

Ratbag Idealism

Gordon Belot

Well, I grant that there are indeed these ineffable, unanswerable questions—but who ever promised me that there wouldn't be such questions? The worst part of being a quidditist, I guess, is that I am in danger of agreeing with Kant about something (Kant as told by Rae Langton, anyway) and I'd never want *that* to happen!

David Lewis

First Day

Sagredo. I spent a lot of time working on an anthology of philosophical horror that I am editing, *The Human Serpent is Over Everything: An Anthology of Philosophical Horror*. I am not sure that's the right title, though. I would prefer something longer and more obscurely allusive.

Salviati. I know what you mean. All of my manuscripts are entitled "Miscellaneous Tracts on Some Curious, and Very Interesting Subjects in Mechanics, Physical-Astronomy, and Speculative Mathematics," until some well-meaning editor gets involved. Your project sounds very odd.

Sagredo. Yes! So far as I can tell, what really creeps out most scientists and philosophers of science is the idea that the world as described by science is at least partially constituted by the mental. I want to publish a collection of quaint philosophical writing in this vein—I reckon that horror of any sort will be a huge money maker again next time we have a plague year.

Salviati. Unquestionably. But why 'quaint'?

. To appear in Y. Ben-Menahem (Ed.), *Rethinking the Concept of Laws of Nature*.

Sagredo. Well, these days it is sociologists that come out with the really scary stuff—you know, the stuff that gets Nobel Prize winners to complain about philosophers. But back in the day, it was philosophers who provoked scientists to complain about philosophers. Think of the conventionalist-pragmatist-Bergsonian positivism of Le Roy, according to which scientific facts are made by the scientists who observe them, rather than being externally imposed. It sounds even better in French, especially if you leave out most of the words: *les faits sont faits*.

Salviati. Most things do. Is this the same Le Roy that drove Poincaré to fantasize about strange alien beings and to argue that their science would coincide with our own?

Sagredo. Yes, that's the one. It seems that an exposure to a certain sort of horror drives a certain sort of person to a certain sort of science fiction, as a way of affirming their unshakable confidence in the objectivity of science. Mach's phenomenalist positivism drove Planck to pronouncements on the inevitable congruence between human and Martian science.

Simplicio. Planck's student Schlick followed a similar path.

Salviati. Okay. But I am still puzzled by the 'quant' bit. Some of the most influential, interesting, and widely-read philosophers seem like good candidates for your anthology, if I understand what it is all about.

Sagredo. Well, I am certainly going to include Peirce. Perhaps that is who you are thinking of? He famously tells us that:

The opinion which is fated to be ultimately agreed to by all who investigate, is what we mean by truth, and the object represented in this opinion is the real.

This is pretty spooky! For one thing, it seems to imply that there can be no buried secrets, facts about the past that it is beyond our power to discover. But then to counter the spookiness, he elsewhere turns to science fiction. He tells us that it is at least possible that some facts that

we might think would be buried forever could nonetheless come to light: perhaps beings of a distant planet have recorded historical events on Earth and the recordings will come into our possession. In general, he seems to have really enjoyed a good science fiction tale:

if we ever succeed in interpreting the communications of the inhabitants of Mars, I will risk a nickel that their first dispatch will read: 'O yes, we know all about your attempts to learn from us. We'll learn this: you are the most stupid of all organized beings. You even allow creatures to have a voice or a vote in your government who hardly can solve a partial differential equation in its generality and have not mastered the higher reaches of the calculus of variations. Bring a diploma from a colony of bees before you presume to seek instruction from Martians!'

Salviati. I am glad you are including Peirce! But I had others in mind.

Sagredo. Pray tell.

Salviati. Let me introduce a technical notion: a *ratbag idealist* is someone who takes some pretheoretically fundamental aspect of the world—its causal structure, or its laws, or its spatiotemporal geometry—to depend on human cognitive constitution.

Simplicio. Of course, this notion is due to Lewis—although he only mentions the possibility of ratbag idealism concerning laws—and he has a decisive argument that the correct account of laws saves us from ratbag idealism.

Salviati. Let us come back to Lewis. First . . .

Sagredo. What is a 'ratbag,' exactly?

Simplicio. No one knows, except Australians. Sometimes they say a ratbag is a lunatic, sometimes a loveable rascal, sometimes a troublemaker. It is hard to know exactly what Lewis had in mind when he introduced ratbag idealists about laws:

Now, some ratbag idealist might say that if we don't like the misfortunes that the laws of nature visit upon us, we can change the laws—in fact, we can make them always have been different—just by changing the way we think! (Talk about the power of positive thinking.) It would be very bad if my analysis endorsed such lunacy.

Salviati. First, Sagredo, are my ratbag idealists the sort of characters that you are interested in?

Sagredo. I am unsure because I don't know how to think of the notion of dependence that figures in your characterization of ratbaggyery.

Salviati. Let us agree to think of it this way: a good test of whether someone might be a ratbag idealist is whether they think that, for all we know, there may be other beings differently constituted, for whom geometry, or laws, or causal facts might be different.

Sagredo. Agreed. Then your ratbag idealists are exactly the sort of people I have in mind. Doesn't it give you goosebumps just thinking about people like that?

Salviati. Thinking about Kant gives you goosebumps? I think that might be unusual.

Sagredo. I guess I wasn't really thinking of Kant. I have my doubts that he was a ratbag idealist.

Salviati. Hmm. Perhaps we can continue our discussion on that point tomorrow.

Second Day

Salviati. Consider terms in which Kant explains the transcendental ideality of space in the *Critique of Pure Reason*.

We can accordingly speak of space, extended beings, and so on, only from the human standpoint. If we depart from the

subjective condition under which alone we can acquire outer intuition, namely that through which we may be affected by objects, then the representation of space signifies nothing at all. (A26/B42)

Since we cannot make the special conditions of sensibility into conditions of the possibility of things, but only of their appearances, we can well say that space comprehends all things that may appear to us externally, but not all things in themselves, whether they be intuited or not, or by whatever subject they may be intuited. For we cannot judge at all whether the intuitions of other thinking beings are bound to the same conditions that limit our intuition and that are universally valid for us. (A27/B43)

This is a form of ratbag idealism.

Sagredo. Very nice! But I hardly think that Kant, in the 18th century, would have had space aliens in mind.

Salviati. As someone in the habit of flipping to final pages of long books to find out how they end, I can assure you that Kant *did* like to think about space aliens. Having observed that asking someone to back up a pronouncement of belief with a wager is a good way to help them to clarify how strongly held their belief really is, Kant tells us that

If it were possible to settle by any sort of experience whether there are inhabitants of at least some of the planets that we see, I might well bet everything that I have on it. Hence I say that it is not merely an opinion but a strong belief (on the correctness of which I would wager many advantages in life) that there are also inhabitants of other worlds. (A825/B853)

Sagredo. I don't know whether to be more surprised that Kant was so sure that we had company or that he *didn't* disapprove of betting.

Simplicio. Kant's chum Heilsberg recalled that as undergraduates, they and another chap, Wlömer, made enough money at billiards that even-

tually they could no longer find anyone to play against—at which point they switched to the card game *l'hombre*. After Kant's death, his house became a student tavern, *Au Billard Royal*, complete with a bowling-alley and a billiards-room.

Salviati. So far as extra-terrestrials go, there is more. His early essay, "Universal Natural History and Theory of the Heavens, or, Essay on the Constitution and the Mechanical Origin of the Whole Universe according to Newtonian Principles," shows that Kant liked to think about space aliens *a lot*.

There Kant takes space to be infinite and Euclidean, of course, but he also takes the material world to have a centre of attraction at which the density of matter achieves its maximum, with average matter density falling off as one travels away from this point (1: 311 f.). He thinks that inhabited planets can be found throughout infinite space. Further, since there is a lower bound to the possible degree of intellectual perfection of a spiritual being, but no upper bound on the intellectual perfection of such a being,

if a law is to be in place according to which the domiciles of intelligent creatures are distributed in the order of their relation to the common centre point, we shall have to place the lowest and least complete type that constitutes, as it were, the beginning of the type of the spiritual world, at that region that can be called the beginning of the entire universe in order to fill simultaneously with this and in equal progression all infinity of time and spaces with increasing degrees of perfection of the capacity to think and as it were gradually to approach the goal of the highest excellence, namely the divinity without, however, ever being able to attain it. (1: 331).

Kant sees a related hierarchy within our solar system.

The material of which the inhabitants of different planets, indeed even the animals and plants on them, are formed must altogether be of a lighter and finer type and the elasticity of the fibres together with the

advantageous arrangement of their build be more perfect the further away they are away from the Sun. (1: 358)

And the gradations in material fineness and elasticity are reflected in intellectual and moral gradations. For Kant, there are of course only six planets in the solar system: Mercury, Venus, Earth, Mars, Jupiter, and Saturn.

Human nature, which occupies as it were the middle rung on the ladder of beings, sees itself as being between between the two extreme limits of perfection, equally distant from both ends. If the idea of the most sublime classes of of rational creatures that inhabit Jupiter or Saturn arouses their jealousy and humiliates them by the knowledge of their own baseness, then they can be satisfied again and comforted by the sight of the low stages on the planets Venus and Mercury, which are lowered far below the the perfection of human nature. (1: 359)

Simplicio. Elsewhere, Kant suggests that if only our sense organs were more fine, we could perceive magnetic fields (A226/B273).

Sagredo. Very well—as far as the stuff about space aliens goes, I am happy to concede that Kant positively relished the idea that we are not alone. But I simply do not believe that the possibility of aliens whose space and time are different from ours is what Kant was alluding to in the passages you started us with today. Indeed, I recall once sitting next to a Kant scholar at dinner who assured me that in passages like this Kant has in mind God, for whom there is no space and there is no time.

For consider Kant's distinction (B144–B150) between sensible and intellectual intuition and his account of their respective relation to the understanding. In beings like ourselves, the understanding operates on material given to it via sensible intuition, and in this way cognizes objects in space and time. We can distinguish between two types of sensible intuition: pure intuition (space and time, the forms of sensible intuition) and empirical intuition (the contribution of sensation). For a

being like God, however, understanding is itself intuited and to cognize an object is to produce that object. For such a being, nothing is externally given. There is no sensation, no sensible intuition, no form of sensible intuition—there is no space and no time. Kant later tells us that even the possibility of intellectual intuition is something that we cannot understand (B307).

This is what is going on when he tells us that “we cannot judge at all whether the intuitions of other thinking beings are bound to the same conditions that limit our intuition and that are universally valid for us.” He has in mind not beings whose forms of sensible intuition are different from our own, but a Being whose intuition is not sensible at all.

Salviati. I have heard people say that. But I think that there are some texts that are difficult to square with such a reading.

One is a note that Kant inserted in his copy of the first edition of the *Critique*, immediately following the first passage that we started with today.

Perhaps all created beings are bound to it, that we do not know. This much one can know, that it is a merely sensible form. The most important thing is that it yields a determinate concept *a priori*, and through inner intuition we would not have sensations, thus no empirical representations and no science of objects *a priori*.

The question raised here is not whether space and time are forms of sensible intuition for God (the one being with intellectual rather than sensible intuition), but rather whether space and time are forms of sensible intuition for all ordinary cognizing beings, or just for humans.

The second example, new to the second edition, is General Remark IV of the Transcendental Aesthetic (B71 f.).

In the first half of this Remark, Kant observes that in natural theology, one does not regard space and time as conditions of the intuition of God. He then notes that this means that they therefore cannot be regarded as

objective forms of all things—since if they were such, the intuitions of God would need to be subject to them. The natural option, then, is to regard them as forms of sensible intuition—that type of intuition which is dependent on the separate existence of objects, to be distinguished from that type of intuition (here called *original intuition*), which would appear to pertain only to God (the *original being*), through which objects are given.

In the second half of the Remark, Kant tells us, as clearly as he can, that for all we know, we may share our world with beings for whom space and time are not the same as they are for us—and also distinguishes, as clearly as he can, between this thought and the thought that for God there is no space and time.

It is also not necessary for us to limit the kind of intuition in space and time to the sensibility of human beings; it may well be that all finite thinking beings must necessarily agree with human beings in this regard (though we cannot decide this), yet even given such universal validity this kind of intuition would not cease to be sensibility, for the very reason that it is derived (*intuitus derivativus*), not original (*intuitus originarius*), thus not intellectual intuition, which for the ground already adduced seems to pertain only to the original being, never to one that is dependent as regards both its existence and its intuition (which determines its existence in relation to given objects); although the last remark must be counted only as an illustration of our aesthetic theory and not as a ground of its proof.

Sagredo. This is disappointingly convincing. It seems that Kant is more correct, more trivial, and more Anglo-Saxon than I took him to be.

Salviati. But still deeply weird! In the second edition version of the Transcendental Deduction, he makes it clear that his ratbaggy extends even to the categories—and so to the causal structure of the world of experience.

But for the peculiarity of our understanding, that it is able to bring about the unity of apperception *a priori* only by means of the categories and only through precisely this kind and number of them, a further ground may be offered just as little as one can be offered for why we have precisely these and no other functions for judgment or for why space and time are the sole forms of our possible intuition. (B145 f.)

Sagredo. Now you have gone too far! It sounds like you are attributing to Kant a view on which the categories are merely psychological apparatus with which we happen to find ourselves equipped. But Kant explicitly tells us that

the concept of cause, which asserts the necessity of a consequent under a presupposed condition, would be false if it rested only on a subjective necessity, arbitrarily implanted in us, of combining certain empirical representations according to such a rule of relation I would not be able to say that the effect is combined with the cause in the object (i.e., necessarily), but only that I am so constituted that I cannot think of this representation otherwise than as so connected; which is precisely what the skeptic wishes most. . . . (B168)

Salviati. Ah! Perhaps it will help to zoom out a bit from the passage you quote. In the final section of the revised version of the Transcendental Deduction, Kant considers three accounts of the origins of our concepts and he links these with three accounts of the generation of living beings, which he calls *generatio aequivoca*, epigenesis, and preformation.

Simplicio. Kant lived at a time of radical transformation in the scientific understanding of embryology. Kant himself shifted his views on this topic over time. In this he was certainly influenced, to some extent, by his younger contemporary Blumenbach. In the first edition of his famous work on *Bildungstrieb* Blumenbach defends the preformation account (and reports that boys in the Middle East are born

pre-circumcised). In the second edition, admired by Kant, Blumenbach defends epigenesis (and discusses jackelopes).

Sagredo. You seem very well-informed, Simplicio. Perhaps you could tell me a bit more about what Kant might have had in mind in mentioning these accounts of the growth and development of organisms?

Simplicio. On the epigenetic account, an individual animal or plant develops out of material that is initially formless, with the form of the individual emerging gradually over time. On the preformation account, each animal or plant is fully formed from the moment it comes into being (which on, some versions of this theory, is when the first member of its species comes into being—on one such version, each human is preformed in a seed in a seed in a seed . . . in Adam, on another, each is preformed in an egg in an egg in an egg . . . in Eve). The term *generatio aequivoca* has a tangled history of use. But in a footnote to §80 of the *Critique of Judgement* (5: 419 f.), Kant distinguishes between *generatio homonyma*, in which the being produced is of the same kind as those which produce it, and *generatio heteronyma*, in which the being produced is of a different kind. Kant recognizes two types of *generatio heteronyma*: *generatio univoca*, in which organic things give rise to organic things of different types (as a far-fetched possible example, he suggests a scenario in which, over the course of generations, aquatic animals become terrestrial animals), and *generatio aequivoca* in which a living being arises out of non-living matter. By way of illustration, consider an interesting case discussed by Blumenbach. The pimple-worm (*Hydatis finna*) is found only in domestic varieties of swine, never in wild varieties. Now, we can be sure that domestic swine are descendants of wild swine. So it is reasonable to assume that the first pimple-worms originated some time after the first domestication of swine. So here we have a case *generatio heteronyma*: either these first pimple-worms had no parents (*generatio aequivoca*) or had parents of some other species (*generatio univoca*).

Salviati. That is an interesting case. But let us leave the pimple-worms

alone for the time being. Naturally, Kant compares the empiricist account of concept formation with the notion of *generatio aequivoca*: the categories and the pure forms of sensible intuition are *a priori* and cannot be the result of experience. His own account is compared with epigenesis: the categories “contain the grounds of the possibility of all experience in general from the side of the understanding.” A third approach is compared with preformation, an approach on which “subjective predispositions for thinking, implanted in us along with our existence by our author in such a way that their use would agree exactly with the laws of nature along which experience runs. . . .” It is this third approach that is subject to the objection levelled in the passage that you quoted to us, *Sagredo*.

Sagredo. Wait—I am having a little trouble picturing how this preformationist view is supposed to work. Does Kant have somebody in mind here?

Salviati. It appears that he does: in the corresponding passage in the *Prolegomena*, he mentions Crusius (4: 320 n.). I suspect that *Simplicio* could tell us a thing or two about him?

Simplicio. The semi-empiricist, semi-rationalist system of Crusius is extremely interesting. In his *Sketch of the Necessary Truths of Reason*, he identifies the *principle of the inseparable*, according to which it is genuinely impossible to separate things which cannot be separated in our thought, and the *principle of the uncombinable*, according to which it is genuinely impossible to combine things that cannot be combined in our thought. These principles go beyond mere logic: indeed, it is not just that their denial entails no contradiction, we can even imagine beings whose thought is not governed by them. It is his view that each thing that comes into existence has a cause, that this follows from the principles of human reason, and that it does not follow from logic alone. Special cases aside, “the essence of our understanding is the criterion of truth.”

Salviati. Excellent. It is that sort of view that Kant is complaining about

in the passage that you pointed us towards, Sagredo. Recall that there he says that on a preformation view “I would not be able to say that the effect is combined with the cause in the object: (i.e., necessarily), but only that I am so constituted that I cannot think of this representation otherwise than as so connected. . . .” Of course, we are to understand that on Kant’s own account, we *can* say that the effect is combined with the cause in the object, because under transcendental idealism, the categories are constitutive of experience. Things are quite different on the preformation view: on this view, our thought is required to mirror the causal relation between things in themselves rather than the structure of appearances: but as Kant tells us, “there are only two ways in which a *necessary* agreement of experience with the concepts of its objects can be thought: either the experience makes these concepts possible or these concepts make the experience possible” (of course, closer examination shows the former to be unacceptable). The preformation view doesn’t fall under either of those conditions—and it is for this reason that it renders the concept of cause false. So his point is not that there is something wrong with views on which it is at least notionally possible for distinct types of beings to be equipped with different systems of categories—it is, rather, that there is something wrong with any view, empiricist or preformationist, on which in order for us to know that the same cause always produces the same effect, we must know that the structure of a mind-independent world obeys the causal principle(s) implicit in the structure of our minds.

This point is, arguably, more clearly expressed in the corresponding passage in the first edition (A128 f.). If the objects our cognition were things in themselves, could we have a *a priori* concept of them? No. For either these concepts would derive from experience or from ourselves. Clearly, the first of these options would not lead to a *a priori* concepts (*generatio aequivoca* again). Neither would the the second:

If we take them from ourselves, then that which is merely in us cannot determine the constitution of an object distinct from our representations, i.e., be a ground why there should be a thing

that corresponds to something we have in our thoughts, and why all this representation should not instead be empty.

The solution, of course, is to take the objects of experience to be mere appearances rather than things in themselves.

Sagredo. Hummph. That is enough for me for one day, I think.

Third Day

Simplicio. Can we finally talk about Lewis?

Salviati. Yes! Perhaps we can begin by agreeing that Lewis is a ratbag idealist about laws of nature?

Simplicio. That is just what I deny—because Lewis denies it.

Salviati. Let us begin at the beginning, then. In his earliest published discussion of laws of nature, Lewis suggests that

a contingent generalization is a *law of nature* if and only if it appears as a theorem (or axiom) of each of the true deductive systems that achieves a best combination of simplicity and strength.
(73)

Sagredo. This is a very interesting idea! But what has been done in the intervening years to substantiate Lewis’s bold conjecture that the required intersubjective notions of simplicity and balance between simplicity and strength exist?

Salviati. Hmm. I suspect that it will not be fruitful to pursue that line of questioning here.

Simplicio. I disagree.

Sagredo. Good. Rather than considering laws of nature, suppose that we consider a simpler case that is under better conceptual control: geometry. Suppose that someone were to conjecture that there is a natural intersubjective simplicity ordering on geometries. That would

be very interesting! But a problem would immediately arise: it is not hard to find experts disagreeing about which of the classical geometries is simplest—Euclidean geometry, hyperbolic geometry, and elliptic geometry each has its fans.

Simplicio. Granted. But I am confident that we will not find the same thing in the more complicated setting of laws of nature. Also, many fans of the best-system approach take talk of best balance between simplicity and strength to be a place-holder for some more subtle story about how scientists use data to choose between theories—and I think you will agree that there is little disagreement among expert scientists about which hypotheses are best-supported by data. Also, even if our program does rely on an unsubstantiated empirical conjecture, it is still a better philosophical account than its extant competitors. So it is the best choice among our available options—and after all, each of us *does* need to choose a favourite account of laws of nature, or where would we be?

Sagredo. I see.

Salviati. Yes. Let us return to Lewis. After the passage quoted above, he goes on to make the obvious explicit when he suggests that we think of the system of truths that best balances simplicity and strength in the following terms:

Imagine that God had decided to provide mankind with a *Concise Encyclopedia of Unified Science*, chosen according to His standards of truthfulness and our standards of simplicity and strength. (74)

The notions of simplicity and of balance between simplicity and strength are at best species-relative. So, on the best-system approach, the notion of a law of nature is likewise species-relative. Lewis is a ratbag idealist about laws of nature.

Simplicio. I feel compelled to point out that Lewis has a response:

it does not follow that lawhood depends on us in the most

straightforward way: namely, that if our standards were suitably different, then the laws would be different. For we can take our actual standards as fixed, and apply them in asking what the laws would be in various counterfactual situations, including in counterfactual situations in which people have different standards—or in which there are no people at all. (123)

Sagredo. I don't see how rigidification will help Lewis here. Suppose that elsewhere in the galaxy there is a species of brainiacs who stand to us as we stand to dogs, intellectually. We can consider three sets of true generalizations at our world: the d-laws that are consequences of the set of truths that best balance simplicity and strength according to dogs; the h-laws that are consequences of the set of truths that best balance simplicity and strength according to humans; and the b-laws that are consequences of the set of truths that best balance simplicity and strength according to brainiacs. We can, if we like, insist that the word 'law' in our mouths always picks out the h-laws, even when we are entertaining counterfactual scenarios in which we come to have the intellectual capacities of dogs or brainiacs—but this is not to say that brainiac science would or should be concerned with h-laws rather than b-laws.

Salviati. Yes. Lewis himself seems to have come around to this assessment.

I used to think that rigidification came to the rescue: in talking about what the laws would be if we changed our thinking, we use not our hypothetical new standards of simplicity and strength and balance, but our actual and present standards. But now I think this is a cosmetic remedy only. It doesn't make the problem go away, it only makes it harder to state. (232)

Simplicio. I know all that, of course—but there is nothing I can do in the face of my compulsion to mention rigidification every time the spectre of ratbag idealism is raised. But now we can enjoy Lewis's decisive

rebuttal:

Maybe some of the exchange rates between aspects of simplicity, etc., are a psychological matter, but not just anything goes. If nature is kind, the best system will be *robustly* best—so far ahead of its rivals that it will come out first under any standards of simplicity and strength and balance. We have no guarantee that nature is kind in this way, but no evidence that it isn't. It's a reasonable hope. Perhaps we presuppose it in our thinking about law. I can admit that *if* nature were unkind, and *if* disagreeing rival systems were running neck-and-neck, then lawhood might be a psychological matter, and that would be very peculiar. I can even, concede that in that case the theorems of the barely-best system would not very well deserve the name of laws. But I'd blame the trouble on unkind nature, not on the analysis; and I suggest we not cross these bridges unless we come to them. (232 f.)

I think you will agree that that settles the matter. Lewis is not a ratbag idealist about laws.

Sagredo. I am a little puzzled by this, frankly. Let us return to something you said a little while ago, *Simplicio*. You remarked that there is little disagreement between experts about how to choose theories in light of evidence. I found that claim surprising. Dirac famously thought that one ought to prefer the more mathematically beautiful theory whether or not it was simpler than its competitors. In this, he self-consciously departed from the standards of other physicists. Or again, today there vigorous debate over the question whether the mathematical fecundity of string theory enhances its plausibility as physics.

But now I see that perhaps you are hoping that the scope of such disagreement is narrow enough that we may, with luck, live at a world at which each of the sets of standards accepted by various experts will determine the same set of laws. The laws in *Dirac's Concise Encyclopedia of Science* would be exactly the same as the laws of *Bohr's Concise*

Encyclopedia of Science, and so on.

Simplicio. Yes, exactly. Lewis long emphasized (74, 124) that with luck, any vagueness in our standards of simplicity and of balance will be irrelevant because all reasonable standards will determine the same laws at our world. Only later did he note that, with luck, the dependence of laws on us (via their dependence on our standards) would likewise evaporate.

Sagredo. I see. Even the intra-species version of this idea is very interesting. I would love to hear more about why you expect the sort of variation in the standards between scientists that we see at present to become irrelevant in the limit of complete knowledge of the the distribution of (non-nomic) properties at a world. Perhaps you have some reason to think that the range of this variation is decreasing over time? Or perhaps you have some reason to think that although this range remains constant in time, it tends to make less difference to theory choice, as time goes on?

Salviati. I suspect that it will not be fruitful to pursue that line of questioning here.

Sagredo. I see. Well, let us grant, then, that the range of standards used by human scientists is narrow enough that we can indeed reasonably hope that, with luck, they will underwrite a unique set of best-system laws. Now, think what Kant and Peirce would say at this point: a lot more luck will be required if our laws are to coincide with those of Martians, given their massive cognitive superiority to us—just as, very plausibly, the d-laws and the h-laws at our world do not coincide. And Kant will add: it seems reasonable to assume that there are or could be types of beings whose cognitive powers outstrip ours to an arbitrary degree; so no amount of luck could ensure that our laws coincide with those of each type of space alien.

Simplicio. Perhaps, though, we are lucky, and there *are* no beings whose cognitive powers outstrip ours to the required extent?

Salviati. Perhaps. But that is not relevant to the question of whether Lewis is a ratbag idealist about laws—we agreed that it sufficed to be a ratbag idealist if you agreed that, for all you know, there might be other beings for whom certain (pretheoretically) fundamental facts about our world differed. And that sufficient condition is met at present.

Simplicio. Well, have it your way then: I suppose that Lewis *is* a ratbag idealist about laws. It seems that you think that is an objection to his account. But it is really more of a matter of taste.

Salviati. I think it is more like an observation. It is not like I think it is an objection to Kant to label him a ratbag idealist—it just highlights a feature of transcendental idealism of which he was well aware. Nor do I think it is any objection to the best-system account of laws to observe that it renders laws mind-dependent. Lewis himself always seemed to hope to be able to finesse this feature away. But today, there are a number of relativist, indexical, or perspectivalist variants of the best-system account of laws that, to some extent, own up to their ratbaggery. For me, the point of making the observation is to goad fans of the best-system approach to take its ratbag idealism fully seriously.

Sagredo. I would be interested to hear more about what you mean by that.

Simplicio. First, I think it is only fair to let you know that you have walked into a trap! Let me reveal my *real* response (inspired by Ned Hall) to your worries about ratbag idealism. It is that all along you should have been saying: *This is going to hurt me more than it hurts you.*

Lewis is a reductionist about laws. A set s of standards of simplicity and balance determine the s -laws at each possible world, where a possible world is specified by specifying a Humean mosaic, a spatiotemporal pattern of instantiation of perfectly natural properties (themselves non-modal). So for each s , the s -laws at each world supervenience on non-modal facts at that world.

Lewis's opponents are non-reductionists: they think that the laws at a world do not supervene on the pattern of instantiation of non-nomic

properties at that world. Typically, they also buy into a picture on which the laws *govern* the pattern of instantiation of fundamental properties. They think that the laws of a world play a role in determining the shape of things at that world—whereas reductionists know that it is the other way around.

Now, all hands should admit that different sorts of beings will use different sets of standards of simplicity and balance in doing science.

For reductionists about law, this leads to the conclusion that at a given world, the laws may be species-relative. But that is nothing to worry about. After all, what is the point of the distinction between mere true generalizations and laws, by the reductionist's deflationary lights? Roughly, the distinction between mere facts and facts that are central and interesting enough to be targets of scientific investigation. It is no surprise that different sorts of beings, with different cognitive capacities and interests, will draw the border between the two sorts of facts in different places. So it is to the credit of Lewis's reductionism that it implies that the laws are to some extent "up to us."

How do things look to non-reductionists? Given the metaphysical centrality of laws on their picture, it would be hard for them to deny that science ought to strive to discover the laws. But now we have to worry whether our standards of simplicity and balance are the right ones—among all the kinds of cognizing beings at our world, most will be using standards that are too lax (leading them to count too many regularities as laws) or too stringent (leading them to count too few regularities as laws). Why think that natural selection has equipped us with the right standards for the goals of science?

This is a pressing challenge for non-reductionists—but for Lewisians, it can be met trivially, since the scientific goal of a type of being (the laws-for-them) covaries with their abilities.

Sagredo. That is very interesting! I would like to hear what Salviati has to say in response—tomorrow.

Fourth Day

Sagredo. I hope that today we will see whether or not Salviati is able to escape from Simplicio's trap.

Salviati. I would like to try! Along the way, maybe I can also enlarge on something I said yesterday: that to me that point of raising the threat of ratbag idealism is to push fans of Lewis's best-system account of laws to take the account fully seriously. Consider scientific realism.

Simplicio. Gladly—most best-systems enthusiasts are scientific realists, you know.

Salviati. Are they, though? It is common to identify scientific realism as involving a semantic component, a metaphysical component, and an epistemic component: (i) the sentences expressing a scientific theory are true or false; (ii) very special cases aside, the relevant truth conditions are mind-independent; and (iii) the empirical success of our theories gives us (defeasible) reason to think them true.

Simplicio. Humph. Yes. But the sort of mind-dependence involved in our account of law is not the bad kind.

Sagredo. What is the bad kind?

Simplicio. You should know—the spooky kind. The sort of thing Putnam went in for when he *wasn't* a scientific realist: "the mind and the world jointly make up the mind and the world." He went even further, you know: "the Universe makes up the Universe—with minds—collectively—playing a special role in making it up." Even he admitted that that last bit was Hegelian. Scandalous. I am glad to say that he eventually repented.

Salviati. You do concede, though, that your view about laws brings you into conflict with the metaphysical clause of the characterization given above?

Simplicio. Yes. But it isn't important. We just need to tinker with that

clause a bit.

Salviati. Good—I genuinely look forward to hearing more about that. In the meantime, of course, you can continue to make common cause with classic and contemporary scientific realists against those anti-realists who question the epistemic credentials of science. But you will have to part ways with a realist like Planck, who was deeply concerned with mind-independence. As you will no doubt recall, the second sentence of his "Scientific Autobiography" reads:

In this connection, it is of paramount importance that the outside world is something independent from man, something absolute, and the quest for the laws which apply to this absolute appeared to me as the most sublime scientific pursuit in life.

Simplicio. I *do* recall that. *And* I recall that his first sentence reads:

My original decision to devote myself to science was a direct result of the discovery which has never ceased to fill me with enthusiasm since my early youth—the comprehension of the far from obvious fact that the laws of human reasoning coincide with the laws governing the sequences of impressions we receive from the world about us; that, therefore, pure reasoning can enable man to gain an insight into the mechanism of the latter.

I am afraid this brings us right back to the trap that I laid for you, Salviati. Planck is in effect supposing some sort of pre-established harmony between the principles of human reasoning and the nomic structure of the world. And it is hard to see how non-reductionists about laws can do otherwise in the face of the gap that their view sets up between how we think and how the world is. The beauty of the best-system account of laws is that it erases that gap, as I was saying yesterday.

Sagredo. We might almost say that where Planck adopts a preformationist account of human reason, Lewis adopts an epigeneticist one?

Simplicio. Ha, ha. Very clever—perhaps on this point, Lewis *does* stand to Planck as Kant stands to Crusius. I am still waiting to hear how you are going to get out of the trap that *I* laid, however.

Salviati. Good. Let us bring causation into the picture. For Lewis, the causal facts at a world depend on which counterfactual conditionals are true at that world, and which counterfactual conditionals are true at a world depends in part on the laws at that world. So Lewis should be a ratbag idealist about causation as well as about laws. That is an appealingly weird idea. But not, so far as I can tell, one that Lewis's followers have had much to say about.

Simplicio. Cohen and Callender mention that if one adopts their relativized best-system account laws, it is natural to likewise accept relativized accounts of causation and chance. They say a bit about how this looks for a theory of chance.

Sagredo. So you and your friends hold that the world as it is in itself, is not the sort of thing that is governed by scientific laws or that is structured by relations of cause and effect, but that the constitution of the human mind is such that, relative to it, the world has a rich nomic and causal structure?

Simplicio. You could put it that way. Some of us add that the structure of space and time also have this status. But it is important to keep in mind that there is nothing remotely German about any of this.

Salviati. Let us think a bit about all of this looks in the case of causation. Let us follow Peirce and Kant in assuming that Martians are far more intelligent than we are. And let us suppose that we are unlucky enough to find ourselves in a world in which this difference in intelligence, via the difference it makes to our respective standards of simplicity and strength, also makes a difference to laws. So there are some regularities at our world that count as laws for Martians, but not for us. Now, if you are Lewis—or indeed, anyone who accepts that there is a tight connection between laws and effective strategies—then you will expect

that there will also be strategies for intervening in the world that Martians regard as effective strategies but which we do not.

Simplicio. Yes. Different beings with different capacities and interests will and should draw the line between effective and ineffective strategies in different places.

Salviati. I am not sure that they always will or that they always should. Suppose that we come into possession of a piece of Martian technology that exploits some of these strategies that are Martian-effective but not human-effective. Now, it does not follow from the difference in our cognitive capacities that we will be incapable of figuring out the principles by which this gizmo works—it is just that in working this out, we will eventually realize that the Martians take as lawful and counterfactual-supporting some regularity that we consider to be a mere regularity, one that is excluded from our best-system because adding it would not yield enough further strength, given its complexity and our standard of balance between strength and complexity. What will and should we do if we are interested in having devices that do what the gizmo does? Change our engineering practices so that we treat the relevant regularity as counterfactual-supporting, even though according to our pre-gizmo standards, that would appear most unwise.

Let us consider Simplicio's trap, then. It is true that anyone who takes laws to be mind-independent faces a substantive challenge: Why think that human science is well-adapted to discover the laws of our world? And it is true that views that take laws to be mind-dependent in the right sort of way have an easy answer to this question: laws-for-us are *automatically* the sort of thing that our science is good at discovering. But it would be better to say that all accounts of laws of nature face a double-barrelled challenge: Why think that laws of nature are the sort of things that we would want our science to discover—and why think that our science can discover them? Anti-reductionists who assign laws an exalted metaphysical status *may* feel that they have a good answer to the first of these challenges—but as we have just been saying, they have a hard time with the second. With Lewisian reductionism, it is

the other way around. On this view, the second part of the challenge is more or less trivial. But the first part is not: Lewisian reductionists face the substantive challenge of showing that the notions of simplicity and balance that we have been equipped with by natural selection align with our scientific and technological goals. There are real challenges here for everyone.

Sagredo. Ah, I see. Does it follow that whether or not we have gotten our hands on Martian technology, we should be open to the idea that our built-in standards are leading us to systematically under-shoot—that we may be ignoring lots of effective strategies that are in principle available to us, because we are being too conservative in determining which regularities are candidate laws?

Salviati. Yes. Indeed, a natural consequence of Lewis's view is that there are regularities that are not good candidates to be laws by our standards—but which would count as laws for smarter beings. Why shouldn't we aim for super-human science and technology—even if it means using an exchange rate between simplicity and strength that feels unnatural to us?

Simplicio. The question you raise seems very like an aspect of the problem of induction to me—you are asking us to justify our choice of inductive methods. I am really more interested in philosophy of science, you know.

Salviati. I think that anyone interested in philosophy of science should be interested, at the very least, in the practical aspects of the problem of induction. The New Riddle of Induction is nothing but a sharp way of putting the point that you need some way of selecting which correlations in your data set you expect to hold up as more data come in (since it is incoherent to expect every correlation to continue to hold). This is a practical problem for anyone interested in designing autonomous learning systems. Similarly, the choice between different inductive methods is a practical problem faced by anyone intending to use machines to perform super-human scientific tasks—such as identifying patterns

in huge data sets. When we talk about 'our' standards of simplicity and balance, should we be talking about the standards appropriate for unaided human scientists or for humans with super-computing prosthetic extensions?

Simplicio. I think I have had enough horror-science fiction for now, thank you very much.

Salviati. I expect you are not the only one.

Sagredo. Let us leave the pimple-worms for another time, then.

References

For the epigraph, see Beebee and Fisher (2021, Letter 217). For Lewis, quidditism is the doctrine that two worlds can differ only in which which property plays which role—for example, according to quidditists, corresponding to any Newtonian world in which R_1 is the relation of temporal betweenness and R_2 is the relation of spatial betweenness, there is another which differs only in that the the roles played by these two relations are reversed. For discussion, see Lewis (2009) and Beebee and Fisher (2021, Letters 217, 405, and 510).

First Day. See Le Roy (1901, p. 145) for a good statement of his positivism. For Poincaré's reaction, see his (1907, Part III). For others fantasizing about non-human science in response to perceived threats to scientific objectivity, see Glashow (1992), Planck (1909/1970), Schlick (1979), and Weinberg (1996). The passages from Peirce that Sagredo mentions can be found at de Waal (2014, pp. 98, 180, and 208). For the debut of the ratbag idealists, see Lewis (1999, p. 232). For further Lewisian uses of 'ratbag,' see Lewis (2001, p. 396), Lewis (2015, p. 208) and Beebee and Fisher (2021, Letters 168 and 475).

Second Day. Quotations from Kant are from the translations in Guyer and Wood (2015) and Watkins (2012), with page numbers given using the usual conventions (first edition/second edition page numbers for the *Critique of Pure Reason*, Akademie edition volume:page number for other works). Note that the editorial apparatus of the Guyer and Wood edition

of the *Critique* includes Kant's marginalia. For Kant as pool-shark, see, e.g., Stuckenberg (1882, 51) or Kuehn (2001, p. 64). On *Au Billard Royal*, see Stuckenberg (1882, p. 159) and Smith (1827, p. 87). For helpful discussions of B168 see Zöllner (1989), Sloan (2002), and Callanan (2013). For a helpful discussion of the development of Kant's and Blumenbach's views on development, see again Sloan (2002). See Blumenbach (1781, p. 69) on circumcision and Blumenbach (1789/1792, p. 101/p. 80) on jackelopes. On the origin of pimple-worms, see Blumenbach (1806/1865, §I.5; 1810, §39); for further discussion and context, see McLaughlin (2005). For the views of Crusius summarized by Simplicio, see §§14, 15, 31, and 50 of his *Sketch* in Watkins (2009); the snippet quoted is from §50. For background on Crusius, see, e.g., Beck (1993, pp. 15–19). Following the last-quoted passage from the “Universal Natural History,” Kant gives one of his appalling racist illustrations, the gist of which is that among the Venusians, the least impressive human would be as a Newton, whereas the Jovians would consider Newton himself even less impressive than Kant considers the least impressive humans. Despite what he says about the role of the Sun in shaping intellectual capacities, Kant does not consign the residents of the hemiboreal climate of Kaliningrad to the middle rungs of the ladder of human beings—instead, he singles out as inferior some inhabitants of milder climates and some inhabitants of harsher climates. On Kant's racial theories (and Blumenbach's), see, e.g., Smith (2015, Chapter 9).

Third Day. For the canonical presentations of the best-system account of laws, see Lewis (1973, pp. 72–77; 1986, pp. xi f. and 122–131; 1999, pp. 39–43 and 231–236)—these are cited in the main text by page number alone. For an earlier version in Lewis's correspondence, see Beebe and Fisher (2021, Letter 427). For other discussions of Lewis and transcendental idealism, see Belot (2010, §1; 2011, §III.4), Langton (2015), Lewis (2009), and Lichtenstein (forthcoming). For a best-system account of geometry, see Huggett (2006). For Sagredo's criticism of this approach, see again Belot (2011, §III.4). For a reply, see Callender (2017, p. 151 fn. 6). For approaches that take strongest-simplest to

be a placeholder for the standards of scientists, see, e.g., Cohen and Callender (2009), Dorst (2019), Hall (2015), Hicks (2018), Jaag and Loew (2020), and Loewer (forthcoming). On simplicity vs. beauty, see Dirac (1940) and the references in Bangu (2006). For a critical overview of the debate about the probative force of the mathematical fecundity of string theory, see Penrose (2004, §§31.18, 34.2, and 34.9). For indexical, relativist, or perspectivalist variants of the best-system account, see Cohen and Callender (2009), Halpin (2003), Massimi (2017), and Roberts (1999). For a classic discussion of the governing and non-governing conceptions of laws, see Beebe (2000). For Simplicio's trap, see Hall (2015, §15.5.1).

Fourth Day. The characterization of scientific realism given is intended to be non-tendentious, being in broad conformity with: the “general recipe for realism” of Chakravartty (2017, §1.2); the characterization of Psillos (1999, pp. xix f.); and the “naïve statement of the position” offered by van Fraassen (1980, pp. 6 f.). See Putnam (1981, p. xi) for his Hegelian mottos, and Auxier, Anderson, and Hahn (2015, pp. 87, 481, and 771) for Putnam's repentance. See Planck (1949, p. 13) for the passage from his “Scientific Autobiography.” For Lewis on the relationship between causal facts, counterfactual conditionals, and laws, see Lewis (1986, Essays 17 and 21). See Cohen and Callender (2009, §4.2) for their discussion of the relativity of causation and chance. For the classic case for the linking causal laws with effective strategies, see Cartwright (1979).

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