Introduction

The Framework of Everyday Life: Technology, Women and Cultural History

> It must I think be perfectly clear that to understand lives, the ordinary activities of human beings in ages other than our own, it is indispensable to consider the technologies that served them, for they formed in many respects the very framework of those lives themselves.
>
> Jack Simmons, *History of Technology*

Among the most popular exhibits in local and national museums are the displays of everyday objects, the sets of craftsmen's tools and the reconstructions of kitchens or workshops that allow the visitor not just to view each step in the making of a cheese, a cart or a bolt of cloth, but to envision a world.[1] The glass cases, the roped-off spaces and "Do not touch" notices are far more frustrating here than the enforced separation between viewer and painting in an art gallery, for in the case of artifacts we feel strongly that the key to deciphering these tokens of the past is physical: if we can actually pick these ordinary objects up, weigh them in our hands, try them out (if only on the air), the physical experience will translate us back into the world in which they belonged, an everyday world of working, making and consuming that made up the lives of ordinary people. Enlightened museum curators recognize the urgency of this need for physical communion and provide some working machines where visitors can take turns with the trained and costumed personnel, fumbling for a few minutes at a loom or potter's wheel, then compensating for their incapacity by purchasing the "authentic" artifact in the museum shop.

For ordinary people the fascination of old technologies is that they seem to convey the core experiences of past lives. But conventional history of technology is rigid and reductive in its dealings with this rich world of

1. Throughout this book, I almost invariably use the masculine form of terms such as *craftsmen, kinsmen, man,* and so on, because in the Chinese context they refer to males.

meaning. It focuses on the production of commodities and the development of scientific knowledge, and relies on categories of analysis like "relations of production," "stock of knowledge" or input-output ratios. Nor is *technology* in the crude material sense a word to conjure with in social or cultural history, in fact it is quite out of fashion. We decode the sexual body and the gendered body as cultural artifacts, but despite routine allusions to Michel Foucault's "technologies of power" or to Pierre Bourdieu's concept of habitus, only a few historians pay serious heed to another fundamental level at which epistemes and relations of power are embodied: the everyday technologies that shape material worlds.

Every human society constructs for itself a world of food, shelter, clothing and other goods, a domain of material experience that is often richly and diversely documented in words, in numbers, in pictures and in artifacts. From these sources we can piece together a historical text that records the changing patterns and textures of a social fabric. We can tease out the strands that wove rulers and subjects, artisans and merchants, peasants and landlords, wives and husbands into interlocking patterns of hierarchy. We can try to retrieve the messages conveyed by technical practices and products, to see how social roles were naturalized through that most powerful form of indoctrination, the bodily habit. We can set these systems of material practice and experience against written formulations of metaphysics and ethics to explore the mutual penetration of ideology and popular belief. To read this immensely rich text creatively, to recover the meanings of the shifts, negotiations and ruptures that it records, we must go beyond the terms of conventional history of technology to analyze a society's technologies as part of a web of political and cultural practices.

This book explores the role of technology in shaping and transmitting ideological traditions, focusing on the contribution of technology to the construction of gender. The case I take as my illustration is late imperial China from the Song to the Qing, a society for whose material culture we possess an extraordinarily rich legacy of documentation.

Despite wars and invasions, natural disasters, dramatic population changes and economic growth, the social system in China between A.D. 1000 and 1800 displayed remarkable continuity.[2] From the Song to the

2. I have chosen to conclude my study before the nineteenth century, when China suffered the massive impact of Western economic and political demands and of exposure to Western ideas. Despite its weakness during the nineteenth century, however, the Qing dynasty survived until 1911, when the imperial era ended.

Qing the vision and indeed the practice of the basic political order remained essentially unchanged: the emperor ruled the common people through a bureaucracy staffed by scholars; as the economy became increasingly commercialized merchants grew in number and wealth, but they never gained political influence as a class, largely because their ambition was to join the ranks of the scholar gentry. This long period of continuity, which historians of the economy and of technology have tended to view as stagnation, is regarded by political, cultural and intellectual historians as something of a miracle. Given China's huge size, its social complexity and regional diversity, the effects of population growth and the violent shocks of war and invasion to which it was repeatedly subjected, not to mention the differences between the elite and the uneducated, how can we account for the fact that the culture of late imperial China became so well integrated and durable, and that people at every level of society had so much in common?

True, the political structure and modes of production in late imperial China were not dramatically transformed in the way that the social structures of early modern Europe were by the emergence of capitalism and the industrial revolution. But given the enormous shocks and challenges that the Chinese social order managed to absorb and contain over the centuries, the continuities that have often been labeled inertia or stagnation are better understood as resilience: they represent complex processes of cultural negotiation, incorporation and adaptation, the forging of symbols, identities and roles that eventually came to be accepted at all levels of society throughout a vast and heterogeneous empire. In recent years historians and anthropologists have worked hard to unravel and interpret these processes of cultural reproduction. I suggest that the study of technology can significantly enrich our understanding of such processes.

I am particularly interested in how technologies contribute to producing people and relations between people, which in turn requires me to look at technology as a form of communication. Taken overall, a society's technology gives out as many mixed messages as any other aspect of its culture: a study of a country's coal-mining industry will provide very different insights into the social formation from a study of cookery. Here I work on the premise that it is possible to identify within a particular society significant *sets* of technologies that constitute *systems*, providing overlapping messages about a particular kind of person. These messages are not necessarily identical even within one technological domain, and certainly not within the set. They operate at different levels, they present variations and contradictions; their power lies in the flexibility

this permits, the rich scope for "practice," for accommodating or expressing both synchronic differences and historical change.

This book looks at a set of technologies that one might call, in the spirit of Lewis Mumford, a *gynotechnics:* a technical system that produces ideas about women, and therefore about a gender system and about hierarchical relations in general. In this Chinese example of gynotechnics I include three technological domains that were particularly important in giving shape and meaning to the lives of women in late imperial China: the building of houses, the weaving of cloth, and the producing of children.[3] The relations between women and technology have usually been ignored in Chinese history, as elsewhere, and when I started to search for original sources I was surprised to find just how much there was. In concentrating on technologies that directly affected women's lives and identities, I have been able to explore not only what they can tell us about ideas and experiences of women and femininity, but also what we can infer about constructions of masculinity and of difference, and therefore about the changing organization of Chinese society as a whole.

Part 1 of the book looks at the material shell of family life. It analyzes the building of houses and the complex structuring of domestic space that embodied in microcosm the hierarchies of gender, generation and rank inherent to the Chinese social order, tying all its occupants into the macrocosm of the polity. Although women did not build the houses in which they lived in the sense of assembling bricks and mortar, they played an active role in the production of domestic space, which they experienced in ways very different from their menfolk. The evolution of domestic spatial practices during the later imperial period can be seen as the production of a text with multiple grammars, female as well as male, that could simultaneously accommodate popular visions of cosmos and society and the secular orthodoxy of the educated elite. Increasing numbers of women lived in strict physical seclusion, but orthodox ideology continued to insist on the importance of their contributions to the world outside and to the social order. The nature and readings of women's moral, human and material contributions altered in the course of the late imperial period, however, as

3. No doubt food preparation and cookery should also have been included, but I was not sure I would be able to find enough solid information, particularly about the roles of men and women in cooking. Françoise Sabban, a historian of Chinese dietetics and food preparation, informs me that she has found very few sources for any period that provide unequivocal information about the sexual division of labor in cooking.

the balance between what we would consider productive roles (part 2) and reproductive roles (part 3) shifted.

Part 2 penetrates inside the walls of the house to examine the meanings of the productive work that took place there. It focuses on historical changes in the production of cloth, traditionally a female domain construed in terms of complementarity to the male domain of farming.[4] Up to the Song the social contract between state and people was embodied in a fiscal regime based on the working couple, in which husband and wife contributed equally—he in grain and she in cloth—to the upkeep of the state. All women, even noblewomen, worked in the production of textiles. In the course of the late imperial period, however, the textile sector became increasingly commercialized and specialized; new forms of organization of production meant that commoner women's work in textiles was marginalized, while upper-class women abandoned spinning and weaving for embroidery. In classic Engelsian terms, one would expect the reduction in the recognized value of women's productive labor to bolster patriarchal control by allowing women to be represented primarily as reproducers dependent on men and living separate from the male, public world. In certain respects Engels's hypothesis holds for late imperial China; however, we must also take into account the fact that many elite men of the later Ming and Qing tried strenuously to reverse the trend by bringing women back into textile production. By now ordinary working families saw work, whether by men or by women, chiefly in economic terms, but for statesmen and philosophers "womanly work" in textiles was an indispensable moral contribution to the social order; its practical importance was that it protected families from destitution and allowed them to pay their taxes. We see an interesting divergence between popular forms of

4. Farm work in China was represented as a male activity (fig. 2). Women's real involvement in work in the fields was extremely limited compared with most of sub-Saharan Africa, where farming is women's work, and also with neighboring regions such as Southeast Asia or Japan, where tasks like transplanting rice or harvesting were often construed as mainly female. When a member of the male elite in imperial China noticed women working in the fields he saw it as unnatural, a symbol of profound social and moral disorder. So although women did in reality participate in all kinds of field work, from picking cotton (fig. 16) to plucking tea to harvesting grain, written and visual representations of farming generally masked this role. It is often asserted that Chinese women were physically unable to work outside the house because of their bound feet, but in fact foot binding restricted mobility much less than we imagine and did not prevent women from participating at least occasionally in almost every kind of field work except wet-rice cultivation.

patriarchy, in which women's childbearing role became increasingly prominent, and an elite orthodoxy that continued to represent an ideal world as one in which women (or at least wives) contributed actively to the maintenance of the polity.

Part 3 focuses on the women's quarters and the marital chamber. It looks at conceptions of the body and at the repertory of medical and social techniques that were available to women of different rank and class in pursuit of maternal status. I argue that fertility, far from determining the fate of every woman in "traditional China," must be understood in the context of a wider ideology of "nature" versus "culture" that defined male as well as female ideals and expressed differences in class even more clearly than it did those in sex. Once again we see a divergence between elite and popular ideals of femininity and forms of patriarchy. In poor households that could not afford the luxury of polygyny, all the burdens of the wifely role fell on a single woman, whose performance was likely to be judged by her natural fertility. For many elite women, however, social motherhood was more important than giving birth, since they were legally entitled to appropriate any children fathered by their husband on concubines or maids. I argue further that if we combine all the reproductive responsibilities of women in late imperial China, we see that the role of mother was subordinate to the overarching feminine role of wife. According to elite orthodoxy, both as a wife and as a mother a woman made active and indispensable contributions to the social order beyond the walls of the inner chambers. A wife's role was still represented as "the fitting *partner*"[5] of her husband. But although almost all women were attached to men, by no means all of them were legal wives. The ideals of reproduction thus reinforced class differences and exploitation not just of women by men, but of women by women, and of class by class.

Bringing together the spaces Chinese women of different class, rank and age inhabited, the work they did or did not do, and the ways in which they struggled to fulfill demanding reproductive roles while protecting their own health and life gives a new density and definition to the complex historical negotiations of gender and other social hierarchies that underpinned the political continuities of late imperial China. As a set they help us understand how historical redefinitions of domesticity, of gender roles, of the meanings of concepts like "wife" and "mother," of differences among classes, and of the relations between orthodoxy and popular custom took on the powerful shape of material practices.

5. *Book of Rites*, tr. Kuhn 1988: 20.

In two senses this book is an attempt to recover a history for a people without history. First, historians of technology treat non-Western societies as having not histories, but an absence of history. And second, women are invisible in most history of technology. In the case of China, historians who have studied Chinese technology agree that after an initial flowering up to about 1400, during which time it surpassed Europe in productive capacity and inventiveness, China fell into a period of stagnation and decline—a failure to generate the significant qualitative change that constitutes real history. Furthermore, today's conventional representations of "traditional" Chinese gender roles characterize women primarily as biological *reproducers* and as passive consumers or victims of patriarchal ideology. Their roles as *producers,* whether of commodities, of knowledge, or of ideology, have been marginalized and neglected. Since conventional history of technology focuses primarily on the production of commodities and the development of scientific knowledge, it follows that histories of technology in China pay almost no attention to women or to gender, whereas histories of Chinese women seldom even mention technology.

As conventionally defined and studied—that is, as a system of knowledge and equipment that allows more or less efficient production of material goods and control over the environment—technology is a central element in the discourse of Western superiority. More perhaps than any other branch of history, the history of technology retains a colonialist mentality. "For historians of technology, the 'master narrative' is the whig reading of Western technological evolution as inevitable and autonomous," writes John Staudenmaier, referring to Joan Wallach Scott's definition of master narrative, or historical received opinion, as an account of the past "based on the forcible exclusion of others' stories." In this epistemological framework, Western technology becomes a symbol in a structured hierarchy that opposes modern to traditional, active to passive, progress to stagnation, science to ignorance, West to rest, and male to female. Just as female is not-male, a looking glass that sets off the male image to advantage, so other societies and their technologies are not-West, a flattering mirror in which the West can contemplate its virtues.[6] By definition negatives of the original, the features of such mirror images can by and large be deduced: there is no need to accord them the same painstaking attention that the history of Western technology commands.

6. Staudenmaier 1990: 725; Scott 1989: 690; for an analysis of how technology is used as a symbol of Western preeminence and a justification for imperialism, see Adas 1989.

There have, of course, been serious historical studies of indigenous technology in non-Western societies. Joseph Needham's project on China, the first volume of which appeared in 1954, was the pioneering work that set the stage for a radical venture. Rather than cobbling material from different periods together to assemble patchwork images of a timeless, undifferentiated Chinese past, Needham used the wealth of sources he had collected to show how things changed with time. This was the first serious historical study by a scientist of non-Western science and technology,[7] and it has been absolutely fundamental in challenging ahistorical representations of non-Western societies. Still, it constitutes a first step rather than a critical revolution.

Needham's explicit purpose in devising the multivolume series *Science and Civilisation in China* was to demonstrate that real science and technology were not the unique products of European minds—that the history of modern science and technology was in fact a world history. His strategy was to divide Chinese knowledge into the disciplinary branches of modern Western science, pure and applied. Technologies were among the applied sciences. Thus astronomy was classified as applied mathematics, engineering as applied physics, alchemy as applied chemistry, and agriculture (the technical domain entrusted to me for the *Science and Civilisation* series) was classified as applied botany.[8] Himself a distinguished scientist, Needham was able to argue convincingly that China preceded Europe in a number of important discoveries and inventions—including documenting the three Chinese inventions that Francis Bacon associated with the birth of the modern world: printing, the magnetic compass, and gunpowder.[9]

7. Encyclopedic studies like those by Singer et al. (1954–78) or by Gille (1978b) either provide largely ahistorical glimpses of technology in non-Western societies or take it for granted that they were essentially static and argue why that should be.

8. For astronomy as applied mathematics see Needham and Wang Ling 1959; engineering as applied physics, Needham and Wang Ling 1966; alchemy as applied chemistry (a view strongly criticized by Nathan Sivin), Needham, Ho Ping-Yü and Lu Gwei-Djen 1976; and agriculture as applied botany, Bray 1984. I worked at Needham's East Asian History of Science Library in Cambridge (now called the Needham Research Institute) between 1973 and 1984 and have remained involved in the *Science and Civilisation in China* project ever since. I share with many of my colleagues there a strong commitment to carrying the project on to a further stage.

9. In fact Needham's claim that the magnetic compass was introduced from China to Europe is only circumstantial. Nor is it clear that Chinese woodblock printing was the direct inspiration for Gutenberg's movable type. But even if the precision of these claims has subsequently been called into question, there is no doubt that it was a brilliant move to invoke Bacon in this way.

Furthermore, Needham was able to construct convincing historical narratives of intellectual progress in all the scientific and technological categories covered in *Science and Civilisation in China,* although he felt that the extraordinary creativity and inventiveness of the Song dynasty (960–1279) died away in succeeding centuries, to be followed by a long period (from about 1400 or 1500 up to the nineteenth-century confrontations with the Western powers) during which China contributed little or nothing to the growth of world scientific knowledge.

Needham's project and its methods have been extremely influential both within and beyond the profession of history of science and technology. His work was warmly welcomed in China, and also in India, as a means of restoring national self-respect; both countries have now established institutions to study the history of indigenous science and technology. And in the West children now learn from their high school textbooks that the Chinese invented gunpowder and fireworks. Nevertheless, the teleology inherent in Needham's project raises two serious problems. First, accepting the evolutionary model of a family tree of knowledge whose branches correspond to the disciplines of modern science allows Needham to identify Chinese forebears or precursors of modern science and technology, but at the price of disembedding them from their cultural and historical context. One could caricature this as a Jack Horner approach to history, picking out the plums and ignoring the rest of the pie. It emphasizes "discoveries" and "innovations" in a way that is likely to distort understanding of the broader context of skills and knowledge of the period. It distracts attention from other elements that may now seem dead-end, irrational, less effective or less intellectually exciting but may have been more important, more widely disseminated or more influential at the time.[10]

Second, taking the scientific and industrial revolution as a natural outcome of human progress leads us to judge all historical systems of skills and knowledge by criteria derived from this specifically European experience. The rise of capitalism, the birth of modern science and the industrial revolution are so closely intertwined in our intellects that we find it difficult to separate the concept of technology from science,[11] or to think

10. See, for example, Pinch and Bijker 1987 on "closure" and on the interest of studying trails that came to a dead end.

11. Historians, sociologists and philosophers of science and technology nowadays recognize that it is best to consider the two domains as representing different kinds of knowledge, reasoning and skills; however, a more popular view of the relationship between the two is still that technology is applied science.

imaginatively about trajectories of technical development that emphasize other criteria than engineering sophistication, scale economies or increased output. Any deviation from this narrow path then has to be explained in terms of failure, of history grinding to a halt. Societies that produced undeniably sophisticated technical repertories but failed to follow the European path to the same conclusion—such as the medieval Islamic world, the Inca empire, or imperial China—are then subjected to the so-called Needham question and its correlates: Why did they not go on to generate indigenous forms of modernity? What went wrong? What was missing? What were the intellectual or character failings of that culture?[12]

After six multipart volumes (altogether about twenty separate books) detailing what the various branches of Chinese scientific and technical knowledge achieved, the three parts of the final and as yet unfinished seventh volume of *Science and Civilisation in China* are devoted to addressing the "Needham question," offering a constellation of linguistic, epistemological, social and political explanations for China's failure to build on its impressive medieval achievements and generate a modern society. Taking the Needham position a step further, Mark Elvin argued in *The Pattern of the Chinese Past* that exogenous forces were necessary (in the form of the impact of Western imperialism) to open China to a phase of true progress.

Needham's arguments, and Elvin's, have been widely if selectively drawn on by economic historians, comparative sociologists and historians of Western science and technology not as the essential first step to open up a critical world history of science and technology, but to confirm versions of the master narrative. Paradoxically, historians of science and technology can continue to ignore what happened in other societies precisely because of pioneering work by scholars like Needham—because the questions they set out to answer about China, or India, or Islam were framed in the terms set by the master narrative. In a sense, this absolutely foun-

12. Gille (1978b) lists China, the Muslim world and pre-Columbian America under his heading of "blocked systems." The Muslim world has perhaps suffered most explicitly from Orientalist gendered contrasts. It is commonly depicted as a *passive* repository of Greek learning rather than a realm with many outstanding centers of learning that actively advanced scholarship. The reconquest of Moorish Spain is represented in more than one study as the natural outcome of a confrontation between the passive, luxurious and effeminate worldview of the Muslims, congenitally unable to reap the full benefits of the rich heritage of Greece and Rome, and the virile, aggressive, questing culture of Christian Europe (e.g., Crow 1985; Mokyr 1990).

dational work has been sadly underexploited; in another sense, it has been sadly exploited. Within the discipline of history of technology, the differences between Europe and China or other non-Western societies are taken not as a challenge to recover other cultures of knowledge and power with different goals and values, but simply as confirmation that only the West is truly dynamic and therefore worthy of study.

As an indication of how serious the neglect of non-Western societies remains within the discipline, Staudenmaier pointed to the official journal of the Society for the History of Technology, *Technology and Culture*. Of the articles published between 1958 (when it was founded) and 1980, only 6 percent dealt with non-Western societies; after 1980 the figure dropped to 3 percent.[13] As another example, reading the program for a four-day international conference entitled "Technological Change" (held in Oxford in 1994), I noticed that of about a hundred papers, two or three dealt with some form of West-to-East technology transfer, and there was a theoretical session on evolutionary models of technological development; otherwise there were no papers dealing with non-Western technologies.

James Clifford has noted how ethnographic museums put together exhibits by selecting artifacts according to categories that fulfill Western expectations of a "primitive" or "traditional" society, thus creating the illusion of adequate representation.[14] Until one questions the underlying master narrative, the conventional history of technology—and the economic history and comparative sociology that draw on it for material grounding—succeed in creating this illusion of adequate representation. The technological histories of non-Western societies are depicted as faltering steps along a natural path of progress that only the West has trodden boldly to the end. Sometimes these alien technological systems are shown as coming up against insuperable cultural obstacles to further development, sometimes they are treated as inherently inert. The focus is always on what they failed to do, rather than on whether and how they met the goals, values and purposes of the society that generated them.

A critical history of technology should explore the local meanings of technological systems not in order to construct comparative hierarchies (and perpetuate ethnocentric judgments), but seriously to study alternative constructions of the world. The criteria in general use for evaluating technological success are seldom treated as culturally relative, but in fact, as Marx long ago made clear, they are an ideological product of our own

13. Staudenmaier 1990: 724.
14. Clifford 1988: 220.

history. If we assume that real technology is inseparable from experimental science, if we judge technical efficiency by mechanical sophistication, by the productivity of labor and of capital, by the scale of operation and the reduced number of human agents on the assembly line or in the field, if we think growth and change are more advanced than stability or continuity, it is because that is how our modern Western world was made.

But other worlds were made in other ways. How did past societies see their worlds and their place in them, what were their needs and desires, what role did technology play in creating and fulfilling those desires, in maintaining and reshaping the social fabric?[15] Such questions should provide the framework for exploring the technologies of non-Western societies. How else can we dispel the illusion of adequate representation and look at people in other worlds as something more (and more interesting) than benighted fools?

> There is a story, repeated by a number of Roman writers, that a man—characteristically unnamed—invented unbreakable glass and demonstrated it to Tiberius in anticipation of a great reward. The emperor asked the inventor whether anyone shared his secret and was promptly assured that there was no one else; whereupon his head was promptly removed, lest, said Tiberius, gold be reduced to the value of mud.

To a Roman mind, M. I. Finley says, this did not mean that Tiberius was an idiot blind to new ideas, still less did it mean that he or the Roman ruling class despised wealth. What did this tale signify then? "We must remind ourselves time and time again," writes Finley, "that the European experience since the late Middle Ages in technology, in the economy, *and in the value systems that accompanied them,* was unique in human history until the recent export trend began. Technical progress, economic growth, productivity, even efficiency have not been significant goals since the beginning of time . . . other values held the stage."[16] How then can we reconstruct those other values?

It is not surprising that some of the most fruitful approaches to the interpretation of technology have come from anthropologists, since anthropology is a discipline committed to investigating other systems of meaning. What is surprising, however, is how marginal this domain of experience remains in mainstream anthropology, especially in the English-speaking world. As Pierre Lemonnier remarks, "It has been some

15. In the contemporary world, the Greens offer one example of an attempt to construct a world around noncapitalist values and desires.

16. Finley 1973: 147, emphasis added.

decades since the interest in what was, in the 1930s, rightly called 'material *culture*' declined, and for years France has been alone in developing institutionalized research in the anthropology of techniques."[17] The French tradition grew out of a Durkheimian interest in *mentalités*. Marcel Mauss, a student of Durkheim, founded the tradition with a study of an aspect of technological experience that might surprise conventional historians of technology, namely "techniques of the body." Reflecting a deep concern among French social scientists to connect language, psychology and social norms, Mauss discussed bodily deportment and gestures as learned cultural practices and as a form of communication.[18] In the French ethnological tradition, technology has continued to be studied as a form of symbolic communication and cultural reproduction.[19] But even within French ethnology, technology remains a specialist domain rather than an integral part of cultural interpretation.[20]

The *Annales* school of history has also, in its many avatars, shown a consistent concern with exploring how material production and material culture relate to social, psychological and symbolic dimensions of meaning.[21] The preeminent example is Fernand Braudel's *Civilisation matérielle, économie et capitalisme,* which treats eating habits as well as the

17. Lemonnier 1993a: 7.

18. Mauss [1935] 1979. This approach to integrating nonverbal and verbal communication fed into the work of the ethnomethodologists and into current work in linguistic anthropology on contextuality.

19. Leroi-Gourhan entitled his two-volume study of communication *Gesture and Speech;* the first part being *Technology and Language,* the second *Memory and Rhythms* (1964–65). In the work of scholars like Haudricourt, Bernot, Barrau and Cresswell, and of the younger generation of ethnologists connected to the "techniques et culture" research team of the Centre National de la Recherche Scientifique, the study of techniques is always linked to linguistic and to symbolic practice (e.g., Haudricourt 1987; Koechlin et al. 1987; the journal *Techniques et culture;* Lemonnier 1992, 1993b). I myself was a member of the French research team for several years, although unfortunately I never acquired any competence in linguistic analysis.

20. Lemonnier believes a trend toward integrating technology and material culture into cultural analysis has begun beyond France. He draws attention to the work of ethno-archaeologists and postprocessual archaeologists, and also of a few anglophone ethnologists working independent of the French tradition (e.g., Ingold 1988; Reynolds and Scott 1987; Sillitoe 1988).

21. Perhaps because so many scholarly institutions are oriented primarily toward research rather than teaching, French scholars have less often been bounded by the disciplinary segregation typical of English-speaking universities, where the objects and methods of history, anthropology, sociology and other human sciences are often defined as distinct. But the role of Marc Bloch and Lucien Febvre in establishing the interdisciplinary journal *Annales* was extremely important in fostering this ambiance.

production of daily bread, furnishing styles as well as architectural techniques, as keys to explaining a civilization and its history. "Our investigation takes us . . . not simply into the realm of material 'things,' but into a world of 'things and words'—interpreting the last term in a wider sense than usual, to mean *languages* with everything that man contributes or insinuates into them, as in the course of his everyday life he makes himself their unconscious prisoner, in front of his bowl of rice or slice of bread."[22] But Braudel is no Norbert Elias; he places the economy firmly in the driving seat of history. In the section devoted to "technologies" it becomes clear that Braudel (not surprisingly, since his interest is in explaining the rise of capitalism in Europe) fully accepts both the boundaries and the master narrative of conventional history of technology:

> First the accelerator, then the brake: the history of technology seems to consist of both processes, sometimes in quick succession: it propels human life onward, gradually reaches new forms of equilibrium on higher levels than in the past, only to remain there for a long time, since technology often stagnates, or advances only imperceptibly between one "revolution" or innovation and another. It often seems as if the brakes are on all the time, and *it is the force of the brakes that I had hoped to describe more successfully than I perhaps have. . . .* [The role of technology] was a vital one. As long as daily life proceeded without too much difficulty in its appointed pathway, within the framework of its inherited structures, as long as society was content with its material surroundings and felt at ease, *there was no economic motive for change. . . .* It was only when things went wrong, when society came up against the ceiling of the possible that people turned of necessity to technology.[23]

As Braudel himself acknowledges, he does not succeed in conveying the nature of the "force of the brakes," not least because in his view the brakes are not so much active mechanisms as an absence of acceleration. Despite Braudel's privileging of economic production, he insists on incorporating the full experience of material life into his analysis of history. My study has been greatly influenced by Braudel's insistence on the need to link production and consumption, and to embed local technologies in the broader geographical and social context. But unlike Braudel's work, the heart of my study is precisely the interplay between accelerator and brakes, or rather, the various ways in which a social system can channel or absorb the potentially disruptive energies generated by disequilibria. Most materialist theories of human evolution or history, Marxist or not,

22. Braudel 1992: 1: 333.
23. Ibid.: 430, 435, emphases added.

are basically interested in the instability of modes of production; they highlight the role of technology as a vehicle for precipitating change. Historians have generally paid less attention to the fact that at another level, technologies, like kinship or gender, can also serve to reproduce the social system, channeling and absorbing the very energies that they generate.

This brings me back to gynotechnics. To understand the part technology plays in supporting a social formation, one must go beyond looking at a single technology or domain of technology (for example, the technologies of economic production), to consider the interplay of *sets* of technologies, or technological *systems*. In *Technology, Tradition and the State in Africa*, Jack Goody correlates African forms of political organization with kinship practices and agricultural technology on the one hand ("polity and the means of production") and with the technologies of warfare on the other ("polity and the means of destruction"). Analyzed as a system, the technologies reveal not just the material dimensions of a mode of production, but the social and ideological world it underpins.[24] The technologies I have brought together here also constitute a set or system: they were technologies for producing women. Each gave material form to different fundamental components of the overarching ideology of gender and hierarchy in late imperial China—gendered and hierarchical space, gendered and ranked work, and gendered reproduction tied to rank and status. Considered historically, each technology reveals changes that illuminate different dimensions of the overall historical process by which gender roles and social hierarchies were redefined, allowing the social order to adjust to the pressures of changing circumstance.

There are even more definitions of technology in circulation than there are of science—some sixteen hundred according to François Sigaut.[25] Many studies treat technology primarily as the rational application of knowledge to meet material challenges. While I recognize the importance of this aspect of human technical endeavors throughout history, here I am most interested in the social worlds that technology builds. Like Braudel, I am therefore interested in the language of technology and of things. For my purposes a *technique* can be defined as an action performed on some form of inanimate or animate matter (including oneself, as in the case of movement through domestic space, or of various practices of fertility

24. Goody's explorations of literacy as a technology of control also suggest helpful ways to explore the intellectual dimensions of technologies and the mindsets they make possible, as well as their role in producing certain forms of social stratification or political organization (J. Goody 1986, 1987).

25. Sigaut 1985.