

B O O K R E V I E W S

Alexander Bird, *Nature's Metaphysics: Laws and Properties*.
Oxford: Oxford University Press, 2007. 256 pp.

In *Nature's Metaphysics*, Alexander Bird gives us the most carefully reasoned defense to date of “dispositional essentialism” and “dispositional monism,” positions previously advanced by Sydney Shoemaker, Brian Ellis, Chris Swoyer, Rom Harré, and Ed Madden, among others. Bird's book is well argued and provocative.

Dispositional essentialism is the view that at least one sparse fundamental property of physics essentially involves a disposition—that is, a potency, a power, a “threat or promise” (as Goodman said) to yield some manifestation in response to some stimulus. Dispositional monism is the view that *every* sparse fundamental property of physics essentially involves a disposition. On Bird's view, the association between a fundamental natural property and a disposition is a matter of metaphysical necessity. (Bird goes even further: he argues that the identity of a given fundamental natural property is *exhausted* by its dispositional character.) Therefore, it is metaphysically necessary that anything possessing a certain sparse fundamental property of physics will exhibit certain further properties when suitably stimulated. These regularities, or the corresponding relations among properties, are the laws of nature. Although metaphysically necessary, the laws do not perform the explanatory heavy-lifting. The motor and cement of the universe are the dispositional essences of the fundamental natural properties.

According to Bird, subjunctive conditionals express the dispositions constituting the essences of the fundamental natural properties. But Bird and others have uncovered several difficulties in equating dispositions with subjunctives. Some of these difficulties have involved the “finkish dispositions” popularized by C. B. Martin. In one of Martin's examples, a wire carrying an electrical current possesses the disposition of being “live,” but it is connected to a safety device so that if the wire were touched, the wire would not impart an electrical shock because the current would be turned off before the shock could be administered. The disposition would not be manifested, were it stimulated.

Bird argues that despite such finks afflicting ordinary dispositions, various subjunctive conditionals *can* be equated with the dispositions constituting the essences of the fundamental natural properties because there are no finkish dispositions at the fundamental level. A fink requires that were the stimulus to occur, the characteristic response would occur only after a short delay and only if the disposition persisted throughout the delay. The disposition is then

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finkish only if the stimulus makes the disposition disappear before the response can occur. But if the dispositional property is genuinely fundamental, Bird argues, there is no deeper mechanism producing the response from the stimulus, so there is no reason why the response should be delayed and hence no reason why the response requires the disposition to persist for a certain span of time following the stimulus. Therefore, a fundamental disposition cannot be finkish.

Bird argues: Suppose for the sake of *reductio* that the response can occur only after a two-second delay. If the disposition is truly fundamental, then one second after the stimulus, the system is no different than it is two seconds after the stimulus since no deeper mechanism is at work. But then why does the response take place only after a two-second delay, considering that there is no intrinsic difference between the system then and the system after one second?

It seems to me that the two-second delay could be a brute fact. Such things have been proposed seriously in physics. For instance, nineteenth-century physicists often took electric and magnetic forces as operating by “retarded” action-at-a-distance: a charge here now produces a force some distance away only after a certain interval of time has elapsed, without the charge producing any effects between now and then or between here and there. These theories were not widely rejected as metaphysically impossible. Bird’s argument seems to presuppose that in order for a cause to have an effect distant in time, it must have effects at every intervening moment. This view seems akin to arguing that action at a spatial distance is metaphysically impossible.

Bird seems to be suggesting that if there is no intrinsic difference between two closed systems now, then they should have the same chances of exhibiting various properties one second from now. But (it seems to me) their chances could reflect not only their current intrinsic properties, but also their current spatiotemporal relations to the stimulus.

Let’s now consider Bird’s view of laws. Laws are contingent facts according to the otherwise dissimilar accounts of David Lewis and David Armstrong. Therefore, Bird says, these accounts cannot explain why the laws would still have held under various counterfactual antecedents, such as “Had I worn a blue suit today.” Of course, a defender of Lewis’s account of laws could *stipulate* that a possible world where I am wearing a blue suit and the actual laws of nature hold is “closer” than any possible world where I am wearing a blue suit and the actual laws of nature are violated. But this stipulation threatens to be *ad hoc*. That laws belong to the deductive system of truths with the best combination of simplicity and strength (as Lewis says) does not obviously entitle laws to have any particular weight in determining which possible worlds are the closest. We could even concoct another kind of conditional governed by a closeness metric that gives some other, arbitrary class of facts this special weight in determining the closest worlds. What is it about laws that we should care about conditionals where they rather than some other facts play this special weighty role? Bird rightly presses this question.

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By taking laws to be metaphysically necessary, Bird has plenty of necessity to account for the laws' invariance under counterfactuals. Bird's account is nicely parsimonious in pressing into service here a variety of necessity that we already had to countenance. Of course, Bird has to explain away the intuitions suggesting that laws are contingent, such as our apparent capacity to imagine a possible world where the same fundamental properties figure in different laws. But we are accustomed to rejecting a few pretheoretic intuitions on the strength of an otherwise attractive philosophical theory.

More worrisome, however, are the features of scientific practice suggesting that the laws' necessity is weaker than the kind of necessity possessed by metaphysical truths—and that some laws are less necessary than others. Counterlegals are widely entertained in science. For instance, had the electric force been a bit stronger, the nuclear force would have been too weak to hold protons together in carbon nuclei. Had gravity declined with the separation cubed, then (as Paul Ehrenfest showed) planetary orbits would have been unstable. When we figure out what would have happened, had the forces been different in these ways, we use various mathematical truths, metaphysical truths about space and time, the fundamental dynamical law linking forces to motion, and the parallelogram law governing the composition of forces. They would all still have held, had the force laws been different. It is also frequently suggested that the great conservation laws as well as the spacetime transformations and symmetries are not mere byproducts of the particular kinds of forces there happen to be, but rather would still have held even if there had been different kinds of forces or the actual kinds had been governed by different laws. If all of these various truths are modally on a par, why do some of them exhibit far more counterfactual resilience than others?

Accordingly, I see both Bird and Lewis as overreacting in response to the apparently paradoxical character of the laws' contingent necessity: Bird elevates laws alongside metaphysical necessities, whereas Lewis reduces laws to the same modal rank as accidents. Neither picture embraces the diverse grades of necessity *between* metaphysical necessity and no necessity at all.

Of course, these philosophical disagreements do not diminish my enthusiasm for Bird's book. It is "must reading" for all philosophers concerned with laws, dispositions, and fundamental properties.

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