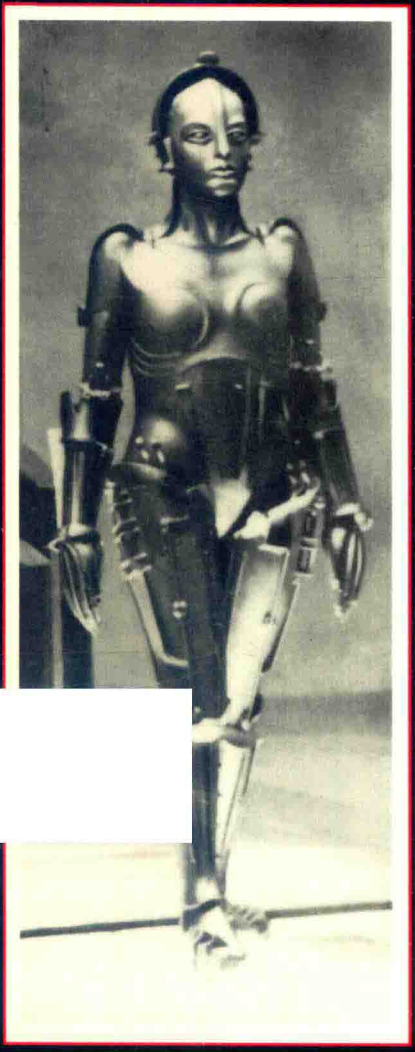
FEMINISM CONFRONTS TECHNOLOGY



JUDY WAJCMAN

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Polity

First published 1991 by Polity Press
in association with Blackwell Publishers Ltd.

Reprinted 1993, 1996, 2000

Editorial office:
Polity Press, 65 Bridge Street,
Cambridge CB2 1UR, UK

Marketing and production:
Blackwell Publishers Ltd
108 Cowley Road, Oxford OX4 1JF, UK

ISBN 0–7456–0777–2
ISBN 0–7456–0778–0 (pbk)

A CIP catalogue record for this book is available from the British Library.

Typeset in 10½ on 12 pt Times
by Colset Private Limited, Singapore
Printed and bound in Great Britain by
MPG Books Ltd, Bodmin, Cornwall

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In memory
of my father
Szloma Wajcman
1905–1978

Acknowledgements

In acknowledging the help I received in producing this book, I must begin with Jenny Earle. She not only read and expertly edited every chapter, but discussed with me all the ideas, intellectual and political. I am indebted to her for constant support and encouragement throughout the entire process.

I started out intending to write an article - it was Donald MacKenzie who suggested I might as well write a book. I have often cursed him since! Now it is finished I can thank him for his suggestion and for initially fostering my interest in this area. He and Tony Giddens have seen the book through from beginning to end, promptly reading its many drafts and exhorting me to continue through despondency and ill-humour. I am grateful to them both and relieved that our friendships have survived. Cynthia Cockburn also read many drafts and her belief in the project was likewise very important to me.

The research and writing for the most part took place while I was a visitor at the Department of Applied Economics at Cambridge University. As in the past, this was an excellent workplace for me. I would like to thank Bob Blackburn, who arranged my visit, Ken Prandy, Jeremy Edwards, Lucia Hanmer and Kath Wilson all of whom made me welcome and were a continuing source of encouragement.

While in Cambridge, I was most fortunate to live in a household with Ros Morpeth and Lol Sullivan. They were both extremely generous to me, from patiently engaging about the ideas in the book to fixing my bicycle! In particular, I am grateful to Ros for her warm hospitality and unswerving friendship. I am indebted to many other friends in Cambridge, London and Edinburgh and I would particularly like to mention Karen Greenwood, Lynn Jamieson, Archie Onslow, Mary Ryan and Michelle Stanworth. For their helpful comments on particular chapters and for inspiring me with their own work, I must thank Ruth Schwartz Cowan, Sandra Harding, Maureen McNeil and others associated with the UK Gender and Information Technology Network. The last stages of the manuscript were

completed when I returned to Australia and I would like to thank Pauline Garde, Richard Gillespie, Carol Johnson, Belinda Probert, Stuart Rosewarne and especially Michael Bittman for helping me with the final draft.

I had the benefit of a small research grant from the University of New South Wales and the Australian Research Council. I am grateful to Alex Heron, Karen Hughes, Jocelyn Pixley, Alison Tilson and especially Mandy Wharton for their exemplary, if all too brief, research assistance.

This is by no means an exhaustive list of contributors to my thinking and writing on gender and technology. A project with as broad a sweep as this, extending over an intensive two-year period, has of course involved me in numerous conversations particularly with other feminists working in the area. Feeling part of a collective feminist endeavour has sustained me and I hope the end product usefully contributes to this ongoing work.

Preface

Over the last two decades feminists have identified men's monopoly of technology as an important source of their power; women's lack of technological skills as an important element in our dependence on men. From Women in Manual Trades, set up in the early 1970s to train women in traditionally male skills, to the Women and Computing courses of the 1980s, feminist groups and campaigns have attempted to break men's grip on technical expertise and to win greater autonomy and technical competence for women. In the same period, women's efforts to control their own fertility have extended from abortion and contraception to mobilizing around the new reproductive technologies. With dramatic advances in biotechnology and the prospect of genetic engineering, women's bodies have in some respects become increasingly vulnerable to exploitation.

These and other political struggles around technology, and the difficulties they continue to confront, have opened up an exciting new field in feminist scholarship. To date however, most contributions to the debate on gender and technology have been of a somewhat specialist character, focused on a particular type of technology. This book represents an attempt at a more coherent approach, bringing together under one theoretical framework a number of different sites of technology. It is my intention both to explicate and to extend the newly emerging feminist analysis.

Turning to social science debates about technology we find a preoccupation with the impact of technological change on society. Many commentators, for example, claim we are in the midst of a microelectronic revolution, which will cause a radically new form of society to emerge. Regardless of their theoretical or political perspectives, women rarely enter their field of vision. Feminists have worked to put women and gender relations back into this frame, highlighting the differential effects of technological change on women and men. Although still largely concerned with 'effects', feminists also point beyond the relations of paid production to a recognition that

technology impinges on every aspect of our public and private lives. While I will be engaging with these issues, I also intend to take the analysis into less charted waters.

The technological determinism implicit in much of both the sociological and feminist literature on the impact of technology has recently been subjected to criticism. The new sociology of technology has turned the focus around to examine the social factors that shape technological changes. Rather than only looking at the effects of technology on society, it also looks at the effects of society on technology.

The Social Shaping of Technology (1985), which I co-edited with Donald MacKenzie, was part of this project. As an edited collection, that book was to some extent deficient in its treatment of gender issues, reflecting the state of knowledge at that time. This book is motivated by a desire to redress the balance, exploring in more depth women's relationship to and experience of technology. Rather than providing a comprehensive review of the now burgeoning literature in this area, I have selected research which can best exemplify the centrality of gender relations to the social shaping approach.

I have not attempted to encompass here all forms of technology. I have not, for example, dealt with the technologies of surveillance and political control, nor with energy technology. Various aspects of information and communication technologies have also been excluded. I have chosen to concentrate on advanced industrial societies, and the book has few references to the major issues concerning technology in the Third World. There is now an extensive literature on how technology transfer to the Third World has a powerful tendency to reinforce male dominance.[1] In the end, the sheer scope of the topic prohibited its inclusion.

The book begins with an overview of feminist theories of science and technology. In this first chapter, I argue that the feminist critique of science cannot simply be translated into a feminist perspective on technology. Although useful parallels can be drawn, technology needs to be understood as more than applied science. The following chapters have a less abstract focus and are organized around substantive areas of technology. Each chapter begins by looking at the impact of technological change on sexual divisions and goes on to develop the argument that technology itself is gendered.[2]

Chapter 2 assesses the impact of production technologies on sexual divisions in the sphere of paid work. It then looks at the extent to which these divisions, and gender relations in the workplace, themselves profoundly affect the direction and pace of technological change.

Perhaps it is the new technologies of human biological reproduction that have been most vigorously contested, both intellectually and politically, by feminists in recent years. Chapter 3 explores the arguments, placing them in the wider context of the growing supremacy of technology in Western medicine.

There is now a substantial body of feminist writing on domestic technologies and their bearing on housework. Chapter 4 examines this research in conjunction with more mainstream (malestream) sociological theories regarding the impact of technologies on the 'post-industrial' home.

Chapter 5 deals with the built environment. The first section considers the design of houses and their urban location. I argue that sexual divisions are literally built into houses and indeed into the whole structure of the urban system. The last section scrutinises transport technology and demonstrates how women in particular have been disadvantaged by the design of cities around the automobile.

Picking up on issues from the previous four chapters, chapter 6 presents an analysis of technology as a masculine culture. I argue that the close affinity between technology and the dominant ideology of masculinity itself shapes the production and use of particular technologies. The correspondingly tenuous nature of women's relationship to this technical culture is the subject of the second part of the chapter.

In the conclusion, I hope to convince the reader that a recognition of the profoundly gendered character of technology need not lead to political pessimism or total rejection of existing technologies. The argument that women's relationship to technology is a contradictory one, combined with the realization that technology is itself a social construct, opens up fresh possibilities for feminist scholarship and action.

NOTES

1 For an introduction to this literature, see McNeil's (1987, pp. 227–9) bibliography on 'Development, The "Third World" and Technology'. See also Ahmed (1985).

2 Throughout this book I use the term 'sex' and 'gender' interchangeably. This is symptomatic of the blurred boundaries that mark the distinction between what is construed as 'natural' and what is construed as 'social'.

Contents

1
Feminist Critiques of Science and Technology

Writing in 1844 about relations between men and women, Marx said that '[i]t is possible to judge from this relationship the entire level of development of mankind' (1975, p. 347). More commonly it is the level of scientific and technological development that is taken as the index of a society's advancement. Our icons of progress are drawn from science, technology and medicine; we revere that which is defined as 'rational' as distinct from that which is judged 'emotional'. As we approach the twenty-first century however we are no longer sure whether science and technology are the solution to world problems, such as environmental degradation, unemployment and war, or the cause of them. It is not surprising therefore that the relationship between science and society is currently being subjected to profound and urgent questioning.

The development of a feminist perspective on the history and philosophy of science is a relatively recent endeavour. Although this field is still quite small and by no means coherent, it has attracted more theoretical debate than the related subject of gender and technology. It will become apparent in what follows, however, that feminists pursued similar lines of argument when they turned their attention from science to technology. I will therefore start by examining some approaches to the issue of gender and science, before moving on to look at technology.

The Sexual Politics of Science

The interest in gender and science arose out of the contemporary women's movement and a general concern for women's position in the professions. Practising feminist scientists have questioned the historical and sociological relationships between gender and science at least since the early 1970s. The publication of biographical studies of great women scientists served as a useful corrective to mainstream histories

of science in demonstrating that women have in fact made important contributions to scientific endeavour. The biographies of Rosalind Franklin and Barbara McClintock, by Anne Sayre (1975) and Evelyn Fox Keller (1983) respectively, are probably the best known examples. Recovering the history of women's achievements has now become an integral part of feminist scholarship in a wide range of disciplines. However, as the extent and intransigent quality of women's exclusion from science became more apparent, the approach gradually shifted from looking at exceptional women to examining the general patterns of women's participation.

There is now considerable evidence of the ways in which women have achieved only limited access to scientific institutions, and of the current status of women within the scientific profession. Many studies have identified the structural barriers to women's participation, looking at sex discrimination in employment and the kind of socialization and education that girls receive which have channelled them away from studying mathematics and science. Explaining the under-representation of women in science education, laboratories and scientific publications, this research correctly criticises the construction and character of feminine identity and behaviour encouraged by our culture.

However these authors mainly pose the solution in terms of getting more women to enter science – seeing the issue as one of access to education and employment. Rather than questioning science itself, such studies assume that science is a noble profession and a worthy pursuit and that if girls were given the right opportunities and encouragement they would gladly become scientists in proportion to their numbers in the population. It follows that remedying the current deficiency is seen as a problem which a combination of different socialization processes and equal opportunity policies would overcome.

This approach, as Sandra Harding (1986) and others have pointed out, locates the problem in women (their socialization, their aspirations and values) and does not ask the broader questions of whether and in what way science and its institutions could be reshaped to accommodate women. The equal opportunity recommendations, moreover, ask women to exchange major aspects of their gender identity for a masculine version without prescribing a similar 'degendering' process for men. For example, the current career structure for a professional scientist dictates long unbroken periods of intensive study and research which simply do not allow for childcare and domestic responsibilities. In order to succeed women would have to model themselves on men who have traditionally avoided such commitments. The

equal opportunities strategy has had limited success precisely because it fails to challenge the division of labour by gender in the wider society. The cultural stereotype of science as inextricably linked with masculinity is also crucial in explaining the small number of women in science. If science is seen as an activity appropriate for men, then it is hardly surprising that girls usually do not want to develop the skills and behaviours considered necessary for success in science.

When feminists first turned their attention to science itself, the problem was conceived as one of the uses and abuses to which science has been put by men. Feminists have highlighted the way in which biology has been used to make a powerful case for biologically determined sex roles. Biology has been central to the promotion of a view of women's nature as different and inferior, making her naturally incapable of carrying out scientific work. For example, sex differences in visual-spatial skills are said to explain why there are so many more male scientists. In confronting biological determinists, many feminists inquired as to how and why the study of sex differences had become a priority of scientific investigation. They set out to demonstrate that biological inquiry, and indeed Western science as a whole, were consistently shaped by masculine biases. This bias is evident, they argued, not only in the definition of what counts as a scientific problem but also in the interpretations of research. It followed that science could not be genuinely objective until the masculine bias was eliminated. As we shall see below, this approach leaves unchallenged the existing methodological norms of scientific inquiry and identifies only bad science and not science-as-usual as the problem.

The radical political movements of the late 1960s and early 1970s also began with the question of the use and abuse of science. In their campaigns against an abused, militarized, and polluting science they argued that science was directed towards profit and warfare. Initially science itself was seen as neutral or value-free and useful as long as it was in the hands of those working for a just society. Gradually, however, the radical science movement developed a Marxist analysis of the class character of science and its links with capitalist methods of production. A revived political economy of science began to argue that the growth and nature of modern science was related to the needs of capitalist society. Increasingly tied to the state and industry, science had become directed towards domination. The ideology of science as neutral was seen as having a specific historical development. One of the most characteristic formulations of this position, associated with the radical science movement, was that 'science is social relations'.

The point was that the distinction between science and ideology could not be sustained because the dominant social relations of society at large are constitutive of science.

During this same period a radical shift took place in the history, philosophy and sociology of science, which added weight to the view that science could no longer be understood simply as the discovery of reality. Thomas Kuhn's *The Structure of Scientific Revolutions* (1970) marked the beginning of what was to become a major new field of study known as the sociology of scientific knowledge.[1] Its central premise is that scientific knowledge, like all other forms of knowledge, is affected at the most profound level by the society in which it is conducted.

Much research has examined the circumstances in which scientists actually produce scientific knowledge and has demonstrated how social interests shape this knowledge. Studies provide many instances of scientific theories drawing models and images from the wider society. It has also been demonstrated that social and political considerations enter into scientists' evaluations of the truth or falsity of different theories. Even what is considered as 'fact', established by experiment and observation, is social. Different groups of scientists in different circumstances have produced radically different 'facts'. Numerous historical and contemporary studies of science, and the social processes through which inquiry proceeds, highlight the social aspects of scientific knowledge.

Despite the advances that were made through the critique of science in the 1970s, gender-conscious accounts were rare. The social studies of natural science systematically avoided examining the relationship between gender and science in either its historical or sociological dimensions. Similarly, the radical science movement focused almost exclusively on the capitalist nature of science ignoring the relationship of science to patriarchy. In short, gender did not figure as an analytical tool in either of these accounts of science.

It is only during the last decade with writers such as Carolyn Merchant (1980), Elizabeth Fee (1981), Evelyn Fox Keller (1985), Brian Easlea (1981), Nancy Hartsock (1983), Hilary Rose (1983) and Ludmilla Jordanova (1980) that Western science has been labelled as inherently patriarchal.[2] As Sandra Harding (1986) expresses it, feminist criticisms of science had evolved from asking the 'woman question' in science to asking the more radical 'science question' in feminism. Rather than asking how women can be more equitably treated within and by science, they ask 'how a science apparently so deeply involved in distinctively masculine projects can possibly be

used for emancipatory ends' (p. 29). It is therefore time to consider the main feminist critiques of science itself.

Scientific Knowledge as Patriarchal Knowledge

The concern with a gender analysis of scientific knowledge can be traced back to the women's health movement that developed in Britain and America during the 1970s. Regaining knowledge and control over women's bodies - their sexuality and fertility - was seen as crucial to women's liberation. Campaigns for improved birth control and abortion rights were central to the early period of second-wave feminism. There was a growing disenchantment with male medical theories and practices. The growth and consolidation of male expertise at the expense of both women's health and women's healing skills was the theme of an American study, *Witches, Midwives and Nurses: A History of Women Healers* (Ehrenreich and English, 1976). This documented how the growth and professionalization of male-dominated medicine had led to the marginalization of female health workers. At the same time, critiques of psychiatry and the treatment of women's depression as pathological were being expounded. Asking why the incidence of mental illness should be higher among women than men, feminists exposed the sexist bias in medical definitions of mental health and illness. Implicit in these analyses was a conviction that women could develop new kinds of knowledge and skills, drawing on their own experience and needs. The insights of the radical science movement contributed to the view of medical science as a repository of patriarchal values.

If medical scientific knowledge is patriarchal, then what about the rest of science? As Maureen McNeil (1987) points out, it was a short step to the emergence of a new feminist politics about scientific knowledge in general. Some feminists re-examined the Scientific Revolution of the sixteenth and seventeenth centuries, arguing that the science which emerged was fundamentally based on the masculine projects of reason and objectivity. They characterized the conceptual dichotomizing central to scientific thought and to Western philosophy in general, as distinctly masculine. Culture vs. nature, mind vs. body, reason vs. emotion, objectivity vs. subjectivity, the public realm vs. the private realm - in each dichotomy the former must dominate the latter and the latter in each case seems to be systematically associated with the feminine. The general issue of whether conceptual dichotomizing is itself distinctly masculine or part of the Western

philosophical tradition is beyond the scope of this book.[3] My concern is with the way dualistic gender metaphors such as those used above reveal the underlying social meanings in purportedly value-neutral scientific thought.

There has been a growing awareness of the use of female metaphors for nature and natural metaphors for women. An examination of the texts of science highlights the correspondence between the way men treated women in particular historical periods and the way they used nature. Some feminist historians have focused on the rape and torture metaphors in the writings of Sir Francis Bacon and the other fathers of modern science. Merchant (1980) argues that during the fifteenth to seventeenth centuries in Europe both nature and scientific inquiry were conceptualized in ways modelled on men's most violent and misogynous relationships to women and this modelling has contributed to the distinctive gender symbolism of the subsequent scientific world view.

Eighteenth and nineteenth century biomedical science in France and Britain deployed similar gender symbolism to conceptualize nature: '. . . science and medicine as activities were associated with sexual metaphors which were clearly expressed in designating nature as a woman to be unveiled, unclothed and penetrated by masculine science' (Jordanova, 1980, p. 45). Anatomically, males were depicted as representing active agents and females as passive objects of male agency. From her study Jordanova concludes that biomedical science intensified the cultural association of nature with passive, objectified femininity and of culture with active, objectifying masculinity. This strikingly gendered imagery of nature and of scientific inquiry is not just an historical relic, as these same dichotomies and metaphors can be found in contemporary writing on science. As Harding asks, is it any wonder that women are not an enthusiastic audience for these interpretations?

Rather than pointing to the negative consequences of women's identification with the natural realm, some feminists celebrate the identification of woman and nature. This finds political expression in the eco-feminism of the eighties which suggests that women must and will liberate the earth because they are more in tune with nature. For them, women's involvement in the ecology and peace movements was evidence of this special bond. As Susan Griffin expressed it: 'those of us who are born female are often less severely alienated from nature than are most men' (1983, p. 1). Women's biological capacity for motherhood was seen as connected to an innate selflessness born of their responsibility for ensuring the continuity of life. Nurturing and