

explanation of the predominance of males in science in 'Gender and Science.' Although many of us are familiar with the objectification of nature by "masculine rationality" and the identification of the female with nature, Keller's discussion presents the position clearly.

Somewhat less familiar is the position developed in the next paper where Keller and Grontkowski argue that the privileged status of vision as a metaphor for truth and knowledge corresponds to the objectification of rather than identification with that which is being studied. Further, as a metaphor for intellection (e.g. "the eye of the mind," "the light of reason"), vision also supports the development of mind-body dualism which is introduced to guarantee the indubitability of knowledge claims. While the authors argue that there is no evidence to suspect that the dependence of visual metaphor is explicitly patriarchal they claim that such dependence is "consonant with other more explicitly patriarchal biases" (p. 221).

Both Naomi Scheman and Jane Flax in the next two chapters give a feminist psychoanalytic interpretation of individualism in philosophical psychology and political philosophy. Since most readers will be familiar with the feminist interpretation of male development in patriarchal society, I will not elaborate on these articles. Both articles argue for the recognition of how male gender identity becomes magnified into the ideological underpinnings of traditional philosophical psychology and political philosophy.

In the last two articles, both Nancy Hartsock and Sandra Harding argue for the necessity of creating a new epistemology. Hartsock believes that feminists can create a "specifically feminist historical materialism," using Marxian meta-theory as a methodological starting point. Harding argues in 'Why Has the Sex/Gender System Become Visible Only Now?' that while feminist inquiry has led to critiques of morality, science and politics, it has not yet developed the new

epistemology which feminism requires. She states that this "new epistemology must be one which is not fettered by the self-imposed limitations of empiricist, functionalist/relativist or marxist epistemologies" (p. 311).

In general, the text is a well-balanced, interdisciplinary treatment of the "theories, concepts, methods and goals of inquiry" within traditional philosophy, science and social science. The articles go beyond critiques of the content and practice of patriarchal scholarship. There are critical examinations of the underlying sexism in traditional theories of knowledge and methodology which provide the framework for the sexist content prevalent in science and philosophy. There are also attempts by these authors to set out the requirements for feminist epistemology, metaphysics, methodology and philosophy of science.

This is a text which should be required reading in senior under-graduate and graduate women's studies courses. It will also prove helpful to feminists doing research in both philosophy and science.

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Machina Ex Dea. Feminist Perspectives on Technology. Edited by Joan Rothschild. *New York: Pergamon Press, 1983. Pp. 233.*

Few would deny that we live in an increasingly technological age. In the expanding world of microelectronics, the connections between technology and culture are all too often obscured. The basic premise of this collection of essays edited by Joan Rothschild is that technology, because of its organic link to capitalism and patriarchy, reinforces male supremacy. The twelve essays in the volume—which derives its title from the feminization of a Greek dramatic metaphor symbolizing the relationship between

humans and technology—place women at the centre of technological studies. The collection illuminates the historical, sociological, psychological and philosophical issues fundamental to a feminist perspective on technology. Machines are portrayed as neither inherently masculine or feminine. Rather, their invention, diffusion and application have historically taken place within an economic and cultural context dominated by men and the profit motive. Hence women have been objects of technological control. The authors contributing to *Machina Ex Dea* are committed to developing a feminist perspective on the relationship of women to science and technology so that ultimately women can realize these cultural products for more humane and egalitarian ends.

Rothschild has skillfully organized the twelve essays into three sections: women, technology and production; technology and values; and feminist perspectives for a technological age. Each section is prefaced by a brief editor's introduction identifying the key issues. Rothschild's cogent introduction and conclusion squarely locate the book in the voluminous literature of technology studies, highlighting the prerequisites for a feminist approach to research—and action—in this area. All but one of the twelve essays are original, thus placing the book at the forefront of scholarship in the area.

In her introduction, Rothschild provides a critique of the male bias in technology studies. The exclusion of women from the literature on technology is amply documented in the contents of *Technology and Culture*, the pre-eminent journal in the field. In 24 years of publication, the journal has published only four articles dealing explicitly with women and technology. This scholarly blind-spot means that women's contribution to technology remains buried from view. Moreover, women's roles as producer and reproducer, and how both have been shaped by science and technology, remain largely a topic of speculation. Equally problematic, by affecting

women's knowledge about technology, these male biases reinforce the subordination of women to the machine. As Rothschild observes: "For most scholars and writers in the technology field, the prototype—the inventor, the user, the thinker about and the reactor to technology—is male." Not only can a feminist perspective on technology empower women to utilize it to their own advantage, but the area of technology studies will also be enhanced by a vigorous interdisciplinary focus which emphasizes socio-cultural factors.

Women and men have experienced technology differently, especially in the world of work. The first section contains five essays documenting women's contribution to creating new technologies and how, as workers, they have been adversely affected by it. Autumn Stanley's essay presents a "revised history of technology," outlining women's role as primary technologists. Once technology is redefined to encompass what *people* do, rather than just what *men* do, we discover that women made significant contributions to such diverse areas as horticulture and agriculture, herbal remedies and cosmetics. Asserts Stanley: "women hold up at least two-thirds of the technological sky." Trescott's fascinating article on Lillian Moller Gilbreth firmly establishes this female psychologist and industrial engineer as a seminal figure in the development of modern management. Gilbreth injected humanism into scientific management's mechanistic time and motion approach to job redesign. Her emphasis on the psychological factors in industrial engineering predated the more famous Hawthorne studies and the launching of the human relations movement in the 1920's. The next article, by Sally Hacker, demonstrates that women such as Gilbreth faced enormous obstacles in attempting to enter the engineering profession. Hacker examines how mathematics testing serves as a gate-keeping function in the profession, restricting the access of women to all but lower-level technological jobs. Feldberg's and Glenn's article shows how automation

affects clerical work, the classic female job ghetto. Automation tends to subdivide, standardize and specialize office jobs typically performed by women. Yet at the same time, their case study of the insurance industry suggests that the newly created data processing jobs—potential avenues of mobility out of the clerical ghetto—go disproportionately to men. Rothschild contributes the final chapter in this section which examines housework. Rothschild concludes that while home conveniences have eased the burden of housework, women certainly have not been liberated from the role of housewife. Instead, technology in the home has served to reinforce patriarchy by insuring women remain relegated to unpaid domestic labour. Paradoxically, household technology possesses liberating potential, for according to Rothschild, the victims of the feminine mystique—the bored, suburban housewife of the 1960's—sowed the seeds for the contemporary women's movement.

The second section shifts ground, examining the more philosophical basis of the relationships of science and technology to nature. Carolyn Merchant, for example, argues that the technological-scientific revolution of the 16th and 17th centuries supplanted the nurturing imagery of women which prevailed at the time. Replacing this was an imagery of control and domination. The mother-earth image, respectful of nature's animism and its organic links with the individual, was swept aside by a new ethic of exploitation. In the next chapter, Ynes-tra King maps out a strategy for eliminating the male ethos of domination over nature through a feminist ecology. King's premise is that in our culture, domination of women and exploitation of nature are mutually reinforcing. She opens up a theoretical discussion of how feminism can join forces with the ecology movement, forging an 'ecofeminism.' Ecofeminism holds that the starting point for an alternative culture and politics is the woman-nature link. For King, ecofeminism can offer us a way out of the current life-threatening trajectory of technology. Keller's

article on women, science and popular mythology ends this section. The representation of women in U.S. science has actually declined since 1920, Keller documents, largely because of a variety of cultural factors which alienate women from these disciplines. More specifically, science overvalues what culture defines as 'masculine' while devaluing 'feminine' attributes. Keller's case study of biologist Barbara McClintock clearly presents an alternative to the male approach to science. One can see that a more sensitive and nurturant orientation to nature would prevail if science was less gender-bound.

The third section of the book presents feminist views on the development, application and future direction of technology. Corlann Gee Bush argues that public policy has unfortunately emphasized technology as either tool, threat or triumph. We must therefore "unthink the power dynamics of technological decision making." Obviously the social context in which technology is devised and put to use will also have to be transformed before we can use it to solve basic human problems. A prerequisite for this strategy is a better awareness among women of the egalitarian potential of technology. This agenda becomes all the more urgent in light of Gearhart's arguments in the following chapter. She identifies four axioms of science and technology which threaten planetary survival: the bigger the better; if it's possible it must be done; if it benefits 'mankind' it must be done; and scientific knowledge makes right. One area of scientific development of vital concern to women is reproductive technologies. Jalna Hanmer's article on this topic considers the ethical and moral questions techniques such as artificial insemination, cloning and sex determination raise. Even more alarming is the increasing control over women's bodies by the medical profession—a trend which can only be reversed if women demand less alienating uses for reproductive technologies. The final article by Patrocinio Schweickart, takes the reader into the speculative realm. Her review of four recent feminist uto-

pian novels underlines one of the recurring themes in the volume: that the domination of nature and the domination of women are closely intertwined. Feminist utopias thus paint a hopeful vision of the future founded on the liberating values of feminism and a respect for our organic ties with nature.

Machina Ex Dea certainly lives up to its promise to offer an interdisciplinary exploration of the relationship of women to technology. What ultimately emerges is a wholistic, feminist perspective brimming with fresh insights about women as producers, consumers, and victims of technology. Rothschild's conclusion wraps all the essays up into a neat thematic package. While emphasizing that there is no "party line" on either feminism or technology, she also stresses that all contributing authors are united in challenging and changing the male bias in technology studies. Rothschild then maps out future directions for feminist research in this area. Undoubtedly the immediate concerns about the impact of technology on women's work will receive the greatest attention. But Rothschild's call for more research on the subjective side of the problem—how women actually experience and feel about technology in their lives and work—seems especially central to any program of change. By ending with a research agenda Rothschild confirms the scholarly bent of the book, despite earlier remarks about seeking a broad readership. The book is highly appropriate for undergraduate or graduate courses in women's studies, especially women's history. Yet the wealth of information and ideas packed into these pages should be communicated to a wider audience. As Rothschild points out in her introduction, through a better understanding of technology from a feminist perspective, women can begin to control it. *Machina Ex Dea* represents a step in this direction.

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Dual Career Couples. Edited by Fran Pepitone-Rockwell. *Beverly-Hills, California: Sage Publications, 1980. Pp. 294.*

Based on the premise that as more women gain access to higher education they will thereby increase their chances for employment advances, this book views the dual-career couple as a new emerging family form. An increasing number of American wives are opting for committed "careers," as opposed to "jobs" to earn money. The dual-career couple implies equity between husband and wife, which is more in tune with the ideological and economic changes of the 1970's and 1980's than the "two-person career couple," with the wife-homemaker supporting her husband's career.

The book is divided into three major sections, with an introduction and an epilogue written by the editor. The first section deals with a review of earlier studies on dual-career families, social and political factors influencing the increase in two-career families, and socialization factors in the intellectual development of women. While the review of the literature is excruciatingly thorough, dealing with "three generations" of dual-career research, the article connecting the American civil rights movement with the women's movement is too brief and only touches on dual-career couples. The assumption that the civil rights and women's movements have increased women's desire to have careers was underdeveloped on the four short pages devoted to this topic. The chapter on the intellectual development of women should have been better edited to fit in with the theme of the book. As a reprint from another volume, it refers to earlier chapters of that book, which is confusing. There is no reason why it could not have been edited to be more relevant to dual-career couples and to make it sound like it belongs in the Pepitone-Rockwell collection.

In the second section, six articles discuss various aspects of marriage and family issues of