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their motives, dust in the spaces between them and glue in their relationships.

Yet Jack and Jill are still playing games. The metaphor remains illuminating. There are pails of water to fetch, which one cannot carry alone and two cannot manage without a concern for the common good. If game theory cannot see them safely home with its standard assumptions, I hope that philosophy can help find some better ones.⁴

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FILLING IN SPACE

By SIMON BLACKBURN

WHY do people think that dispositions must have categorical grounds underlying them? Well, the clock tells the time because there is such-and-such an arrangement of little bits inside it; Sandy barks because her vocal chords vibrate; the light glows because electrons whizz around in its filament. The explanations are excellent, but do they illustrate the doctrine?

They do if they bring us to categorical grounds that indeed underlie the dispositions. But they do not if they bring us to something else. For instance, they might only bring us to a point where the possession of some disposition by something is explained by the possession of other dispositions by the same or different things. Or they might only bring us to the instancing of a power (disposition) at some region of space explained by the instancing of some other power at some related region of space.¹

When we think of categorical grounds, we are apt to think of a spatial configuration of things — hard, massy, shaped things resisting penetration and displacement by others of their kind. But the categorical credentials of any item in this list are poor. Resistance is *par excellence* dispositional; extension is only of use, as Leibniz insisted, if there is some other property whose instancing defines

¹ To avoid clutter I should say that from now on I shall talk indifferently of powers, dispositions, and 'counterfactuals' to describe the features on the non-categorical side of the fence; it is their contrast with the other side that matters, not possible differences between them.

the boundaries; hardness goes with resistance, and mass is knowable only by its dynamical effects. Turn up the magnification and we find things like an electrical charge at a point, or rather varying over a region, but the magnitude of a field at a region is known only through its effect on other things in spatial relations to that region. A region with charge is very different from a region without: perhaps different enough to explain all we could ever know about nature. It differs precisely in its dispositions or powers. But science finds only dispositional properties, all the way down.

Evans talked of a prejudice against bare ungrounded dispositionality, 'equally offended by the idea of two places alike in what occupies them between visits, yet of which one is such that if one goes to it, one will have certain experiences, and the other is not'.² He wanted as well a 'relatively abiding property' that fills out the intervals in the exercise of dispositions. Physics can only give him this in a backhanded way that will not satisfy the demand. An electrical field can abide, certainly, but that just means that there is a period of time over which various counterfactuals are true. It does not give us reason to think of a different property, quietly persisting, as it were, even when the disposition is not exercised.³

Perhaps I have been unduly verificationist. True, you might say, things like fields and masses are known by their effects on other things. But this should not prevent us thinking of them as *in themselves* categorical. There will be a categorical ground, G, for the (multi-track) disposition D whereby we know of mass or charge. It will be in virtue of the instancing of such a G that an object has the mass that it does, or a region of space the charge. When we think this, I believe we surreptitiously imagine an improvement in science that would enable us to identify G: a new theory about something true of charged regions of space, for example, rather like the molecular theory of gases. But this road only leads to the same place. Just as the molecular theory gives us only things with dispositions, so any conceivable improvement in science will give us only a better pattern of dispositions and powers. That's the way physics works.

Is it the way it has to work? I believe so. A quick route to this conclusion is to see the theoretical terms of a science as defined functionally, in terms of their place in a network of laws.⁴ A slower route is to reflect on what is needed from physical thinking. What

² Gareth Evans, 'Things Without the Mind', in *Philosophical Subjects*, ed. Zak van Straaten (Oxford: Oxford University Press, 1980), p. 102.

³ Cf. Strawson's reply to Evans, p. 280. 'If it seems true of the sensory properties in general that they all dissolve together, under reflective pressure, into dispositions, this seems even more certainly true of the "physical" properties which are held to constitute their categorical base.'

⁴ David Lewis, 'How to Define Theoretical Terms', in his *Philosophical Papers*, Vol. 1 (Oxford: Oxford University Press, 1983).

is needed is the use of concepts — energy, temperature, entropy — that cover changes of state, permitting the formulation of conservation laws. Such concepts in effect tell us what is the same about a changing system, in terms precisely of its powers and dispositions.⁵

G will remain, therefore, entirely beyond our ken, a something-we-know-not-what identified only by the powers and dispositions it supports. And then the possibilities multiply. Perhaps there is a possible world just like ours, not only in surface appearance, but in all that physics could ever discover, in which the dispositions have a different categorical ground, G'. Perhaps in our own world G' supports dispositions on Mondays and Wednesdays, while G supports them on the other days. But the real problem arises with the nature of the underlying and support that G provides for D. Is it logically necessary that G supports D? Presumably not — what could logic have to say about it? And since we know nothing of G it can hardly be a priori in any other way that it does what it does. Presumably then there is a law whereby G supports D and this law imputes a power to G. So it ought to need a separate categorical ground, G*, it being in virtue of G* that G gives rise to D in the worlds that obey this law. But then the power of G*, to bring it about that G gives rise to D, will itself need a ground, and so forever. To stop the regress we need a brute or bare power without a categorical ground: better in that case not to insist on grounds in the first place.

Are we in danger of proving too much? It seems as though we have excised categorical properties from nature altogether, leaving only features that, as Russell said, are each other's washing.⁶ The problem is very clear if we use a possible worlds analysis of counterfactuals. To conceive of *all* the truths about a world as dispositional, is to suppose that a world is entirely described by what is true at *neighbouring* worlds. And since our argument was a priori, these truths in turn vanish into truths about yet other neighbouring worlds, and the result is that there is no truth anywhere.⁷ Here is a good analogy. Early philosophers such as Whitehead and Collingwood, reflecting on modern physics saw that it resolved substance into function, and drew the consequence that there is no such thing as a state of nature at a literal time-

⁵ I tell this story at greater length in 'Losing your Mind: Physics, Identity, and Folk Burglar Prevention', forthcoming.

⁶ *The Analysis of Matter* (London; Kegan Paul, 1927), p. 325. 'There are many possible ways of turning some things hitherto regarded as "real" into mere laws concerning the other things. Obviously there must be a limit to this process, or else all the things in the world will merely be each other's washing'.

⁷ I have subsequently found this point made in very similar terms by Howard Robinson, *Matter and Sense* (Cambridge: Cambridge University Press, 1982), Chapter 9. Robinson uses it to attack any conception of matter, whereas I leave the issue in Hume's hands rather than Berkeley's.

slice: processes take time. 'There is no nature at an instant'.⁸ The present problem is that processes take possibilities as well as actuality, so there is no nature at an actual world.

In Lewis's exploration of these issues, categoricity comes in the 'Humean mosaic' or pattern of 'perfectly natural intrinsic properties which need nothing bigger than a point at which to be instantiated'.⁹ It seems as though we need them, but it now also seems as though we cannot have them — our best physical understanding of the world gives us no conception of what they might be. But the mention of Hume is suggestive. We can think of the Humean mosaic in experimental terms: a colour here, a tactile sensation there, a sound somewhere else. Categoricity in fact comes with the subjective view: there is nothing dispositional, to the subject, in the onset of a pain or a flash in the visual field. Such events come displayed to us as bare, monadic, changes in particular elements of experience. In this perspective a change in perceived colour is as categorical as a change in shape or a twinge of toothache, even if from the objective standpoint, 'all that goes on' when such changes occur is that a change of functional (dispositional) state arises, the subject being disposed to act and think differently as a consequence of changes in the dispositions of surrounding things.

The trouble now is that such events, conceived of as categorical, play no role in a scientific understanding of the world; they certainly do not serve to ground anything. The question remains whether we can live with a concept of objectivity that leaves us only powers without end, and escape from the discomfort this causes by somehow retreating to a subjective point of view. Strawson counsels that we can, self-consciously shifting perspectives to avoid the contradiction of thinking of the same event as both categorical and dispositional.¹⁰ But the problem remains that this gives us no help in understanding what, except counterfactuals, is true of the objective order of nature, unless, heroically, we see that order as a kind of construct from the categorical point-instances of properties available to the subjective view — a kind of neutral monism. It almost seems that carelessness and inattention alone afford a remedy — the remedy of course of allowing ourselves to have any idea at all of what could fill in space.

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⁸ See for example, R. G. Collingwood, *The Idea of Nature* (Oxford: Oxford University Press, 1945), Introduction, Sections 4 and 5. The saying is quoted from Whitehead, *Nature and Life* (Cambridge: Cambridge University Press, 1934), p. 48.

⁹ David Lewis, *Philosophical Papers*, Vol. II (Oxford: Oxford University Press, 1986), Introduction, p. x.

¹⁰ Op. cit., p. 280-1.