

Feminism in philosophy of science

Making sense of contingency and constraint

Introduction

Feminist philosophy of science is situated at the intersection between feminist interests in science and philosophical studies of science as these have developed in the last twenty years. Feminists have long regarded the sciences as a key resource for understanding the conditions that affect women's lives and, in this connection, they have pursued a number of highly productive programmes of research, especially in the social and life sciences. At the same time, however, feminists see the sciences as an important locus of gender inequality and as a key source of legitimation for this inequality; feminists both within and outside the sciences have developed close critical analyses of the androcentrism they find inherent in the institutions, practices and content of science. Both kinds of feminist engagement with science – constructive and critical – raise epistemological questions about ideals of objectivity, the status of evidence and the role of orienting (often unacknowledged) contextual values.

Despite substantial overlap between philosophical and feminist interests in science, a number of outspoken critics argue that the very idea of feminist philosophy of science (or, more generally, feminist epistemology), is a contradiction in terms.¹ Insofar as feminism is an explicitly partisan, political standpoint, they insist, it can have no bearing on the practice or understanding of science, the hallmark of which is value neutrality and objectivity. In response to objections of this sort, feminist philosophers of science argue that their critics make a number of highly problematic assumptions about science. Arguments that were well established by the late 1970s – arguments from the theory-ladenness of evidence, the underdetermination of theory by evidence, and various forms of holism – substantially undermine confidence in the central tenets of 'received view' theories of scientific knowledge; they make it clear that the empirical basis of science cannot be treated as a foundational given in any straightforward

sense, and that objectivity cannot be identified with strict value neutrality and the context independence of epistemic standards.²

The conclusions that emerged from these internal critiques of positivism in the 1960s and 1970s have been reinforced by twenty years of post-positivist research in which philosophers have turned increasingly to fine-grained, discipline- and practice-specific studies of science. The inspiration for much of this work is a commitment to ground philosophical analyses in a detailed understanding of the content and practice of actual science.³ Time and again, the result has been increased recognition that the sciences are complex and contingent in ways that resist explanation in conventional philosophical terms. ‘Contextual’ (external, non-cognitive) factors play a crucial role not only in decisions about what questions to pursue and how to apply the results of inquiry, but also in the intellectual and methodological judgements that shape the content of science; they influence how scientists conceptualize their subject domain, what hypotheses they consider plausible, and what will count as evidence and ‘good reasons’ in the evaluation of these hypotheses. It is a short step from the insights central to the work of this new generation of contextualizing philosophers of science to a recognition that the gendered dimensions of scientific practice – the gender structures inherent in its institutions, the gender symbolism associated with its practice and its products, the gendered interests and identities of its practitioners – may well be among the contextual factors that are relevant for answering philosophical questions about science.

In what follows, I begin with a general account of the difference that feminist perspectives have made to the practice of science. I then consider a number of responses to the philosophical questions raised by feminist critiques of science and feminist research initiatives, and describe the range of theories developed by feminist philosophers of science. I will focus, in conclusion, on recent developments in feminist empiricism and feminist standpoint theory as examples of work in feminist philosophy of science that illustrate both its unique contributions to and its continuities with the growing tradition of naturalizing and contextualizing research in philosophy of science.

Feminism and science

Where science is concerned, feminists are perhaps best known for sharply critical assessments of various ways in which sexist or androcentric values and assumptions are reproduced in the institutional structures, the practice, the research agendas and the resulting content of even the most credible and well-established sciences. Often feminist critics begin by documenting

gender inequalities in the training, representation and recognition of women in the sciences, a pattern of marginalization that continues into the present even as increasing numbers of women demonstrate their aptitude for scientific training and their capacity to make substantial contributions to virtually all fields of scientific research. Londa Shiebinger, a feminist historian of science, argues that these long-established patterns of exclusion were by no means inevitable; elite women and women involved in traditions of craft production in the seventeenth and eighteenth centuries played an active role in the early formation of the sciences but were systematically marginalized as these disciplines assumed the institutional forms that have since become familiar.⁴ Women were rarely admitted to the major scientific academies and universities responsible for training scientists until the last fifty years, whatever their talents or contributions and, despite their growing representation in graduate programmes, they remain a striking minority in most fields. The resulting under-representation of women in the sciences is both reflected in and reinforced by representations of science (popular and internal) that define it as a stereotypically masculine enterprise. The circle is closed when the tools of science are used to demonstrate that women, along with a variety of other unsavoury outsiders (e.g., criminals, the 'lower classes', a shifting catalogue of racial, ethnic and national groups) lack the cognitive capacities necessary to succeed at disciplined, scientific inquiry.⁵

While these 'equity' critiques challenge the democratic, meritocratic ideals associated with science, on their own they do not call into question its content or credibility. This requires a further programme of critical analysis that focuses on ways in which persistent, deeply rooted gender inequities compromise not only the fairness and effectiveness of science as an institution, but also its epistemic integrity. These 'content' critiques take quite different forms depending on the subject matter and practice of the field (or subfield) in question.⁶

In cases where the subject of inquiry is explicitly gendered – in the social sciences and some areas of the life sciences – feminists have pursued two broad strategies of analysis. On one hand, they draw attention to gaps in understanding that arise when researchers exclude women and gender as a subject of inquiry, or treat the experience and attributes of men as normative. Consider, for example, recurrent critiques of medical research that decry the preoccupation with ailments of special concern to men as opposed to those that primarily affect women, and the associated practice of generalizing the results of male-specific studies to women. The relative dearth of research on common forms of breast cancer has been a matter of intense public debate in the last decade, as are the results of recent studies

which suggest that women may be routinely misdiagnosed when it is assumed that they suffer from the same (well-studied) forms of heart disease as afflict men. In a parallel critique from psychology, Carol Gilligan shows what is missed when the moral development of children is modelled exclusively on samples of boys.⁷ And in history and anthropology feminists call into question the androcentrism of quite fundamental subject-defining assumptions. The Renaissance proves to be anything but a period of cultural 'rebirth' if you consider the fortunes of women,⁸ while the activities of women 'gatherers' are frequently the primary source of dietary intake in 'hunter-gatherer' societies, a finding that reinforced the need to rethink 'man the hunter' models of human evolution.⁹

On the other hand, feminists are also concerned to identify systematic distortions that arise when gender differences are taken seriously but are conceptualized in terms of stereotypes that impose sharply polarized, static categories on what are often quite complex and highly variable constructs. Assumptions of this kind are most obviously at work in the long history of sex difference studies that have been dedicated to documenting gender differences in intelligence and other cognitive capacities, and to isolating their genetic or hormonal or other biophysical foundations.¹⁰ Even if the contingency of cultural or historical subjects is explicitly recognized, parallel problems arise when investigators project gender categories derived from their own experience onto culturally and historically distant subjects. Assumptions about the passivity and dependence of women, by contrast to the active, publicly dominant roles of men, pervade archaeological and palaeontological reconstructions, and aligned theories of human evolution.¹¹ Feminists have themselves wrestled with the influence of these stereotypes from the time they initiated research programmes of their own. A number of auto-critiques appeared in the early 1980s in which feminist ethnographers and historians took stock of their early labours, concluding that, in refocusing attention on the activities and experiences distinctive of women, they had often simply inverted dominant assumptions about gender difference that, on closer inspection, require more fundamental reassessment.¹²

Sometimes this last type of critique proves salient in fields concerned with subject domains that are not overtly gendered, but that lend themselves to being projectively gendered and investigated in light of familiar sex/gender stereotypes. One widely publicized example is that of primatology where recent research suggests that, contrary to deeply entrenched assumptions about what counts as 'natural' in the domain of sex/gender relations, wild primate populations exemplify more flexible and, in many cases, more female-centred patterns of social organization than previously

recognized.¹³ Famously, studies of reproductive physiology were long structured by assumptions that arose from the attribution of stereotypically masculine traits to sperm (as active agents) and feminine traits to eggs (as passive), sometimes at considerable cost to empirical adequacy and explanatory power. And by extension of these most obvious cases, there are a number of areas of biological research in which even subjects of micro- and molecular biology are projectively gendered.¹⁴

Finally, a different kind of case is sometimes made for recognizing gender bias even in fields whose subject matter is neither inherently nor projectively gendered. This often depends on an argument to the effect that the whole orientation of fields like mathematics and theoretical physics, or the dominant concern with ‘master molecule’ theories in micro-biology, is ideologically masculine in its preoccupation with abstraction, control and an idealized ‘culture of no culture’.¹⁵ In the early 1980s, some feminists writing on science considered the possibility that the sciences, dominated as they are by men, may reflect a distinctively masculine cognitive orientation. Some drew on psychoanalytic accounts of early childhood socialization (‘object relations’ theory) and argued, on this basis, that girls tend to grow up with less sharply defined identity boundaries, less dissociation from objects of knowledge, less compulsion to control and manipulate, and a greater capacity for empathetic engagement, while boys develop the cognitive styles that have come to be associated with dominant, scientific forms of knowledge – the characteristically ‘masculine’ traits of detachment, objectivity, and a preoccupation with intervention and control of the objects of knowledge.¹⁶

The essentialism inherent in this line of argument has been as sharply criticized internally, by feminist theorists, as by their critics.¹⁷ In recent discussions it has been reconceptualized as a thesis that concerns not actual gender differences in cognitive orientation, but the symbolic conventions by which the cognitive styles associated with science are represented and valued; the claim here is that the attributes of good scientific practice are assimilated symbolically to masculine stereotypes.¹⁸ It should be noted, however, that this turn away from appeals to a distinctive women’s or men’s ‘way of knowing’ by no means establishes that gender is irrelevant to the understanding of sciences that investigate non-gendered subjects. One of the central insights to emerge from recent sociology of science is that class and national bias are evident not just in notorious instances of propagandistic science such as Nazi science, but in the conceptual foundations and preferred modes of practice typical even of those research programmes that were acclaimed as the best examples of natural science and mathematics in their day. The question of how the gendered dimen-

sions of practice shape various of these fields is one that a number of feminists are actively exploring with reference, increasingly, to specific research programmes and practices in the physical and life sciences where the subjects of inquiry are not explicitly or projectively gendered.¹⁹

On not ‘disappearing’ gender: philosophical responses

Feminist practitioners and philosophers of science grapple with epistemological issues as soon as they ask how it is possible that many of our best and most authoritative sciences have been compromised by sexist and androcentric bias. Is the problem one of correcting surprisingly widespread instances of ‘bad science’, or must we reconsider the scope and powers of ‘science as usual’, good science, even our best science?²⁰ Even more perplexing, how are we to understand the contributions of feminist critics and practitioners? Androcentric and sexist presuppositions remained unrecognized in many fields until feminists drew attention to them and insisted that they be subjected to empirical and critical scrutiny. In this case it seems to have been the political engagement of feminist practitioners – the contextual values that comprise their distinctive ‘angle of vision’ – that put them in a position to notice ‘things about research methods and interpretations that many others have missed’,²¹ and to formulate fruitful new lines of inquiry, both critical and constructive, that frequently improve upon the supposedly value-neutral research traditions they call into question.

These questions make clear the limitations of the traditional, positivist/empiricist conceptions of science that still define, for many, what it is to do science. In particular, they challenge us to rethink the relationship between the range of broadly ‘internal’, epistemic (cognitive) values that are generally taken to be constitutive of science, and the various contextual (non-cognitive, sociopolitical) factors that have conventionally been treated as properly ‘external’ to science.²² They illustrate in concrete terms the extent to which the import of evidence is a function of the background theory and interpretive assumptions researchers bring to it. And they throw into relief the contingency of the decisions scientists make when they determine what questions to pursue, what categories of description and analysis to employ, what forms of evidence to seek, and what range of hypotheses and background assumptions to consider in connection with any given research project. Evidence alone cannot determine the adequacy of the interesting knowledge claims considered by scientists, and evidence itself cannot be treated as a self-warranting foundation, autonomous from

the theoretical assumptions that frame research (internally) and from the contextual values and interests that are supposed to remain external to it.²³

Feminist engagements with science reinforce the further point, central to much post-positivist philosophy of science, that even such core epistemic requirements as empirical adequacy, as well as a wide range of other constitutive values typically cited in this connection – internal coherence and external consistency, explanatory power, simplicity, unity – must be understood as evolving standards of practice, subject to interpretation and to historically situated, pragmatic considerations that determine how these virtues will be weighed against one another. They are not transcendent and universal; they are neither given by the subject domain (or evidence derived from it) nor by universal principles of rationality. These issues have been a central concern for post-positivist philosophy of science throughout the period when feminist philosophy of science has taken shape.

The epistemological challenge taken up by feminist philosophers of science is, then, to understand both the enabling and the compromising role that contextual factors play in science, in particular, those that arise from the gendered dimensions of scientific practice: gender relations, gendered identities, sex/gender systems, gender ideology. Although feminists hold widely divergent views about science, typically they share what Longino has described in another connection as a ‘bottom line maxim’ not to ‘disappear’ gender.²⁴ They do not assume that considerations of gender must be relevant, much less fundamental, but they do insist that gender cannot be assumed, in advance, to be irrelevant to the understanding of science.

This open-ended feminist commitment to a gender-sensitive contextualism has generated a diverse range of philosophical responses. At the conservative end of the spectrum, it has been sharply condemned by philosophical traditionalists who insist that it represents a pernicious concession to irrationalism. As Haack makes the case, when feminists take seriously the possibility that gender (among other contextual factors) may shape scientific understanding, they undermine crucial distinctions between ‘truth seeking’ inquiry – inquiry that is motivated by a ‘genuine desire to find out how things are’ and is ‘not informed by political ideas at all’²⁵ – and various forms of ‘sham’ research undertaken by those who are bent on ‘politiciz[ing] science’ and therefore ‘are not really engaged in inquiry at all’.²⁶ Haack insists that we must hold the line against social constructivism of all kinds which she identifies, as an undifferentiated whole, with the view that science is (nothing but) ‘a value-permeated social institution’; politics or idiosyncratic preference, not evidence, determines what theories are accepted, indeed, reality itself may be seen as ‘constructed by us’.²⁷

Haack fails to distinguish between the wide range of positions articulated by feminists and by the growing number of philosophers of science who have, as she suggests, confronted the limitations of science and recognized that its epistemic authority should be scrutinized.²⁸ Broadly contextualist, anti-foundationalist and fallibilist positions take a number of different forms; by no means do all advocates of these positions assume that the only alternative to 'romantic' idealization is wholesale rejection of science and its orienting (epistemic) values. In fact, a great many feminist philosophers of science, and most feminist scientists, strongly resist corrosive post- or anti-modern critiques because there is much they need to know (as feminists) about 'how things [really] are' that requires the kind of systematic, empirical investigation best accomplished by scientific means. As clearly as feminists understand that science is a deeply social enterprise, they also recognize it to be hard and profitable work; scientific inquiry is a matter of sustained engagement with recalcitrant (if never uninterpreted) empirical realities which, time and again, reshapes our settled assumptions about how the world is, or must be. If anything, feminist philosophers and scientists are precisely those for whom the epistemic stakes valued by Haack are highest; they know first hand the cost of self-delusion and error in understanding the conditions they seek to change.²⁹

Sometimes feminist analyses are rejected as antithetical to philosophical interests in science even by those who embrace the range of constructivist and contextualist positions to which Haack assimilates feminist theories of science.³⁰ More often they are simply ignored. Elisabeth Lloyd³¹ argues that a wide range of influential (recognizably mainstream) philosophers have been prepared to question key elements of the 'philosophical folk view' underlying traditional epistemology; they recognize the 'essential sociality of science and its relations to our community's purposes and goals' and take seriously the role of community-based, intersubjective assumptions and values in science.³² But when it comes to feminist work along these lines, they maintain a pervasive 'double standard'; they seem prepared to consider 'everything but the kitchen sink as potentially relevant to our conceptions of objectivity, truth, knowledge, and meaning – but not sex and gender'.³³

At the other end of this spectrum lie the responses of feminists, some of whom are just as deeply sceptical as Haack about the prospects for making any fruitful connection between feminist analysis and philosophy of science.³⁴ Lorraine Code argues that the questions feminists raise about knowledge and science cannot be adequately addressed within the framework of any of the dominant traditions of epistemological research, perhaps most especially those central to contemporary philosophy of

science. Whatever liberalizing trends may be evident, epistemology, ‘for all its variations’,³⁵ continues to be dominated by the quest for ‘a monolithic, comprehensive epistemological *theory* removed from the practical-political issues a theory of knowledge has to address’.³⁶ As such, it is inimical to feminist interests in understanding the gendered contexts and contingencies of knowledge. Feminists must be prepared, Code concludes, to undertake a radical ‘remapping of the epistemological terrain’.³⁷ Many feminists agree that philosophical questions about knowledge and science must be substantially reframed, but find rich resources and useful precedents for such a project within contemporary (post-positivist) philosophy of science.

The growing body of literature that constitutes feminist philosophy of science occupies a conceptual space between these sharply polarized expressions of scepticism about ‘the very idea’ of feminist philosophy of science. It is predicated on the conviction that feminist perspectives and philosophy of science have much to gain from one another. Indeed, as Lloyd’s analysis suggests, the most innovative work by feminist philosophers of science frequently arises as much from the careful extension of insights central to post-positivist philosophy of science as from critical reaction against it.³⁸

Feminist philosophy of science

In a now classic taxonomy of the epistemological positions embraced by feminist analysts of science that appeared in 1986, Sandra Harding distinguishes between feminist empiricism, feminist standpoint theory and emergent forms of feminist postmodernism.³⁹ In its most straightforward ‘spontaneous’ form feminist empiricism is often the position adopted by feminist scientists. As practitioners, many accept the objectivist and foundationalist ideals constitutive of their disciplines and argue not for a reassessment of these entrenched epistemic values (at least, not immediately), but for more systematic, rigorous application of the existing methods of science; many use these to good effect to identify and correct androcentric biases of content that must be understood to arise, on an empiricist account, from a contingent failure to counter the effects of intrusive external interests. More sophisticated forms of liberal empiricism have been developed by a number of feminist philosophers of science (I consider some of these below), but when Harding characterized this family of positions over a decade ago, she tended to the view later articulated by Code. As forms of empiricism, she argued, they lack the resources to account for the persistence of gender bias in many otherwise exemplary

sciences, or to explain the corrective insights made possible by bringing feminist perspectives to bear on the sciences.⁴⁰

By contrast, feminist standpoint theory gives central importance to the social and political contexts of inquiry. Its roots are Marxist; in its earliest formulations feminist standpoint theory turned on the argument that, just as the proletariat are in a position, by virtue of their class location, to see with particular clarity the exploitative relations of production that structure capitalist society, so too are women in a particularly good position to understand the inequitable social relations that constitute patriarchal social systems.⁴¹ The central insight here is that, as ‘embodied’ social-natural beings, our understandings of the world and, more broadly, our capacities for epistemic engagement,⁴² are to varying degrees partial and ‘perverse’ depending on the material conditions of our lives, and these conditions are, in part, a function of sex/gender systems. The mechanisms by which gender relations affect our epistemic standpoint are necessarily different in important respects from those which might account for the distinctive insights of an under-class. The complexity of sexual divisions of labour, both productive and reproductive, figure centrally in these accounts. Dorothy Smith and Nancy Hartsock argue (in rather different ways) that women do distinctive kinds of work – various forms of domestic labour and other types of service and support ‘behind the scenes’ – which are systematically obscured from public view.⁴³ As a result, women are often in a position to know how the social order is actually produced and maintained, and to recognize the ideological distortions in received knowledge that sustain conventional sex/gender systems.

These lines of argument are meant to show that, although women often lack epistemic authority, in fact they may occupy a privileged epistemic standpoint when it comes to recognizing the partiality of a dominant androcentric or sexist world view and to grasping the underlying realities of life that this world view obscures. Where scientific inquiry is concerned, standpoint theory suggests that androcentric bias of various kinds is to be expected. Science is likely to reflect assumptions that predominantly male practitioners take for granted, the limitations of which will be most clearly visible to practitioners who bring to bear not just the standpoint of women, but the analysis afforded by an explicitly feminist consciousness of gender relations.

From the outset, even those most closely associated with standpoint theory have raised probing questions about its central assumptions. Hartsock was clear about the difficulties involved in conceptualizing the standpoint of women by analogy to that of a political-economic class; and Harding called into question the viability of any appeal to a distinctive

'woman's' (or 'feminist's') standpoint, whether construed in psychoanalytic or political-economic terms.⁴⁴ Harding's reservations have been reinforced by well over a decade of intense critique of essentialism by feminist theorists and activists who draw attention to the enormous diversity of women's experience and circumstances and argue, on this basis, that it makes no sense to speak of the attributes of a gendered standpoint distinct from all the other factors that structure our identities, opportunities and social relations. In a recent reassessment of standpoint theory, Hekman notes that for these reasons (among others) it is 'frequently regarded as a quaint relic of feminism's less sophisticated past'.⁴⁵

When Harding assessed standpoint theory in the mid 1980s, she characterized it as an unstable position located dialectically between feminist empiricism and various forms of feminist postmodernism. She argued that if feminist standpoint theorists were consistent in maintaining their central contextualizing insight – that all knowledge is 'situated and perspectival',⁴⁶ and all science 'irreducibly social'⁴⁷ – they must accept the thoroughgoing relativism of a postmodern stance that abandons or, at least, regards with ironic scepticism all claims of epistemic privilege. If, on the other hand, standpoint theorists are committed to the claim that feminists' (or women's) standpoints are epistemically privileged, they often revert to justificatory arguments that invoke transcendent epistemic standards (of rationality or credibility) of the sort associated with conventional empiricism. At the time, Harding urged strategic ambivalence. She embraced the visionary potential of postmodernism, but also acknowledged that feminists cannot afford to abandon the resources of the successor science projects that grow out of feminist empiricism and the more conservative forms of standpoint theory.⁴⁸

I have argued that this is an inherently unsatisfying position,⁴⁹ and it is one that Harding has moved away from in recent work in which she has renewed her interest in standpoint theory.⁵⁰ The problem with it is the assumption, which animates Haack's defence of objectivism as much as arguments for postmodern conclusions, that contextualizing moves of any kind lead inexorably to corrosive relativism; if knowledge claims are recognized to be constructed and situated, it seems that there can be no ground for assessing their credibility, and no justification for claiming that any have epistemic authority. Neither horn of this implied dilemma has been acceptable to feminists engaged in science for all the reasons outlined above. They urge a realistic and pragmatic assessment of the (human) capacity of science to provide reliable, probative knowledge of the natural and social worlds in which we live and act. Feminists on both sides of the artificial divide insist that 'there are cultural and natural/material causes for

knowledge claims', and both need to be considered if we are to understand the powers and limitations of real-world science: 'the fact that scientific knowledge is socially constructed does not imply that science doesn't "work"', and the fact that it 'works' is not grounds for reverting to objectivist ideals that disappear its essential contingency and contextual rootedness.⁵¹ In short, feminist philosophers of science have been acutely aware of the hybridity of their subject. Those who work within the framework of philosophy of science have been centrally concerned to show that the sociopolitical dimensions of key features of science – the nature of evidence, ideals of objectivity – can be understood using the resources of liberal empiricism and post-positivist contextualism.

Consider, for example, the sophisticated feminist empiricisms developed by Lynn Hankinson Nelson⁵² and Helen Longino.⁵³ They retain from the empiricist tradition the thesis that authoritative knowledge is evidentially grounded but make the case for a quite fundamental reformulation of what counts as evidence and as epistemic agents. Nelson argues, by careful extension of Quine's holism, that it implies not only that hypotheses are always embedded in networks of assumptions, but that individual epistemic agents are always (likewise) interdependent; they never produce or hold knowledge in isolation from one another. Consequently evidence, and the knowledge based on it, should be regarded as a collective achievement, and epistemic agents should be conceived as communities whose shared conventions of practice play a crucial role in determining what counts as an observation and what bearing it has on explanatory or generalizing knowledge claims.

Longino exploits a rather different strategy for building a recognition of the social dimensions of science into the core of a neo-empiricist theory of science. She draws on well-established arguments for the inferential complexity of evidential claims – Quinean holism, theory-ladenness, underdeterminism – to establish that contextual values deeply structure science; they do not displace epistemic considerations but necessarily supplement them at every point.⁵⁴ Given this, she argues that the central goals of science – producing empirically adequate, objective, explanatorily powerful theories – are best served not by ignoring or suppressing contextual values, but by making them explicit and subjecting them to critical scrutiny as an integral part of scientific inquiry. For example, Longino makes a case for 'democratizing' science on grounds that the best way to discover the errors and limitations of prospective knowledge claims is to subject them to critical assessment from as many different angles as possible. By extension, Longino's social empiricism suggests that it should be part of the mandate of science itself to ensure that its institutions foster the forms of rigorous,

critical evaluation of knowledge claims, and open, inclusive debate that are called for by the constitutive ideals of scientific practice.

Although feminist standpoint theory has often been represented as incompatible with feminist empiricism, it is being reformulated in terms that reflect a common interest in resisting single-factor, reductive theories of science, whether these privilege internal (epistemological) or external (sociological) factors. Those who have been concerned recently to 'reassess' feminist standpoint theory are mindful of critiques of essentialism in characterizing epistemic standpoints, and repudiate any thesis of automatic privilege. Their central claim is that gender institutions and conventions define, in part, the standpoint of epistemic agents (or epistemic communities) and, in doing this, make a *contingent* difference to what these agents are in a position to learn or to know. In concrete terms, what kinds of empirical evidence an epistemic agent has access to, what sense they make of this evidence, what capacity they have to discern the limitations of dominant views about the social and natural world, and what new possibilities for inquiry they envision, may be both enhanced and limited by features of their social location (e.g., the experience, resources, values, and interests that comprise their standpoint).

Some of the most compelling examples of analysis along these lines have been developed by feminists who consider the kinds of contingent epistemic advantage and disadvantage that accrue to women who are 'insider-outsiders' to privilege in many other respects than gender alone.⁵⁵ An 'insider-outsider' who straddles class and race lines, for example, may be in a position to recognize anomalies, contradictions and implausibilities that have gone unnoticed in the assumptions or explanatory models taken for granted by those who operate exclusively within a dominant epistemic community. As Patricia Hill Collins describes her experience, the gaps and distortions inherent in standard explanations of race difference in employment patterns and household composition were patently obvious to her as one who brought to her professional training in sociology a grounding in the culture, history and experience of the black community.⁵⁶

The insight central to feminist standpoint theory as it emerges in these accounts is that those who are marginal to established structures of privilege for any number of socioeconomic, political, or cultural reasons, including their gender, may prove to be better positioned to understand a given subject domain (natural or social) than those who are comparatively privileged. What counts as compromising baggage on standard objectivist accounts may confer crucial advantage in maximizing standard epistemic virtues. These epistemic advantages or disadvantages are understood to be contingent and specific both to subject matter and to purpose; no stand-

point confers automatic or global epistemic privilege. Here the interests of feminist philosophers of science converge on various of the (social) naturalizing projects that have been so vigorously developed by philosophers of science in recent years. If we are to understand how contextual factors both enable and limit the knowledge-producing capacities of the sciences, it will be necessary to make extensive use of the tools of empirical inquiry – including those of the historical and social, as well as the behavioural, sciences – to determine exactly what features of ‘location’ or ‘context’ shape the practice of science and to what effect.⁵⁷ This has implications not only for feminist studies of science but also, on some accounts, for the practice of science itself. Harding makes the case that, if we are to produce knowledge claims that are, at least, ‘less partial and distorted’ than they otherwise might be, the appraisal of these claims should include a consideration not only of the evidence and arguments presented in their support but also of the social, historical conditions under which they have been produced and authorized.⁵⁸ This requirement for ‘strong objectivity’ illustrates how a rigorously developed feminist standpoint may substantially raise our epistemic standards rather than compromise them.

Conclusion

The philosophical challenge taken up by feminist philosophers of science is to make sense of the play of contextual factors in science. We are concerned to understand how the gendered dimensions of background beliefs, institutional structures, social relations and identities shape scientific practice both for better and for worse. This does not indicate a failure of epistemic nerve, a capitulation to ‘coloniz[ing]’ instincts, as Haack suggests.⁵⁹ Rather, it is a reasoned response to a number of lines of argument which by now are commonplace in post-positivist philosophy of science, and are exemplified by feminist critiques of science and feminist practice within the sciences. In principle, then, feminist projects fall well within the ambit of contemporary philosophical thinking about science. A commitment to ensure that gender is taken into account in the philosophical study of science is ‘plausible and unremarkable’; crucially, it does not settle in advance the central and most controversial questions raised ‘in and by’ feminist inquiries.⁶⁰ Feminist philosophers of science have answered these questions in widely different ways but for all the epistemological differences among us, there is broad consensus that extreme relativism is precisely *not* what follows from the ‘new fallibilism and anti-foundationalism’ that we take as our point of departure. The exigencies of feminist

political engagement counter any easy reduction of science either to the contingencies of social construction or to the constraints of ‘evidence’ and ‘good reasons’.

NOTES

- 1 For example, S. Haack, ‘Knowledge and Propaganda: Reflections of an Old Feminist’, *Partisan Review* 60:4 (1993), 556–64; and P. R. Gross and N. Levitt, *Higher Superstition: The Academic Left and Its Quarrels with Science* (Baltimore: Johns Hopkins University Press, 1994), especially ch. 5, ‘Auspicious Gender’, pp. 107–48.
- 2 In an influential overview of these developments, Frederick Suppe describes these ‘contextualist’ critiques as both the impetus for and one response to growing crisis within ‘received view’ philosophy of science, broadly, logical positivist and logical empiricist theories of science. See Suppe’s lengthy introduction to *The Structure of Scientific Theories*, 2nd edition (Urbana, IL: University of Illinois Press, 1979), pp. 119–220. Post-positivist analyses from an explicitly feminist point of view began to appear within a few years of Suppe’s overview, e.g., in the collection edited by Sandra Harding and Merrill B. Hintikka, *Discovering Reality: Feminist Perspectives on Epistemology, Metaphysics, Methodology, and Philosophy of Science* (Boston: D. Reidel, 1983), and in two special issues of the journal *Hypatia* on *Feminism and Science*, ed. Nancy Tuana: *Hypatia* 2:3 (1987) and 3:1 (1988). Sandra Harding published an influential overview of work in this area in *The Science Question in Feminism* (Ithaca, NY: Cornell University Press, 1986), and a few years later Linda Alcoff and Elizabeth Potter included a number of representative examples of feminist philosophy of science in their widely used collection, *Feminist Epistemologies* (New York: Routledge, 1993); see also *A Mind of One’s Own*, ed. Louise Antony and Charlotte Witt (Boulder, CO: Westview Press, 1993). Feminist philosophy of science and epistemology has since been the theme of special issues published by at least three mainstream philosophical journals: *Feminist Epistemology: For and Against*, ed. Susan Haack, *The Monist* 77:4 (1994); *Feminist Perspectives on Language, Knowledge, and Reality*, ed. Sally Haslanger, *Philosophical Topics* 23:2 (1995); and *Feminism and Science*, ed. Lynn Hankinson Nelson, *Synthese* 104:3 (1995).
- 3 The commitment to ground philosophy of science in the sciences takes two forms. On one hand it reflects a growing concern that philosophical analyses of science should embody a sophisticated understanding of the sciences under study. The legacy of this commitment can be seen in two developments typical of post-positivist philosophy of science: the uneasy but highly productive rapprochement between history and philosophy of science and the growth of interest in foundational studies of science that focus on the content, not just the logic, of scientific theories. On the other hand, however, a number of philosophers of science have made the case for ‘naturalizing’ their field, inspired by Quine’s insistence that philosophers (generally) must make use of the tools of science if they are to be effective in addressing their central questions. Contemporary advocates of naturalistic approaches to philosophy of science draw on the resources of a much wider range of disciplines than Quine had

- considered, including a number of social and historical sciences; some are intent on 'socializing' as well as naturalizing philosophy of science. A useful review of these positions is provided by James Maffie, 'Recent Work on Naturalized Epistemology', *American Philosophical Quarterly* 27:4 (1990), 281–93. See also contributions to *Naturalizing Epistemology*, 2nd edition, ed. Hilary Kornblith (Cambridge, MA: MIT Press, 1993), and to *Socializing Epistemology: The Social Dimensions of Knowledge*, ed. F. F. Schmitt (London: Rowman & Littlefield, 1994); as well as W. Callebaut, *Taking the Naturalistic Turn or, How Real Philosophy of Science Is Done* (Chicago: University of Chicago Press, 1993).
- 4 L. Schiebinger, *The Mind Has No Sex?: Women in the Origins of Modern Science* (Cambridge, MA: Harvard University Press, 1989). See also M. W. Rossiter, *Women Scientists in America: Struggles and Strategies to 1940* (Baltimore: Johns Hopkins University Press, 1982).
 - 5 For a more detailed account of these equity critiques, see A. Wylie, 'The Contexts of Activism on "Climate" Issues', in The Chilly Collective, *Breaking Anonymity: The Chilly Climate for Women Faculty* (Waterloo, Ont.: Wilfrid Laurier Press, 1995), pp. 29–60; and 'Good Science, Bad Science, or Science as Usual?: Feminist Critiques of Science', in L. Hager, ed., *Women in Human Evolution* (New York: Routledge, 1997), pp. 29–55.
 - 6 The various forms of content bias that arise in these fields have been categorized in a number of ways; one of the most detailed analyses is due to Margrit Eichler and Jeanne Lapointe, *On the Treatment of the Sexes in Research* (Ottawa, Ont.: Social Sciences and Humanities Research Council of Canada, 1985). This section is adapted from Wylie, 'Good Science, Bad Science'.
 - 7 C. Gilligan, *In a Different Voice: Psychological Theory and Women's Development* (Cambridge, MA: Harvard University Press, 1982). Gilligan's studies of girls' moral reasoning suggest that what had been treated as puzzling immaturity in girls at some stages of development actually reflects a distinct pattern of moral maturation that had gone unnoticed so long as the experience of boys was treated as a gender-neutral norm applicable to all children.
 - 8 J. Kelly-Gadol, 'Did Women Have a Renaissance?', in R. Bridenthall and C. Koony, eds., *Becoming Visible: Women in European History* (Boston: Houghton Mifflin Co., 1977), pp. 137–64.
 - 9 S. Slocum, 'Woman the Gatherer: Male Bias in Anthropology', in R. Reiter, ed., *Toward an Anthropology of Women* (New York: Monthly Review Press, 1975), pp. 36–50; L. D. Hager, ed., *Women in Evolution* (New York: Routledge, 1997).
 - 10 See, for example, A. Fausto-Sterling, *Myths of Gender: Biological Theories of Women and Men* (New York: Basic Books, 1985).
 - 11 D. Gifford-Gonzalez, 'You Can Hide but You Can't Run: Representation of Women's Work in Illustrations of Paleolithic Life', *Visual Anthropology* 9 (1995), 3–21; and 'The Drudge-on-the-Hide', *Archaeology* 48:2 (1995), 84; S. Moser, *Ancestral Images* (Ithaca, NY: Cornell University Press, 1998).
 - 12 Consider, for example, Michelle Z. Rosaldo's analysis of the legacy of Victorian assumptions about the segregation of male and female domains, 'The Use and Abuse of Anthropology: Reflections on Feminism and Cross-Cultural Understanding', *Signs* 5 (1980), 389–417; and J. Ringelheim, 'Women and the Holocaust: A Reconsideration of Research', *Signs* 10:4 (1985), 741–61.

- 13 For a general discussion, see V. Morrell, 'Seeing Nature Through the Lens of Gender', *Science* 260 (1993), 428–9.
- 14 See, for example, E. Martin, 'The Egg and the Sperm: How Science has Constructed a Romance Based on Stereotypical Male-Female Roles', in E. F. Keller and H. E. Longino, eds., *Feminism and Science* (Oxford: Oxford University Press, 1996), pp. 103–17. See also E. F. Keller's discussion of research on embryo development in 'Developmental Biology as a Feminist Cause', *Osiris* 12 (1997), 16–28; and her account of the reconceptualization of 'gene action' in *Refiguring Life: Metaphors of 20th Century Biology* (New York: Columbia University Press, 1995); as well as A. Fausto-Sterling on models of sexual development: 'Of Genes and Gender', in *Myths of Gender*, pp. 61–89.
- 15 S. Traweek, *Beamtimes and Lifetimes* (Cambridge, MA: Harvard University Press, 1988), p. 162.
- 16 See, for example, the title essay in E. F. Keller, *Reflections on Gender and Science* (New Haven: Yale University Press, 1985). Nancy Hartsock also appeals to object relations theory in her influential early essay, 'The Feminist Standpoint: Developing the Ground for a Specifically Feminist Historical Materialism', in Harding and Hintikka, eds., *Discovering Reality*, pp. 283–310.
- 17 For example, by 1986 Harding had made the case that the characteristics associated with women on these psychoanalytic accounts are strikingly similar to those which are routinely attributed to subordinate or colonized men and women. Rather than assuming a unique association with gender differences, it is more plausible that these attributes are simply the negation of dominant norms, projected on to any group whose marginality defines (by contrast) what counts as the identifying features of the relevant power elite. Harding, 'Other "Others" and Fractured Identities', in *The Science Question in Feminism*, ch. 7.
- 18 This response to such criticisms is outlined by Jane Roland Martin in 'Science in a Different Style', *American Philosophical Quarterly* 25 (1988), 129–40.
- 19 On the question of how far, to what disciplines, feminist analyses may be extended, see Sergio Sismundo, 'The Scientific Domains of Feminist Standpoints', *Perspectives on Science* 3:1 (1995), 49–65. For examples of recent feminist analyses in the physical sciences, see K. Barad, 'Meeting the Universe Halfway', in L. H. Nelson and J. Nelson, eds., *Feminism, Science, and the Philosophy of Science* (Dordrecht: Kluwer, 1997), pp. 161–94; Traweek, *Beamtimes*; B. B. Spanier, *Im/Partial Science: Gender Ideology in Molecular Biology* (Bloomington, IN: Indiana University Press, 1995); E. Potter, 'Making Gender/Making Science: Gender Ideology and Boyle's Experimental Philosophy', in B. B. Spanier, ed., *Making a Difference* (Bloomington, IN: Indiana University Press, forthcoming).
- 20 This is Harding's formulation in *The Science Question in Feminism*, pp. 19 and 102–5.
- 21 Fausto-Sterling, *Myths of Gender*, p. 11.
- 22 See H. Longino's distinction between contextual and constitutive values; *Science as Social Knowledge: Values and Objectivity in Scientific Inquiry* (Princeton, NJ: Princeton University Press, 1990).
- 23 As Helen Longino puts this point, 'constitutive values conceived as epistemological (i.e., truth-seeking) are not adequate to screen out the influence of

- contextual values in the very structuring of scientific knowledge'; 'Can There Be a Feminist Science?' *Hypatia* 2 (1987), 51–64 (p. 56).
- 24 H. Longino, 'In Search of Feminist Epistemology', *The Monist* 77 (1994), 472–85. Longino characterizes this 'bottom line' as a 'community value' shared by feminist scientists; I propose a meta-philosophical counterpart in 'Doing Philosophy as a Feminist: Longino on the Search for a Feminist Epistemology', *Philosophical Topics* 23:2 (1995), 345–58.
 - 25 'Knowledge and Propaganda', p. 564.
 - 26 *Ibid.*, p. 565.
 - 27 *Ibid.*, p. 560.
 - 28 For detailed critiques of Haack's position see Elizabeth Anderson, 'Knowledge, Human Interests, and Objectivity in Feminist Epistemology', *Philosophical Topics* 23:2 (1995), 27–58; and L. H. Nelson, 'The Very Idea of Feminist Epistemology', *Hypatia* 10:3 (1995), 31–49.
 - 29 I have developed this argument in more detail with reference to feminist research in archaeology: A. Wylie, 'Feminist Theories of Social Power', *Norwegian Archaeological Review* 25:1 (1992), 51–68; 'The Constitution of Archaeological Evidence: Gender Politics and Science', in P. Galison and D. J. Stump, eds., *The Disunity of Science: Boundaries, Contexts, and Power* (Stanford: Stanford University Press, 1996), pp. 311–43.
 - 30 See, for example, M. Hesse, 'How to Be Postmodern Without Being a Feminist', *The Monist* 77:4 (1994), 445–61. Hesse's argument is discussed in Wylie, 'Doing Philosophy as a Feminist'.
 - 31 E. Lloyd, 'Objectivity and the Double Standard for Feminist Epistemologies', *Synthese* 104 (1996), 351–81.
 - 32 *Ibid.*, pp. 365–73.
 - 33 *Ibid.*, p. 368.
 - 34 For a parallel argument, see L. H. Nelson, 'The Very Idea of Feminist Epistemology', *Hypatia* 10:3 (1995), 31–49 (pp. 33–42).
 - 35 L. Code, *What Can She Know?* (Ithaca, NY: Cornell University Press, 1991), p. 314.
 - 36 *Ibid.*, p. 315.
 - 37 L. Code, 'Taking Subjectivity into Account', in Alcoff and Potter, eds., *Feminist Epistemologies*, pp. 15–48 (p. 20).
 - 38 See, for example, Nelson, 'The Very Idea of Feminist Epistemology'; J. Nelson and L. H. Nelson, 'No Rush to Judgement', *The Monist* 77:4 (1994), 486–508.
 - 39 Harding, *The Science Question*, pp. 24–9.
 - 40 *Ibid.*, pp. 36–7.
 - 41 Hartsock, 'The Feminist Standpoint', pp. 283–310. See also D. E. Smith's earlier discussion, 'Women's Perspective as a Radical Critique of Sociology', *Sociological Inquiry* 44 (1974), 7–14. For a useful chronology of contributions to the development of feminist standpoint theory, see Sandra Harding, 'Comment on Hekman's "Truth and Method: Feminist Standpoint Revisited": Whose Standpoint Needs the Regimes of Truth and Reality?', *Signs* 22:2 (1997), 382–91 (pp. 388–9).
 - 42 Sismundo, 'Scientific Domains', p. 52.
 - 43 D. Smith, *The Everyday World as Problematic: A Feminist Sociology* (Toronto:

- University of Toronto Press, 1987); *The Conceptual Practices of Power: A Feminist Sociology of Knowledge* (Toronto: University of Toronto Press, 1990). As Hartsock puts this point, women are immersed in ‘the world of use – in concrete, many-qualified, changing material processes’; their work is typically repetitive, often collective and occurs outside the realm of commodity exchange, in ways that gender-appropriate work for men does not; ‘The Feminist Standpoint’, p. 292.
- 44 Harding, ‘Other “Others”’.
- 45 S. Hekman, ‘Truth and Method: Feminist Standpoint Revisited’, *Signs* 22:2 (1997), 341–65 (p. 341).
- 46 *Ibid.*, p. 342.
- 47 Sismundo, ‘Scientific Domains’, p. 50.
- 48 Harding, *The Science Question*, p. 196.
- 49 A. Wylie, ‘The Philosophy of Ambivalence: Sandra Harding on *The Science Question in Feminism*’, *Canadian Journal of Philosophy* supplementary volume 13 (1987), 59–73.
- 50 Harding, *Whose Science? Whose Knowledge?* (Ithaca, NY: Cornell University Press, 1991); ‘Rethinking Standpoint Epistemology: “What Is Strong Objectivity?”’, in Alcoff and Potter, eds., *Feminist Epistemologies*, pp. 49–82.
- 51 Barad, ‘Meeting the Universe Halfway’, p. 162.
- 52 L. H. Nelson, *Who Knows: From Quine to a Feminist Empiricism* (Philadelphia, PA: Temple University Press, 1990).
- 53 Longino, *Science As Social Knowledge*.
- 54 This argument is developed in greatest detail in Longino, *Science As Social Knowledge*, but see, as well, H. Longino and R. Doell, ‘Body, Bias and Behaviour: A Comparative Analysis of Reasoning in Two Areas of Biological Science’, *Signs* 9 (1983), 206–27.
- 55 U. Narayan, ‘Working Together Across Difference’, *Hypatia* 32 (1988), 31–48; P. H. Collins, *Black Feminist Thought* (New York: Routledge, 1990); P. H. Collins, ‘Learning from the Outsider Within’, in M. M. Fonow and J. A. Cook, eds., *Beyond Methodology: Feminist Scholarship as Lived Research* (Bloomington: Indiana University Press, 1991), pp. 35–59; Harding, *Whose Science?*.
- 56 Collins, ‘The Outsider Within’, pp. 52–3.
- 57 See, for example, Longino’s discussion of how the values constitutive of science are reinforced, or compromised, by the various institutional structures through which scientific practice is funded and organized; *Science as Social Knowledge* (ch. 4).
- 58 Harding, *Whose Science?*.
- 59 Haack, ‘Knowledge and Propaganda’, p. 560.
- 60 Nelson and Nelson, ‘No Rush to Judgement’, pp. 488–9, 492.