DRAFT

Chapter from a book, *The Material Theory of Induction,* now in preparation.

Epilog

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The many chapters of this book all aim to sustain a single conclusion. Inductive inferences are not warranted by formal schemas or rules. They are warranted by background facts. Over the last few years, I have had the opportunity of presenting this thesis and arguments for it in various philosophical forums. The reactions to it have been varied. Some find the idea illuminating and even obvious, once it is made explicit. They are supportive and I am grateful for it. Others are more neutral, reacting with various forms of indifference or incomprehension. Some set aside the question of whether they are or are not convinced by the main claim; or whether there is some way that they could help the speaker advance the project. Rather they hold to the lamentable idea that, no matter what, the job of an audience in a philosophy talk is to try to trip up the speaker with some artful sophistry. Still others are, perhaps, not quite sure of precisely what I am proposing and arguing. But they are nonetheless sure that it is a Very Bad Thing that must be opposed and stopped.

For audiences in these last two categories, a common strategy is to pursue this line:

> "If every inductive inference is warranted by contingent facts,
> how do we know those warranting facts?"
> "By more inductive inferences, warranted by further warranting facts?"
> "Doesn't that mean that there's a regress problem?"
> "Aha—Gotcha!"

My response to them then and to you now is the same. Yes—they are right. There's something like a regress lurking about. It is something I should address. It is, very roughly, the analog of Hume's problem of induction, but now played out in the material theory.[1]

Hume's problem of induction is the classic exemplar of an intractable philosophical problem. While many solutions for it are offered in the philosophy literature, I do not think that there is any one solution that commands universal assent. To have a theory of inductive inference that does not also solve Hume's problem would put me in good company with all the other accounts of inductive inference. If failing to solve Hume's problem is sufficient to damn the material theory, then we must also damn all other accounts.

For the purposes of this book, I wish to stop with that last conclusion. My hope is that readers will think about the issues I do raise and the arguments I do offer in this book. There is ample material here for readers to ponder, endorse and dispute. I hope that they will not let themselves be distracted by an easy critique. Someone has a new theory of inductive inference? Throw Hume's problem at it! That will silence them and we won't have to bother with the thing! It is a stratagem made cheap by its familiarity.

It is precisely because I wish to avoid this distraction that I have not raised the issue of Hume's problem so far in this book. For I find it entirely adequate to say that, if the material theory fails to halt the regress of justifications of Hume's problem, then it fares no worse than all the other accounts. However, in closing, I alert the reader that I do believe that the material theory is not derailed by a regress akin to Hume's problem. My reasons have already been summarized in a paper (Norton, 2014) and I have elaborations in preparation.

In short, I argue that Hume's problem is an artifact of the formal approach to inductive inference. There we warrant an inductive inference by an appeal to a rule; and we justify that rule by inferring inductively over its past usage using another rule; and so on indefinitely. We thereby trigger a fanciful regress of inferences rules applied to inference rules applied to inference rules… It is fanciful since it is nothing like what we see in real science. Attempts to implement even the first few steps of the regress lead us far from contexts in which reasonable judgments can be made. How do we apply rules of severe testing to vindicate the use of inferences to the

[1] Hume's problem can be set up as a circularity or an infinite regress. Something like this second regress form is the one that threatens in the material theory.

best explanation when they are used to justify instances of enumerative induction?

In the material theory, we have something similar. An inductive inference is warranted by a fact; and we support that fact by an inductive inference warranted by another fact; and so on. As we trace out these connections, we find ourselves mapping out an increasingly tangled network of inferential pathways that can quite quickly span across much science. However this regress is not fanciful. Rather it is a mundane exploration of the connections among the facts that support our science. Curie's inference on the crystallographic form of radium chloride is justified by Haüy's principle that in turn is justified by inferences that draw on much of the physics and chemistry of the nineteenth century. It is complicated, but not fanciful.

So far all is well. Yet one may still wonder: must not all the pathways of this network terminate in something like the singular facts of brute experience? The totality of those singular facts cannot warrant any universal generalization. For, when all we have are singular facts, we can call up no warranting facts of general scope to support inductions from singular facts to generalities. Or so it might appear.

Here appearances are deceptive. This last failure requires as a tacit assumption that relations of inductive support are hierarchical, something like the courses of stones used to build a tower. Each course is supported solely by the course below it. Analogously, the propositions of science reside in layers, with lower layers closer to the singular facts of experience. An inductive inference that starts with facts in one layer can only call upon warranting facts in that same layer or those below it.

This hierarchical assumption fails for science. Its relations of inductive support are not hierarchical, like the relations of structural support among courses of stones in a tower. They are interconnected in very many complex ways. Relations of inductive support are closer to the relations of structural support in complicated systems of arches and vaulted ceilings. Each stone in such a system is supported structurally both by those below it and those above it.

How can these structures come about? An arch cannot be built simply by piling up stones, layer by layer. Rather we must temporarily support stones higher up in the arch by scaffolding. As further stones are put in place, support for these higher stones shifts to the permanent security of other stones and the scaffolding can be removed.

It is the same in science. To get our inductive inferences started, we make various general hypotheses. These hypotheses are used to warrant inferences, even though they are themselves inductively unsupported at this initial stage. They are the analog of stones in arches supported by scaffolding. We must recall which these hypotheses are, for their use places an obligation on us. As our investigations proceed, we must return to them and give them proper support. When we do this fully, what results is an inductively self-supporting structure. Its simplest propositions will be singular but nonetheless they are able to support inductively other propositions of universal scope. When this process is complete, every proposition is well-supported inductively.

Here I have sketched my account so that readers see that my impudent boast of having evaded Hume's problem has a real basis. However I hope that readers can keep their interest and focus on the material in the many chapters preceding this epilog. There will, I promise, be ample opportunity elsewhere to dispute my solution of the regress problem in the material theory of induction.

References

Norton, John D. (2014) "A Material Dissolution of the Problem of Induction," *Synthese*. **191**, pp. 671-690.