III. The New Riddle of Induction

1. The Old Problem of Induction

The old (or Humean) problem of induction is often taken to be the problem of justifying inductive inference, inference from known instances to unknown instances, from examined instances to unexamined instances, or from past instances to future instances.

Hume’s own answer is often thought to be entirely off-target. Hume “answers that the elect prediction is one that accords with a past regularity, because this regularity has established a habit. Thus among alternative statements about a future moment, one statement is distinguished by its consonance with habit and thus with regularities observed in the past. Prediction according to any other alternative is errant.” (60)

Why is this answer off-target? Because, it is claimed, Hume merely describes the way in which we come to make the inductive inferences that we do make but offers no justification for them. [Goodman thinks it implausible that Hume missed the point of his own question and proposes that one re-think what that question was.]

How could one justify induction then? Goodman offers two (hopeless) possibilities. First, one proposes “some resounding universal law of the Uniformity of Nature.” (61) [Note the distaste for philosophical pretension characteristic of pragmatists.] If one is “tired”, one takes this law as primitive. If one is ambitious, one finds a justification for it, but then the problem shifts to justifying the principles involved in that justification.

2. Dissolution of the Old Problem

What could such a justification provide us? A guarantee that a prediction is true? Such guarantees can’t be had. Can it assure us that certain predictions are probable? But this means either determining how predictions are related to actual future frequencies (which is the problem of induction again) or not (but then, what is such a determination of probability worth, if it doesn't tell us what is going to happen?).
Goodman thinks that, as a heuristic, a useful question to think about is: How is deduction justified? Particular deductive inferences are justified as being in conformity to the valid rules of deduction. And the rules are justified as sanctioning proper deductive inferences. This looks circular, but, according to Goodman, it is a virtuous circle, with rules and instances being brought into harmony in a process that has come to be called either rational reconstruction or reflective equilibrium (in ethics, for instance).

“The point is that rules and particular inferences alike are justified by being brought into agreement with each other. A rule is amended if it yields an inference we are unwilling to accept; an inference is rejected if it violates a rule we are unwilling to amend.” (64)

If the same process of reflective equilibrium can justify induction, then the general problem of justification is solved. The residual problems are, first, to find some acceptable general rule(s) of induction and, second, to describe the particular inductions we find acceptable.

[John Earman and Wesley Salmon argue (in Introduction to the Philosophy of Science, p. 62-3) in effect that Goodman’s view leaves something out. They claim that we reject the deductive rule of affirming the consequent because it is not truth preserving (a general feature of the rule) rather than because it licenses inferences that we do not wish to accept. But it does license, Goodman might reply, a class of particular inferences that we do not wish to accept.]

3. The Constructive Task of Confirmation Theory

The justification of induction, then, breaks down into two inter-related parts: finding some general inductive rules that distinguish between acceptable and unacceptable inductive inferences and examining the particular inferences we make (as Hume did). [Goodman nicely characterizes rational reconstruction here. Compare rational reconstruction with ordinary language philosophy, which was dominant at the time.]

The first part “is to define the relation that obtains between any statement \( S_1 \) and another \( S_2 \) if and only if \( S_1 \) may be properly said to confirm \( S_2 \) in any degree.” (66) To be acceptable an inductive rule must at minimum allow some sentences to confirm each other but not permit all sentences to confirm each other. It turns out to be surprisingly hard to meet these obvious criteria of adequacy.
For instance, suppose we assume that induction is the converse of deduction (Cf, hypothetico-deductivism), so that \( S_1 \) confirms \( S_2 \) if \( S_2 \) entails \( S_1 \). (Let us call this the reverse consequence condition.) It is natural also to assume the consequence condition, that if \( S_1 \) confirms \( S_2 \), then \( S_1 \) confirms whatever follows logically from \( S_2 \). [In fact, it is quite reasonable to suppose that \( S_1 \) confirms any statement that is logically equivalent to \( S_2 \). Goodman is being very cautious here.] Immediately, we run into the tacking problem. Given these assumptions, \( S_1 \) confirms \( S_1 \& S_2 \), but \( S_1 \& S_2 \) entails \( S_2 \), so \( S_1 \) confirms \( S_2 \). Since these two sentences are chosen completely arbitrarily, we can conclude (from these assumptions) that every sentence confirms every other sentence.

What went wrong? Typically (or, in general) showing that one conjunct in a conjunction is true does not make the other conjuncts more likely to be true. (I.e., there is no confirmation.) It is really only particular instances of general statements that (sometimes, at least) support the general statement in a way that extends to unexamined particular cases. (E.g., ‘This piece of copper conducts electricity’ stands in this relation to ‘All copper conducts electricity’.) How can we fix what went wrong? It makes sense to eliminate the tacking problem by restricting the kind of consequence we permit. One natural restriction is to permit quantified statements to be confirmed by their instances. For instance, we allow \( (x)(Fx \supset Gx) \) to be confirmed by \( Fa \& Ga \), the assertion that something, \( a \), is both \( F \) and \( G \).

Unfortunately, we arrive at the paradox of the ravens problem. That this piece of paper is not black and not a raven (which we may write as \( \neg Ba \& \neg Ra \)) confirms the hypotheses that all non-black things are non-ravens (that is, \( (x)(\neg Bx \supset \neg Rx) \)), which in turn entails (and so the original evidence confirms) the hypothesis that all ravens are black. “The prospect of being able to investigate ornithological theories without going out in the rain is so attractive that we know there must be a catch in it.” (70)

Now what’s gone wrong? Goodman points to two problems. First, in the argument above, we tacitly used evidence not explicitly called for in the formula for determining confirmation, because my non-black sheet of paper also confirms the generalization that all non-ravens are non-black, a hypothesis we don’t take at all seriously, since we know that there are black non-ravens.

Secondly, the criteria for confirmation developed so far do not force us to use all the evidence or information that we have. Suppose that evidence statement \( E_1 \) says that some given thing \( b \)
is black and that $E_2$ says that some other thing $c$ is not black. Then given the criteria for confirmation as specified so far:

1. $E_1$ confirms the hypothesis that everything is black,
2. $E_2$ confirms the hypothesis that everything is non-black,
3. $E_1 \& E_2$ confirms the hypothesis that everything is black and non-black (since $A, B \vdash (A \& B)$,

which is an unacceptable conclusion. Carl Hempel, in other work, provides a careful formulation of a way to bring into consideration what is true in the whole evidence universe as a way of eliminating this last problem. But we now have to turn to another disaster instead.

4. The New Riddle of Induction

A characterization of confirmation cannot restrict itself to *syntactic* matters only, to the “logical form” of sentences [that is, to matters of the uninterpreted signs that compose a language, to which strings of these signs are well-formed or grammatical, and to which strings of well-formed formulas conform to various rules of transformation or inference], since instances do not confirm accidental generalizations whereas they do confirm lawlike generalizations. (Compare ‘This piece of copper conducts electricity’ with ‘This other person in the room is a third son.’) The situation is even worse than the example indicates, since (as the characterization of confirmation above stands), the examination of emeralds before $t$ and finding them all green equally supports two claims: ‘All emeralds are green’ and ‘All emeralds are grue.’ Since a given evidence base can confirm virtually any prediction, we have a large problem to deal with.

However, it is unclear how to deal with it. Adding in collateral evidence (for instance, that different bits of one kind of material are usually alike in colour) does not seem to help. Nor does observing that we know lots about the uniform behaviour of other kinds, when we don’t have a criteria for distinguishing which classes of objects make up kinds (that is, which sentences about classes of objects are lawlike). We can’t simply rule out hypotheses that make reference to a particular time, place, or individual, since we can always find logically equivalent hypotheses that do or do not make such reference. Nor can we restrict lawlike hypotheses to those containing “purely qualitative” predicates, as Carnap suggested. We can’t
propose that such predicates lack reference to particular times, places, or individuals (for reasons given in the previous objection), and we can't say it's just obvious to inspection, given the interdefinability of Goodman's odd colour terms with the standard ones. Finally, to restrict induction to familiar predicates is to ignore the problem.

5. The Pervasive Problem of Projection

“The problem of justifying induction has been displaced by the problem of defining confirmation, and our work upon this has left us with the residual problem of distinguishing between confirmable and non-confirmable hypotheses.” (81)

The upshot of Goodman's long argument is that the distinction between those hypotheses confirmed by instances and those not so confirmed cannot be a merely syntactic distinction and the obvious semantic suggestion [Semantics is that aspect of a language having to do with its relation to the world—with meaning and truth.] fails too. The solution that Goodman proposes goes beyond both, into the history of the use of a term in a culture.

The problem of induction is one case of the problem of projection. What Goodman proposes to do is to define the dispositional term ‘projectible’ in terms of actual projections in a culture. So his solution is pragmatic and explicitly relativistic.