Why There Need Not Be Any Grue Problem About Inductive Inference As Such

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1

Nelson Goodman's[1] supposed *problem of grue* relies upon the semantic equivalence of these reports of some epistemic subject *S's* inductive evidence:

> All emeralds examined before *t* are green;
> All emeralds examined before *t* are grue.

That equivalence—I will call it The Goodman Equivalence (or GE for short)—rests on the predicate 'grue' being defined so that it[2]

> applies to all things examined before *t* just in case they are green but to other things just in case they are blue.

Let us suppose that *t* is the present moment. Then, according to GE, *S's* evidence is no more and no less of all examined emeralds having been *green* than it is of all examined emeralds having been *grue*. And this leaves *S* with a predictive puzzle. Should she predict that the next emerald to be examined will be green? Or should she predict that it will be grue? Although the two characterizations of *S's* evidence are rendered interchangeable by GE, the two possible predictions on the basis of that evidence remain competitors. The next emerald to be examined will *not* be both green and grue (because if it is grue then it is blue, and if it is blue then it is not green). Yet how do we avoid the unwelcome implication that *S's* inductive evidence supports *either* of those predictions equally well?

Goodman thought that he had revealed the inadequacy of purely *formal* criteria, at any rate, for *S's* favouring one of these possible inductive predictions over the other:[3]

> confirmation of an hypothesis by an instance depends rather heavily upon features of the hypothesis other than its syntactical form.

[1] *Fact, Fiction, and Forecast* (Cambridge, MA: Harvard University Press, 1983, fourth edn), ch. III.
[2] Ibid., 74.
[3] Ibid., 72–73.

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However, even if purely formal logic cannot tell us which one of the two possible predictions by *S* is confirmed by her evidence,[4] this does not entail that epistemology cannot do so. And some simple epistemological analysis does indeed muzzle Goodman's puzzle. I will argue that it is only if we think of inductive inference *itself* in too formal a way—more as a logician would think of it, less as an epistemologist would do so—that we will see Goodman as having posed a real riddle about inductive inference as such, one that must arise for *any* possible instance of inductive reasoning.

2

Although Goodman proclaimed his puzzle to be 'the new riddle of induction',[5] he was not clearly meaning to be talking about a new *sense* of induction. So, let us remind ourselves of what Hume took inductive reasoning to be. I accept Stove's account of Hume on this matter.[6] Stove shows that Hume, when talking of inductive arguments, was focusing on 'arguments from observed to unobserved instances of empirical predicates'.[7] Hume's topic was predictive arguments from evidence reporting an epistemic subject *S's experiences*, her *observations*—not just possible experiences, but her actual ones. And these experiences, as Stove also observes,[8] involve *S's* having various *impressions*, in the Humean sense of 'impression'.

This implies that when we purport to be evaluating the epistemic status of an inductive reasoner *S's* predictions, we need to be careful as to what we describe (in what Goodman calls *evidence statements*) *as* reporting *S's* pertinent experiences, her observations. In particular, we need to be careful to present *S's* experiential evidence *as S experienced it*. We need to present the evidence from *her* perspective. For instance, it is not sufficient if we report the experiences as we who are looking on at *S*—we, who are not experiencing exactly *S's* experiences—might wish to represent them. Clearly, we might purport to represent *S's* experiences in a way which we would regard as being semantically *equivalent* to how *S* would represent them. Yet equivalence is not good enough in this domain: If we are

[4] As to whether this limitation on purely formal logic is thereby a limitation on logic *per se*, see David Stove, *The Rationality of Induction* (Oxford: Clarendon Press, 1986), 131–39.

[5] *Fact, Fiction, and Forecast*, 72.

[6] *Probability and Hume's Inductive Scepticism* (Oxford: Clarendon Press, 1973), 36–42.

[7] Ibid., 41.

[8] Ibid., 37.

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not capturing how the experience is represented by *S* to herself, then the premises as we are formulating them are not reporting *S's* experiences *as such*, certainly not as *S* would be using them as a basis for her inductive reasoning. In such an event, they are reporting only *our interpretation* of *S's* experiences. We need to bear this in mind when thinking about what predictions are supported by a given epistemic subject *S's* particular inductive evidence.

3

Goodman's putative problem of grue relies on *S's* inductive evidence being characterizable, with equal accuracy, both as having been of all examined emeralds being green and as having been of all examined emeralds being grue. And *S's* evidence admits of those two characterizations, we are told, because GE is true: The proposition that all examined emeralds have been green is equivalent to the proposition that all examined emeralds have been grue.

But section 2 implies that the premises of an inductive inference—an inductive inference as such, being made by a real epistemic subject *S*—are not simply propositions *qua* propositions. They are propositions reporting *S's* relevant experienced impressions—in this case, how the examined emeralds *seemed* to *S*. Did *S* experience them as green? Or did she experience them as grue?[9] The fact (if it is one) that our awareness of GE allows *us* to describe *S's* pertinent experiences both as being of grue examined emeralds and as being of green examined emeralds does not entail that *S* herself would recognize both descriptions as being reports of how she experienced the emeralds. And if in fact she has *not* experienced them both as being green and as being grue, then—GE notwithstanding—her *inductive evidence* as such is not both of green examined emeralds and of grue ones. In which case, there is no problem of grue afflicting her as an inductive reasoner in this case. So, if there can be epistemic subjects like that, then there is no problem of grue about inductive inference as such—that is, about all possible cases of inductive reasoning. At most, quite possibly, only *some*

[9] Many philosophers have argued that only one of the two predicates 'green' and 'grue' is observational—that only one of these two predicates expresses a property which could genuinely be part of someone's experience of the emeralds. Although that conclusion would strengthen my position in this paper, I do not presuppose it in what follows. For argument's sake, I am happy to concede that both 'green' and 'grue' are observational predicates. ('But how would the respective observational experiences *differ* from each other?' I say a little about this in section 5.)

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inductive reasoners would face that problem. Goodman will seem to have presented a puzzle about inductive inference as such only insofar as we treat inductive inference purely as a sequence of propositions *qua* propositions, say, rather than as a prediction by an epistemic subject on the basis of her actual observations. In short, no real inductive reasoner need be susceptible to a problem of grue.[10] A given inductive reasoner on a given occasion might—*but might not*—be susceptible.

So, there remains the empirical question as to just how often real inductive reasoners *are* in fact susceptible to a problem of grue (as I am describing it). However, this empirical question is *not* one I am attempting to answer in this paper. Instead, I am simply pointing out how the mere existence of the equivalence GE *need* not—that is, how it is not by itself sufficient to—render every possible inductive reasoner vulnerable to a problem of grue. Goodman was warning us against being formalist in presenting and epistemologically evaluating inductive inference—but his warning is itself based on an argument that is formalist in its presentation and epistemological evaluation of inductive inference. He has ignored part of what makes evidence *inductive* evidence.

4

Goodman might object in the following way to section 3's argument:

> The argument assumes that an epistemic subject's pertinent experiences are intrinsically of greenness, or that they are intrinsically of grueness (and that rarely, if ever, will an epistemic subject have a pertinent experience both of greenness and grueness). Yet GE implies that the experiences themselves are no more of green/grue emeralds than of grue/green ones. (No experience of an emerald's having been green is not also of its having been grue.)

But that objection overlooks the difference between experience-*of* and experience-*as*. An epistemic subject *S's* experience could be *of* an emerald *e*'s being green, say, without her experiencing *e as* being green. *A fortiori*, *S's* experience could be *of e*'s being green without her experiencing *e as* being grue. The difference is analogous to that

[10] Elsewhere, I have discussed further—in relation to *coherentist* theories of justification—the importance of distinguishing, as I am doing here, between real and idealized epistemic subjects: 'Epistemic Disaster Averted', *Analysis*, **59**, No. 3 (1999), 194–200.

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between *de dicto* belief and *de re* belief: *S* might believe, of a grue emerald, that it is green, without believing that it is a green and grue emerald. In such a case, we would be misrepresenting *S's* evidence if we were to describe her as having *evidence* of the emerald's being both green and grue. Perhaps she *could* have such evidence, if she were to experience the emerald differently to how in fact she experiences it; but in fact she does not. Equally, her experiencing the emerald as being green could be evidence for *us* (if we are aware of her experiencing the emerald as being green) that it is also grue, without thereby being evidence for *S* herself that the emerald is also grue. And inductive evidence, in particular, is grounded in experiences-*as*: *S's inductive* evidence is of *e*'s being grue only if *S* has experienced *e as* being grue. Otherwise, if we insist that in spite of *S's* experiencing *e* only as being green, for instance, *S* is still having an experience of *e*'s being grue, we are guilty of something else upon which Hume had more than a little to say—namely, *projection*. We would be reading into *S's* inductive evidence something that is simply not there—an experiencing by her of the emerald as being grue. We would be reading into *S's* evidence something that is just part of how *we* might be *interpreting* the situation—and hence how we might be aware that *S could* be *experiencing* the situation. But we would thus fail to be assessing *S's* own inductive reasoning *as such*, because we would fail to be reporting *S*'s pertinent observational experiences—her inductive evidence—as such.

Hilary Putnam[11] says that

> Goodman totally recasts the traditional problem of induction. For him the problem is not to guarantee that induction will succeed in the future—we have no such guarantee—but to characterize what induction *is* in a way that is neither too permissive nor too vague.

But we have found that Goodman *mis*characterized what induction is, by being too permissive in what he admits as being inductive evidence. A statement's being semantically equivalent to a report of *S*'s observational evidence—her inductive evidence—does not entail the statement's also being a report of her inductive evidence as such. Again, I am not saying that no one *could* experience *e* both as green and as grue. I am saying, though, that it mischaracterizes inductive evidence—experiential evidence—to assume that to experience *e* in one of those ways is *ipso facto* to experience it in the other way too.

[11] 'Foreword to the Fourth Edition', *Fact, Fiction and Forecast*, vii–xvi, at vii.

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5

What would be the *difference* between experiencing an emerald as green and experiencing it as grue? If there is none, then my defusing of Goodman's problem fails, because in all possible cases to have the one experience *would* thereby be to have the other. So, what is it, if anything, about the respective experiences that distinguishes the one from the other?

The difference is somewhat like that between reacting to someone (whom you have met for the first time) either with the feeling that he *is* nice or that he is *just being* nice. You could feel more, or you could feel less, confident that the person's friendly behaviour is a comparatively chance occurrence, somewhat dependent for its presence upon the time at which you are meeting him. If you attempt to analyse the basis of, or to epistemically justify, your feeling (whichever one of those two feelings it happens to be), you might be unable to do so. It might be none the less real, though. You can be aware of an *air* of unreliability—of unprojectibility, to use Goodman's term—about your experience of the person, even as he seems nice, indeed is being nice, but as you remain unconfident that this reflects how he is on most other occasions. As I said, the difference between experiencing an emerald *e* as green and experiencing it as grue is rather like that.

More formally: It is the difference between experiencing *e* as green, and experiencing it as green *while also feeling the fallibility of this experience*. Not all experiences include a sense of their own fallibility. But some do; and, probably for most of us at any rate, the experience of grueness would be just such an experience. The definition of 'grue' provides a precise specification of one of the many possible *ways* in which an epistemic subject's sense of *e* as being green could be fallible. Consequently, to experience grueness would be to experience that fallibility. It would not necessarily be to experience the actual *realization* of that fallibility (which would be, in effect, the experience of an emerald's being blue—and surprisingly so—when examined at some future time). It would merely be to experience the modal quality itself—the fallibility *as such* of one's experience of *e*'s being green. In practise, a given epistemic subject might, *or* she might not, feel the fallibility of her experience of *e* as being green. But, for those people who *are* susceptible, for whatever reason at a given time, to having that feeling as part of having that experience, their experiencing *e* as grue could be one way for them *of* experiencing that fallibility. Again, though, it is not an essential part of one's experiencing *e* as green that one also experience the

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fallibility of that experience. *A fortiori*, it is not an essential part of one's experiencing *e* as green that one also experience the fallibility of that experience *by* experiencing the fallibility in the particular way described by the predicate 'grue'. This is why we may spurn the Goodmanian nexus—his inferring, on the basis of GE, that any actual or possible experience of an emerald as green is thereby an experience of that emerald as grue. If 'grue' denotes a real property (observational or not), then the experienced emerald, if it is green, will *be* grue too. However, this does not entail that the emerald is *experienced* as being grue, even if it is experienced as being green. Once more, if in fact the emerald is not experienced *as* being grue, then the epistemic subject's inductive evidence as such is of the emerald as being green, *not* of it as being grue.

I do not deny that, at least in principle and at least for some people some of the time, experiencing an emerald as green could be a more 'primary' experience than experiencing it as grue. A given epistemic subject might experience *e* as grue more readily than she experiences it as green. For instance, if some particular *S* has a constant consciousness of the passage of time, always registered along with her sensory inputs, then experiencing *e* as grue might be more natural for her than experiencing it as green would be. No doubt for most or even all of us right now, that is not in fact how we happen to sense an emerald's colour; but I do not see why it *might* not be. And *if* it were how a given epistemic subject experienced emeralds, then those experiences would be the ones providing her with her pertinent inductive evidence, too, as to the colour of emeralds. *Her* observational evidence would be of *e* as being grue. By the argument developed in this paper, however, it would not *thereby* be observational evidence of *e* as being green. Nor would it thereby be inductive evidence for her of *e* as being green. My argument thus does *not* presume that people will actually experience emeralds as green, say. It simply points out that (i) to experience an emerald as green/grue is not *thereby* to experience it as grue/green, and hence that because (ii) inductive evidence *is* experiential (in this case, it is one's experiencing emeralds as having some specific colour), (iii) inductive evidence of emeralds as being green/grue is not *thereby* inductive evidence of their being grue/green. So, a given inductive reasoner might happen to evade Goodman's clutches *by* experiencing emeralds only as green/grue and not as grue/green.

Even so, my answer to Goodman does not open the door to what would be an unfortunate *relativism* about the quality of inductive evidence. For example, no matter whether a particular epistemic subject's inductive evidence comprises her experiencing emeralds as green, or

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whether it comprises her experiencing them as grue, her evading Goodman in the way I am describing does not entail that whatever experiences she has are automatically providing her with *good* inductive evidence as to the colour of emeralds. It does not preclude that possibility either, of course. Determining what exactly *suffices* to make inductive evidence good inductive evidence is a further challenge I leave to one side in this paper. My general goal here is only to describe a *necessary* condition on evidence's being good inductive evidence—because my general goal is only to describe a necessary condition on evidence's being inductive *at all*. Still, it is a necessary condition which Goodman has overlooked. That is particularly unfortunate because, as we saw Putnam observing (in section 4 above), Goodman himself wished to decide just what it *is* to reason inductively. But he has 'discovered' a puzzle which might well be a puzzle only for *some* actual or possible inductive reasoning, rather than for *all* actual and possible inductive reasoning. It is a puzzle only about those cases of inductive reasoning whose premises report the observational experiences of those epistemic subjects (however many there might be) who *do* experience emeralds both as green and as grue. To assume that Goodman's puzzle applies to all actual inductive reasoning (let alone to all possible inductive reasoning) is to assume that each of us in fact experiences emeralds (when we do) both as green and as grue. But that is an *empirical* assumption, not a truth to be established on the basis just of a semantic equivalence such as GE. It is also an empirical assumption which is yet to receive adequate *empirical*—presumably, inductive—support from Goodman or from anyone else.

6

Consider a given epistemic subject *S* who has not in fact experienced any emeralds as being grue, even though she has experienced many as being green. Suppose too, for the sake of argument, that *S could* have experienced those emeralds both as green and as grue. Does this modal fact about *S* still render her *in*directly susceptible to the Goodmanian grue problem, by showing that she *could* have experienced the relevant parts of the world rather differently in the first place—as being grue, not green, say. Is it therefore arbitrary of *S*, no matter how she has experienced the emeralds she has examined, to favour a prediction of greenness over one of grueness?

It is not. All that follows is that *S* could have experienced the world in a way that would have justified, if anything,[12] a different

[12] As I explained near the end of section V, my anti-Goodmanian strategy does not commit me to any particular theory as to what is sufficient for something's being *good* inductive evidence—good enough to epistemically

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prediction to that which in fact she might well be able to justify on the basis of the experiences she has in fact had. But the existence of this possibility does not show that *S's* actual prediction is not justified—relative to how she *has* experienced, and thereby classified, the emeralds she has examined. And inductive justification, being an inferential kind of justification after all, *is* only ever present in that conditional way. So, we are free to interpret the case in this way:

> The fact (if it is one) that *S* could have experienced the emeralds other than how in fact she has experienced them is compatible with her being inductively justified in a particular prediction without having *had* to be inductively justified in that prediction.[13]

And this is not a fault in inductive inference as such. That modal feature of inductive justification, described just now, is present only because *S* could have had rather different inductive *evidence* to that which she actually has. Yet this does not entail that there is a problem about *S's* inductive *inference* as such—that is, about what predictions *S* should make, once she *has* classified her experiences, thereby gaining her inductive evidence. Given GE, we might well allow that *S* could have viewed the relevant parts of the world in some way other than how in fact she has viewed it; and if she had done so, then she would have had different inductive evidence in the first place. Still, even this does not entail that once she *has* experienced the examined emeralds as green, or as grue, there is no correlative inductively justified prediction which she should make on the basis *of* those experiences. In other words, even though Goodman has alerted us to some possible arbitrariness in how, in the first place, *S* came to have this—rather than that—particular inductive evidence concerning the colour of the emeralds she has examined, this is not thereby an actual arbitrariness in how *S* should predict on the basis of whatever actual experiences she has had.

7

We have found that Goodman's famous predicate, 'grue', does not confront us with a *perennial* philosophical problem. It is not a problem about inductive inference *as such*. Still, it *was* a real puzzle,

[13] For more on this sort of idea, as applied to *S's* having a particular piece of knowledge, see my 'Knowing Failably', *The Journal of Philosophy*, **96**, No. 11 (1999), 565–87.

justify one prediction over another. I am describing only a *necessary* condition of something's being good inductive justification (by describing a necessary condition on some justification's being inductive in the first place).

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relative to something that was hovering in the philosophical air when Goodman initially presented his putative puzzle. Logicist interpretations of confirmation were a significant part of the philosophical ferment at the time. Rudolf Carnap was seeking a full non-deductive logic, by way of his theory of logical probability,[14] and Carl Hempel had presented his 'purely syntactical definition of confirmation'.[15] Moreover, Goodman clearly *was* reacting to Carnap's, and to Hempel's, views on confirmation.[16] And his ruminations on grue did score a palpable hit against those views.

However, that success, significant though it was at the time, does not justify the importance which so many *subsequent* philosophers have accorded to Goodman's supposed riddle of grue. The logicist interpretation of inductive inference and rationality is no longer a thriving enterprise. Even so, philosophers have continued to regard 'grue' as a predicament, not simply a predicate—as a philosophical puzzle whose relevance to philosophy *transcends* its role in having undermined the logicism of Carnap and of Hempel.[17] But this paper has identified one respect, at any rate, in which 'grue' should *not* receive such continuing philosophical respect. No philosopher who is concerned with the nature of inductive inference, yet who is *not* a logicist about inductive inference and rationality, need fear Goodman's 'grue'.

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[14] *Logical Foundations of Probability* (Chicago: University of Chicago Press, 1950; second edn, 1962).

[15] 'A Purely Syntactical Definition of Confirmation', *Journal of Symbolic Logic*, **8**, No. 4 (1943), 122–43.

[16] *Fact, Fiction, and Forecast*, 67–72.

[17] Douglas Stalker documents the remarkable entrenchment of 'grue' within philosophical thinking over the past forty or so years. See his introduction (as editor), along with his annotated bibliography, in *Grue!* (Chicago: Open Court, 1994), 1–18, 281–457.

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