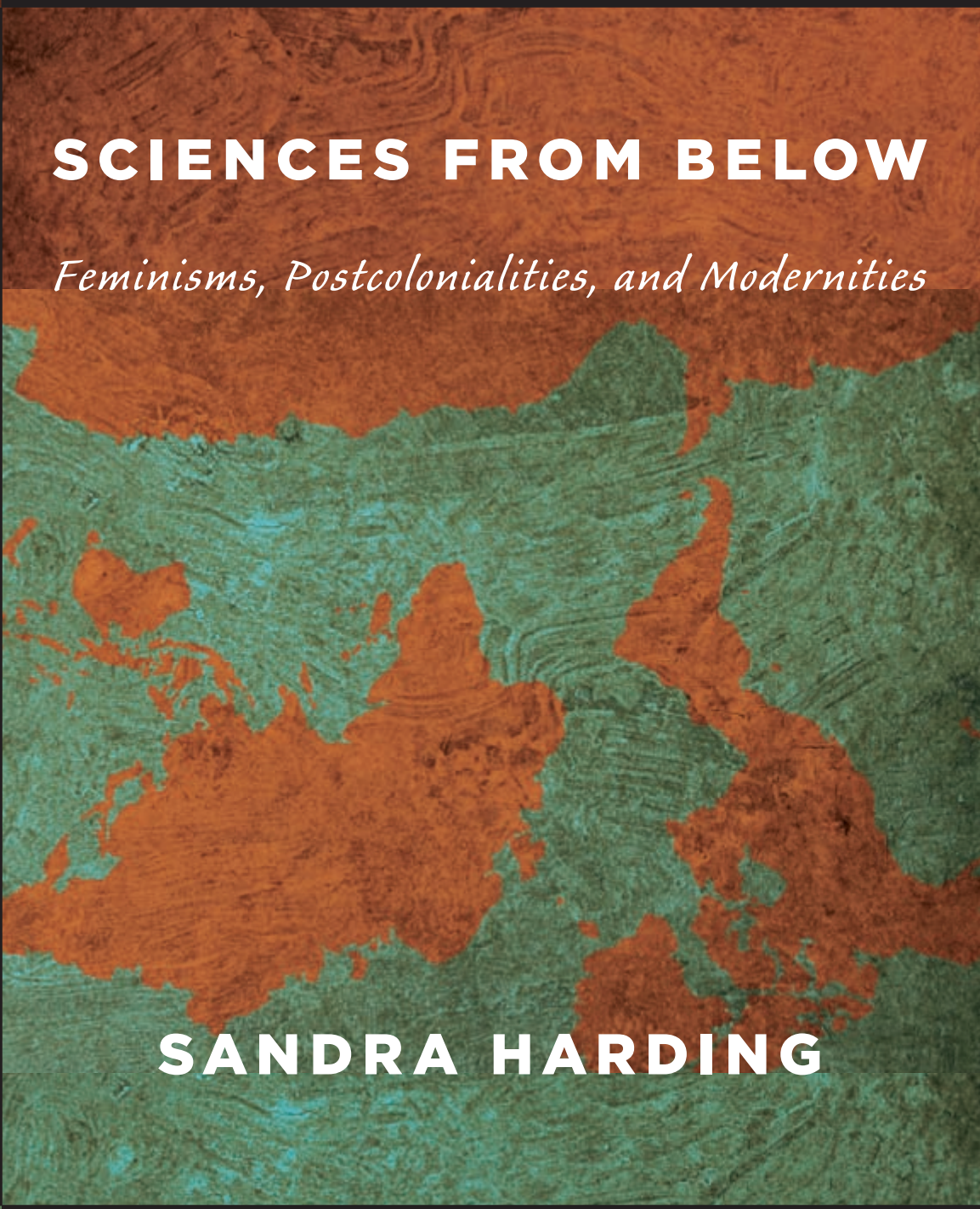
SCIENCES FROM BELOW
Feminisms, Postcolonialities, and Modernities
SANDRA HARDING

Sciences from Below

NEXT WAVE: NEW DIRECTIONS IN WOMEN'S STUDIES
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Sandra Harding

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Feminisms, Postcolonialities, and Modernities

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INTRODUCTION

Why Focus on Modernity?

THIS IS A BOOK ABOUT WESTERN MODERNITY and the ways it remains haunted by anxieties about the feminine and the primitive, both of which are associated with the traditional. Northern philosophies of science and technology have been complicitous in establishing and maintaining these haunting specters. Scientific rationality and technical expertise are presented in these philosophies as the one-way time machines that supposedly enable elite Westerners and men around the globe to escape the bonds of tradition, leaving behind for others the responsibility for the flourishing of women, children and other kin, households, and communities, and for the environments upon which their flourishing depends. These others must do the kind of reproductive and "craft" labor necessary to raise acceptably human children of a particular culture, maintain community social bonds, and "suture" the new—such as railroads or electric cars—to the familiar conceptually, materially, morally, and politically. These others are mostly women and non-Western men. How can Western modernity hope to deliver social progress to women and non-Western men when its most valued achievements are measured in terms of its distance from the interests, needs, and desires of the very humans who produce and reproduce human life and the world around us in ways that make Western modernity possible?

This is not to say that Westerners or men in non-Western cultures individually hold such views. Many have struggled, often at great costs, to enable their women, children, kin, households, communities, and local environments to flourish. Rather, the point here is that the institutions of Western modernity and their scientific and political philosophies, designed by and for men in elite classes, persistently create meanings and practices of modernity which create fearful specters of "the feminine" and "the primitive." Even purportedly progressive scientific and technological projects, in the North and the South, are doomed to fail when they do not critically engage with the specters of modernity.[1]

1. MODERNITY BEYOND POSTMODERNITY

The topic of modernity can seem unpromising for a number of reasons at this moment, however. For one thing, it has already been a constant topic of discussion for many decades, ever since postmodernism became a theoretical project able to bring into sharp focus widespread discontents with modernity. Feminisms and postcolonialisms seem to share with postmodernism skepticism about modernity's idealized rational man; his propensity for grand narratives that presume to provide a universally valid official history and to be able to predict the future from a supposedly culture-free perspective; his assumptions about an innocent core self which exists prior to its encounter with culture; and the various ontological, epistemological, political, and ethical theories and practices which flow from this familiar discourse (Flax, *Thinking Fragments*). So there are good reasons why feminisms and postcolonialisms are frequently labeled postmodern. Yet in other respects these social movements also seem firmly lodged in modernity, or at least unwilling to commit themselves to the side of either modernity or postmodernity. They seem unwilling to engage in the luxury of postmodernist disillusion with politics and its silence in the face of needed social justice projects. Could there be anything further useful to be said about this already widely discussed dispute?

Another discouraging problem is that terms such as *modernity, the modern, modernization,* and *modernism* seem to be used in different ways by speakers in different disciplines, different political orientations, and even different languages (Friedman, "Definitional Excur-

sions"). It is hard to know just what is meant by embracing or rejecting modernity, modernization, or modernism in the face of the confusing references and meanings these terms have. Here we will shortly clear the ground for the discussions of modernity to follow by identifying some basic characteristics of the phenomena to which these terms refer. But before we do so, let us note five reasons to pursue discussions of modernity beyond the point where postmodernism ended.

First, while modernity was forced to turn and face postmodernism by the latter intellectual movement, its earlier and ongoing contrast with tradition and the pre-modern was largely obscured and, at any rate, not interrogated in the postmodernity discussions. Yet the modernity vs. tradition binary remains powerful today in shaping research in the natural and social sciences and their philosophies as well as in the public policy which such research serves. Such work typically treats the needs and desires of women and of traditional cultures as irrational, incomprehensible, and irrelevant—or even a powerful obstacle —to ideals and strategies for social progress. No wonder modernity's social progress has been delivered to only such a small minority of the world's citizens.

Second, this binary needs examination because modern discourses are haunted by specters of the feminine and the primitive. Objectivity, rationality, good method, real science, social progress, civilization—the excellence of these and other self-proclaimed modern achievements are all measured in terms of their distance from whatever is associated with the feminine and the primitive. Western sciences and politics, and their philosophies, need an exorcism if they are to contribute at all to social progress for the vast majority of the globe's citizens! Here such an exorcism is performed through critical examinations of tradition. Such a project has become possible only with the emerging insight that modernization is not identical to Westernization. This project abandons the narratives of exceptionalism and triumphalism which have been favored in the West. Western modernity is not the only modernity which has emerged around the globe and which has admirable features. And Western modernity has brought not only great benefits to some, but also great disasters to many. To understand modernity more fully, it turns out that we have to focus on tradition.

What are exceptionalism and triumphalism? By exceptionalism I mean the belief that Western sciences alone among all human knowledge systems are capable of grasping reality in its own terms—"cutting

nature at its joints," as philosophers of science typically enjoy referring to the matter. According to this view, only modern Western sciences have demonstrated that they have the resources to escape the universal human tendency to project onto nature cultural assumptions, fears, and desires. Indeed, these research projects alone of all human inquiries into natural and social orders are entitled to be called sciences, according to the defenders of exceptionalism. Critics document just how such exceptionalists conflate Science with science. That is, the exceptionalists conflate the West's idealized understandings of its own practices with the universal human impulse to understand ourselves and the world around us in ways that permit effective interactions with such worlds. In contrast, the critics argue that "all people operate within the domains of magic, science, and religion" (Malinowski, *Magic* 196; quoted by Nader, *Naked Science* 5). Modern Western sciences are just one set of sciences today, albeit powerful ones, among the many others that have existed and do today around the globe. Moreover they are not constituted entirely by Europeans or within European civilizations; in fact they owe great debts, mostly unacknowledged, to the science traditions that preceded them, especially those in Asia (see e.g., Hobson, *Eastern Origins of Western Civilisation*; Selin, *Encyclopedia of the History of Science*).

By triumphalism I mean the assumption that the history of science (which, for triumphalists, is thus the exceptionalist history of Western science) consists of a narrative of achievements. For triumphalists, this history has no significant downsides. From this perspective, Hiroshima, environmental destruction, the alienation of labor, escalating global militarism, the increasing gap between the "haves" and the "have nots," gender, race, and class inequalities—these and other undesirable social phenomena are all entirely consequences of social and political projects. The history of Western science proper makes no contribution to such social events and processes. These are a matter of the political and social uses of the pure knowledge which scientific inquiry produces. They are appropriately discussed under the heading of the applications and technologies of science, but not of sciences' representations of the natural world or distinctive (they say) methods of intervening in it. Exceptionalist and triumphalist assumptions about Western sciences are obviously mutually supporting. However, neither can today gather the support either in the West or elsewhere that they once could claim. Widespread scepticism about such histories and

philosophies of modern sciences have prepared the ground for the issues about modernities and sciences I will raise here.

Even work that is otherwise innovatively progressive—work which understands, for example, that we must transform politics and social relations in order to transform sciences into more competent knowledge production and service to democratic social tendencies—remains captive to exceptionalism and triumphalism insofar as it distances itself from the insights of feminist and postcolonial science studies. Consequently, even this progressive work is doomed to failure since it does not access the resources necessary to bring about the projects of democratic political and scientific transformation to which these authors aspire. It provides analyses of modernity, its strengths and limitations, only "from above" when it avoids taking the standpoint of women and the world's other least-advantaged citizens on such topics. It is doomed to the loss of both competence and legitimacy in the eyes of the vast majority of the world's citizens—losses already fully under way today, as we shall see. The account here is intended to contribute to the different project of looking at modernity and its sciences "from below."

Returning to our list of reasons to pursue issues about modernity further, once exceptionalist and triumphalist narratives of Western history no longer can gather either empirical support or moral/political approval, Westerners must develop new notions of expertise, authority, and desirable speech which do not depend upon such narratives. Western ways of understanding the world are not always right or the best ways, and certainly not uniquely so. Westerners must learn how to make ourselves fit, and to be perceived to be fit, to enter into the democratic, pluricentric global dialogues from which global futures will emerge. This is a third reason to continue this project.

Fourth, we can come to see how modernity's Others have produced resources valuable for everyone who is interested in thinking about how to transform the modern social institutions we have into ones more suitable for today's and tomorrow's progressive global social relations. Feminist and postcolonial science and technology movements, separately and conjoined, will be the focus of such discussions here. What we can know about nature and social relations depends upon how we live in our natural/social worlds. And peoples at the peripheries of modernity—women and other marginalized groups in the West and peoples from other cultures—have lived differently, with

distinctive kinds of interactions with the world around them, than those at the centers. This is not to say that the centers are all bad and the peripheries are all good. It is not to say that Western modernity has to date produced no still-desirable features, or that everything in traditional cultures is valuable. It is certainly not to say that Westerners should abandon the West and yet again seek salvation and innocence in the worlds of modernity's Others. Rather we need realistic reassessments of both Western and non-Western knowledge systems and the social worlds with which they are constituted rather than romantic evaluations of one and demonizations of the other. The point here is that "tradition" requires more realistic assessments than it has received within the horizons of Western modernities, and that such assessments by groups on those horizons already reveal rich resources for living together on this planet which have been ignored or disvalued in the West's modernity.

Finally, pursuing issues about modernity further in these ways raises new questions about postmodern discourses. They, too, will need to be reevaluated from the kinds of perspectives of the Others of Western modernity engaged here. To put my point another way, I am asking the field of science and technology studies to become even more controversial than it already is. Let us briefly recollect the sources of its existing controversiality.

2. A CONTROVERSIAL WORLD

This field has been controversial from its beginnings. Almost half a century ago it set out to show "the integrity" of high points in the history of modern science with their particular historical eras, as Thomas S. Kuhn (*Structure of Scientific Revolutions*) famously put the point. The new sociologies, histories, and ethnographies of science have revealed how scientific inquiry has been a social institution with many features of other social institutions (cf. Biagioli, *Science Studies Reader*). Subsequently, social constructivist tendencies in technology studies have shown how technologies are not merely value-neutral chunks of hardware; "artefacts have politics," as Langdon Winner ("Do Artefacts Have Politics?") argued (cf. MacKenzie and Wajcman, *Social Shaping of Technology*). The recent Science Wars provide one kind of testimony to how unsettling it can still be for many people—scientists and nonscientists alike, and whether they think of their political com-

mitments as on the left, right, or center—to be asked to recognize that the highest achievements of the North's natural sciences are deeply permeated by distinctively historical social projects and practices.[2]

Feminist science studies has frequently been a target of such fears and criticisms. To be sure, any charges of continuing male supremacy are unnerving today to the many men and women who hope and believe that traditional patterns of discrimination in every field and profession mostly have ended. Any continuing signs of such discrimination are merely residues of those older patterns, they assume, and such residues are destined soon to disappear. Yet the challenges to the natural sciences remain especially troubling. Feminists have criticized the incompetence of the very standards of objectivity to identify widespread patterns of gender biases in the sciences. This charge strikes at the heart of what is generally considered to be most admirable about scientific research and its rationality—its methods of research. Thus they have also criticized the inadequacies of its standards for rationality, good method, and "real science." These criticisms focus not on the prejudices of individuals (unpleasant as those can be for their targets), but rather on the assumptions, practices, and cultures of institutions, and on prevailing philosophies of science. Of course it is scientific rationality and its standards for objectivity that also structure and set standards for the modern social institutions, principles, and practices that are regarded as most progressive in the modern industrialized societies of the North. If the objectivity and rationality of the natural sciences are questionable, so too is the progressiveness of the social institutions of which citizens of industrialized societies are most proud. For whom do modernity's sciences provide social progress?

Yet science and technology studies could usefully become much more controversial, and that is the recommendation here! There are two areas of appropriate analysis which have been under-addressed. This book sets out to explore how they can be used to turn familiar science studies and feminist frameworks into even more widely controversial topics of public discussion and debate. Such public discussion and debate are a necessity in societies aspiring to democracy and social justice, and in which the proposals for new destinies for the sciences and for women are the sites of both powerful yearnings and fearful anxieties.

One such understudied topic is the effect of Northern scientific and technological inquiry on peoples and cultures at the peripheries of Northern modernity. The experiences of these peoples have been artic-

ulated for several decades now through postcolonial science and technology studies and its feminist components. Though the concerns of this field can appear exotic and tangential to many people who are concerned with social equality, such an appearance is deceiving. These peripheries are more and more loudly "talking back" to the centers about such matters for both political and epistemological reasons. Fortunately, such topics are finally beginning to appear in mainstream science and technology studies conferences and publications.[3]

The other neglected topic in Northern science and technology studies is the modernity/tradition binary. A few scholars, on whom we will focus, have taken up the issue of whether and how (Northern) sciences and technologies are modern. Yet they, like the rest of the field, have largely stayed within the conceptual framework of modernity when it comes to issues about tradition, the premodern, and their conventional association with nature, the past, women, the feminine, the household, "the primitive," and loyalty to kin and "tribe." This binary creates horizons for Northern thought beyond which lie the irrational, the incomprehensible, and the unintelligible—namely, the worlds of the peoples neglected in the first topic as well as the worlds of women in the North. Here the interests of Northern women, on the one hand, and women and men in societies in the South, on the other hand, are conjoined (though they are of course not identical). The neglect of this second topic protects the neglect of the first. Hence the importance of the focus in this book on modernity and its Others, and the implications of such a discussion for the kinds of progressive transformations of Northern sciences and technologies which have been called for by so many groups committed to social justice.

To put the project of this book in other words, I want to "calibrate" to each other progressive tendencies in Northern science and technology studies, Southern science and technology studies, feminist work in both fields, and modernity studies.[4] I propose that each needs the success of the others for its own projects. What can each learn from the others?

3. MODERNITY: TEMPORAL OR SUBSTANTIVE?

Modernity and tradition will be defined and redefined again and again in the following chapters. Let us start off with some basic and competing ways in which modernity has been conceptualized. In the Ameri-

can Academy of Arts and Sciences issue on the topic of "multiple modernities" in its journal, *Daedalus*, Brian Wittrock identified problems with two ways of thinking about modernity which have long been widely influential.[5]

> When we speak of modernity and of modern societies, we seem to mean one of two things. First, we may speak as if we were giving an encompassing name to a whole epoch in world history, the modern age, as distinct from, say, the medieval age or classical antiquity. Such a terminology makes it legitimate to discuss questions as to when exactly the modern age may be said to have come into existence, what its origins may have been, or, indeed, if it has now come to an end. Second, we may speak as if we were actually characterizing distinct phenomena and processes in a given society at a given time. We may say that the technology used in some branch of industry of a country is modern but that patterns of family life are not. It is then an empirical question to determine to what extent different institutions and phenomena of a country may be described as modern. (Wittrock, "Modernity" 31)

Each of these notions is controversial. Such controversiality no doubt is one reason why many scholars prefer to avoid the whole topic of modernity and, rather, pursue their interests under other headings. But this strategy does not succeed in making the intellectual, social, and political power of the contrast between modernity and tradition go away—not even in their own work. Instead it comes to live a subterranean life, structuring thought, action, and public policy while remaining seemingly out of reach of public discussion and analysis.

Temporal modernity: Three referents

The temporal notion currently is used in the West with three distinct referents corresponding to the particular aspects of "the modern" which are in focus (cf. Friedman, "Definitional Excursions"). First, for philosophers and many historians of science, modern science begins in the seventeenth century with the scientific revolution of Copernicus, Galileo, Boyle, Harvey, and Newton, and modern philosophy begins with Hobbes and Descartes. The early modern philosophers engaged with implications of features of the world which new sciences such as astronomy and physics revealed, and they thought about some ways in which these new sciences did or could participate in the shifts in European social formations which they were experiencing. They thought about the new experimentalism in the sciences and about the new

science movements of their day (Van den Daele, "Social Construction of Science"; Shapin and Schaffer, *Leviathan and the Air Pump*).

Yet some historians of science and technology would date the emergence of fully modern sciences later, in the bourgeois revolutions of the eighteenth century and the industrial revolution of the late eighteenth century and the early nineteenth. Copernicus, Galileo, Boyle, Harvey, and Newton are not yet truly scientists, they would hold. (Or, maybe there were two Western scientific revolutions?) These scholars are concerned especially with the new classes which supported the emergent democratic governments in the United States, France, and England; with urbanization; and with the increasing power of scientific technologies.

Modernization theorists, who produce the second kind of temporal notion of modernity, draw especially on this kind of history of modern sciences and technologies. Those concerned with modernizing traditional societies, for example in the Third World development policies of national and international agencies and institutions after the Second World War, always focus on transferring to underdeveloped societies (as they were characterized) Western scientific rationality and technical expertise in manufacturing, health care, agriculture, and other economic sectors. They take Western forms of modernization to be the only ones, as did their nineteenth-century forerunners such as Marx, Durkheim, and Weber. The nineteenth-century theorists created modern social sciences in their attempts to explain urbanization and industrialization. Consequently this conceptual legacy of contemporary social sciences seems to limit the critical resources that these sciences can bring to bear on modernity and modernization processes. For such theorists, as well as for some of their critics, modernization is identical to Westernization. Modernization means Western modernization, and "science" refers only to Western science. Like their nineteenth-century forerunners, the modernization theorists of the 1950s expected a gradual homogenization of global societies as Western forms of modernity disseminated around the globe. The term "modernization" has been used primarily to identify various pathways to change in "underdeveloped" societies, where it is associated with the transfer of Northern scientific rationality and technical expertise to the Southern societies.

By now, those Third World development policies grounded in modernization theory are widely criticized for further immiserating precisely the majority of the world's poorest citizens whom such policies were supposed to benefit (Amin, *Maldevelopment*; Sachs, *Development*

Dictionary; Escobar, *Encountering Development*). Feminist work has been an important part of this critique (Mies, *Patriarchy and Accumulation*; Shiva, *Staying Alive*; Sparr, *Mortgaging Women's Lives*; C. V. Scott, *Gender and Development*). Moreover, while modernity is now a global condition shaping how all societies engage with the world around them (Wittrock, "Modernity"), the expected homogenization of societies around the world has not occurred (Eisenstadt, "Multiple Modernities").[6]

Finally, for literary and cultural theorists, modernism refers to the late-nineteenth-century and early-twentieth-century movement which comes after romanticism. T. S. Eliot, James Joyce, Bauhaus architecture, Picasso, and Seurat are modernist. This literary and cultural movement has been the focus of what are perhaps the most developed analyses of the gender of modernity (e.g., Felski, *Gender of Modernity*; Jardine, *Gynesis*), though particular aspects of modernity have long been the topic of feminist sociologists, political theorists, and science theorists.

We must note that these different names for different pursuits of the modern seem to be characteristic in the English-speaking world. Yet in France "modernism" is used to refer to all three (Friedman, "Definitional Excursions"). "Postmodernism," also, can refer to any one of these three eras and its characteristic concerns. No wonder discussions of the modern among people from different disciplines can get confusing.

Substantive modernity

Deciding just when such temporal eras begin and end requires the specification of substantive criteria of the modern which some particular era does or does not meet. Thus the temporal notion collapses into or depends upon substantive criteria (Wittrock, "Modernity"). Substantive conceptions are controversial. Yet one can consistently find in the accounts of the post-World War II Western theorists and their nineteenth-century legacy a focus on the emergence of a differentiated social structure with political, economic, religious/moral, and educational (including scientific) institutions which are independent of family structures; the separation, therefore, of public and private spheres; and such democratic institutions as representative government, free elections, and a free press. Such conceptions also focus on a secular worldview, the idealization of universal instrumental rationality, and a social orientation toward the future rather than the past. They also

include several kinds of contradictory tendencies, such as the insistence on universal reason, yet also recognition and even toleration of the pluralism of rationalities, and a critical and self-critical attitude along with severe restrictions on the appropriate targets of such criticisms (Eisenstadt, "Multiple Modernities"; Wittrock, "Modernity"). Such contradictory tendencies are especially important for critics of modernity who would revise rather than turn their backs on the concept of modernity, as we shall see below.

Exceptions and complexities

Anyone who reflects for a moment about how the modernity vs. tradition binary structures issues in one's own area of expertise will immediately find exceptions and contrary tendencies which seem to refute the preceding attempt to organize the topic. For example, powerful cases have been made for the claim that no Western society has in fact fully achieved substantive modernity. (Here we have the ironic situation that modernity could not even fully come into existence before postmodernity declared its death.)[7] Moreover, modernization has proceeded unevenly around the globe, and even within Europe itself; parts of Spain and Russia were feudal monarchies well into the twentieth century. Furthermore, as we will see in Part II, there are good reasons to think that many of these substantive features of purportedly unique European modernity can in fact be found in non-Western societies, where they promiscuously mingle with local cultural features. Thus there seem to be many different modernities, always containing sciences and technologies, each with distinctive cultural features, "traditional" or not. Western modernities and sciences are just one among many possible organizations of post-premodern social realities and their sciences,[8] although they are today much more powerful in at least some respects than the alternatives. Thus, as the title of Wittrock's essay asks: "Modernity: One, None, or Many?" (31).

Yet the situation for modernities is even more complex. In Western societies today, modernity seems to be shrinking, not expanding as the classical theorists predicted. Many of the features taken to be required by the modernity paradigmatically found in Western societies seem to be disappearing. Modern institutions of the economy, politics, and education as well as science seem increasingly transgressive and simultaneously porous, as other such institutions come to permeate their practices and principles and they, in turn transgress in matters

which were thought properly to belong to other institutions. We will see how this is so for the sciences, which increasingly appropriate political and economic functions and even religious institutional styles while permitting their own permeation by local, national, and international political and economic institutions. Is the West getting less and less modern?

Additional dimensions of discussions of the "modernity vs. tradition" binary will emerge in the chapters which follow. And we will propose some alternative conceptual frameworks that gain both cognitive and political power by avoiding the problems this binary poses as they better illuminate the empirical realities which appear abhorrent and/or unintelligible when seen only through the conventional binary.

Modernity is not the only central term in this study which has become a site of controversy. Three of the others are feminism, postcoloniality, and science. Actually, it would be better to speak of each in the plural in recognition of the diversity that is characteristic of each. Other controversial terms will be defined as we go along.[9]

4. MORE CONTROVERSIAL TERMS

Feminisms

Feminists share the belief that women, too, are fully human. This apparent platitude is in fact a revolutionary claim, the shock-value of which should not be underestimated. We will look at some of the consequences for sciences and modernities of actually taking women to be fully as human as their brothers. Feminists also share the belief that women's conditions in any particular historical context are largely a social matter. Of course there are biological differences between females and males in every species with two-sex reproduction. Yet women's conditions in societies are not, for the most part, caused by such biological differences (Fausto-Sterling, *Myths of Gender*). Feminists advocate for improving such social conditions. But beyond such general claims, there is considerable disagreement about just what women's conditions are, what the social causes of these conditions are, and how best to improve women's lives. Of course, there are similar controversies over the conditions of men's lives also; controversy over scientific and social explanations is not peculiar to feminists! In the West, one set of distinctive accounts of the nature, causes, and pre-

scriptions for improvement of women's conditions can be found in the grand traditions of political theory. Thus Mary Wollstonecraft and John Stuart Mill developed Liberal (social contract) feminist theories in the context of the American and French Revolutions of the eighteenth century. Marx and Engels provided a powerful indictment of distinctive forms of women's class oppression, and socialist feminists created influential updates of these insights in the context of the New Left social movements and women's movements of the 1960s and 1970s. Radical feminists developed the first accounts of the at least partial autonomy of sexism and androcentrism from class oppression (Jaggar, *Feminist Politics*).

Beginning in the 1970s, a rich array of women-of-color, postcolonial, and transnational feminisms have emerged to map the distinctive effects of cultural difference and of class, race, and ethnic discrimination on women. They chart the many ways in which the lives of women in different cultures and classes around the world are linked through global networks of both empowerment and exploitation which advantage people of European descent, including women, and the elites in other cultures around the world. These feminisms offer illuminating explanations of how such processes occur and of the changes in conventional and much feminist social theory necessary to account adequately not only for the lives of women of color, but also for the lives of all the rest of the men and women in the world. Dominant groups cannot understand the nature and causes of their own social situations if they examine such topics only from their own "native" perspectives. It takes the standpoint of the oppressed and disempowered to reveal the objective natures and conditions of dominant groups. Modernity, its rationality, and its sciences look different from the standpoint of women's different social and cultural locations, and in the context of local and global systems of empowerment, oppression, and exploitation (Harding, *Feminist Standpoint Theory Reader*). Our paths through the modernity issues will seek out the theoretical and practical resources available by focusing on these differences.

It should be noted also that the term "feminism" is controversial in more than the ways obvious to women in the dominant groups in the West. Here male supremacists in the media (for example, on "talk radio") use it to conjure up radical, irrational man-haters who can only lead sensible young women into trouble. Yet in many parts of the world, feminism is seen as only a bourgeois Liberal movement inter-

ested in securing rights for rich women. The term is far too conservative for activists who care about the lot of poor and minority women. In the United States, African American novelist Alice Walker thought it important to introduce the term "womanist" to signal the possibility of a social movement that was for women but designed to meet the needs especially of African American women, whose concerns had not been addressed in the prevailing "white" feminist movement. And Third World male activists have frequently used the term "feminist" to disparage what they see as foreign, Western, colonial, and imperial projects unsuitable for the culture-valuing and nation-building projects in which they think women in their societies should involve themselves (see chapters 6 and 8). Thus the term itself is a site for struggles over political, economic, social, and cultural goals, practices, and resources.

Postcolonialities

European formal colonial rule ended for many societies around the world only during the last half of the twentieth century. For some, such as in Latin America, it ended in the early nineteenth century. In Asia the history of imperialism and colonialism varies from country to country. (And still a number of other sub-cultures are agitating to escape rule by local dominant groups.) Is "postcolonial" the most accurate way to designate these societies? Moreover, many would say that "neocolonial" better describes Third World social systems in that the interests and desires of Western nations, and especially the United States, still dominate their economics, politics, and cultures. Of course, all of those Western countries also have internal "colonies" of disadvantaged groups, some only recent immigrants from former formal colonies or from other economically disadvantaged societies. "Postcolonial" can seem to all such less-advantaged groups to take a position of an unwarranted triumphalism. "Decolonizing" or perhaps even "postcolonializing" would be better terms to describe progressive social movements and theoretical analyses (see Ashcroft, Griffiths, and Tiffin, *Postcolonial Studies Reader*; Williams and Chrisman, *Colonial Discourse*).

Yet I will use the term here for several reasons. For one, there is a field of research and scholarship which calls itself "postcolonial studies." Discussions of modernity and of the sciences' roles in modernity projects deserve to be part of this field. Moreover, the term clears a discursive space for asking questions which have been otherwise diffi-

cult to raise. Postcoloniality can and must be a desire, a dream, and a vision long before it becomes a reality. (Think, for example, of descriptions of the United States or France as "democracies.") We shall see examples of such questions when we turn to postcolonial science and technology studies.

Sciences

I have already indicated that in contrast to the exceptionalist who thinks that this term must be reserved only for modern Western inquiries, I shall follow the lead of postcolonial science studies scholars who use it to refer to any and every culture's institutions and systematic empirical and theoretical practices of coming to understand how the world around us works.[10] Yet this expanded use of the term is controversial for still other reasons. The original producers of what has come to be called indigenous knowledge and traditional environmental knowledge do not refer to their activities as science. So one could regard the insistence here on doing so as another piece of Eurocentrism; if we are to take seriously the achievements of another culture, we have to talk about it in our terms, rather than theirs. Yet it can be valuable to do so in this case because such a practice levels the playing field by refusing to grant Western practices an entirely different, more highly valued, category of human inquiry. We can ask what we can learn about Western sciences and the inquiry practices of other cultures if we look at their similarities and their differences from a postcolonial standpoint instead of focusing, as Eurocentrists have done, only on their exceptional differences as Eurocentrists have identified them.

Of course the definition of what counts as science was not handed down from the heavens on stone tablets at the origins of modernity in the West. The early modern scientists called their work "natural philosophy." The term "scientist" only came into use in the early nineteenth century (Nader, *Naked Science*). The internal feature of modern sciences responsible for their successes was a matter debated throughout the twentieth century. It remains a compellingly controversial issue in the field of science education (Aikenhead, *Multicultural Sciences*). To be sure, there are contexts in which it will be important to distinguish between the practices of Western researchers and those of researchers in other cultures. But we will not take the exceptionalist route in doing so.

5. PREVIEW

Part I looks at three innovative and influential accounts in the field of science and technology studies, each of which has taken up the issue of modernity. These are the accounts of the French anthropologist of science Bruno Latour, the German sociologist and environmental theorist Ulrich Beck, and the European team of sociologists headed by Michael Gibbons, Helga Nowotny, and Peter Scott. (I shall refer to this last team as a single author with the initials GNS.) All three are unusual in that they focus on how concepts and practices of "the social" and "the political" must themselves be transformed in order to transform the sciences into more competent knowledge-producers as well as into resources for democratic social relations. Taking on this double concern is a valuable and rare kind of project to find in the field of mainstream science and technology studies. Moreover, it is not easy to find social theorists and political philosophers interested and courageous enough to have entered the world of science and technology studies in order to examine how to transform modern sciences and technologies for the kinds of politically progressive ends they recommend.

I also selected these three because they represent three distinctive sub-fields in science and technology studies, each with different resources to bring to the project of rethinking Western modernity's sciences and their social relations. Latour co-produced one of the early influential ethnographies of the production of scientific knowledge in *Laboratory Life* (Latour and Woolgar). His subsequent work has repeatedly raised important questions about the nature of scientific inquiry and the adequacy of prevailing philosophies of science. Beck approaches contemporary issues about science and technology from his work in the German Green Movement and from critical engagement with the tradition of sociological theory in which issues of modernity and modernization have always been centered. Indeed, nineteenth-century sociology was constituted by attempts to understand modernization's processes and effects in Europe—an origin which Beck, as well as others, suggests makes it an unlikely resource for thinking past modernization's conceptual framework. The GNS team's studies originated in a Swedish science policy assignment, and their analyses remain couched in terms useful to policy. Central concerns of Beck and GNS lie outside the ways the field of science and technology studies has come to define itself (cf. Biagioli, *Science Studies Reader*).[11] Yet GNS,

and Beck to a lesser but still significant extent, are familiar with the central tenets of the conventional science and technology studies movement and situate their own work in the contexts of post-Kuhnian social studies of scientific and technological practices and philosophies.

While all three are critical of (Western) modernity and its philosophies and effects, they all also turn away from postmodernism as a solution to the crises of modernity. All three find it a valuable symptomology of modernity, but lacking a vision forward. In contrast to postmodernism, all three are optimistic about the possibilities of changing how science and politics are currently organized. Their activist, engaged stance toward how science is done is also valuable and rare in this field. They bring important resources to the projects of feminist and postcolonial science studies and to others grappling with issues about modernity beyond those raised by postmodernism. Yet each of these three accounts has severe though illuminating limitations, as we shall see in Part II. Neither the insights of feminism nor those of postcolonialism are engaged in these narratives. This failure undermines the potential success of their transformative projects.

Thus chapters 4, 5, and 6 look at the strengths and limitations of three fields of science and technology studies frequently ignored or misevaluated by mainstream progressive modernity and science studies and even by each other—feminist and postcolonial work on sciences and technologies, and their distinctive and illuminating ways of intersecting in the feminist work that is set in the context of the postcolonial analyses. In the course of their accounts, central dogmas of mainstream modernity theory are challenged. Each offers valuable strategies for transforming sciences and politics, North and South, to be more epistemologically competent and of use for pro-democratic projects.

In Part III, chapters 7 and 8 specifically look at ways that postcolonial and feminist science studies directly address modernity issues. Each of these modernity studies has significant stakes in demobilizing how modernity has been conceptualized as independent of and in opposition to tradition and how that oppositional contrast has been deployed in science, science studies, and public policy. Each offers visions of transformed sciences and politics which move past the modern impasses.

The litany of problems with modernity identified in the preceding chapters can be discouraging and immobilizing. The concluding chap-

ter addresses the question of what can be done to transform the modernities that exist around the world today into ones which can and do deliver social progress to all of the world's citizens rather than only to an elite few. This is obviously a gargantuan task, and not one to which thinkers from the West alone could possibly have the best answers. Yet we will have seen diverse and valuable resources for such a project provided by Northern science and technology studies, on the one hand, and the postcolonial and feminist accounts, on the other hand. Each set of resources can enrich the other projects. In conclusion, I outline a modest proposal for obstructing the way that the modernity vs. tradition binary shapes research projects. Now we can turn to the innovative accounts of Northern science and technology studies scholars.

I.

PROBLEMS WITH MODERNITY'S SCIENCE AND POLITICS

Perspectives from Northern Science Studies