BOOK REVIEWS

A Standpoint on Science

Whose Science? Whose Knowledge? Thinking from Women's Lives. SANDRA HARDING. Cornell University Press, Ithaca, NY, 1991. xiv, 319 pp. $34.50; paper, $12.95.

This is an important book that has much to offer practicing scientists but probably will not be read by many of them. That is a shame, because its bold claims are usefully unsettling and its argument begs for engagement. One of the basic messages of *Whose Science? Whose Knowledge?*—that all fields of natural science are best analyzed from within the social sciences, of which they are logically a part, rather than taken as external models for the social sciences—has potential consequences for most, perhaps all, scientific practice.

In 12 chapters divided into three sections, Sandra Harding, a philosopher specializing in epistemology, maps the relations between the development of powerful models and bodies of knowledge in Western science and the continuous creation and displacement of what she calls "others": parties often excluded from science and often objects of study, like Third World peoples, women, sexual minorities, the poor, and nature itself. By standing the hierarchical relationship between the natural and the social sciences on its head, Harding attempts to show that the much-debated objectivity claims of science are actually weaker in fields of natural science than they would be if the analysis of social contexts and interests were made a central part of scientific inquiry. In other words, by excluding the social relations and contexts of the scientific discovery process from scientific scrutiny, scientists end up with elaborate explanatory rationales but weakened understandings of causation. Were they to draw on recent developments in the critical social sciences, they would have both a stronger handle on the nature of their own knowledge and richer and more objective understandings of their objects of scrutiny.

Harding approaches this important claim through the following moves. First, she summarizes ferment around what she has earlier labeled (in the title of a 1986 book) "the science question in feminism": feminist (and allied) critiques of scientific objectivity have imputed a gendered or otherwise political nature to every aspect of the enterprise: who can become a scientist; what research projects get material and intellectual support; what "counts" as important, rather than marginal, science; and scientific findings themselves. By chapter 4, Harding asks her readers to understand "Why 'physics' is a bad model for physics," on the basis of a critique of objectivity as necessarily excluding (rather than more powerfully including) the social matrix within which its methods are developed. Illustrations of the "strong objectivity" that emerges when social context is included are most powerfully laid out in chapter 8, where Harding provides an extensive review of studies describing African-Americans' relation to the sciences. The experiences of black women doctors and nurses, the substandard science education available in most African-American communities, the lack of respect minority people have experienced in their encounters with the medical and health professions, and the use of racially marked language in scientific descriptions are all factors that have shaped the benefits and burdens of science for African-Americans. Bringing their criticisms and aspirations inside scientific investigation opens up new possibilities for research as well as for social justice. Later chapters make similar cases regarding the Third World, lesbians, and what Harding calls "more new agents of history and knowledge." In other words, learning to think from the perspective of excluded groups yields new insights into the process by which scientific questions are formulated, and, potentially, how scientists might best be recruited and taught to transform their research agendas.

There is a second epistemological argument that runs through the book: better science has already emerged and will continue to emerge from developments in "standpoint theory" than from more conventional notions of objectivity. Standpoint theory itself emerged from a critical, often Marxist-influenced philosophic tradition that saw the location of social actors as critical to the development of their particular scientific tools and methods. In standpoint theory, feminism develops from thinking through women's lives and experiences, but experience per se must be processed through reflection; it does not automatically yield insight. From this position, Harding works out an elegant argument asserting that all of us can learn to think about the effects of sexism (or racism, or homophobia, or any other bias) like "natives" of the various minorities who initially mounted powerful criticisms of the effects of scientific exclusion on their lives and communities. In other words, male (or white, or heterosexual) scientists not only can but should use the powerful critical perspectives developed from excluded standpoints in the development of their scientific work. Some of this is heady stuff: the systematic comparison of standpoint theory with its Marxian roots and postmodernist transformations and the author's explanation of why some sciences move toward self-reflexivity (that is, self-awareness) more rapidly and successfully than others make for fascinating reading. But for those not already committed to a social constructionist worldview, much of the book may seem rhetorical, and the repetition of a small number of examples drawn from a limited range of epistemological texts made me yearn for a broader and more challenging array of criticisms.

Above all, the insistence that the social sciences provide a more powerful model of epistemology than the natural sciences may not persuade non-philosophers, because Harding scants the hardest cases that might challenge her claims. When examples are drawn from applied fields that intertwine with the biological sciences, it is relatively easy to see what anthropologist Leila Leibowitz once called "the Disneyization process" at work: our genes, hormones, organ systems, and the like are too easily characterized in comfortably anthropomorphic terms. Social studies of science effectively describe how culturally embedded scientific worldviews and explanations can be. Recent studies of primatology, for example, highlight the central importance of race and gender categories in the development of scientific thinking about monkeys and apes; military models loom large in the language of contemporary immunology. (See for example Donna Haraway, *Primate Visions* [Routledge, 1989] and "The biopolitics of postmodern bodies: determinations of self in immune system discourse," *Differences* **1**, 3 [1989]; and Emily Martin, "Toward an anthropology of immunology: the body as nation-state," *Medical Anthropology Quarterly* **4**, 410 [1990].) Such examples gracefully sustain Harding's perspective.

The arguments for social construction are harder to sustain in sciences less obviously about human beings and our (limited) agency, such as physics, chemistry, astronomy, or geology. Why should a chemist accept the assertion that the periodic table is gendered and racially marked? Why

should a physicist rethink "his" commitment to quarks just because a philosopher alleges that the small scientific elite responsible for their discovery systematically overlooked other explanations as a result of its social standing? (Though recent social studies of science *do* claim to have located cultural processes, rather than unmediated natural ones, at the heart of what the "hard" sciences study; see for example Sharon Traweek, *Beamtimes and Lifetimes* [Harvard University Press, 1988] and Karin Knorr-Cetina and Michael Mulkay, Eds., *Science Observed* [Sage, 1983].) Though Harding provides a logical argument against distinctions between applied and pure, natural and social, and "softer" and "harder" sciences as themselves hierarchical social constructions, only those of us already committed to this position are likely to take her word for it. A deeper engagement with these tough cases would have made the book more useful to audiences beyond those already well read in feminist epistemology.

Still, what is most compelling about *Whose Science? Whose Knowledge?* is its belief in the power of democratizing scientific personnel, subjects, and objects. In the late 20th century, "we" are all inside science: women, racial and sexual minorities, inhabitants of the most underprivileged (as well as what Harding labels the "overprivileged") parts of the globe. People whose standpoints develop out of these diverse experiences must be recruited into setting and carrying out scientific agendas not only for reasons of justice, but for what they can contribute to scientific practice. That's a large and utopian agenda whose fulfillment should benefit everyone.

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An Enthusiasm in Cosmology

Quantum Cosmology and Baby Universes. S. COLEMAN, J. B. HARTLE, T. PIRAN, and S. WEINBERG, Eds. World Scientific, River Edge, NJ, 1991. xiv, 353 pp., illus. $54; paper, $32. Jerusalem Winter School for Theoretical Physics, vol. 7 (Dec. 1989).

Quantum cosmology (quantum mechanics applied to the entire universe, and in particular to its space-time structure) essentially began with a small number of foundational papers by Bryce DeWitt, Charles Misner, and John Wheeler in the 1960s. However, the subject did not really explode until the early 1980s, when James Hartle, Stephen Hawking, Andrei Linde, and Alexander Vilenkin made proposals regarding the quantum state of the universe, thereby fundamentally going beyond the dynamical laws that are the focus of those seeking a "theory of everything." The subject was further inflamed by Sidney Coleman's 1988 proposal of a mechanism by which baby universes (other regions of space-time connected to our large region only by tiny wormholes) might force the cosmological constant to zero, thereby explaining why we don't see empty space gravitate or antigravitate. A blaze of activity resulted, which culminated in a Jerusalem Winter School for Theoretical Physics held over New Year's 1990. The present book is the archival record.

The Jerusalem Winter School occurred when the flames of enthusiasm for baby universes were dwindling as the fuel of basic information known in quantum gravity and applicable to baby universes became largely depleted. Even at the school, one of the invited lecturers, Leonard Susskind, remarked that the subject was dying. He only bothered to write up a seven-page summary of his lectures.

The man most responsible for the blaze, Sidney Coleman, codirector of the school, notes in the preface to this book that "the more responsible lecturers submitted lecture notes to be published." A quick check reveals that every lecturer contributed at least some notes, except Coleman himself. Coleman and Susskind's responses seem to indicate that they had little new to write on the subject or that they had turned their attention to other areas where it is less difficult to avoid sinking into "a trackless swamp," in Coleman's earlier characterization of the subject.

The problem is not that baby-universe theory has been shown to be wrong but rather that quantum gravity is simply not understood well enough to be applied to baby universes or wormholes with any confidence. Not only are there formidable technical issues (on which some important progress has been made in superstring theory), also there are obstinate conceptual problems (which are largely still unresolved even in superstring theory). Stephen Hawking and Andrew Strominger present stimulating lecture notes on certain approaches to these problems, but their basic assumptions are certainly not beyond controversy.

Perhaps for these reasons it is well to step back from baby universes and look at the foundations of quantum gravity and quantum cosmology. This is what the lectures of Claudio Teitelboim, James Hartle, and Jonathan Halliwell do, taking up over two-thirds of the book. After giving beautiful review lectures of Hamiltonian gravity, Teitelboim focuses his notes on BRST theory and generally covariant systems, which are not so well known as the rest of his subject. Hartle goes most deeply into the fundamental conceptual issues and proposes a generalized quantum mechanics for cosmology. Halliwell gives introductory lectures on quantum cosmology, proposals regarding the quantum state of the universe,

Vignettes: Ontogenetic Viewpoints

Developmental biology is a strange science because it denies the hegemony of the adult . . . . To a developmental biologist, the expression, "Mayflies live but for a day," is completely fallacious . . . . the embryonic and larval states of this organism last the remaining 364.

—*Scott F. Gilbert*, in *Organism and the Origins of Self* (Alfred I. Tauber, Ed.; Kluwer Academic Publishers)

About twenty years ago a French embryologist named Raynaud took fertile eggs out of a reticulated python at various intervals and examined them closely. He was interested in that most snakey of qualities, limblessness. One of the things he discovered was that his unborn pythons weren't naked below the waist throughout their development. At one point tiny mounds of tissue known as limb buds appeared on either side of their cloacal regions, much like the ones that in most higher vertebrates eventually become legs. But his snakes were not freaks; almost immediately the epithelial cells covering these buds began to die. It was as if a message had been received: *Upon thy belly thou shalt go.*

—*Thomas Palmer*, in *Landscape with Reptile: Rattlesnakes in an Urban World* (Ticknor and Fields)