinal side of epistemology in his Kant lectures (Quine, 1980/2019), where he says that the doctrinal side of epistemology is "a critique of evidence for the truth of science" (31) and "the critique of thinking" (33). Unlike the first interpretation we considered, according to which the goal of doctrinal studies is to justify our statements, on the alternative we are now considering, the goal

of doctrinal studies is to understand the relation of justification or evidential support and (perhaps) to show that we really do know what we ordinarily take ourselves to know.

One might think that the distinction we've just drawn corresponds to Verhaegh's (2017 and 2018) distinction between immanent and transcendental inquiry, where an inquiry is immanent iff it sets out from "our inherited best scientific theories and methods" (2017, 319) assumed defeasibly as true, and an inquiry is transcendental iff it (attempts) to ground or to criticize science from a science-independent perspective on reality. We initially wondered whether our first characterization of the doctrinal side as concerned with the determination of the truth-values of our statements might correspond to *immanent* doctrinal studies, while our second characterization of the doctrinal side as concerned with justifying that our statements constitute knowledge corresponded to *transcendental* doctrinal studies. But on reflection, we don't think this is quite right. One might (attempt to) determine the truth-values of our statements from a transcendental perspective, either non-skeptically by deriving our statements from foundational statements taken to be self-evidently true a priori or skeptically by offering a science-independent argument that the truth-values of our statements are indeterminate or false. Similarly, one might (attempt to) justify the claim that our statements constitute knowledge from an immanent perspective. We'll come back to the possibility of immanent attempts to show that we know the things we ordinarily take ourselves to know, as it seems to us that many philosophers since Hume have attempted to provide exactly such an account and that their efforts constitute progress on the doctrinal side.

Moreover, although we are sympathetic to Verhaegh's treatment of Quine's naturalism generally, we are skeptical that the distinction between immanent and transcendental inquiries helps us understand "Epistemology Naturalized" as a whole or offers any resources for

explaining the relationship between naturalized epistemology and normativity. Verhaegh argues, especially in Chapter 2 of his 2018 book, that Quine treats rational reconstruction in "Epistemology Naturalized" as an immanent inquiry, not as a transcendental one. We have no objection to understanding Quine's discussion of the conceptual side of epistemology in "Epistemology Naturalized" as immanent. But how should we apply Verhaegh's distinction to the doctrinal side of epistemology? If we understand the Humean predicament in immanent terms, it's unclear how Quine could reasonably think there had been no progress or for that matter why it is a *predicament* at all. Alternatively, if we understand the Humean predicament in transcendental terms, it's unclear why Quine would be bothered by it. Moreover, if we understand Quine's discussion of the *conceptual* side as immanent, it seems odd to treat his discussion of the doctrinal side as transcendental. Reading Quine in that way would have him sliding from immanent to transcendental inquiries without acknowledging that fact in any way.

So, on balance, we do not think that our two characterizations of the doctrinal side of epistemology should be identified with Verhaegh's division of inquiries into immanent and transcendental. The two characterizations of the doctrinal side are distinct, however. According to the second characterization, success on the doctrinal side would involve showing that we really do know the things we commonly take ourselves to know---coming to know that we know our best scientific theories. Here, the sorts of arguments we should offer will be about ourselves, our methods of inquiry, and our relationship to the world. We take Quine to be wondering about the doctrinal side in our second sense when, in "Natural Kinds" (1969c, 126), he asks why "our innate subjective spacing of qualities" matches the world in such a way as to make induction work. By contrast, according to our first characterization, success on the doctrinal side would involve showing that various scientific statements are true by marshalling evidence in their favor.

But of course, we might provide evidence for a wide range of statements without ever explaining how or why our evidence functions as evidence.

On both construals, conceptual and doctrinal studies are distinct enterprises. As Quine said, even if Carnap's conceptual project had fully succeeded, "the mere fact that a sentence is *couched* in terms of observation, logic, and set theory does not mean that it can be *proved* from observation sentences by logic and set theory" (Quine 1969b, 74). Moreover, whereas for Quine, the conceptual side of epistemology is not normative (or is only weakly normative), the doctrinal side *is* normative. The most straightforward and obvious reason for thinking that Quine took the doctrinal side to be normative is that he uses the normatively-loaded language of "justification," "truth," "evidence," and "knowledge" to describe the doctrinal side. A less obvious reason has to do with Quine's *stagnation thesis*, according to which there had been no progress on the doctrinal side of epistemology since Hume.

We will come back to the Humean predicament and the stagnation thesis in greater detail in Sections 4 and 5. Here, we only want to point out that what Quine says in "Epistemology Naturalized" would be wildly implausible if he thought of the doctrinal side of epistemology as descriptive, rather than normative. Given his commitment to naturalism, Quine would surely have agreed that we learned a lot in the period from 1750 to 1970 about how humans convert sensory stimulation into scientific theories. After all, that period saw the proposal and defense of the theory of evolution by natural selection (Darwin 1859 and 1871), the birth of experimental psychology and psychophysics (Weber 1851, Fechner 1860, von Helmholtz 1863/1885, Wundt 1874, Peirce and Jastrow 1885, and James 1890), the discovery of neurons and a host of facts about their structure and function (von Helmholtz 1850a and 1850b, Golgi 1873, Cajal 1888 and 1889, and Waldeyer-Hartz 1891), the realization that at least some cognitive abilities (such as the

ability to produce speech) are underwritten by specific regions of the brain (Broca 1861a, 1861b, and 1863, Wernicke 1874, and Brodmann 1909), the development of techniques for measuring cognitive abilities (such as intelligence, for which see Spearman 1904) and mental states (such as beliefs, for which see Ramsey 1926/1964, Stevens 1957, and Luce 1959), the discovery of classical and operant conditioning (Pavlov 1927, Thorndike 1901, 1911, and 1931, and Skinner 1938 and 1950), and the invention of signal detection theory (Peterson, Birdsall, and Fox 1954, Tanner, Green, and Swets 1954, and Swets, Tanner, and Birdsall 1961), to name just a few of the most important developments that Quine could and should have known about. If Quine had thought that the doctrinal side of epistemology could be replaced by purely descriptive psychology, then he could hardly have maintained that there had been no progress on the doctrinal side since Hume. Charity prohibits reading Quine as a replacement naturalist with respect to the doctrinal side of epistemology, even in "Epistemology Naturalized."

Section 3. How to Read "Epistemology Naturalized"

The doctrinal side of epistemology is and always was normative for Quine. How could readers have missed this fact? According to Johnsen (2005), Quine misled his readers by describing his project as one of replacing epistemology with psychology, when in fact, he had only proposed to replace the project of *rational reconstruction* with psychology. Thus far, we are broadly in agreement with Johnsen. Quine's presentation was sloppy. At crucial points (especially when he used the metaphor of containment on pages 82-83 of his essay), Quine wrote in a way that is naturally read as proposing to replace the whole of epistemology with psychology. However, we disagree with the rest of Johnsen's reading. Most importantly, we do not think that Quine ever understood the whole of epistemology to be constituted by rational

reconstruction, as Johnsen maintains. In this section, we argue that Johnsen is wrong about the specific way in which Quine failed to clearly articulate his proposal, and we argue that Johnsen's reconstruction of how Quine's naturalized epistemology retains normativity not only fails but also undermines the first part of Johnsen's own proposed reading.

We think that Quine is best read as proposing to replace *the conceptual side* of epistemology with psychology. This still involves attributing to Quine a substantial expository failure. But the failure is different from the one Johnsen suggests and our reading squares better with Quine's total system of philosophy. When Quine wonders why we don't just settle for psychology, he is wondering why we don't give up the *descriptive* project of rational reconstruction. On Quine's proposal, the target to be replaced is a creative fiction about the connection between sensory stimulation and our ordinary, physicalistic language. We are invited to replace that creative fiction with a scientific report about how the connection between sensory stimulation and language actually works. As we have noted already, there is nothing *wrong* with creative fiction on the conceptual side of epistemology—provided it works. If Carnap had succeeded in spinning a story that made sense of our ordinary discourse in terms of sets and sense-data, it would have served the epistemological purpose. But there is also nothing to *gain* by doing creative fiction rather than cognitive science. Any admissible story would serve just as well. With respect to the purpose of the conceptual side of epistemology, the internal details of *how* sensory stimulation is connected to our ordinary discourse do not matter, so long as the input-output relation is preserved.

Insofar as Quine was proposing to replace the *conceptual* project of Carnapian rational reconstruction with psychology, he erred in saying that epistemology—*as a whole*—becomes a chapter of psychology. At first blush, our proposal may appear to be identical to Johnsen's, but

there is an important difference. Johnsen maintains—and we deny—that "as Quine uses the term 'epistemology' in 'Epistemology Naturalized,' that discipline *does* consist of efforts at rational reconstruction" (81). According to Johnsen, it is Quine's idiosyncratic use of the term "epistemology" that led his readers to think that he was proposing to replace a normative study with a descriptive one. By contrast, we think it is Quine's prose style (and perhaps an overly-optimistic opinion of his readers) that is primarily to blame.

Johnsen quotes three short passages from "Epistemology Naturalized," which he thinks make "starkly evident" that Quine took epistemology to consist in efforts at rational reconstruction. But as we will argue, the passages do not support his claim. We will take the passages one at a time and quote them as they are given in Johnsen's essay but without his added emphasis. In the first passage that Johnsen quotes, Quine writes, "The old epistemology aspired to … construct [natural science] somehow from sense data" (83; quoted by Johnsen on 81). This passage has an unfortunate ambiguity. It *could be* read as saying that the old epistemology aspired to provide an account of the *content* of science. That is, the old epistemology aimed to translate our scientific theories into a language of sense data and logic. The project of translating our science into a language of sense data and logic is conceptual in character. That our science has content that can be expressed in terms of sense data and logic would not on its own show that our science is *true*, as we have already seen Quine say. So, on this reading, Quine is saying that the old epistemology aspired to carry out a conceptual project. We think that insofar as Quine is talking about *construction* or *reconstruction*, we ought to read him as talking about the conceptual side of epistemology, since he says explicitly that the Carnapian project of rational reconstruction is a conceptual project (for which, see especially, 74-75). However, the passage could *also* be read as saying that the old epistemology aspired to construct science, understood as

a *body of knowledge*, out of sense data and logic. There are some reasons for taking the second reading seriously, both internal to "Epistemology Naturalized" (e.g on page 84) and with reference to other papers Quine wrote at around the same time, such as his 1975 paper, "The Nature of Natural Knowledge" (especially pages 68, 75, and 78). Moreover, on the second reading, Johnsen's claim that Quine takes epistemology to *consist in* efforts at rational reconstruction no longer makes Quine seem so wildly idiosyncratic. Johnsen's Quine would, perhaps, leave out of epistemology the project of answering the skeptic, but that is much *less* shocking and idiosyncratic than leaving out everything having to do with truth and justification, i.e. the entire doctrinal part of epistemology.

We think Johnsen has to opt for the second reading in order for his account to be at all plausible. Recall that according to Johnsen, Quine uses the term "epistemology" to denote a discipline that *consists in* the project of rational reconstruction. But Quine obviously did not think that the old epistemology consisted in its conceptual part. So, when Johnsen says that Quine took epistemology to consist in rational reconstruction, he must understand rational reconstruction as more than a conceptual project. However, if rational reconstruction includes normative, doctrinal elements, then Quine really does seem to be proposing to replace a normative project with a descriptive one, as his critics have claimed. We will come back to Johnsen's defense of Quine later in this section. For now, we want to point out that on neither reading does the passage Johnsen quotes provide any reason to think that Quine took epistemology to *consist in* rational reconstruction. Rather, the passage asserts only that *one aspiration* of the old epistemology was to construct natural science from sense data. But obviously a person or (metaphorically) an activity may have more than one aspiration. For example, many people aspire to eat well. They think that eating well is part of living a good life.

But not very many people *only* aspire to eat well. Moreover, not many people think that living a good life *consists* in eating well. Similarly, theoretical activities, such as physics and biology may be said to have many aspirations corresponding to their many different sub-branches or content areas. Physics aspires to catalog all of the fundamental particles. But physics does not *consist of* efforts to catalog all of the fundamental particles. Physics also aspires to understand the nature of space and time, to describe the fundamental forces of nature, to explain how Bose-Einstein condensates and globular clusters work, and much else.

The first passage, then, does not support Johnsen's contention that Quine took epistemology to consist in efforts at rational reconstruction. In the second passage that Johnsen quotes, Quine writes, "Philosophers have rightly despaired of translating everything into observational and logico-mathematical terms. … And some philosophers have seen in this irreducibility the bankruptcy of epistemology" (82; quoted by Johnsen on 81). This second passage also fails to support Johnsen's claim, since there is an obvious way in which the impossibility of translating scientific theories into observational terms threatens the whole of epistemology.[6] If one thinks that the conceptual side of epistemology is logically prior to the doctrinal, so that one must resolve the conceptual problems before one can resolve the doctrinal problems, then a failure on the conceptual side would wreck the entire enterprise. After all, if we can't figure out what our theories *mean*, we will be hard pressed to figure out whether they are *true*. But such a strong priority thesis is not required in order for the impossibility of reducing science to sense data to threaten epistemology as a whole. If we think of epistemology as a unified activity with the conceptual and doctrinal studies forming two indispensable parts of that

[6] Here, we will suppose (contrary to Johnsen) that rational reconstruction is a purely conceptual project. If we are wrong about that and rational reconstruction includes doctrinal elements as well, we think what we say here is even easier to defend.

activity, then showing that the conceptual part of the overall project cannot be carried out is to show that the entire project cannot be carried out. Just as one can show that a conjunction is false by showing that one of its conjuncts is false, one can show that epistemology is insolvent by showing that its conceptual part cannot work. The argument is simple. Solving all the problems of epistemology is possible only if solving the problems on its conceptual side is possible. But solving the problems on the conceptual side is not possible. Whatever one thinks of this argument, it clearly does not require us to think that epistemology consists in attempts to rationally reconstruct science. So, the passage Johnsen quotes does not support his claim that Quine used "epistemology" to denote a discipline that consists in rational reconstruction.

The third passage that Johnsen quotes is at least prima facie more helpful for him and more problematic for us. Quine writes, "But I think that at this point it may be more useful to say rather that epistemology still goes on. … Epistemology, or something like it, simply falls into place as a chapter of psychology." What should we make of this passage? On a straightforward reading, Quine means that *the whole of epistemology* becomes a chapter of psychology when epistemology is naturalized. From here, the argument goes something like this. Quine sometimes proposes to replace *rational reconstruction* with psychology (as on pages 78 and 82). In the third passage Johnsen quotes, Quine seems to be saying that epistemology as a whole will be replaced by psychology. Hence, we should suppose that for Quine, epistemology consists in rational reconstruction. One consequence is that Johnsen's Quine uses "rational reconstruction" in a broad way that includes both conceptual and doctrinal elements. As he puts it: For Quine, epistemology consists in "efforts at rational reconstruction---or, more broadly, attempts to discover or establish logical, translational or rational-reconstructive links between observation and theory" (2005, 81).

By contrast, on our view, Quine takes rational reconstruction to be entirely a conceptual project, not a doctrinal one. In the passage Johnsen quotes, we think Quine's use of "epistemology" should be read as having an implicit qualifier *that restricts attention to the conceptual side* of epistemology. We take Quine to be relying on his readers to carry over his previous statements about the conceptual nature of rational reconstruction and about the lack of progress on the doctrinal side of epistemology. In that context, a reader should understand that Quine is talking about the conceptual side of epistemology, not epistemology as a whole. On our reading, Quine's argument is simple, compelling, and unproblematic as far as it goes. Rational reconstruction is a conceptual project, not a doctrinal one. Conceptual projects are not normative (by which we mean: *any* story that captures the relationship between our sensory stimulations and our physicalistic discourse is just as good as any other). Hence, rational reconstruction is not normative. But if rational reconstruction is not normative, then it can be replaced by psychology without loss (so long as psychology provides a story that captures the relationship between our sensory stimulations and our physicalistic discourse). Quine is not proposing to replace a normative enterprise with a descriptive one; rather, he is proposing to replace a descriptive enterprise with a different descriptive enterprise.

Both our reading and Johnsen's reading face some challenges. We have to make sense of Quine's use of epistemology in the "containment" metaphor (on page 83). Johnsen has to make sense of Quine's repeated claim that rational reconstruction is a conceptual project. On these points, we think our accounts are pretty evenly matched. We both argue that Quine's exposition was poor, we just disagree about the way in which it was poor. And consequently, we both have to explain away some literal readings of Quine's text. However, we think our account does a better job accounting for what Quine says in "Epistemology Naturalized" and elsewhere about

the doctrinal (normative) side of epistemology and what he said in response to the normativity challenge itself. As we've seen, our account leads to a very simple reply to the normativity challenge, on which the fact that the challenge was raised at all becomes somewhat surprising. By contrast, as we will now argue, Johnsen's proposal is in obvious tension with the combination of Quine's naturalism and stagnation thesis, Johnsen's proposal doesn't fit well with Quine's later remarks on naturalized normative epistemology, and Johnsen's proposal introduces serious new problems for anyone with Quine's basic outlook regarding the nature of science.

According to Johnsen, Quine thought we should construct or discover the normative *in* the descriptive psychological story. Johnsen writes: "What he is actually proposing is to *enlist the aid* of psychology in addressing the burden of epistemology: psychology will identify the norms we adhere to, and philosophy will tell us that, *by virtue of* their being the ones we adhere to, they are the ones we *are to* adhere to" (88). So, for Johnsen, rational reconstruction is normative, since it describes the *evidential* linkage between patterns of sensory stimulation and scientific theory and thus tells us what the epistemic or scientific norms are. We think there is a lot to like about Johnsen's view, but we don't think it fits very well with what little Quine says about the doctrinal side of epistemology in "Epistemology Naturalized" and what he says in his reply to Hookway's (1994) paper on "Naturalized Epistemology and Epistemic Evaluation." Furthermore, Johnsen's interpretation is at odds with what Quine says in later writings about normative epistemology and the role of prediction in the game of science.

Recall that with respect to the doctrinal side of epistemology, Quine claimed that there had been essentially no progress since Hume. Previously, we argued that Quine's stagnation thesis would be implausible if Quine had thought of the doctrinal side of epistemology as descriptive, rather than normative. Essentially the same point is problematic for Johnsen's

reading of Quine. If Johnsen's interpretation is correct, then advances in psychology represent progress *on the doctrinal side*. Given his commitment to naturalism, Quine should agree that physiologists and psychologists learned a lot in the period from 1750 to 1970 about how humans convert sensory stimulation into science. If Quine had thought that advances in psychology were advances in our understanding of how we actually connect sensory stimulation to scientific theory, then on Johnsen's interpretation, Quine should have said that there had been *substantial* progress since Hume on the doctrinal side of epistemology. For, on Johnsen's reading, as we learn more about how we actually connect sensory stimulations to scientific theories, we learn something about how justification works, and justification is a topic on the doctrinal side.

In "Epistemology Naturalized," Quine claimed that there had been essentially no progress on the doctrinal side of epistemology since Hume. In his reply to Hookway, Quine maintained that we are not really *entitled* to rely on induction but are nonetheless *bound* to do so at least to some extent, which we take to be a traditional way of understanding Hume's skeptical solution to his skeptical problem. We will discuss Quine and Hume in greater detail in Section 5. For now, we want to observe that on Johnsen's reading, Quine's response to Hookway makes no sense. If Johnsen is correct, then the fact that we are (psychologically) bound to rely on induction entitles us to rely on it. Psychology identifies the canons of inductive reasoning as norms we adhere to. If philosophy tells us that we are supposed to adhere to some norms of reasoning in virtue of them being the norms we actually adhere to, then philosophy tells us that we are supposed to adhere to the canons of inductive reasoning. Hence, we are not only *entitled* to adhere to the canons of inductive reasoning, we are *obligated* to do so, contrary to what Quine says in his reply to Hookway.[7]

[7] There is another oddity here. On Johnsen's reading, Quine's view with respect to induction is essentially the same as Strawson's (1952, Chapter 9). Quine reviewed Strawson's book in 1953 and describes the chapter on induction as

Finally, we think that Johnsen's interpretation is at odds with what Quine says in his later writings about normative epistemology and the role of prediction in the game of science. For Quine in "Epistemology Naturalized," the conceptual side of epistemology is non-normative, so if there is any normative part of epistemology, it must be on the doctrinal side. We adopt as an interpretive principle that all else being equal, a philosopher's views should be read so as to make them consistent across time. Hence, we take it that when Quine talks about normative epistemology in his later writings, such as his replies to Hookway and to White and his books *Pursuit of Truth* and *From Stimulus to Science*, he is talking about the doctrinal side of epistemology or a project on the doctrinal side. But what Quine says about normative epistemology in his later writings does not fit well with the thought that the norms that we *ought* to follow can simply be read off from the norms that we actually *do* follow.

In the first place, Quine doesn't *say* in those places that the norms we ought to follow are read off from the norms we actually follow. In fact, he suggests the opposite in *From Stimulus to Science*, where he writes: "Podiatry, appendectomy, and the surgical repair of hernias are technological correctives of bad side effects of natural selection, and such also in essence is normative epistemology in its correcting and refining our innate propensities to expectation by induction" (50). Quine then cites as an example "the exposure and correction of the gambler's fallacy: the insidious notion that a run of bad luck increases the likelihood that the next try will win" (50). Far from enshrining the norms we actually follow, those norms are likely to need correction. Some norms we follow in practice, such as the gambler's fallacy, might need to be

"an excellent little philosophical essay on induction" (433). But Quine never, so far as we know, mentions Strawson in connection with the normativity challenge. Even in his response to Hookway, which is specifically about the problem of induction and its relation to the normativity challenge, Quine does not mention Strawson or say that his own view has any relation to Strawson's. The absence of any such acknowledgement is not decisive, but we think it goes in the balance against Johnsen's reading.

eliminated altogether. Quine was even more explicit in his Kant lectures, saying that "by no means" are we "bound to say that in science anything goes, just so [long] as it is already going" (1980/2019, 33).

In the second place, Quine's account of the nature of science is in tension with Johnsen's reading of "Epistemology Naturalized." In his reply to White, Quine says (1986, 665) that normative epistemology is "the technology of truth-seeking, or, in a more cautiously epistemological term, prediction." In *Pursuit of Truth*, he maintains that accurate prediction is the constitutive aim of science (1992, 19-20). Quine emphasizes empirical checkpoints in his response to Hookway, where he says that the checkpoints give his overall theory a *realist* rather than *instrumentalist* character (1994, 504), and in *From Stimulus to Science*, he explicitly locates the empirical checkpoints in observation categoricals (1995, 25-26 and 49-51). But once we admit that prediction (or truth-seeking) is the constitutive aim of science—if it is, as Quine (1992, 20) puts it, what "decides the game, like runs and outs in baseball"—we have opened the door to the possibility of doing better or worse in an objective, measurable sense, and our psychology goes by the board. Appealing to the norms we actually follow has no value in the game of science unless the norms we actually follow promote successful prediction.[8] This point is highlighted by Quine's references in later writings to statistics and to decision and game theory, which are primarily concerned with predictive accuracy and truth, while engaging only minimally (if at all) with our actual psychology.

Summing up: We have argued that when Quine says epistemology becomes a chapter of psychology when it is naturalized, we should understand him as talking about the *conceptual side* of epistemology, which for Quine is descriptive, rather than normative. The normative

[8] This is a standard criticism of Strawson's attempt to dissolve the problem of induction. See Earman and Salmon (1992).

questions in epistemology, such as whether our inductive beliefs are justified, are all on the doctrinal side. Our reading makes sense of Quine's careful distinction between conceptual and doctrinal projects in epistemology, and unlike Johnsen's account, our reading doesn't make Quine's stagnation thesis obviously false.[9] Moreover, our view makes better sense of Quine's later remarks on normative epistemology and the nature of science.

What does our reading say about the puzzle of how to reconcile what Quine says in "Epistemology Naturalized" about replacing epistemology with psychology and his subsequent assertions that naturalized epistemology has a normative part that survives naturalization? We think the puzzle is due to a misreading of "Epistemology Naturalized." Why have so many philosophers misread Quine's essay? In part, we agree with Johnsen that readers missed the normativity in Quine's proposal because of expository failure on Quine's part. In crucial places in the middle of his essay, Quine wrote "epistemology" when he should have written "epistemology on its conceptual side." But Quine's sloppy use of the term "epistemology" is only part of the story. We think that if Quine had discussed the doctrinal side of epistemology in as much detail as he gave to the conceptual side, he would have been significantly less likely to have been misread. Had Quine traced out some of the history of work on the doctrinal side of epistemology as he saw it and given reasons for thinking that the Humean predicament is the human predicament and for thinking that there had been no progress on the doctrinal side since Hume, his readers would have had a much clearer idea of what he took to be the nature and limits of normative epistemology. Or perhaps, reflecting on the history of work on the problem of induction, he would have come to reject the stagnation thesis. In Section 5, we do some of the work on the doctrinal side that we think Quine ought to have done in "Epistemology

[9] As we argue in Section 5, Quine's stagnation thesis *is* false, but we do not think that it is *obviously* false.

Naturalized." We argue that Quine's slogan and his stagnation thesis are really distinct claims, and we argue that even if his slogan that the Humean predicament is the human predicament is true, his stagnation thesis is false. But before turning to Quine and Hume, we take a detour through the question of philosophical progress.

Section 4. Progress in Philosophy

In Section 5, we will argue that Quine was wrong to say that there had been no progress on the doctrinal side of epistemology since Hume. In order to make our case, we need at least a provisional understanding of what it might mean to make progress in philosophy. So, in this section, we describe five kinds of progress in philosophy: clarificational, teleological, exploratory, negative, and positive. For each kind of progress, we give some illustrations and indications of how that variety of progress has been made with respect to induction, since for Quine, it seems that there is only one problem on the doctrinal side of epistemology: Hume's problem of induction. Then in Section 5, we explicitly connect the examples here to Quine's stagnation thesis. We do not pretend to be giving a partition of the space of kinds of progress. The varieties of progress that we describe blend into each other and probably aren't exhaustive, either. However, we think our list is still useful insofar as we have identified important and interesting features of progressive inquiries. In order to situate what we say about progress, we begin this section with a brief discussion of some of the most prominent literature on the topic of progress in science and philosophy.

Typically, philosophers writing about progress in science and philosophy are interested in whether the discipline of philosophy is progressive and what it means to say that philosophy

makes progress or fails to make progress.[10] Chalmers (2015) says that philosophy makes progress iff (or to the degree that) it converges to the truth on big questions in philosophy.[11] Van Inwagen (2006) says that philosophy makes progress iff (or to the degree that) its arguments are successful, where an argument succeeds if it could be used by an ideal proponent of a philosophical thesis to convince an ideal, neutral audience in the presence of an ideal opponent of the thesis. Golding (2011) says that philosophy makes progress iff (or to the degree that) "a warranted, defensible position is developed that resolves a philosophical problem, even if there are competing resolutions and further problems to resolve" (200). We understand Golding's account of philosophical progress to be sympathetic with a beautiful account of the aim of philosophy given by Beebee (2017), according to which philosophy aims at finding places in the landscape of possible worldviews where one may comfortably live: what Beebee calls equilibria that can withstand examination. Stoljar (2017) says that philosophy makes progress iff (or to the degree that) it answers philosophical questions.[12] And Dellsén et al. (2022) offer four possible accounts of progress in philosophy by analogy to the four accounts of progress in science described by Dellsén (2018), namely: increase in truth-likeness, increase in effective problem-solving ability, increase in knowledge, and increase in understanding.

[10] In this paper we are not interested in philosophy as a whole but only in the doctrinal side of epistemology. However, the same considerations apply in our case as apply with respect to the wider discipline.

[11] Chalmers gives a list of examples of big questions in philosophy, but he doesn't provide any principled account of philosophical questions. Instead, he suggests using the opinions of professionals in philosophy as a way of operationalizing what counts as a big question in philosophy (or any other discipline). He writes (5): "The big questions of a field at time *t* are those that members of that field would count as the big questions of the field at time *t*." We will not take any position in this paper with respect to what counts as a philosophical question. See Floridi (2013), Sytsma and Livengood (2016), Chapter 2, and Stoljar (2017) for discussion of what makes a question philosophical. We also will not take any position with respect to whether some philosophical questions are empirical For discussion of that question, see Sytsma and Livengood (2012 and 2016) and Livengood and Sytsma (2022 and forthcoming).

[12] Stoljar argues for optimism about progress in philosophy. According to Stoljar, philosophical problems are often what he calls boundary problems, where a boundary problem is (roughly) a decision problem in which one needs to choose which of three prima facie plausible but mutually inconsistent propositions to reject, and if so, then "reasonable optimism" is true, since we have reason to think that we can solve and have often solved such boundary decision problems.

Generalizing and taking cues from Stoljar (2017, 21) and from Beebee (2017), we say that a discipline or part of a discipline makes progress iff (or to the degree that) it does an increasingly good job of satisfying its aims over time.[13] Whether science or philosophy makes progress is then a question of its aims, and we can redescribe the disagreements among Chalmers, van Inwagen, Golding, Stoljar, and Dellsén about the nature of philosophical progress as disagreements about the aim of philosophy. We think it is unlikely that philosophy has a single aim or even a single *cognitive* aim, but we do think philosophy has a few typical or characteristic aims. So, in what follows, we'll consider a range of possible aims and point to ways in which there has been doctrinal progress with respect to those aims.

We'll begin with a characteristic philosophical aim of clarifying things. *Clarificational progress* occurs when investigators transform a question or problem—which often starts out in a confused, vague, ambiguous, or inchoate form—into a clearer, sharper, more definite and mature form. In the case of the problem of induction, clarificational progress includes making Hume's skeptical challenge(s) precise. One might think that the problem of induction is already stated precisely in Hume's writings:

> [H1] Every induction assumes the *principle of induction*, which is itself a matter of fact.
>
> [H2] No matter of fact can be justified a priori, and any attempt to justify the principle of induction by induction a posteriori would be viciously circular.
>
> ---
>
> [H3] No induction is justified.

But scholars have debated and continue to debate about the character of Hume's skeptical challenge. As an example, consider Stove's (1965) reconstruction of Hume's argument and his criticism of the interpretations of Smith (1960), Popper (1959), von Wright (1957), and Flew

[13] Following Genin (2018), we might add nuance by requiring some limits on backsliding.

(1961). The H-argument reconstruction suggests that Hume made trouble for probabilistic justifications of induction. But Stove argued that "Hume's refutation of [inductive probabilism][14] is an entirely imaginary episode in the history of philosophy" (161). Although we do not think Stove's interpretation of Hume is correct, we think his account led to a better understanding of Hume's problem and thereby constitutes clarificational progress.

As a second example, consider the question of whether Hume's challenge is itself normative or descriptive. The H-argument assumes that Hume's challenge is normative and therefore, falls on the doctrinal side of epistemology for Quine. But on some readings, Hume asked for an account of the *psychology* of induction, not for a justification. A third example concerns the scope of Hume's argument. The H-argument implies that no induction is justified *in any way*. But on some readings, Hume was only skeptical of the power of the *understanding* to justify induction, allowing that induction is justified by custom and habit.

A fourth example has to do with the content of the principle of induction itself. The H-argument doesn't tell us what the principle says, and history has shown that the principle is very difficult to articulate. As we'll see later, Quine was aware of at least some of the difficulty in understanding the principle by way of Goodman's (1954) challenges to Carnap's confirmation theory. Hume himself gave two different statements of the principle of induction (that nature is uniform and that the future resembles the past), which might or might not amount to the same thing. We take it that Bayes, Kant, De Morgan, Peirce, de Finetti, and Carnap all made progress specifically with respect to clarifying the principle of induction. For example, Bayes (1763) showed that if we assume repeated trials of some experiment are independent and identically

[14] Stove used the abbreviation "I.P." to stand for "inductive probabilism," which is the thesis that [1] some arguments require rational agents to believe their conclusions, albeit with less than maximal certainty, despite the fact that those arguments are not deductively valid, and [2] some of those arguments are inductive arguments (160-161).

distributed, then we can put definite bounds on our rational credence with respect to the occurrence of an event in a new trial. Following Bayes, we might say that nature is uniform iff the parameters in a mathematical model of the data-generating process that we care about are stable over time. Reflecting on Kant and De Morgan, Peirce (1878c, 212) argued that the law of causality that every event has a cause follows from the logical principle that "any plurality or lot of objects whatever have some character in common (no matter how insignificant) which is peculiar to them and not shared by anything else." Peirce connected the law of causality thus formulated to the problem of induction, which again constitutes (at least) clarificational progress, tying together causation and the uniformity of nature. De Finetti and Carnap made similar contributions that are laid out in detail in Zabell (1989 and 2009).

As a fifth and final example, consider details of Hume's discussions of induction left out of the H-argument that might be philosophically important. Hume laid heavy emphasis on causation and the role of the causal relation in inferences to absent matters of fact, but the H-argument doesn't say anything about causation. Does that mean that the H-argument is unfaithful to Hume? Or is Hume's version just encrusted with unnecessary psychological or metaphysical commitments? These are contentious matters, and our collective understanding of the problem of induction has been and is still being clarified (see Jacobson 1987, Millican 1995, and Livengood and Korman 2020). Interpretative work constitutes progress, since the way one goes about responding to Hume's problem depends on what exactly that problem *is*.

Teleological progress occurs when investigators describe what would count as a solution to a problem by specifying the purpose served by solving it. Teleological progress might also be understood as clarificational progress, since a problem is clarified immensely by determining what would count as a solution to it. Still, we think the two varieties of progress are distinct.

How might teleological progress work in the case of induction? In some passages, Hume challenges his readers to produce the "chain of reasoning" by which inferences to absent matters of fact are made. Taking the challenge to produce a chain of reasoning seriously, one might say that solving the problem of induction requires describing an algorithm or building a machine that draws inductions in the ways that humans do. The purpose here being to make the rules of inductive inference explicit, either as a descriptive aim in itself or as a step toward an evaluative or injunctive end. If so, then nothing less than an effective procedure will count as a solution to the problem.[15] One might strengthen the demand and require a proof that the algorithm has some good-making epistemic feature, such as conforming to the canons of rationality, whatever those might be, or converging to the truth in the long run. The purpose here being, for example, to show that the procedure can be relied on. Although there was no implemented induction machine at the time Quine wrote "Epistemology Naturalized," there was serious progress both towards articulating what a solution to the problem of induction might look like in computational terms and towards producing an induction machine (for which, see Gold 1967 and Putnam 1968). Broadly methodological research, especially by Mill and by Peirce in the 19th century is a precursor. Increasingly sophisticated mathematical and computational work by Ramsey, Reichenbach, and Putnam in the 20th century constituted progress of the teleological sort. As an example, consider the following passage from Section 5 of Ramsey's paper on "Truth and Probability" (89-90):

> Men have not always believed in scientific method, and just as we ask 'But am I necessarily reasonable', we can also ask 'But is the scientist necessarily reasonable?' In this ultimate meaning it seems to me that we can identify reasonable opinion with the opinion of an ideal person in similar circumstances. What, however, would this ideal person's opinion be? As has previously been remarked, the highest ideal would be always to have a true opinion and be certain of it; but this ideal is more suited to God than to

[15] Notice that Hume could not have described his problem as we have here, since there was no adequate account of "effective procedure" in the 18th century.

> man. We have therefore to consider the human mind and what is the most we can ask of it. … We can therefore state the problem of the ideal as "What habits in a general sense would it be best for the human mind to have?" This is a large and vague question which could hardly be answered unless the possibilities were first limited by a fairly definite conception of human nature.

Here Ramsey tells us that a successful solution to the problem of induction must be a solution for humans and so any acceptable proposal answers to distinctively human ends, which depend on specifiable characteristics of human beings. Reichenbach (1939), Putnam (1968), and their successors also adopted a pragmatic, means-ends approach and have articulated a variety of precise ends that might be served by an induction machine.[16]

Exploratory progress occurs as investigators map out the possible ways of attacking a problem or the possible techniques for providing a solution. The most straightforward way in which exploratory progress occurs is when investigators propose—through invention or discovery—*new approaches* to a problem. Pragmatic justifications of induction, which focus on the justifying methods of inquiry rather than directly justifying beliefs, and proposals to dissolve the problem of induction by appeal to the meaning of "rationality" are both good examples of exploratory progress with respect to Hume's challenges. Whether or not those approaches succeed, they present new avenues for thinking about the problem. Making exploratory progress often involves the two related tasks of tracing consequences of adopting a proposed solution and identifying assumptions sufficient for definitively solving a problem, provided only that the assumptions are correct. Importantly, as Beebee (2017) makes clear, one can make exploratory progress with respect to a problem without *answering* it. Instead, one might make exploratory

[16] Considerable work has been done in the learning-theoretic tradition since 1970 such that it would be impossible to list all of the most important contributions. For an introduction to the contemporary literature, see Kelly (1996). For a recent and minimally technical contribution, see Huber (2017). For recent, technically demanding contributions, see the excellent work of Konstantin Genin, such as Genin (2018), Genin and Kelly (2019), Genin (2022), and Genin and Mayo-Wilson (2022).

progress by finding "intellectual equilibria" that can plausibly withstand examination. Hence, skepticism about philosophical *theses* is compatible with exploratory progress. Moreover, exploratory progress is possible even after a solution has been found. Other solutions might be better than the one(s) found so far or they might serve to better integrate old solutions with the rest of our knowledge.

Negative progress occurs when investigators rule out a proposed solution to a problem. In the history of work on the problem of induction, one might think that all of the progress has been negative. Bayes' solution presupposes that nature is uniform (in taking the single-case probability of the event of interest to be fixed) and hence fails to provide a non-skeptical solution. Kant's solution, if it works, shows how the law of causality may be supplied by the mind but says nothing about the reliability of any specific inductive inference or of any determinate method. Combinatorial, sampling-solutions such as the one proposed by Peirce and defended by Williams assume without justification that our experiences are randomly (or fortuitously) sampled from all possible experiences. Strawson's analytic dissolution is a non-starter because it confuses rationality with reliability. Evolutionary selectionist solutions fail to solve the logical problem. And so on. Or so one might think. But notice that we learn something about induction and about scientific reasoning more broadly by seeing how and why various proposals for solving the problem of induction fail.

As we search for a satisfying solution and fail, we learn that if a solution is to be found, it is to be found elsewhere. Perhaps a solution that justifies our ordinary practices will never be found. Perhaps Hume's skeptical challenge—whatever it is—simply cannot be met. It seems odd to maintain, *by induction*, that a record of failed attempts to answer Hume's skeptical challenge provides evidence that induction cannot be justified. But if the paradox can be tolerated, it seems

that ruling out various ways in which induction might be thought to be justified is a way of making progress on the topic.

Clarificational and teleological progress are closely related, since determining what would count as a solution to a problem is often one way to clarify what the problem is. Similarly, exploratory progress is related to clarificational and teleological progress, since clarifying the problem and describing what a solution would look like are plausibly part of the process of describing the landscape of approaches to the problem. All of the varieties of progress that we have noticed so far are types of what Stoljar (2017) calls "indirect" progress. One can make progress in any or all of these ways without actually solving the principal problem under investigation.

By contrast with the indirect varieties of progress, *positive progress* occurs when investigators actually solve a problem. Here we want to let what counts as actually solving a problem be a bit vague. Sometimes, solving a problem means there is consensus, but not always. In some cases, there may be several solutions that are equally good or equally good for practical purposes. Here, it is useful to think about engineering and design problems. There are lots of ways to build a chair, to flush a toilet, to transport goods to a market, to light a room, and the like. Often, there is no uniquely best way to solve a problem but there are several satisfactory ways to go. (Quine, the persistent explorer, should have been happy with this observation, given that he often took new routes to a target destination.) In many cases, positive progress is made incrementally. Investigators break a larger problem into smaller, more manageable parts and show how to address the parts. Solving a problem does not require solving all of the problems having to do with the topic under investigation—nor even all of the problems that might plausibly count as *the* problem. As we have observed, for Quine, there was really only one

doctrinal problem: Hume's problem of induction. We think it is at least plausible that there was positive progress with respect to Hume's problem between 1750 and 1970. For example, one might understand Reichenbach's pragmatic justification of the straight rule as partial or incremental positive progress. In closing out this section, we want to observe that several philosophers have regarded and do regard Hume's problem of induction as outright *solved*. Recently, Stoljar (2017, esp. 50-51 and 57) has argued that Hume's problem of induction has been solved, and importantly for our project here, Stoljar points to Goodman's reflective equilibrium solution in *Fact, Fiction, and Forecast* and seems to agree with Goodman (1954, 63) that "What is commonly thought of as the Problem of Induction has been solved or dissolved."

Section 5. Doctrinal Stagnation and the Humean Predicament

In "Epistemology Naturalized," Quine made two claims about the doctrinal side. The first, which we have called Quine's *stagnation thesis*, was that there had been no progress on the doctrinal side of epistemology since Hume. The second, which we have called Quine's *slogan*, was that the Humean predicament is the human predicament. Perhaps Quine took the claims to be obvious. In any event, he didn't argue for either claim, and he didn't articulate them in any detail.

In this section, we discuss Quine's slogan and stagnation thesis. We argue that if the slogan is true, then the stagnation thesis is false. The structure of the argument is a constructive dilemma. We assume that Quine's slogan is true, and we consider what we take to be the only four admissible interpretations of it: [1] that all or almost all of our beliefs fall short of *Cartesian certainty*; [2] that induction is not rationally justified; [3] that induction is not justified in *any* way; and [4] that induction does not produce knowledge. We argue that on each of these

interpretations, the stagnation thesis is false. Hence, if Quine's slogan is true, his stagnation thesis is false. But if Quine's slogan is false, then his stagnation thesis is probably *also* false. So, we ought to think the stagnation thesis is false.

We think that in "Epistemology Naturalized," Quine took the Humean predicament to be that all or almost all of our beliefs fall short of *Cartesian certainty*, since inductive reasoning cannot provide such certainty.[17] We do not think the anti-certainty interpretation is plausible as a reading of Hume. However, we think it is likely that Quine *interpreted* Hume as arguing that inductive reasoning is always uncertain.[18] Some evidence for this reading comes from the first of Quine's 1946 lectures on David Hume's philosophy. After giving some biographical details, Quine writes (2008, 50-51):

> Historically the theory of knowledge begins as a quest for certainty. Mathematics is the shining example of a science in which we can be certain of our conclusions. If this virtue were shared by the other sciences, notably physics and the rest of the natural sciences, there would have been little speculation over the theory of knowledge. Philosophers worry about theory of knowledge because the human understanding is in *trouble*; and its trouble is the uncertainty of knowledge about the world.

One might say that this *trouble* is a kind of *predicament* that we're all in and that Hume left us in that predicament by showing that other philosophers' attempts to provide us with certainty were nothing but sophistry and illusion.

The anti-certainty interpretation also fits well with Quine's use of Descartes as a foil in "Epistemology Naturalized" and with his analogy to philosophy of mathematics. Both in his

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[17] Sometimes, the failure of Cartesian *certainty* is run together with the failure of Cartesian *foundations*, as in the following passage from Putnam (1982, 18): "'Epistemology Naturalized' takes a very different tack. "Justification" has failed. (Quine considers the notion only in its strong "Cartesian" setting, which is one of the things that makes this paper puzzling.) Hume taught us we *can't* justify our knowledge claims (in a foundational way). Conceptual reduction has also failed (Quine reviews the failure of phenomenalism as represented by Carnap's attempt in the *Logische Aufbau*). So, Quine urges, let us give up epistemology and "settle for psychology"."

[18] Stove (1965) defends the claim that Hume's arguments establish only that induction does not provide us with conclusions that are certain. We think that Millican (1995) thoroughly demolishes Stove's interpretation of Hume, but it is perhaps significant that Stove's reading was on the cutting edge at the time that Quine was writing "Epistemology Naturalized."

Hume lectures and in "Epistemology Naturalized," the project of epistemology is framed in terms of the quest for certainty. As an example, consider the following passage in which Quine remarks on the state of the doctrinal side of epistemology after Carnap (1969b, 74):

> There the Humean predicament remained unaltered. … The most modest of generalizations about observable traits will cover more cases than its utterer can have had occasion actually to observe. The hopelessness of grounding natural science upon immediate experience in a firmly logical way was acknowledged. The Cartesian quest for certainty had been the remote motivation of epistemology, both on its conceptual and its doctrinal side; but that quest was seen as a lost cause. To endow the truths of nature with the full authority of immediate experience was as forlorn a hope as hoping to endow the truths of mathematics with the potential obviousness of elementary logic.

Here, we read Quine as saying that the bulk of what we believe is derived from observation by way of induction, rather than deduction, and all of our inductions are uncertain; hence, the bulk of what we believe is uncertain. Perhaps observation sentences themselves may be construed so as to make them certain, in more or less the way that Hume secured our knowledge of the objects present to our senses by identifying bodies with sense impressions (as Quine remarks on 71). But while appealing to observation sentences in such a way might represent a conceptual advance, it would not represent a *doctrinal* advance from the place Hume left us.

On the anti-certainty interpretation, we are prepared to accept that the Humean predicament is the human predicament: uncertainty is a fact of life that cannot be altogether eliminated. However, if the Humean predicament is just that the bulk of what we believe is uncertain (because induction does not yield certainty), then despite the fact that the Humean predicament is the human predicament, there clearly *has been* progress on the doctrinal side of epistemology since Hume, and much of that progress happened in the period between Hume and Quine.

For example, at the end of the 18th century, Bayes and Price developed techniques for quantifying and bounding the degree of uncertainty in drawing inferences from experience to

absent matters of fact.[19] Importantly with respect to Quine's slogan and stagnation thesis, Bayes and Price *assume* that our beliefs are uncertain (for the most part). But they show how to *manage* that uncertainty in a formally-precise way.[20] In the 19th and 20th centuries, researchers added more sophisticated mathematical machinery and alternative philosophical foundations for the Bayesian program.[21] On the anti-certainty reading, researchers working in the Bayesian tradition made substantial progress on the doctrinal side of epistemology without ever getting out of the Humean predicament. The work of Bayes, Price, and their followers most obviously constitutes clarificational and exploratory progress. The Bayesian framework substantially clarifies the uniformity of nature assumption. Moreover, it provides several new lines of attack on the problem of induction. It may also constitute teleological progress since it brings into focus the idea that a solution to the problem of induction could be to specify what is required for a wise man to proportion his belief to the evidence.

Other researchers, such as Peirce, Fisher, Neyman, and Reichenbach, developed a different set of techniques for ensuring the reliability of uncertain inferences and putting definite bounds on their errors.[22] Measures of correlation, confidence intervals, hypothesis tests, and maximum likelihood estimators are all examples of statistical technology developed in the period from Hume to Quine. These and related techniques do not eliminate uncertainty, so on the anti-certainty reading, they do not give us any way out of the Humean predicament. But they still represent substantial exploratory progress on the doctrinal side of epistemology by focusing

[19] See Bayes (1763/1958) and Price (1764 and 1767).
[20] Whether Bayes provided a solution to Hume's skeptical doubts is a delicate question that deserved, but did not receive, Quine's attention.
[21] For examples, see Laplace (1774/1986), De Morgan (1838 and 1847), Keynes (1921), Ramsey (1926/1964), De Finetti (1937), Jeffreys (1939), and Carnap (1950 and 1952).
[22] For examples of work in this Frequentist tradition, see Peirce (1878b and 1883), Fisher (1922, 1935), Neyman and Pearson (1928), Williams (1947), Reichenbach (1949), and Neyman (1955).

attention on *methods*, as opposed to personal *beliefs*. The frequentist tradition also constitutes limited positive progress insofar as it shows how the reliability of a method can be formally characterized and its errors kept within definite bounds.

Still other researchers, such as Whewell and Mill, clarified, refined, and elaborated on the nature of scientific inquiry itself. Some notable achievements here include Whewell's (1847 and 1849) accounts of explanatory inference and the consilience of inductions and Mill's (1843) methods of causal inference. Darwin (1859 and 1876) plausibly made serious contributions to methodology along with his first-order contributions to biology and related life sciences by emphasizing the importance of explanatory inference. And later in the 19th century, Peirce (1878b, 1878c, 1878d, 1879/1967, 1883, 1892, and 1901/1958) carried out extensive research on induction, abduction, and the economy of research. None of this activity rejected the claim that our beliefs are uncertain, so on the anti-certainty reading, it leaves us in the Humean predicament. However, these researchers made substantial progress on the doctrinal side of epistemology, since they were engaged with the critical evaluation, revision, expansion, and clarification of the kinds of rules accepted by Hume (e.g. in Book I, Section XV of the *Treatise*) and by Quine (e.g. in the *Web of Belief*) as characterizing our best ways of carrying out inquiry. Again, the work of these researchers constitutes at least clarificational and exploratory progress. Peirce's work also constitutes teleological progress, since he distinguishes different phases in scientific inquiry in a way that makes much clearer what a solution to the problem of induction might look like. So, if the Humean predicament is that all or almost all of our beliefs are uncertain, then it is *true* that the Humean predicament is the human predicament and *false* that there was no progress on the doctrinal side of epistemology from 1750 to 1970.

The anti-certainty interpretation is the most plausible reading of Quine's slogan in "Epistemology Naturalized," but there are better readings of Hume. Moreover, Quine expresses views in line with some other interpretations of Hume, especially in his later writings. So, we now want to consider three further ways of understanding the Humean predicament in order to see whether they make the stagnation thesis plausible. According to the first of the further views we want to consider, which we will call the *non-rational* interpretation, the Humean predicament is that induction is not or perhaps *cannot be* rationally justified.

In order to make this interpretive option clear, we'll start with a traditional statement of the problem of induction. Let the Principle of Induction [P] be the proposition that "instances, of which we have had no experience, must resemble those, of which we have had experience, and that the course of nature continues always uniformly the same" (T 89). Then an inductive skeptic might argue as follows:[23]

[S1] [P] cannot be rationally justified.

[S2] If [S1], then no inference that presupposes [P] can be rationally justified.

[S3] Every induction presupposes [P].

[S4] No induction can be rationally justified.

Hume's defense of [S3] relies on the assumption that all arguments from experience ultimately depend on the uniformity of nature. The traditional defense of [S1] goes like this: If [P] can be *rationally* justified, then there is a good argument whose conclusion is [P].[24] Any argument for

[23] This formulation of the inductive skeptic's argument is taken with very little modification from Livengood and Korman (2020).

[24] For comparison, see proposition (11) in Millican's (1995) reconstruction of Hume's argument, which reads: "The Uniformity Principle can only be justified on the basis of a good argument" (109).

[P] is either deductive or inductive.[25] Any deductive argument for [P] is either invalid because it attempts to derive a matter of fact a priori or it assumes what needs to be proved. And similarly, every inductive argument for [P] is viciously circular, since every inductive argument presupposes [P]. Premiss [S2] follows from the principle that no inference with a rationally unjustifiable presupposition can be rationally justified.

Quine seems to have agreed with Hume that [P] or something substantially like it is the guiding principle of inductive reasoning. In setting up the problem of induction in Chapter 7 of *The Web of Belief*, Quine and Ullian observe: "When we try to be a bit more explicit and precise about induction's guiding principle—that future cases will be like past ones—we are suddenly lost in perplexity" (85). To draw out what is so difficult in the idea that the future will be like the past (or that the course of nature will continue uniformly), Quine and Ullian describe two *paradoxes* of induction. All of our observations of emeralds so far equally support the conclusion that the next emerald will be green and the conclusion that the next emerald will be grue (that is, green and observed before some far future date or blue and observed after that date). Similarly, all of our observations so far equally support the conclusion that our present observation is our last and that our present observation will be followed by more (and hence, that we are immortal). Quine and Ullian conclude (86), "The sober fact is that we cannot expect every trait shared by past cases to carry forward to future cases." The traits that carry forward are, in Goodman's terminology, *projectible*. Our expectations about the future are then implicit claims about which traits are projectible. Quine and Ullian then connect projectibility to similarity, saying that we judge things to be similar when they share traits that we judge to be projectible (87).

[25] In Hume's terms, any argument for [P] would have to be either demonstrative or probable.

We wonder whether Quine thought there was anything new in Goodman's "New Riddle." If the "New Riddle" was really *new,* then it taught us something on the doctrinal side of epistemology. If it wasn't, then we learned something *else*, such as that one can make Hume's problem precise using grue-some predicates or that probabilistic confirmation theories cannot provide a satisfying solution to Hume's problem of induction. Again, we see clarificational and exploratory progress.

In his essay on "Natural Kinds," Quine characterizes the problem of induction as a question about why there should be such close agreement between our innate way of carving up the world into kinds and the way the world is actually divided into functional groupings. He writes (126):

> *Why* there have been regularities is an obscure question, for it is hard to see what would count as an answer. What does make clear sense is this other part of the problem of induction: why does our innate subjective spacing of qualities accord so well with the functionally relevant groupings in nature as to make our inductions tend to come out right? Why should our subjective spacing of qualities have a special purchase on nature and a lien on the future?

In answer, Quine suggests that our inductive inferential practices are justified because they are the products of natural selection, and he claims to be unimpressed by the charge that justifying induction in this way is illegitimately reasoning in a circle (48). So it seems that like Hume on the non-rational interpretation, Quine takes induction to be justified by something other than reason. But instead of custom and habit, Quine appeals to an innate subjective structure with respect to qualities or qualitative properties of things, which structure is due to the action of natural selection. Roughly, our innate way of carving up the world agrees with the actual functional groupings in the world because nature selected for such agreement.

But what Quine says about induction and natural selection in "Natural Kinds" sits awkwardly with what he says in "Epistemology Naturalized." If induction were justified

externally by the fact that our inductive practices are the products of natural selection, then induction was justified already for Hume as well. So, the Humean predicament isn't any *predicament* at all! One might try to argue that the stagnation thesis at least comes out as true on this reading. But even that doesn't look right, since it is surely progress on the doctrinal side to come to understand that one is not really in a bad epistemic predicament and why this is so. Moreover, if our inductive practices are externally justified by way of the action of natural selection, then as we learn about natural selection and its relationship to our inductive practices, we gain internal justification as well. So, even if we take doctrinal progress to require internal justification, Darwin's *Origin* constitutes clear progress—positive progress—on the doctrinal side of epistemology. And so, the stagnation thesis is false.[26]

Returning to the skeptical argument, what should we say? Up front, we are not sure that on the non-rational interpretation, the Humean predicament really is the human predicament. Many philosophers since Hume have denied it. Notably, Price (1767), Peirce (1883, 1892, and 1901), Williams (1947), and Reichenbach (1949) all give arguments aimed at rationally justifying induction. Price was particularly explicit about what he thought his and Bayes' mathematical works showed, writing that "so far is it from being true, that the understanding is not the faculty which teaches us to rely on experience, that it is capable of determining, *in all cases*, what conclusions ought to be drawn from it, and what *precise degree* of confidence should be placed in it" (1767, 398).

[26] Proponents of non-rational justification of induction also face a potential self-defeat challenge along these lines. For once we come to believe that induction is non-rationally justified, e.g. by way of natural selection, we have a reason to think that induction is justified. And hence, induction becomes rationally justified for us after all.

Of course, one might argue that all those philosophers were wrong and that although many have tried, no one has yet shown that induction is or even can be rationally justified.[27] But the collection of attempts to answer Hume's skeptical challenges *must* constitute progress. Either at least one attempt succeeds in addressing Hume's challenges or none of them does. If at least one attempt succeeds, then the attempts collectively constitute positive progress. If none of them succeeds, then we gain confidence that the skeptical challenges cannot be solved as "many penetrating and able philosophers shall turn their enquiries this way and no one be ever able to discover any" solution, as Hume himself suggested (E 4.2.30). If there really is no solution to the problem, then increasing confidence that there is no solution is *positive* progress. Otherwise, it is negative progress.

You may feel that there is something paradoxical in saying that we become more certain that induction cannot be rationally justified in virtue of an induction with respect to a long history of failures to rationally justify induction. Our increasing confidence would itself have no rational justification. But it's hard to see how to square Quine's naturalism and, in particular, his favorable view of psychology with the denial that increasing confidence in this way constitutes doctrinal progress.

We may remove the sense of paradox by arguing that induction is *justified* without being *rationally* justified. Some Hume scholars argue that Hume himself thought induction was non-rationally justified. For example, Loeb (2006, 2008) argues that Hume took induction to be justified externally but not internally. In a similar vein, Qu (2014) argues that Hume took custom and habit to provide a non-rational justification for induction. We cannot rationally justify the principle of the uniformity of nature, which Hume thought was presupposed by every induction.

[27] See Howson (2000) for an extended argument that "despite its seeming absurdity, Hume's argument is actually correct" (2) and that in some sense, at least, Hume's skepticism has resisted all attempts to solve it.

Moreover, we are not *determined by reason*, or by human understanding, to infer absent matters of fact from the evidence of our senses and memory. Instead, we rely on a "principle of human nature" that Hume referred to as *Custom* or *Habit* (E 5.1.36). Hence, induction is not justified by reason, but it *is* justified. As Hume puts it, there is a "principle of equal weight and authority [as reason]; and that principle will preserve its influence as long as human nature remains the same" (E 5.1.34). In some other writings from around the time of "Epistemology Naturalized," such as "Natural Kinds," and *The Web of Belief*, Quine seems to have adopted a view similar to the Loeb and Qu accounts of Hume.

In any event, if Quine thought that inductive reasoning was non-rationally justified when he wrote "Natural Kinds," he did not maintain that view for very long. For in "The Nature of Natural Knowledge," Quine rejects the claim that induction is justified by way of natural selection. Rather than appealing to Darwin's theory to justify induction, Quine simply asserts that induction is effective and then appeals to natural selection to explain *why* induction is effective (70).[28] Quine is more explicit about his view in a response to Hookway's (1994) paper on naturalized epistemology and epistemic evaluation. Hookway lists several classes of "evaluative issues that might be supposed to arise in the course of carrying out inquiries and which are taken seriously by the 'tradition'" (471). The first class of evaluative issues is comprised of problems of *global legitimation*. A problem of global legitimation begins with some important part of our cognitive life, such as our inductive reasoning, and then asks us "to provide an explanation of why we are entitled to rely upon" it (471). In his response, Quine writes (502), "Hookway cites as an issue of epistemic evaluation the question why we are

[28] Quine was right to shift from justification to explanation in this way. As Livengood and Korman (2020) explain, the fact that our inductive practices are the product of natural selection makes the normative problem of induction worse, not better.

entitled to rely on induction. I suppose my position is that we are not *entitled* to, though up to a point we are *bound* to."

How should we read Quine's claim that we are not entitled to rely on induction? One way of going is to add "rationally" as an implicit qualifier to "entitled." Then the contrast is that while we are not entitled *by reason* to rely on induction, we are entitled to rely on induction *by nature*. Again, there is a parallel in Hume, who located custom within the realm of human instinct and claimed that custom is "necessary to the subsistence of our species, and the regulation of our conduct, in every circumstance and occurrence of human life" (E 5.2.44). Hume maintained that our feeling of justification in making inductive inferences is better explained by appealing to instinct than by appealing to human understanding. Moreover, according to Hume, our habit of drawing inductive inferences is so essential to our survival that it would be bad design to entrust it to "the fallacious deductions of our reason, which is slow in its operations; appears not, in any degree, during the first years of infancy; and at best is, in every age and period of human life, extremely liable to error and mistake" (E 5.2.45). One might argue that being bound to reason inductively in this way entitles us to do so—bearing in mind that the entitlement is not *rational* entitlement. But however plausible such a reading might be for Hume, we think it is implausible as a reading of Quine. For one thing, Quine *contrasts* being entitled to rely on induction with being bound to do so. The implication is that being bound to rely on induction *does not* provide any entitlement to do so. Moreover, if Quine had thought that being bound to rely on induction provided some kind of non-rational justification, surely he would have taken the opportunity afforded by Hookway's paper to make his view clear and explicit in this respect.

Instead, we think Quine's response to Hookway suggests a third way of understanding the Humean predicament. Namely, Quine might have taken the Humean predicament to be that

induction cannot be justified *at all*. On this *no-entitlement* reading, Quine's view was that the doctrinal side of epistemology had made no progress since Hume because progress on the doctrinal side is impossible. As a normative matter, induction is not justified. We are not entitled to rely on induction even though in virtue of our evolutionary heritage, we cannot help doing so. We now want to give two arguments for thinking that the stagnation thesis is false even on this *no-entitlement* interpretation of the Humean predicament.

First, we should think that researchers working on the doctrinal side of epistemology made progress—even if it was progress of a limited sort similar to the record of progress on the conceptual side that Quine sketched in "Epistemology Naturalized"—unless that presumption is defeated by good reasons. Quine did not provide good reasons for thinking that research on the doctrinal side of epistemology had made no progress since Hume. In "Epistemology Naturalized," Quine didn't even *mention* proposed justifications of induction down through the years, from Bayes to Kant to Peirce to Reichenbach to Williams, let alone *argue* that they had failed. Nor did he discuss reliabilist accounts of justification according to which induction is justified provided it is effective, as Quine explicitly declared it to be in "The Nature of Natural Knowledge." Nor did Quine seriously engage with any other approaches to the problem of induction that he clearly knew about. For example, he said nothing about Strawson's proposed dissolution of the problem of induction (which proposal was in a book Quine reviewed in 1953). And although he wrote extensively about Goodman's work, including discussing Goodman's new riddle of induction, Quine ignored Goodman's proposal in *Fact, Fiction, and Forecast* (64) that inductive rules of inference are justified by way of mutual adjustments between the rules and particular accepted inferences. Nor did Quine discuss Carnap's extensive work on the doctrinal side of epistemology. Importantly, Quine gave no reason at all to think that the work of

Strawson, Goodman, and Carnap failed to make any progress with respect to the doctrinal side of epistemology. Given both the amount of work on induction in the relevant period and the intellectual ability of the researchers who carried out that work, we ought to think, *by default*, that their work constituted progress on the doctrinal side of epistemology. At the very least, we would expect clarificational, exploratory, and negative progress.

One might balk at the claim that we can accept Quine's slogan under the no-entitlement interpretation while regarding research on induction as progressive by default. We think such doubts are met by a second argument, which is a version of the argument given already in connection with the non-rational interpretation. Either at least one of the proposed answers to Hume's skeptical arguments succeeds or none of them does. If at least one succeeds, then Hume's skeptical problem is solved, which would be positive progress.[29] If none of them succeeds, then by seeing that they fail, we *learn* that none of those specific proposals solves the problem of induction. Such learning constitutes negative progress. But also, we learn more about the predicament we're actually in by seeing *how* or *why* the proposed solutions fail. Such learning constitutes clarificational and perhaps also teleological progress. So, the stagnation thesis is false on a no-entitlement understanding of the Humean predicament.

The stagnation thesis is false on a no-entitlement interpretation. Let's consider one more way of characterizing the Humean predicament. Quine might have understood the Humean predicament to be that induction cannot generate knowledge. We think this is the least plausible way to understand the Humean predicament *as an interpretation of Quine*. However, it is independently interesting and plausible as an interpretation of Hume, and it probably does the

[29] In fact, we think that some of the proposed solutions do succeed---at least in a limited way. For example, the pragmatic argument that Reichenbach (1949) gives in Chapter 11 of his book on probability solves one problem of induction in a special case.

best job of making the stagnation thesis defensible. One nice feature of the no-knowledge account of the Humean predicament is that with some other widely-held assumptions, it is entailed by (at least) two of the other interpretations. First, suppose Hume showed that induction cannot deliver certainty. If knowing that *p* entails that one is certain that *p*, then to show that induction cannot deliver certainty is to show that we cannot know anything on the basis of induction. Since inductions are never certain, they never generate knowledge. Second, suppose Hume showed that induction cannot be (rationally) justified. If knowing that *p* entails that one is (rationally) justified in believing that *p*, then to show that induction cannot be (rationally) justified is to show that we cannot know anything on the basis of induction. Since inductions are never (rationally) justified, they never generate knowledge. Third, suppose Hume showed that when we form a belief on the basis of induction, our belief has no genuine, non-accidental connection to the relevant facts. If knowing that *p* entails that one's belief that *p* is non-accidentally connected to the fact that *p*, then to show that induction cannot secure a non-accidental connection between our beliefs and the relevant facts is to show that we cannot know anything on the basis of induction. Since inductions never secure non-accidental connections, they never generate knowledge.

As in the previous case of the no-entitlement interpretation, progress on the doctrinal side of epistemology is consistent with the Humean predicament being the human predicament. Of course, Quine never establishes that Hume's problem was not solved by Bayes or Kant or Peirce or Reichenbach or De Finetti or anyone else. To do so, he would have had to *argue* that the proposed solutions fail to show that induction can produce knowledge. And such an argument would be self-defeating with respect to the stagnation thesis, since eliminating proposals that fail to solve a problem constitutes negative progress. But another problem for Quine's stagnation

thesis emerges at this point. As we understand it, the stagnation thesis presupposes that the only way to make progress on the doctrinal side of epistemology is to answer Hume's problem and thereby get us out of the Humean predicament. But there are other ways to make progress with respect to the doctrinal (normative) side of epistemology. For example, one might *assume* that the problem of induction is solved—taking it as an axiom that our inductive reasoning practices generate knowledge—and then explore the consequences of that assumption on the doctrinal side. In that case, we learn something about how various norms, methods, and doctrinal assumptions are interrelated. Such work might show how the problem of induction itself could be solved. Or if the problem is not solvable, such work might show the extent of the doctrinal consequences of inductive skepticism, just as computer scientists learn something by proving that a problem is equivalent to the halting problem even though there is no *solution* to the halting problem. Here we have clarificational and exploratory progress.

Alternatively, one might assume that the problem of induction is *not* solvable and ask what we can know and what we can show about what we can know in light of that limitation. One might think that if *induction* doesn't generate knowledge, then it is generated in some other way. And some important philosophers and statisticians in the first half of the twentieth century argued that knowledge is in fact generated in a very different way. For example, Popper argued that knowledge was generated by way of bold conjecture and severe testing, not by way of induction. And Neyman argued that inductive *reasoning* has no place in science, although inductive *behavior* does. For Neyman, knowledge was generated by specifying a collection of hypotheses to test and laying down determinate decision rules for selecting a hypothesis from the collection on the basis of observations. These and related lines of investigation constitute

clarificational, teleological, and exploratory progress on the doctrinal side of epistemology even if (and perhaps *especially* if) the Humean predicament is the human predicament.

Section 6. Concluding Remarks

Let's take stock. We have argued that Quine never endorsed replacement naturalism. His claim that when naturalized, epistemology becomes a chapter of psychology is best understood as elliptical for the more modest claim that when epistemology is naturalized, its conceptual side becomes a chapter of psychology. We think the standard misreading of "Epistemology Naturalized," as proposing to replace all of epistemology with psychology, is explained by the fact that Quine wrote essentially nothing about the doctrinal side in "Epistemology Naturalized." Quine offered no careful statement of what the Humean predicament is. Nor did he give any arguments for thinking that the Humean predicament really is the human predicament or for thinking that his stagnation thesis is true. We discussed four ways of characterizing what the Humean predicament is, and we argued that on each of those characterizations, the stagnation thesis is false.

We have suggested, though we have not really *argued*, that if Quine had discussed the doctrinal side of epistemology to the same extent as he discussed the conceptual side in "Epistemology Naturalized," his essay would not have been so widely misunderstood. Further, we think that seeing how the Stagnation Thesis fails is informative with respect to the project of naturalizing the normative, doctrinal side of epistemology. In closing this essay, we want to gesture at how the history of research on the problem of induction and on uncertain inference can help us to articulate a valuable, progressive naturalized normative epistemology that sits well in a broadly pragmatist, positivist, Quinean framework.

In his later writings, Quine claimed that naturalized normative epistemology is the branch of engineering concerned with the technology of truth-seeking or prediction. As he put it in *Pursuit of Truth* (19):

> Insofar as theoretical epistemology gets naturalized into a chapter of theoretical science, so normative epistemology gets naturalized into a chapter of engineering: the technology of anticipating sensory stimulation.[30]

Quine's best examples of the technology of truth-seeking are *abstract* artifacts, such as the machinery of probability, statistics, and decision theory.[31] We would add various concrete technologies such as microscopes and telescopes, which increase our perceptual capacities. But Quine's own examples are very much in line with what we observe about the history of research on the problem of induction. Philosophers and statisticians have built an impressive collection of abstract artifacts for making reliable predictions, for representing and managing uncertainty, for making good decisions, and generally for getting true answers to our questions.

At least in its broad outlines, we think Quine's approach to the doctrinal side of epistemology is correct. Given an aim, normative, doctrinal problems become optimization problems. Researchers often develop new technology to solve such optimization problems, and much of that technology consists of abstract artifacts. Once an aim is specified, whether this or that technique satisfies the aim or does so better than a competitor is a matter of *description*, and hence, poised for naturalization. Quine took prediction to be the constitutive aim of the game of science. We're not so sure that there is just one aim that defines a single activity properly called "science." Rather, there are several aims, such as getting true answers to our questions, settling

[30] On our reading, Quine is here repeating his division of epistemology into conceptual and doctrinal studies using the terms "theoretical" and "normative," respectively.

[31] Houkes (2002) has argued that Quine cannot make the idea of a technology of truth-seeking work without giving up his critique of intentionality. We think this is a serious challenge but one that can be met. However, we do not have space to address the objection here.

disagreements, making successful predictions, and understanding how things work, which constitute games that are closely related, mutually informing, often overlapping in practical terms, and hence, often difficult to distinguish. But all of that story is consistent with progress on the doctrinal side of epistemology. The Humean predicament may be the human predicament. We may be adrift, as Neurath imagined. But even at sea, we can build better boats.

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