

is always or virtually always. If this argument were correct, it would seem to follow that such generalizations play at best a peripheral role both in science itself and our understanding of it. But the argument seems to depend on construing the gravitational law as a statement of a regularity connecting the total force experienced by some mass m_1 , to the quantities on the right hand side of that law, which include a second mass m_2 , rather than as a statement relating the component force experienced by m_1 due to the gravitational attraction of m_2 . Although there are indeed circumstances—e.g., sufficiently strong gravitational fields or velocities that are large in comparison with the speed of light—in which the Newtonian gravitational law breaks down, no physicist that I know follows Giere in holding that the mere presence of a non-gravitational force falsifies the law. Instead the law is given the “component force” construal described above and this allows it to be applicable to a wide range of situations in which non-gravitational forces are present. Given the evident artificiality and implausibility of the conclusion to which the total force construal (and more broadly, the Humean conception of law with which it is associated) leads, why not take this to be a reason for replacing the Humean conception with a conception of law that better fits scientific practice rather than for aiming for an account of “science without laws”? More generally, it seems to me that one can agree with Giere both about the inadequacy of standard philosophical accounts of lawhood and the wrong-headedness of certain philosophical views about what laws do (e.g., that they are somehow required to serve as “truth makers” for causal claims) without concluding that the notion of law plays no role at all in science.

Giere suggests that the notion of law persists in our contemporary understanding of science simply through a kind of cultural inertia. But I take it that Giere would also agree that when, say, a researcher attempts to construct a Newtonian model of the motion of a collection of particles within a gravitational field, there are important differences among the claims that will figure in the model. “Initial conditions” like the position and velocity of each particle can take any one of a large number of different values and for each of these the gravitational force law as well as Newton’s other laws will continue to hold, but there is no similar freedom to vary the exponent in the inverse square law. Why can’t observations like this be used to construct a nontheological account of laws: laws are just those generalizations that are invariant (in the sense that they are stable or would continue to hold) across some sufficiently large and otherwise “suitable” range of changes in conditions and circumstances (“initial conditions”). Such an account ought to be acceptable to a modal realist like Giere. It has the advantage of connecting up with contemporary physicists’ understanding of laws (which relates laws to generalizations that obey certain symmetry principles and are invariant under certain

transformations—see, e.g., Feynman (1965) and Wigner (1967)). It also allows us to avoid some of what Giere rightly objects to in standard philosophical treatments of laws such as the commitment to exceptionlessness and universality, since a generalization can be invariant under some range of changes in initial conditions without being invariant under all such changes, as the example of the gravitational inverse square law illustrates.

As this short summary perhaps suggests, there is much in this book to interest, stimulate, and provoke both philosophers of science and the science studies community.

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D. Wade Hands, *Reflection without Rules: Economic Methodology and Contemporary Science Theory*. Cambridge: Cambridge University Press (2001), 492 pp., \$ \$95.00 (cloth), \$35.00 (paper).

This book heralds a salutary departure for the field of economic methodology, and deserves to be read even by those harboring suspicions that modern discipline of economics is a mildly disreputable pastime that illegitimately lusts after the honorific of “science.” Too much of what has passed for “economic philosophy” in the past has been either: (a) a garbled recapitulation by economists of some prior discussions within the philosophy of natural science, with unreflective attempts to thrust some aspect of economics onto the Procrustean bed; or (b) awkward exercises by philosophers to mimic decision theory, game theory, or other flavor *de jour* of orthodox microeconomics, to purportedly illuminate minor philosophical questions (a veritable specialty of the journal *Economics and Philosophy*); or (c), less frequently, an exercise in consigning discussions of the economy to the low-rent district of the “philosophy of the social sciences,” as a prelude to writing it off altogether. Hands is the first writer since the 1930s to be equally well-versed in both contemporary philosophy of science and economics, and to insist that methodologists can hold their heads up high by repudiating these dead ends by innovating their own topics, reclaiming the mantle of ‘worldly philosophers’ concerned with all the Big Issues that your thesis advisor darkly warned you against.

Hands accomplishes this feat by reminding the reader that an earlier

honor roll of true blue philosophers (he cites Mill, Keynes, and Neurath) managed to ply their trade without undue embarrassment through close engagement in economic controversies as well as in philosophical disputes, but that a certain coolness set in circa 1940 with the academic professionalization of the two disciplines. (Don Howard has begun to make this case as well.) In the 1960s physics envy got the better of the economists, and they sat out the decades of Popper/Kuhn/Lakatos/Feyerabend fireworks largely as passive spectators, cultivating their own well-fertilized gardens. However, with the fragmentation of philosophy of science into such schools as variants of pragmatism, the naturalistic turn, and the engagement with the sociology of scientific knowledge (each the subject of an individual chapter in this book), Hands suggests that a space has been opened up within which economic methodologists can make their own signal contributions to contemporary debates, and proceeds to survey the ways in which this has already begun to happen.

The first, and most significant lesson of this volume is that prominent philosophers of science have *never* been very far removed from their respective contemporary economic concepts and disputes, no matter how much it may have appeared otherwise in the Cliff's Notes versions of their ideas, a point now being promulgated by numerous recent works (Cartwright et al. on Neurath, Fuller on Kuhn, Hacoheh on Popper, Kadvanly on Lakatos). The importance of this insight is that an adequate understanding of philosophy of science needs to be situated within its socio-economic context, and that economic methodologists are distinctly well-placed to participate in this endeavor. The second lesson is that, however much modern economists may protest that they are immune to almost all cultural currents sweeping the sciences and humanities, in actual fact they are being pummeled hither and yon by everything from postmodernism and feminism and cognitivism to the not-so-stealthy return of Social Darwinism, and that the only people adequately positioned to notice and evaluate such buffeting are those who have reasonable familiarity with the relevant philosophical currents and scientific wellsprings. (Of course, these people may no longer receive their training in economics departments, but that's a different problem.) A third lesson, perhaps not adequately stressed here, is that the natural sciences themselves from time to time have derived inspiration and succor from various economic traditions, and this also raises interesting questions for economic methodologists. The payoff in staking out a "third way" between the economists and the philosophers is that there will exist an identifiable community which can intelligibly discuss the question of "whither economics?" for and with the general public, extending beyond the superficial commentary now found in newspapers and magazines (and movies: witness *A Beautiful Mind*) without being mistaken for impossibly impertinent thought police trying to dictate sanc-

tioned proper behavior to economists (a forlorn and silly ambition in any event) or alternatively, as valued fellow-travelers of the philosophy profession (a remote possibility).

Furthermore, sensitive to the need to counter the suspicion that this 'third way' might constitute little more than an irrelevant pastime, like poetry or pushpin, Hands ends with a very perceptive chapter on the nascent attempt on the part of many writers to conjure an "economics of science." Readers of this journal will be aware of many esteemed philosophers of science who have sought to render philosophy more relevant to the changing modern landscape of scientific organization and research by recourse to conventional *economic* models of scientists' behavior. Economists debating the reorganization of universities and intellectual property in our era of globalization have done likewise. Hands does a wonderful job of exposing the many ironies and contradictions inherent in these forays, and suggests that the arbitrary disciplinary boundaries separating these two groups will not likely lead to mutually advantageous trade and discourse in the near future. Instead, he calls for his newly reconstituted economic methodologist to mediate between these two groups, identifying the ways in which economic models miss the real forces behind the vast reorganization of scientific inquiry which now have been recently made manifest as the consequences of prior attempts to protect the corporate interests of a certain large software firm which will remain nameless, or a certain cartoon rodent, or the governmental drive to wean universities off their dependence upon military funding. The capacity to think through the multivalent consequences of legal and economic changes which range so very far afield from any simplistic notion of scientific research as an epiphenomenon of individual utility and desire, something already called for by writers as diverse as James Boyle, John Ziman, Larry Lessig and Corynne McSherry, would be the competence of the kind of economic philosopher whom Hands conjures. This is truly a book for our time.

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Hugh Lacey, *Is Science Value Free?: Values & Scientific Understanding*. Routledge (1999), xiv + 285 pp., \$90.00 (cloth)

As philosophical debate over the role of values in science continues to smolder, Hugh Lacey's recent work adds richness to the terms of the debate and an intriguing philosophical framework for the questions at issue. While Lacey's own views have some serious difficulties yet to be faced, this work will raise important questions for anyone who has wondered, not whether science currently is value-free, but what such an ideal would be and whether the ideal is defensible.