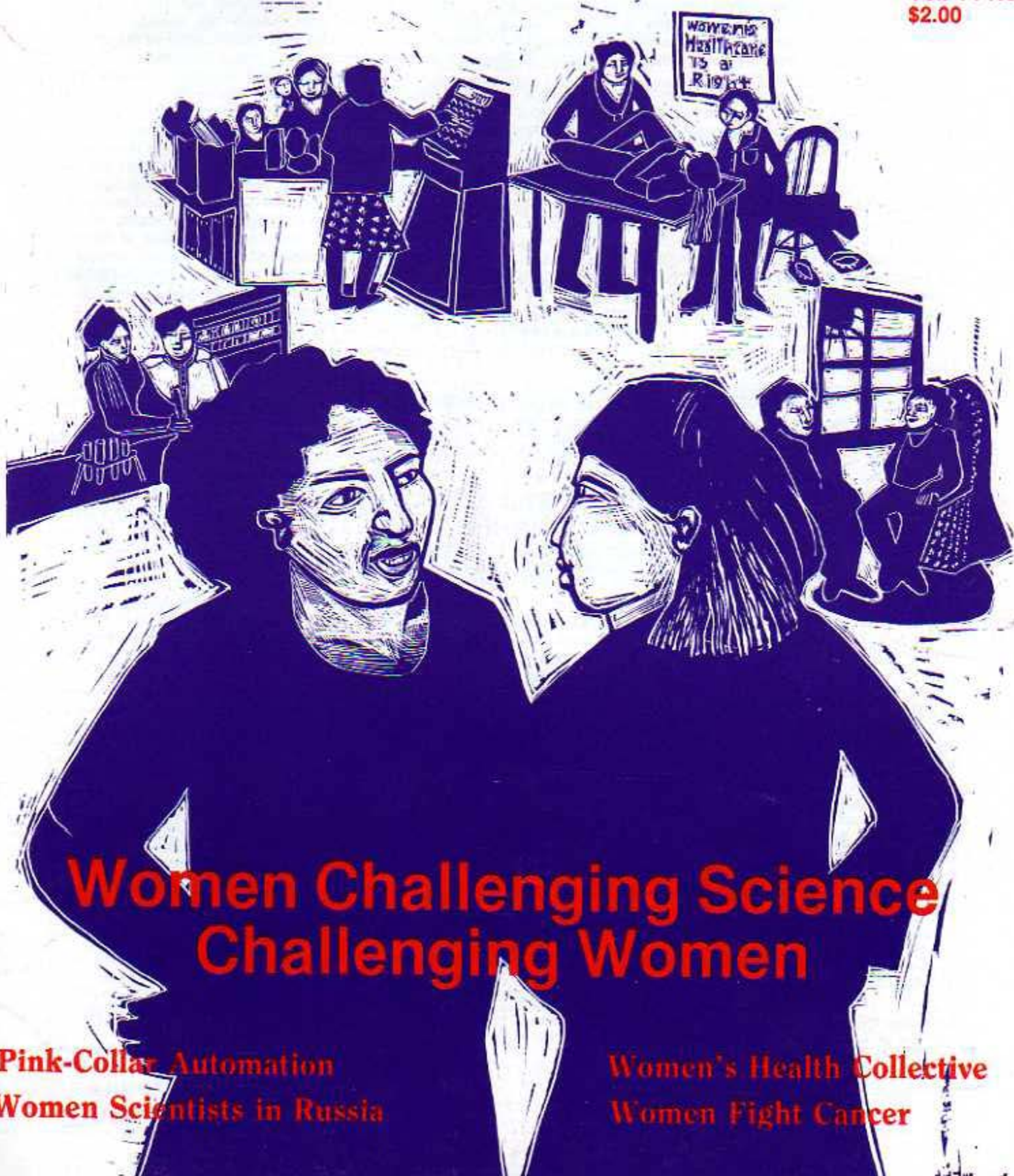


SCIENCE FOR THE PEOPLE

Vol. 14 No. 4
\$2.00



Women Challenging Science Challenging Women

Pink-Collar Automation
Women Scientists in Russia

Women's Health Collective
Women Fight Cancer

about this issue

Questions of gender in the practice and ideology of science have previously been addressed in the pages of *Science for the People*. We will measure the success of our efforts in producing this special issue by the degree to which these debates are enlivened; our aim has been to further and deepen the discussions rather than to provide a definitive analysis of the many aspects of the subject.

This issue was produced by a special editorial collective composed of seven women, all university-affiliated—students, faculty, and workers. Most of us came together in a biweekly Sunday morning discussion group of feminists in science. Within months of the inception of the discussion group, most of the members of the group decided to form this Editorial Collective. Only two of us had previously participated in SftP editorial work; most of us had known each other only for the brief duration of the discussion group.

We maintained the Sunday morning discussions after the formation of the Editorial Collective; this contributed invaluably to the coherence and development of our group. We often chose as subjects for the Sunday morning meetings topics or articles which came up in the Editorial Collective but which we did not have the time to get into in those meetings. That structure helped to overcome the all-too-common tendency of goal-oriented groups to neglect important political and theoretical discussions. While we were perhaps not always "efficient" in completing our work, we adopted a process in which individual skills and understanding were developed.

At many levels, science as it is practiced in our patriarchal, capitalist society reflects the prevailing sexism. We see this clearly in the disproportionately small numbers of women engaged in scientific studies and careers, and in the social relations within laboratories and other sites of scientific production which so deeply affect those women who *are* engaged in the practice of science. Also, science and technology are part of the structure which reproduces the sexism of the society; their use as a means of controlling women as a whole is apparent in many aspects of modern life. Furthermore, since science itself is a historically determined activity, and *not* value-neutral, we must also raise epistemological questions—analyze the effects of patriarchy on the very foundations of science.

The lead article by Elizabeth Fee frames the issue with its consideration of the foundations of science, the challenge posed to science by feminism, and prospects for a feminist science. The implications of the article are broad, and by no means confined to gender-related issues. It warrants the attention of anyone who is concerned with the nature of science.

Ann Hibner Koblitz writes on Russian women scientists in the late 1800s. Because science is determined by the society in which it develops, not only the social environment but also the science in Russia at that time was different from what we know now. Keeping these differences in mind will help us to draw on that history in a way that may provide us with insights into the present without making a simplistic identification of our situation with theirs.

Women's collectives are often proposed as a way of dealing with sexism in science; Parsons' and Hodne's article describes the experiences of a women's health care collective in Iowa, and analyzes the tensions between the goals of providing a service efficiently and promoting a democratic structure.

Women have organized health care collectives to overcome the sense of powerlessness in confronting the power and elitism of the medical establishment. Terri Goldberg interviews two women, Rita Arditti and Pat Brennan, who took control through their battles with cancer and its treatment and emerged with new directions for their lives.

Heidi Gottfried's piece deals with the effects of automation on pink-collar jobs, largely the domain of women workers. It also includes some consideration of the effects of technology on women in their role as consumers.

If we are to fully understand and begin to combat sexism in science, we must analyze the relationships between sexual oppression and other forms of oppression such as class, race, sex, sexual preference and age. These analyses are the subject of much current discussion. Some see one form of oppression as central, with others following from it. Others see these forms of oppression as manifestations of overlapping structures of independent origin (as in capitalism and patriarchy). Still others view these as an integrated social system. Whether implicitly or explicitly, recognized or not, one of the views generally forms the framework for a radical critique of science. Since it is this analysis which determines our strategy, it is important for us to make our underlying assumptions explicit and deepen our analysis.

We believe that there is much important work to be done along these lines. The special oppression of women of color, and the role of science in this oppression, are not addressed here. Anticipating that the articles we would receive would not adequately integrate an analysis of racism, we made efforts to solicit articles relating sexism, racism, and science. We failed. A treatment of sexual preference, particularly lesbianism, in connection with other gender-related issues in science is also missing from these pages. In part, these omissions reflect the fragmented nature of the discussions but, even more disturbing, they reflect passive racism and heterosexism on our part. Confronting our own passive racism and heterosexism in theory and in practice is a necessary part of the political struggle to transform the social relations that produce them.

The persistent appearance of sexism in present-day science certainly cannot be ignored. Some have argued that because of it one cannot in good conscience be a scientist. While we recognize this position as an important component of the debate, we believe that the analysis leading to it fails to take into account the complexity of the issue and the dynamic interaction of science and society. Although a science that truly serves human needs can only flourish in a transformed society, the development of better ways of understanding our world (a better science) will contribute to that transformation. Thus we must redouble our efforts to understand the relations between sex oppression and *all* forms of oppression, both within science and in society as a whole, and struggle for a transformation of science as we struggle for the transformation of society.

UPCOMING ISSUE OF SFTP

The SftP Editorial Committees are now soliciting articles for the Jan/Feb 1983 special issue on "Towards a Science for the People." This thematic issue will celebrate volume 15 of the magazine and will articulate our vision of a people's science.

Please send articles, outlines, graphics, and other materials to: Science for the People, 897 Main St., Cambridge, MA 02139.

A FEMINIST CRITIQUE OF SCIENTIFIC OBJECTIVITY 5
by Elizabeth Fee
A discussion of the prospects for a feminist science.

A COLLECTIVE EXPERIMENT IN WOMEN'S HEALTH 9
by Patricia Parsons and Carol Hodne
A description of the problems and successes of a woman's health collective in Iowa.

FEATURES:

SCIENCE, WOMEN, AND THE REVOLUTION IN RUSSIA 14
by Ann Hibner Koblitz
A historical analysis of Russian women scientists in the late 1800s.

KEEPING THE WORKERS IN LINE 19
by Heidi Gottfried
How automation will affect pink-collar jobs.

Cover: The graphic and design by Bonnie Acker.

FIGHTING CANCER AND THE MEDICAL ESTABLISHMENT 25
Interviewed by Terri Goldberg
Two women's struggle with breast cancer.

DEPARTMENTS:

About This Issue 2 **Resources** 38
News Notes 4

Science for the People is published bimonthly by the Science Resource Center, Inc., a non-profit corporation. The magazine is edited and produced by the national organization Science for the People. Our address is 897 Main St., Cambridge, MA 02139; our phone number is (617) 547-0370. We offer a progressive view of science and technology, covering a broad range of issues. We welcome contributions of all kinds; articles, letters, book reviews, artwork, cartoons, news notes, etc. If possible, please type manuscripts (double spaced) and send three copies. Be sure to keep one copy for yourself. Unless otherwise stated, all material in this magazine is copyright 1982 by Science for the People. Typesetting at the mediaplace, 10 West St., Boston, MA 02111. (617) 542-5351.

Subscription rates (for one year/six issues): \$12 (regular), \$16 (foreign surface mail; for air mail add \$4 to Latin America, \$6.50 to Europe and \$8.50 to Asia and Africa), \$24 (institutional/library), \$25 (member subscription), \$15 (for people with low incomes). Member subscribers receive the magazine, our newsletter and other internal communications. Foreign subscribers must remit in \$U.S. with either an International Money Order or a check drawn on a U.S. bank.

Bookstores may order on consignment directly from Science for the People or through Carrier Pigeon Distributors, P.O. Box 2783, Boston, MA 02208. The magazine is available on microfilm from Xerox Microfilms, 300 North Zeeb Rd., Ann Arbor, MI 48109. *Science for the People* is indexed in *Alternative Press*

Index, P.O. Box 7229, Baltimore, MD 21218. Science for the People's ISSN (International Standard Serial Number) is: 0048-9662.

Editorial Committee: (Mid West Collective) Judith Allen, Kristen Nelson, Lisa Palmer, Margaret Reeves, Patricia Sipe, Katherine Yih, Barbara Zimmermann. *Production Committee:* Joe Alper, Jon Beckwith, Bertram Bruce, John Callahan, Lorrana Castellani, Beverly Chorbajian, Emily Curran, Sandy Farrell, Terri Goldberg, Phil Hamilton, Tony Iarrobino, Bob Lange, Connie Phillips, Sheena Phillips, Charles Puccia, Martha Robb, Virginia Schaefer, Scott Thacher, Ray Valdes. *Distribution Committee:* Alan Epstein, Jim Flowers, Chris Hydeman, Robert Rotstein, Virginia Schaefer, Ray Valdes, Glenn Wargo. *Staff:* Faye Brown, Terri Goldberg.

news notes

MIT MACHINIST REFUSES EXPOSURE TO RADIATION

The *Boston Sunday Globe* of June 6 reported the story behind the firing of a machinist in the Laboratory for Nuclear Science at M.I.T. in March 1981. Vincent Raulinaitis, 58, had asked for the radioactivity of some pieces of metal to be measured one day before he started work on shaping them. Two people independently found the activity of the pieces to be between 4 and 5 millirems per hour—twice the federal and state limit of 2 millirems per hour for people not covered by a recognized radiation protection program. Employees in the lab are neither hired nor trained to work with such radioactive materials, and the lab is considered exempt from M.I.T.'s protection program. On these grounds, Raulinaitis refused to start wearing a film badge that would monitor his subsequent exposure to radioactivity. For this he was fired, and his request to be transferred to work in a non-radiation area was refused.

Shop employees had been told on the day of the incident that the pieces of metal came from the Bates particle accelerator and might be mildly radioactive but safe to machine. However, the piece with the activity of 4-5 millirems had not come at the same time as the rest of the batch. Raulinaitis had in fact already worked on it for 112 hours as early as 1979. Radioactivity dies down with time, so the piece would have been even "hotter" then. Based on the records of its composition, another employee estimated that Raulinaitis had probably received over 1600 millirems from it—over three times the federally allowed annual limit.

Since the metal came from a particle accelerator, and not from a nuclear reactor, the M.I.T. shop was exempt from scrutiny by the Nuclear Regulatory Commission (NRC). The Occupational Safety and Health Administration (OSHA) is no use to Raulinaitis

either: OSHA is drafting, but has not yet set, rules about how much information employers must give employees about the possible risks of their jobs. Raulinaitis filed complaints with the NRC and the state Department of Labor and Industries, and his union is appealing his dismissal. However, the 4 millirem piece of metal has mysteriously disappeared, which makes an independent assessment of its 1979 activity impossible. For the moment, Raulinaitis is out of a job, and the head of the M.I.T. radiation protection program is left smiling out of the *Boston Sunday Globe*.

KEEPING NESTLE IN HOT WATER

The Nestle boycott is not over! Recently the Nestle Corporation issued a public statement which implies bold marketing changes and compliance with the World Health Organization (WHO) and UNICEF ad codes. However, like a giant corporate chameleon, these changes are only skin deep. They are designed to protect Nestle's corporate interests.

A careful reading of the Nestle document reveals a distorted and inaccurate interpretation of the WHO/UNICEF international standard. A recent statement by the Infant Formula Action Coalition (INFACT) documents the problem:

- The Nestle document states that its instructions apply only in those na-

tions which have taken no measures to enact the WHO code. This would mean that the instructions apply only in as few as four countries. None of these are major Nestle formula markets.

- The WHO code and the Nestle boycott demand an end to routine free formula distribution, mothercraft nurses, promotion to the public and pressure on health professionals. The Nestle interpretation legitimizes all of these practices.

- The "marketing ethics audit committee" Nestle has proposed could not function as an independent judge, since Nestle plans to control funding, composition, and the role of the committee.

- Nestle claims to cooperate with national governments in their efforts to implement the WHO code. The reality is quite different. Nestle has systematically and aggressively pressured governments and health associations to adopt weak marketing legislation, often based on industry drafted codes.

It is critical for the boycott to continue and expand. In West Germany, Sweden, the U.S., England, Canada, Australia and New Zealand the boycott is expanding. A month long training session was held in June to train 20 organizers for targeted cities throughout the country. Citizens groups in Southeast Asia and Latin America are considering launching Nestle boycotts in their regions.

For more information please contact, INFACT, 1701 University Ave, SE, Minneapolis, MN 55414. (612) 331-2333 or 331-3437.

IT'S SUMMERTIME AND THE LIVING AIN'T EASY

From June to August, times get tough for SftP financially. This year, we're being hit doubly hard by Reaganomics and inflation. We need to raise \$5,500 to make it through the summer! That may sound like a lot of money, but if each of you either got two other people to subscribe or sent us only \$25 we could pay ALL OF OUR BILLS!

Help us beat these summer cash-flow blues. Please give generously. Remember, all donations are tax-deductable.

A FEMINIST CRITIQUE OF SCIENTIFIC OBJECTIVITY

by Elizabeth Fee

Is there a conflict of interest between women's values and the values of science? If so, how will it be affected by the entrance of increasing numbers of women into the professions? If we are to accept the dominant liberal ideology of science, this question makes little sense. Science, we are told, is characterized by its objectivity, by its very lack of values.

Women, as a group, have been unable to set priorities for research. This is not simply because scientists are male, but because women have little economic or political power. We argue here that some of the notions of "scientific objectivity" are effectively used to mask those relationships of power. We must reexamine the notion of scientific objectivity and the role it plays in our society.

We begin by considering the dominant liberal ideology of science (including the ideology of gender) and the specific challenge posed by feminist critiques. To carefully consider these challenges, we first study the distinction between subjectivity and objectivity which is built into science at many levels. We see how these distinctions reinforce the structure of social and economic power in our society. Finally, we consider the possibilities for a feminist science, and look at two examples to suggest ways in which an attack on the subject/object distinction could lead to a radically transformed science in the future.

The Liberal Ideology of Science

The liberal ideology of science posits man as a rational individual. "Man" is capable of creating a rational knowledge of the world through a process of testing and discarding hypotheses. The techniques of a scientific discipline, such as controlled experimentation, the use of specific quantitative and statistical techniques, the replication of findings, and the submission of results to the collective criticism of the scientific community, are specifically intended to root out any individual eccentricities, biases, or other sources of error. Subjectivity is regarded with suspicion, as possible contaminant of the process of knowledge production, and one which must be subjected to stringent controls.

In this view, it should not matter in the least whether scientists are male or female; any potential sources of error which might arise from the sexual identity and experience of the scientists would be eliminated in the rigorous procedures of scientific testing and confirmation of results. If we see scientific procedures as objective, then we cannot argue that women would bring anything new to the production of science.

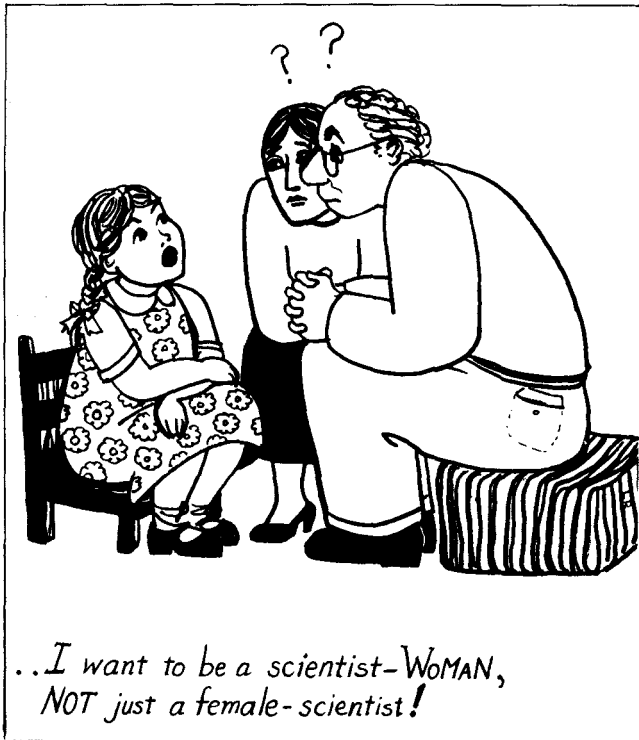
This view appears admirably reasonable and non-controversial. There are, however, certain rather insistent and recurring problems. In the first place, there is the ambiguity about the identity of "man" within the liberal traditions of politics as well as science. According to liberal political theory, all men are in some way equivalent social atoms, and all men are variants of the abstraction "man." The liberal ideology of rational man depends on an unstated assumption: the characteristics of "man" are actually the characteristics of males, and rational man is counterposed to his less visible partner, emotional woman. Our political philosophies and views of human nature depend on the sexual dichotomies involved in the construction of gender differences. We thus construct rationality in opposition to emotionality, objectivity in opposition to subjectivity, culture in opposition to nature, and the public realm in opposition to the private realm. Man is seen as the maker of history but woman provides his connection with nature. Whether we read Kant, Rousseau, Hegel, or Darwin, we find that male and female are contrasted in terms of opposing characters: men love truth, women, beauty; men are

Elizabeth Fee is an Assistant Professor in the School of Hygiene and Public Health in the Johns Hopkins University. She has published a number of articles on Women and Science and is the editor of a forthcoming book, Women and Health: The Politics of Sex in Medicine. (Baywood, 1982) She is currently working on the history of public health and is particularly interested in the ethical and political conflicts in public health research and practice.

An earlier version of this paper was presented at the AAAS in Toronto, January 1981. Other versions have appeared in the International Journal of Women's Studies, Science and Nature, and the Journal of College Science Teaching.

active, women, passive; men are selfish, women, selfless—and so on, and on, through the history of western philosophy.¹

These ideas had long been an integral part of western philosophy, but they were rarely formulated as an explicit part of scientific theory until the mid-nineteenth century, when the first wave of the feminist movement challenged traditionally accepted ideas of male and female differences. The old philosophical constructions of gender provided the program for a variety of special scientific subdisciplines which attempted to reconstruct



Lynn Roberson

these sex differences in terms of natural law. The distinctions between male and female were weighed and measured, explained and interpreted; scientists took over from philosophers the task of assigning to women their proper place in the social order.²

The uneasy relationship between liberal political theory and the establishment of gender as a fundamental division between humans was then reproduced within the sciences. For example, Darwin's *Origin of Species* was modelled on classical political economy and thus treated all animal species as made up of equivalent individuals struggling with each other for survival.³ Sex played no role in the theory of natural selection. Darwin, however, later developed a special theory of sexual selection in order to explain sex and race differences in his *Descent of Man*.⁴ Although the theory of sexual selection was never well integrated with natural selection, and although the genetic theory on which it was

based was quickly discarded, it did provide a model for those who wanted to argue that sexual differences were fundamental to the process of human evolution. Sexual selection became the forerunner of more recent varieties of sociobiology which have sought to root the social inequality of the sexes in genetic structure. Many other scientific subdisciplines, such as physical anthropology, metabolic theory, neurology, psychological testing, genetics, social anthropology, psychoanalysis, endocrinology, ethology, and sociobiology, have offered different ways of structuring sexual dichotomies into nature, and thus different programs for interpretation of human relationships through natural law.⁵

Thus, within the tradition of liberal philosophy there are created two distinct and opposing categories of experience—male and female. Science itself is perceived as masculine, not simply because the majority of scientists have historically been men, but also because the characteristics of science are perceived as sex-linked. The objectivity said to be characteristic of the production of scientific knowledge is specifically identified as a male way of relating to the world. Even the hierarchy of the sciences is a hierarchy of masculinity; as the language suggests, the “hard” sciences at the top of the hierarchy are seen as more male than the “soft” sciences at the bottom.

Because science as a whole is perceived as male, women in science are perceived as unfeminine. J.H. Mozans, who celebrated the achievements of hundreds of scientific women in his historical survey of *Women in Science*, found it necessary to defend the womanhood of this heroines, repeatedly assuring us that these scientific women could be graceful and feminine, good housekeepers and mothers.⁶ Laura Bassi was a good example; while Professor of Physics at the University of Bologna, she managed to raise twelve children.

Responses to the Ideology of Gender in Science

There are several possible responses to the long tradition which states that the characteristics of the sexes constitute a natural polarity, that male and female are fundamentally different, and that science is essentially masculine. One is to claim, like Mozans, that women can be both male and female, physicists and mothers. A second response (that of liberal feminism) is to assert that women must be included *within* the definition of “man” and thus that males and females must be accorded the same individual rights and freedoms. This view denies that there are any significant sexual differences and discounts any apparent differences as a result of either discrimination or socialization. A third possibility is to accept the existing dichotomy between male and female, to promote female values as an essential aspect of human experience, and therefore to seek a new

vision of science that would incorporate these values.

Some recent critiques of science accept and build on the sexual dichotomies reproduced within western philosophy. In different ways, the radical feminists Susan Griffin (*Women and Nature*⁷) and Carolyn Merchant (*The Death of Nature*⁸) play with the identification of scientific and masculine ways of thinking; both are seen as analytic, mechanistic, controlling, exploitive, and ultimately destructive. In a similar view, Russell Means, a major figure in the American Indian Movement, has denounced all forms of "European" thought as devoid of spiritual appreciation of the natural world, and as therefore leading merely to different forms of exploitation of the earth and natural resources.⁹

According to Jean Baker Miller and other feminists psychologists, the male psyche, as it has been socially created in the western capitalist world, is peculiarly unable to integrate self-creative activity with a primary concern for others, having assigned to women the primary responsibility for affiliative ties and emotional expression.¹⁰ This contributes to men's inability to organize technology for human ends. Miller argues that a scientific culture which is responsive to human needs depends on the recovery of that part of human experience which has been relegated to the female.

The radical feminist critique of science and technology locates the problems not in women, but in the particular character of our production of scientific knowledge. The problem is not one of making women more scientific, but of making science less masculine. When masculinity is seen as an incomplete and thus distorted form of humanity, the issue of making science and technology less masculine is also the issue of making it more completely human.

Challenges to Existing Conceptions of Science

These critiques confront us with specific challenges to the prevailing notions of scientific *authority* and of scientific *objectivity*. The radical feminist view of science is one of the forms in which growing popular distrust of scientific institutions and authority is expressed. Others include the anti-nuclear and environmental movements, the radical science movements, the alternative technology groups on the one hand, and fundamentalist religious and creationist organizations on the other.¹¹ Whether identified with left or right political groupings, they perceive scientific authority more as a form of power than a source of truth.

While there is a great deal of substance in these challenges to scientific authority, there is also a danger. Because science has been presented as an objective force above and beyond society, it may appear that the claim

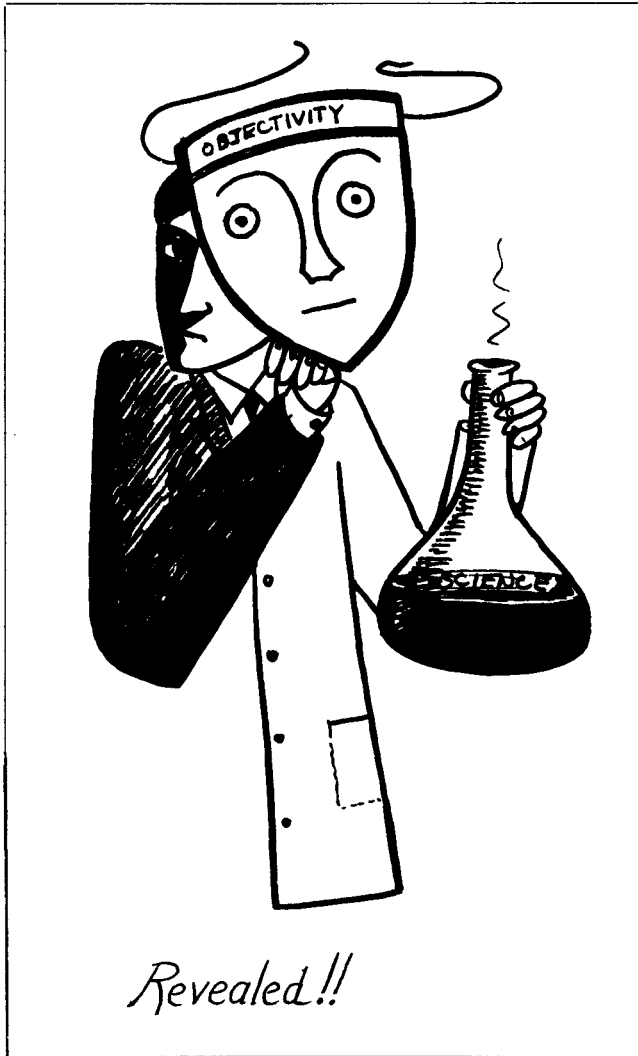
of science to be the arbitrator of truth must be accepted or rejected wholesale. If rejected, we seem to be left without mutually agreed criteria of validity. Decisions between different theories (for example, evolution vs. creationism, or feminist vs. sexist interpretations of social arrangements) would be quite simply a matter of political power.¹²

We need not, however, go so far as to reject the whole human effort to comprehend the world in rational terms, nor the idea that forms of knowledge can be subjected to critical evaluation and empirical testing. The concept of creating knowledge through a constant process of practical interactions with nature, the willingness to consider all assumptions and methods as open to question, the expectation that ideas will be tested and refined in practice, and that results and conclusions of research will be subjected to the most unfettered critical evaluation—all these are aspects of scientific objectivity which should be preserved and defended. The hope of learning more about the world and ourselves by such collective process is not one to be abandoned. The ideal of individual creativity subjected to the constraints of community validation through a set of recognized procedures preserves the promise of progress.

The Concept of Objectivity

There are, however, many forms of the idea of objectivity which do deserve to be questioned. The concept of scientific objectivity carries with it a multitude of meanings; some of these are more closely tied to the ideology of science, and serve mainly to mystify scientific reality, while others are more closely tied to the actual practices of scientific work. The distinction between objectivity and subjectivity is built into science at many levels. We will briefly examine how it is reproduced in the following dichotomies: knowledge/social uses, thinking/feeling, expert/nonexpert, and subject/object.

Production of knowledge/social uses. The idea of objectivity can be used to create a distance between the production of pure science, as seen as the pursuit of knowledge for its own sake, an abstract and value-free ideal, involving purely intellectual and technical decisions—and the uses of sciences, seen as involving purely political and economic considerations. If the production of knowledge is isolated from the uses to which that knowledge is put, then the scientist is freed from any social or moral responsibility. Even the scientist who accepts funding from military sources is therefore free to insist that the use of "his" research is outside of "his" control, and not part of "his" responsibility; the researcher in a corporate laboratory is free to consider "his" work as purely objective and unfettered by any economic considerations.



Lynn Roberson

Thinking/feeling. The claim of “objectivity” may be taken as requiring a divorce between scientific rationality and any emotional or social commitment. Thinking is supposedly divorced from feeling, and feeling is said to be outside the realm of objectivity. Indeed, the concept of scientific objectivity may be used to devalue any positions expressed with emotional intensity or conviction; feeling becomes inherently suspicious, the mark of an inferior form of consciousness. Once this hierarchy between thinking and feeling has become internalized, it is axiomatic that those who identify with “thought” can justify their dominance over those identified with “feeling.” Women are very used to the separation between thought and feeling and the ways in which it can be used to reproduce relations of dominance and subordination between the sexes; it is a familiar aspect of intimate relationships. If a man can present his position in an argument as the point of view of rationality and define the woman’s position as an emotional one, then we know that she has already lost the struggle to be heard; he has already won.

Expert/nonexpert. This dichotomy reproduces a similar power relationship on a social scale. Everyone lacking scientific credentials can be made to feel uninformed, unintelligent, and lacking in the skills required for successful debate over matters of public policy. Those with sufficient wealth can afford to hire the scientific expertise needed to give their positions public validation; those without wealth are made to feel that they must bow to the superior knowledge of the experts. Knowledge can, in this system, flow in only one direction, from expert to nonexpert. There is no dialogue; the voice of the scientific authority is like the male voiceover in commercials, a disembodied knowledge which cannot be questioned, whose author is inaccessible.

Subject/object. This relationship is again one of domination; the knowing mind is active, the object of knowledge passive. This attitude toward nature has been immensely productive in allowing the manipulation and transformation of natural processes to serve human ends. Women, who have already been defined as natural objects in relation to man, and who have traditionally been viewed as passive, have special reason to question the political power relation expressed in this epistemological distancing. The subject/object split legitimizes the logic of domination of nature; it can also legitimize the logic of domination of man by man, and woman by man. Just as the ecological crisis requires that we see “man” as part of nature and not as a superior being above and beyond natural processes, so too the task of human liberation requires us to see science as a part of human society, determined by particular aims and values, and not as the depersonalized voice of abstract authority. Rejecting the efforts made (in the name of scientific objectivity) to deny the social content of scientific knowledge will enable us to concretely debate the values and intentions of scientific practice.

Social Position of Scientists

This raises another set of problems with the theme of scientific objectivity, the question of the social position of scientists. Those scientists who choose to become actively involved in questioning the social uses of science or the power relations which determine its direction, risk being seen as no longer “objective.” Here, the notion of “objectivity” merely a code word for the political passivity of those scientists who have tacitly agreed to accept a privileged social position and freedom of inquiry within the laboratory in return for their political silence.

(Continued on page 30)

A COLLECTIVE EXPERIMENT IN WOMEN'S HEALTH

by Patricia Parsons and Carol Hodne

The awakening political consciousness of women as health consumers in the last 15 years has given rise to the development of women-controlled health projects, centers, and clinics throughout the world. These efforts have generally employed one of two strategies: 1) directly challenging the institutionalized health care system using legal or political means; and 2) providing alternative services to those offered by the established health care system. A commitment to democratic process and collective decision-making characterizes many of these efforts.

We were fortunate enough to be involved in a collective effort to provide alternative women's health services in an Iowa university community in the mid-seventies. Although we were eventually forced to close for financial reasons, our experiences together were rich and rewarding, if sometimes painful or frustrating. We built some solid friendships and shattered others. We gained new social and technical skills. We developed a tremendous respect for the women who began the self help movement and who continue to struggle to reclaim control over our own bodies. We learned lasting lessons about politics, business, and collective decision-making. It is the purpose of this article to share some of those lessons and experiences in the hope that others might also gain from them and to convey our overall sense of empowerment. For many of us, what began as a personal issue became a vehicle for political education and awareness. We were naive, but we were also quite brave. Perhaps if we had been less of either, we would never have tried anything.

Our efforts to establish alternative health services for women in Ames, Iowa, covered a period of several years and three phases of development with varying degrees of commitment to the collective decision-making

Patricia Parsons, a doctoral student in Health Services Organization and Policy at the University of Michigan School of Public Health, was involved in all phases of the health collective's development.

Carol Hodne, currently the Coordinator on Aging for a rural county in northern Minnesota, was a Women's Community Health Center staff member.

process. These phases included an organizational phase, a second phase as the Ames Feminist Women's Health Center (FWHC), and a final phase as the Women's Community Health Center (WCHC).

The Organizational Phase

Following the historic Supreme Court decision of 1972 which affirmed women's right to abortion, a diverse group of women and a few men met to discuss the availability of abortion services to women in our mid-sized community and the surrounding rural area. The major provider of women's health services in the area was a large, multi-specialty clinic. The only other local sources of primary care were a small, but well-established family practice clinic and the Iowa State University (ISU) student health service. Neither individual providers nor the community hospital provided outpatient abortion services at that time. Concluding that abortion services were not sufficiently available and that other women's health services were not acceptably provided, the initial group formed a task force to investigate the possibilities for action.

Our first real organizing effort was planning for the First National Women's Health Conference, held in Ames in 1973. The conference provided our group and many other groups of women from across the country with an opportunity to share skills, experiences, information, and solidarity with other women. The conference was a turning point for our local group since it was our first broad exposure to women who were actually doing what we had only dreamed about doing. Until this time, we had not defined our goals for action nor had we established a formal decision-making structure, although we were committed to a democratic group process. Immediately following the conference, a member of our group was invited to train at one of the Feminist Women's Health Centers in California. Excited by the opportunity, she chose to go to California for five weeks without consulting the group as a whole. We did not provide her with guidance for choosing training priorities because we were unsure of our own immediate objectives. Her independent pursuit of this experience foreshadowed dramatic changes in group dynamics

upon her return. She attained a dominant position in the collective as a result of her enthusiastic commitment to her own agenda for action and of her recently acquired monopoly on information and skills.

Operating out of an apartment near the University, we began to move in the direction of establishing a clinic in Ames. Though our services were limited to education, referrals, and pregnancy screening, our clientele of mostly ISU student grew and we gained acceptance in the community as representatives of the women's health movement. We were anxious to provide clinical services, but never developed a long-range plan for achievement of our broad goals within the context of our resource limitations and the local political situation.

By this time, three of us were able to work full-time for the group. Not surprisingly, the three who could commit the most time wielded the greatest influence in the group. Like many early women's groups, we had suffered from the "tyranny of structurelessness"; as a result, an informal power structure emerged to fill the vacuum. Though we strove for equality within the group, we never adequately addressed power differentials which resulted from member's varying time and energy commitments. When the Boston National Women's Health Conference was held in 1974, the three full-time workers chose to attend the conference independently of any group consensus. Unfortunately, many group members associated such abuse of power with the leadership's desire to adopt the structure of and become affiliated with the Feminist Women's Health Centers. Although a rift was deepening between the three leaders and the rest of the group, the leaders were able to persist in directing the course of action.

The Ames Feminist Women's Health Center

Efforts to open a clinic intensified after the Boston conference. We raised money for a down payment on a house, which was more pleasant than a traditional clinical facility, but located in a questionable zone for business or medical services. Accepting assurances from a local feminist lawyer that zoning would not be a problem, we purchased the house and proceeded with less deliberation than speed. The swiftness of our actions and greater demands for time commitments led several group members to drop out, some with hard feelings, some politically frustrated. We recruited new members to staff the emerging clinic and found a woman physician to perform the abortions. Training of the fledgling staff was largely the responsibility of the woman who trained in California. Since the benefits of her training had not been adequately shared early on, delegation of responsibility was necessarily limited and power was concentrated in her hands. Though the staff was disuni-

fied and poorly trained, the Ames Feminist Women's Health Center opened. That we opened at all is a testimony to our dedication to the cause of women's health rights and to the potential power which collective effort can generate.

Shortly after opening, antiabortion forces used the zoning ambiguities to challenge our right to operate in that location. Although we managed to gather a fair amount of community support, we lost the battle before the zoning commission. Our ability to wage a campaign was significantly weakened by our internal conflicts. Decisions were frequently dictatorial in nature. The concentration of power in the three leaders prevented other group members from feeling a sense of ownership of the project. We lacked a formal mechanism for giving and receiving constructive criticism. Disgruntled



workers quit. The zoning dispute proved to be too much strain for the group under these circumstances. A split among the three leaders surfaced explosively. Arbitration efforts were unsuccessful and two of the leaders wearily quit, leaving the third with a shell of a clinic.

The Women's Community Health Center

There was, however, enough support from the women's community to start another group. Since the capital investment had already been made, it seemed natural to relocate the clinic and reopen. A systematic examination of other alternatives was not undertaken. In late 1975, the group renamed itself the Women's Community Health Center, found a new clinic site, and restructured the decision-making process to reflect more strongly held collective values.

In its new form, the WCHC expanded its services to include a biweekly abortion clinic, well-woman gynecology and pregnancy screening clinics, childbirth classes and prenatal care, and a variety of educational services. A new physician, who also worked at the Emma Goldman Clinic for Women in Iowa City, commuted to perform the abortions. On-site and back-up physicians for the other clinical services worked on a volunteer basis. Members of the collective staff served as lay health workers and provided most of the educational services. Additional support came from a volunteer Consumer Board composed of 15 community members who advised the staff and performed fundraising, public relations, and outreach functions. Other volunteers helped with clerical duties and assisted with educational services.³

The WCHC collective staff numbered ten women, on the average. Most of us began as volunteers, though we eventually received token wages. A tendency to socialize to the detriment of productivity was made more excusable by such meager wages. Although no one had it easy, resentments resulted from the unequal distribution of financial hardships.

All of us were committed to feminist health care, the WCHC, and to making our decisions collectively, on the basis of consensus. We did not, however, share a broader political perspective. Our various philosophies ranged from spiritualism to socialism. This diversity sometimes made it difficult, even impossible, to resolve disagreements about clinic policies and strategies. Though we attempted to include political study in our work schedule, we spent more time wrestling with the decision about what to study than we did studying. The lack of a common political orientation made internal structural decisions bow to individual preferences, prevailing women's movement mythology, or the dominant personalities in the group.

We resisted specialization and division of labor because we were committed to the idea that no one should be indispensable and that we each should be able to perform all the various clinical, clerical, educational, and managerial tasks. We were all trained as lay health workers and educators. The more complex clinical tasks, which were perceived as more desirable, were rotated among a few workers. Eventually, we planned to train everyone for these jobs. Our lack of experience in business management and our general distaste for capitalist practices made it difficult to delegate administrative tasks. Practical considerations finally forced us to move in the direction of greater specialization. On the whole, our fear of inequality produced greater inequities and was wasteful of scarce resources. We did not

take full advantage of the talents available to us nor did we recognize the price of spreading ourselves too thin.

Our commitment to quality health care combined with our lack of business expertise and the political climate eventually led to our financial collapse. Our concern for patient education required extra personnel time, and therefore, higher costs. Our decision to avoid specialization was costly in terms of efficiency. We spent too much time processing decisions in meetings and not enough time producing. We developed a large and underpaid staff and were unwilling to risk friendships by laying people off. Our volunteer program was too little, too late. Our services were too costly to provide and our commitment to low fees prevented us from recovering our costs. The last straw was the loss of our abortion clinic doctor, which eliminated the primary source of income for the clinic. Since there had never been much support from the area medical community, we launched an extended nationwide effort to replace our physician, but to no avail. The Women's Community Health Center declared bankruptcy in May of 1977.

Lessons for Collective Action

The major lessons for collective action which we have distilled from our experiences center around two important issues: the definition of group structure and process, on the one hand, and the definition of collective goals, on the other. An explicitly defined group structure and predetermined procedures for decision-making and conflict resolution can set the stage for successful performance of group functions. A clear, shared set of collective goals is a necessary condition for meaningful choice among available strategies for achieving group objectives. Though conceptually distinct, these tasks must be undertaken simultaneously rather than sequentially. Careful attention to both issues is critical to successful group development. In our opinion, inconsistent and irregular concern with these issues contributed to our clinic's demise.

From our perspective, the two primary structural tasks are 1) the definition of work roles, and 2) the definition of the decision-making process. The delegation of responsibility, specialization, and rotation of work assignments fall into the first category. Our failure to delegate responsibility and share ownership of the project with all the workers contributed to the disintegration of the FWHC group. The WCHC, on the other hand, fearing the concentration of power which can accompany entrenched specialization, erred by rotating jobs too quickly. This practice prevented us from fully developing our skills and did not allow us to take full advantage of the special talents of individual collective members. In between these extremes lies a balanced ap-



Lynn Roberson

proach which recognizes the necessity of delegating responsibility for specialized tasks without sacrificing the benefits of exchanging skills and information through job rotation. Our performance of tasks in the second category—the definition of the decision-making process—was also inadequate. Not enough attention was paid to the effort to reach consensus in the FWHC, and perhaps too much in the WCHC. In the latter case, we often spent so much time processing group decisions that it inhibited our ability to carry out tasks essential to clinic operation. To ensure maximum organizational flexibility, the group's decision-making model should include provisions for orderly and timely modification.

At the same time that groups must determine their structure and decision-making processes, they must also define their collective goals, striving for consistency between the two. Collective action must be guided by clear and shared definitions of the group's goals. Since social goals tend to be grandiose, more immediate and achievable goals must be defined. After the group has reached a consensus about its goals for social change, a strategy appropriate for attainment of a subset of objectives must be selected. In women's health care, the choice is between the provision of alternative services and the direct challenge to some aspect of the health care system. We chose to provide alternative services. Our choice of specific services to offer should have been dependent on how we answered the following kinds of questions: 1) Who does the group want to reach? 2) What resources are available? 3) Is the strategy politically feasible? If we had more carefully addressed these questions at critical moments, we might have avoided some situations which taxed our energies without furthering our immediate or long-term objectives. An obvious example was the decision to purchase a house for the FWHC facility in a questionable business zone. Had we fully explored the zoning issue at the outset, we could have avoided the most costly of all our battles. In fact, had we examined each of the issues raised in the following paragraphs, we

might not have chosen to open a full-service clinic at all. It might have been more productive in the long run to provide educational services and limited well-woman gynecological services.

Collective action is directed toward a subset of the population. The group which is to be challenged or served must be identified clearly by the collective. We wanted to serve women, but we did not really ask ourselves which women could or were likely to serve. Most of our clients were university students, though we did reach some older women, very young women, and rural women. Our energies would have been more focused had we made definite decisions about the population we wished to reach. We diminished the effectiveness of our outreach to any one group of women by trying to reach all women. Ideally, the service goals of the collective will match the needs of the population. Once the target population is chosen and service needs have been assessed, the collective can make sensible choices about what services to provide.

A match between the resource requirements of the services selected by the collective and the resources which the collective can gather must be made. The following kinds of questions need to be asked: What kind of facility is needed? What kind of equipment is required? How much money is needed up front? What are the possible sources of financing? How many people are needed to provide the service? Is the appropriate technical expertise available? Can volunteers be used in any capacities? How much should the collective charge for its services? Is it best to start small and plan to grow? Can the service support itself? These questions need to be reexamined periodically.

Failure to ask these kinds of questions contributed to our downfall. We could have saved money, energy, and also broadened our community support by using volunteers to full advantage. The clinic's financial survival depended on the availability of physicians. In the planning stages, we did not give enough attention to the

difficulties we would face in replacing physicians. Serious consideration of this problem alone might have led us to choose a smaller scale of services. We would also have benefitted from business and financial counselling. Like many collective groups, we had an aversion to "business."

Running a clinic *is* running a business. Had we sought advice earlier, we might have been able to make hard business decisions in time to save the clinic.

The final decision about group strategy must depend on the political feasibility of the action-alternatives outlined by the collective. What is the general political climate? What is peculiar to the local situation? Certainly what was appropriate to the mid-seventies might not be today. In women's health care, the areas of concern are the same, but the political situation is very different. For example, the role of lay health workers is considered quite important in most women-controlled clinics, but recent successful efforts to close clinics employing lay health workers raises a serious issue: Do we stand and fight over the issue of lay health workers or do we fall back and protect ourselves by hiring mid-level practitioners in order to survive the currently inhospitable political environment? Answering this kind of question involves assessing the level of support that can be generated from the women's community and the public as compared to the level of opposition that can be expected from the medical community and other organized opponents. The final decision for group action must be based on a critical analysis of the feasibility of a project within the context of the political climate of the times.

In conclusion, we offer the following general guidelines for groups planning to work collectively to provide services to their communities:

- Define, define, define. Define collective goals, define processes for decision-making and conflict resolution, define work roles, and define expectations for group members;

- Use the experiences and tools available to your group. There is a rich and expanding literature about social change which should be used. Since many of our experiential conclusions echo those of scholarly investigations, we should take advantage of the work of those who study social change.² There is also a growing body of invaluable information about constructive criticism and cooperation.^{4,5} It is not enough to want more democratic forms of organization, we must learn how to behave democratically ourselves;
- Always plan for periodic reevaluation of group goals, strategies for action, and internal structure and process;
- Record what you learn from your experiences so that we may all share the lessons of your mistakes and the rewards of your successes; and
- Do take action. If we want to successfully challenge the dominance of hierarchical forms of organization, we must meet *our* challenge: to develop democratic forms of organization that are capable of quick, concerted action as well as of careful deliberation of the issues and thoughtful selection of strategies appropriate to immediate opportunities and long range goals. □

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SCIENCE, WOMEN, AND THE REVOLUTION IN RUSSIA

by Ann Hibner Koblitz

“Fictitious Marriage”—A Passport to Higher Education

One day in the winter of 1867-1868, a servant ushered three young women into the study of a young professor at St. Petersburg University. They sat down solemnly, facing their host. He was nonplussed at this feminine invasion, since he knew them only slightly, but nevertheless he waited politely for them to state their business. After a moment's awkwardness, the eldest asked if he would be willing to “liberate” them all by marrying one of them, accompanying them to a German or Swiss university, and then leaving them there. It did not matter which one of them he chose, she explained, because the other two would be able to go abroad to study under the chaperonage of the “married” one. She made her request seriously and calmly, with no trace of embarrassment. The professor refused, equally composedly, and the four young people shook hands before parting.

Later, one of the three women did conclude a so-called “fictitious marriage” with a young paleontologist, and went on to become the first woman mathematician ever to attain international eminence. Another became one of the first women to receive a law degree. The third woman became a writer, and took active part in the Paris Commune of 1871.

On the other hand, women in Russia of the 1860s had certain rights which most of their European sisters had not yet attained. They controlled their own property, female property owners could vote (through a male proxy) in the municipal and regional elections, and wife-beating had been outlawed in the first half of the nineteenth century. However, there was one respect in which they were entirely dependent on their fathers and husbands. Women were listed on their father's or husband's internal passport, and therefore could not work, study, or even live apart from them without express permission, which traditionally was not forthcoming.

When, in the early 1860s, young women began to beg their parents to allow them to study away from home, it goes without saying that they did not meet with uniform approval from their elders. There were inevit-

able conflicts, recriminations, blanket refusals on the part of the parents. In the struggle for sexual emancipation, access to education, and political and social reform, the aspiring women and reform-minded men came to consider the use of any means justified. Young women ran away from their homes to be sheltered in communes in the large cities, and the expedient of the fictitious marriage became a last resort to circumvent parental authority. Hence the scene described at the beginning of this section.

A young woman desirous of leaving home to study would come to an agreement with a man of progressive convictions who would go through the marriage ceremony with her and get her transferred to his own passport. He would sign his permission for her to live apart from him and then, theoretically at least, would leave the woman to pursue her own life. Her father had no further authority over her, and her “husband” was honor-bound to keep their relationship strictly platonic. Of course, things did not always go according to plan, and not all young radicals of the sixties approved of the device of fictitious marriages. But the alternatives are few.

The “Nihilist” Movement

In the 1860s and 1870s, Russia was stirring after centuries of stagnation as a traditional autocratic, patriarchal, serf-owning society; and was beginning to surprise its European neighbors with the inventiveness, enthusiasm and ardor of its avant-garde. After the Crimean War, there was increasing talk of the emancipation of the serfs and the need for wide-ranging political and social reforms. There sprung up a generation of progressive thinkers and publicists who strove to reform and enlighten Russia. These people came to call themselves “nihilists.”

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The term "nihilist" (not to be confused with the more extreme twentieth century usage of the word) was popularized in Turgenev's famous novel *Fathers and Sons*. Turgenev used it to describe the younger generation who, it was said, denied everything and respected nothing; or more precisely, respected nothing except for the natural sciences. "He doesn't believe in principles, but he believes in [the dissection of] frogs," an older character remarks bitterly of the young hero of *Fathers and Sons*.

Young people of the sixties, far from being insulted by the word "nihilist," adopted it for their own, and used it interchangeably with "realist," "new man," "new woman," "man/woman/son/daughter of the sixties." The definition was vague—akin to the modern American term "generation of the [nineteen] sixties"—but the word usually denoted a person who questioned just about everything in traditional tsarist Russia, had great faith in the natural sciences and the power of education, strongly believed in the equality of women, and passionately desired to be of use in some capacity to the masses of ordinary people in Russia.

The Natural Sciences and the Political Movement

The nihilists confidently looked forward to the social revolution they considered inevitable, and felt that the best way to help it along was through intensive study of the natural sciences. As the radical publicist Pisarev put it: "Strictly speaking, only the mathematical and natural sciences have the right to be called sciences. Only in them hypotheses do not remain hypotheses; they alone show us the truth."²²

Virtually all of the revolutionary democrats of that period agreed. The writings of the German physiologist/materialists—Buechner, Moleschott, and others—were passed from hand to hand as if they were revolutionary texts. Western scientific and pseudo-scientific writers—Darwin, Buckle, Spencer, Comte—were embraced for the materialism and faith in progress of their worldviews, which seemed to promise an end to the tyranny of religion and autocracy. There was a general conviction that the spread of knowledge, especially scientific knowledge, would hasten along the day of revolution. To the nihilists it seemed obvious that the study of the natural sciences and a revolutionary worldview went hand in hand. Science pushed back the barriers of religion and superstition, "proved" through the theory of evolution that progress was inevitable, and improved people's lives through its discoveries. Consequently, the pursuit of a scientific career was viewed in no way as a hindrance to social activism; in fact, it was seen as a positive boost to progressive forces, an active blow against backwardness. It the words of the famous Russian biologist/

nihilist of the time I. I. Mechnikov, natural science is the only knowledge "capable of leading to true progress."²³

This attitude needs such emphasis because of the sharp contrast with the feeling in many political activist and feminist circles today that it is somehow more natural for progressives and radicals to choose the humanities or social studies.

As a result of their perception of the social role of the sciences, the nihilists were found overwhelmingly in the areas of mathematics, physics, chemistry, biology, geology, medicine, etc. At the same time, because they believed that women were the equals of men, and had a right and even a duty to educate themselves and help society, the nihilists were eager to aid their sisters to break free of traditional restrictions and assume an equal place in the society to come.

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Women's Higher Education in St. Petersburg

Once women had managed to leave their homes in the stifling provinces, they made their way to St. Petersburg, Moscow and other large cities, where many of them joined cooperative living arrangements, settled down to the study of the natural sciences, and discussed ways of furthering the inevitable social revolution. Concurrently, they entered the struggle for officially recognized women's higher education, which was part of the general progressive-egalitarian-democratic movement that arose after the end of the Crimean War. Belief in the power of education, in everyone's—including women's—right to education, combined with a desire eventually to use one's education to help the Russian masses, were essential tenets of the early radicals' creed.

In the early 1860s, women formed a large part of an amorphous group of unofficial auditors who wandered in and out of the lecture halls in St. Petersburg's institutions of higher learning. According to the essayist L. F. Pantelev, who in his student days was exiled to Siberia for his part in the student uprisings of 1863, the older

professors were not particularly sympathetic to the women, but they weren't noticeably hostile, either. "They had no suspicion that this was the beginning of a very serious movement, but rather saw the striving [of the women] as simply a new fashion."⁴

During this time, the Medical-Surgical Academy started admitting women as medical students on a more or less official basis. Among the eager enrollees were Nadezhda Suslova, Maria Bokova-Sechenova, and Natalia Korsini, who, as members of the first Land and Freedom organization, were in intimate contact with all aspects of the progressive-revolutionary movement of their day. Suslova and Bokova-Sechenova became the heroines of their generation. Young girls whispered about Suslova in their institutes, and resolved that they would emulate her.⁵ Bokova-Sechenova was immortalized in Chernyshevsky's *What Is To Be Done? Stories of New People* (1862), which has been called "the women's liberation novel of all times."⁶

The two women's seriousness and devotion to the "new ideas" impressed and attracted others, so that the years 1860 and 1861 saw a steady growth in the number of women attending lectures unofficially or enrolled semi-officially as auditors. Hopes were high that the universities of St. Petersburg, Kiev and Kharkov would soon fully open their doors to women, a development which would have made Russia the first country in all of Europe to have enrolled women students. Although the faculties of Moscow and Dorpat universities had voted against the idea of admitting females, the three universities in St. Petersburg, Kiev and Kharkov were already admitting women on a semi-official basis; so the women's hopes were not entirely unjustified.⁷

The atmosphere in St. Petersburg institutions of higher education in those years was lively and exciting, especially in the natural sciences lectures. As was mentioned above, there were many nihilists among the young professors and their students, and they considered anatomy, zoology, chemistry lectures the perfect place to expound their materialist, antireligious, egalitarian point of view. Around this time the physiologist/nihilist I. M. Sechenov published his work on reflexes and the brain, which was embraced by all, including the author himself, as a work of politically radical as well as scientific importance.⁸ Sechenov's lectures were delivered to standing room only crowds, and he always managed to integrate materialism and egalitarianism into his comments on frogs.

Anatomy professor P. F. Lesgaft did the same. He welcomed women to his classes, would speak of the unity of process in the human and animal worlds (meaning that evolution would lead mankind to equality, progress and an inevitable social revolution), and took great

pains to scoff at the European physical anthropologists who claimed to prove the inferiority of women with their "research" on skull and brain weight.⁹ It is interesting to note that the right-wing pseudosciences of the time, such as these theories of skull measurements, did not make headway among the Russian intellectuals as they did in Western Europe and America.¹⁰

Repression

The nihilists were optimistic about the immediate future, and felt that among the reforms soon to be initiated would be the official admission of women to higher educational institutions. These hopes were soon dashed. Student uprisings started in March 1861 and continued in waves throughout the year. The students demonstrated in support of Polish students who had

Two basic tenets of the young radical movement of the 1860s were a belief in the power of education to cure many social ills, and a belief that women are equal to men and therefore deserve all the same rights. The "new men" were ready to help the "new women."

rioted against Russian imperial domination; protested against the inadequacies and injustices in the proclamation which was supposed to liberate the serfs; and, in the area of university life, made demands to fire incompetent or unfair professors, to allow student meetings, which had been forbidden, and to permit students to band together in eating, reading and lodging cooperatives. The uprisings were put down with force, many students were expelled, arrested and/or exiled to Siberia, and an era of reaction against the "new ideas" set in.

For women, the most unfortunate result of this reaction was that the universities and other institutions of higher learning closed their doors to all but officially enrolled students. This had the effect of excluding all women, with only one exception,¹¹ from such institutions. To be sure, in 1863 a series of women's pedagogical courses were started by the science professors E. K. Brandt (Medical-Surgical Academy), F. F. Petrushevsky (Artillery Academy), and N. N. Tyrtov (Naval Academy). But these courses raised a furor because of rumors that "immoral" and "materialist" propaganda was being given to the students under the guise of anatomy and physiology lectures. In 1865, fearing a government shut-down of the entire program, the



Sonya Corvin-Krukovsky
Kovalevsky
1850-1891

founders canceled most of their scientific lectures, thus leaving Russian women with little possibility of educating themselves except for private tutoring and study abroad.

As was mentioned earlier, two basic tenets of the young radical movement of the 1860s were a belief in the power of education to cure many social ills, and a belief that women are equal to men and therefore deserve all the same rights. The “new men” were ready and eager to help the “new women” continue their studies informally. Sechenov, for example, wrote: “How could I not help such deserving laborers?”, and at one point even threatened to resign his position if the university refused to admit the future mathematician Sofia Kovalevskaya to his physiology lectures as an auditor.¹² The anarchist/naturalist Peter Kropotkin mentions that it was common to meet young men who on principle would not rise when a “lady” entered the room, yet would walk clear across the city, cold and tired, to give free lessons to any young woman who sincerely wanted to study.¹³

For many women, the rigorous but informal tutoring provided by the men satisfied their need for education. They wanted a firm grounding in the natural sciences and mathematics, but did not necessarily intend to pursue careers in that area. In any case, whatever

desire they might have had to pursue such a career was not strong enough to overcome the obstacles placed in their way by the government.

The Zurich Colony

For a number of women, however, this unofficial tutoring was not enough. They wanted to prove their abilities to more than just their tutors and a circle of supportive friends. They wanted to matriculate officially, obtain legitimate degrees, and begin to help the Russian masses in an active capacity. Increasingly, they began to look into the possibility of study abroad.

Rumor had it that the Swiss universities would admit foreign women without entrance examinations or diplomas (an important point, since most Russian women had had no formal schooling). So, starting in 1864, they began to consider Zurich as a possible place of study. First came a few of those students who had started their education before the Russian universities were closed to women in 1862-1863. Among them was Nadezhda Suslova, who enrolled in Zurich as an auditor in 1865. In 1867 she became the first official female student, passed her exams in August of that year, and on December 14, 1867 became the first woman to receive a medical degree from a European university. (The

Englishwoman Elizabeth Blackwell had received her diploma from a Rome, New York medical school in 1865.)

Suslova returned to St. Petersburg in triumph with her new degree in hand. She was greeted enthusiastically by the nihilists, women and men alike, and was deluged by requests for advice and aid. Suslova reported that Zurich would accept women, was indeed the only European university as yet to do so, and she recommended study there for those women who were serious about continuing their education.

That same winter the women made an attempt to get the government to permit the opening of higher courses for them. They submitted a petition to that effect through the first Congress of Natural Science Experimenters being held in St. Petersburg. The scientists, needless to say, were on the whole favorably disposed, but the government refused the request out of hand. The women then had little choice but to continue their studies abroad.

For the most part, Russian women went to Zurich, because there they could be assured of the right to matriculate. Many of them, full of idealism about the West and the level of democracy and equality they assumed Western Europe to have achieved, expected to be joining the ranks of numerous European women already engaged in serious study. To their astonishment, they discovered that their ideas and attitudes, their eagerness for education, put them in the forefront of the European women's movement. Especially in the early years of the Zurich Russian student colony, they encountered few women of other nations. Even the Swiss did not evince great eagerness to take advantage of the privilege which had been granted them.

The cumulative statistics for Zurich University show that a total of 203 women were enrolled as auditors or students between winter 1864-1865 and summer 1872. Of those, there were 148 Russians, 23 Englishwomen, 10 Swiss, 10 Germans, 6 Austrians, 6 American.¹⁴ Later, when women were admitted to other universities in Switzerland, notably Geneva and Bern, the percentages would be much the same. Russians formed a sizable majority of the women who were taking advantage of the availability of university education; and because there were so many of them, and so few of other nationalities, they quite naturally banded together, pooling their often meager resources for common lodging, food, and textbooks.

Almost all of the Russians already had some political commitment. As the radical feminist P. N. Arian pointed out, "One had to have immense energy and bravery to go against society, family and friends and set out alone for far-off places in search of science."¹⁵ At

the very least, the women came to Zurich determined to prove that their sex was capable of sustained intellectual effort and success in such "male professions" as medicine, mathematics, and the sciences. For most of the Russian women, however, political convictions went far deeper than that. They intended to educate themselves so that they could return to Russia and be useful to the masses—the recently freed serfs who had never seen a doctor, knew nothing of modern soil research and cross-breeding experiments, had not the slightest idea of proper nutrition or sanitation. And, along with the concrete use that their professional skills would bring, they intended to take revolutionary propaganda to the peasantry as well.

The Russian colony in Zurich, which included men as well as women students, discussed the coming revolutionary developments as much as they discussed their anatomy, zoology, and physiology lectures.¹⁶ They would come home, completely exhausted from six hours of lectures and four to six hours of laboratories, and re-

Most of the Russian women intended to educate themselves so that they could return to Russia and be useful to the masses. And along with the concrete use that their professional skills would bring, they intended to take revolutionary propaganda to the peasantry as well.

fresh themselves by arguing the form of the societal changes to come. Their communal lending library contained works by Marx and by such Russian political emigres as Lavrov, and these were fully as well read as the required scientific texts.

The Zurich colony was not only a source of women doctors, agronomists, chemists, and biologists, but was at the same time a training ground for active, committed, educated women revolutionaries. Out of the Zurich community came such radical leaders as Vera Figner, Sofia Perovskaya, Olga Liubatovich and the Subbotina sisters (all medical students), Sofia Bardina (agronomy), and a host of others. Out of Heidelberg, Germany (where the university took women students as auditors on a case by case basis) came the revolutionary Natalia Armfeldt (mathematics). All of these women became more committed to revolutionary activity as

(Continued on page 34)

Pink Collar Automation

KEEPING THE WORKERS IN LINE

by Heidi Gottfried

They sit two-by-two, plugged into consoles, lined in a straight procession extending the length and width of the room. A cacophony of voices carries on one-sided conversations. Green and red lights flash on and off, indicating the number of calls, 125 calls per hour, 1000 calls per shift on the average. This setting is not some imagined workplace of the future. It is an accurate description of a traffic office in the telephone company.

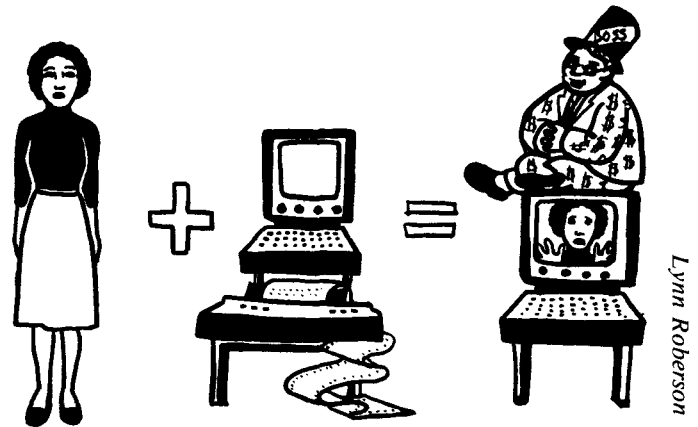
Many pink-collar jobs once sheltered from automation have become the new sites of technological change. Until recently, service-sector industries have been characterized by a high concentration of low-wage labor—the use of labor instead of capital was cheaper. But labor cannot be employed unproblematically. The threat of unionization in the service sector undercuts the firm's potential to realize more profits. Labor constitutes the major portion of production costs, thus the necessity to control wages. It is under these conditions that new technology has spread to service industries.

Technological innovation is only one means by which capitalists seek to achieve their goals. Capitalism requires that the workplace be structured to maximize profits. To do so, productivity must increase either by increasing the work handled by each employee or by introducing "labor-saving" devices.

In the pink-collar industries automation brings about changes that extend beyond the workplace. It pervades all aspects of our lives both as workers and con-

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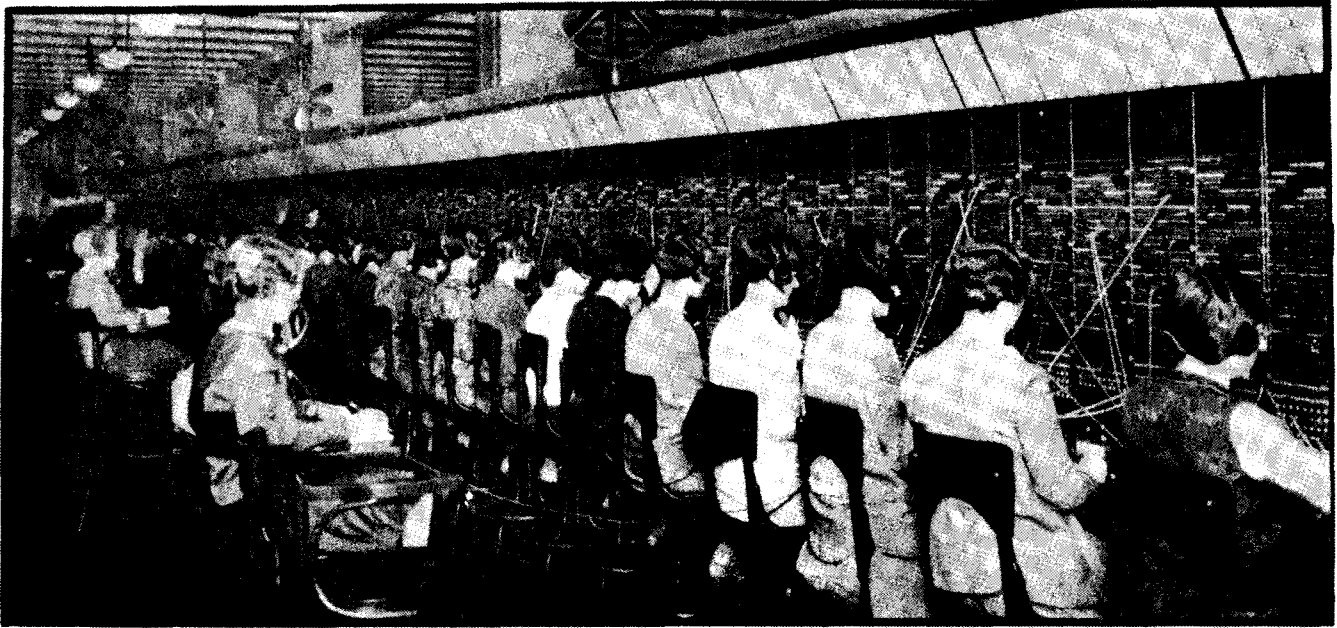
Acknowledgements: This article could not have been completed without the patience and assistance of David Fasenfest. In addition, I would like to thank Judy Gregory of Working Women, the staff of ILIR-University of Michigan, and the Science for the People collective-Ann Arbor, for their helpful comments and support.



sumers. We encounter this new technology at the check-out counter in grocery stores, where cashiers quickly pass items over a scanning device; at offices, where video-display-terminal (VDT) operators key-in alien codes to process information; at the bank, where an automatic teller machine accepts transactions at any time of the day. Women will be disproportionately affected by this new wave of automation, since women predominantly make up the pink-collar workforce and serve as the prime consumer of these services for the family. Our work in the home and in the labor market is being transformed.

The Nature of Technology

An aura surrounds technology—a deity worshipped but little understood. Cloaked in this mysticism, technology becomes an object dependent on experts (scientists) to interpret its meaning. The layperson is left in the dark without knowledge of the nuts and bolts of technology. Workplace technologies have been introduced with much fanfare about the great benefits to workers and consumers. For companies trying to per-



suade their employees and the public, computers and the electronics revolution have become the new gospel. In the name of efficiency, computerized technologies have invaded the workplace.

However, the new technologies are not necessarily the most efficient possible. The criterion of efficiency (the maximum increase in net profits per unit cost of investment), obscures the dual function of technology in capitalism. Technology is more than a tool, it has a social function as well. The assembly line, for example, may not be the most efficient process for the mass production of cars.¹ Its real function may be the subdivision of labor into minute tasks built into the technology, which facilitates the control over workers. Capitalists may trade off some short-term profitability in return for this control.²

The decision to utilize certain technologies rests with management. The National Labor Relations Act of 1935 guarantees management the exclusive right to decisions on these matters. Even workers covered by collective bargaining agreements must fight to have issues of technology discussed at the bargaining table. Although some unions have negotiated clauses in their contracts, few of these agreements really provide for workers' participation in decision-making about the use of technology.

Management often chooses not to deploy technologically feasible innovations which might be attractive to workers. Bell Laboratories, for example, developed a magnetic writing pad that operators could have used to record information pertaining to incoming calls. These devices were tested on the shop floor for only a short time before being replaced by the automatic

computerized systems currently in operation, in spite of operator preference for the writing pad.³ In view of the comparable performance and the insufficient time allowed to test cost-efficiency of the pads, it seems clear that the computer was adopted for its ability to monitor and control the workday of the operator.

Further, there are countless technologies possible given our scientific knowledge which are not even developed, since the development of science itself is a value-laden process. An efficient system which integrates mental and manual labor may be feasible but not exist as an option because scientific inquiry is mediated by class relations and, consequently, does not pursue such options. The research and development of technologies reflect the priorities of business. First, much of the funding for research comes from business either directly or indirectly (for example as government grants to scientists). Secondly, management has been granted the prerogative to decide both what is produced and how it is produced.

Once implemented, technology does not determine the social relations or the scale of production, despite its influence. The advent of computer operations, for example, has made both decentralized and highly centralized production processes possible. That the tendency has been toward the latter is not a consequence of technological constraints.

Restructuring of Work

Automation facilitates the overnight transformation of the workplace. Although several arrangements would be possible given the same technology, after automation the workplace often resembles a factory

characterized by fragmentation of the labor process. This fragmentation of work takes two forms: 1) each worker completes only a small part of the full operation, each small input contributing to the final output, which enlarges the rupture between mental and manual functions, and 2) in the work process each operation is unconnected mechanically to the others. The "office of the future" will even spatially divide workers from one another.

The restructuring of the work process can be illustrated by the pre- and post-computerization stages in telephone operating. Telephone operating previously entailed a cord board operated by six to nine operators. They would select the incoming call by placing the cord into a lit-up slot. Now separated by large spaces, they sit in pairs at dual consoles. Rows of these consoles fill the room. The actions of one operator do not affect the work of another. Work stoppages initiated by a single worker would not interrupt the flow of work. In order for an operator to halt incoming calls, that person must unplug his or her headset, which electronically alerts a supervisor. As a result of such monitoring, management can intervene rapidly, making such action rare. Finally,

breaks and lunch scheduling are randomly assigned by computer programs so no one knows their exact schedule until the beginning of the work day. This makes advance organizing difficult and further reinforces the unconnectedness of the work process.

Employment and the Degradation of Work

While it is hard to determine the exact number of people displaced as a result of the application of new technology, one thing is certain, the job categories after automation reflect a qualitative shift from skilled and semi-skilled work to unskilled labor. Degradation and feminization of work often occur as simultaneous processes resulting from the introduction of new technologies. When the typewriter became a common feature of office work in the late nineteenth century, it provided the companies with the opportunity to transform clerical work from a formerly male bastion with high status to a female ghetto.⁴ Women could be paid lower wages, and because it was a new job the strategy met with relatively little resistance from the displaced male workers.⁵ The typewriter came into the office at the same time the large corporations arose. Skyscrapers punctuated the



Earl Dotter/American Labor

new urban landscape of the 1920's. A clerical army occupied these new offices, supporting the activities of the emergent monopolistic firms.

The telephone company offers a more contemporary version of the same process. Before the development of the self-converted modular phone jack, phone installation was done by skilled tradespeople (usually male). Modular converters are now dispensed by lower-paid saleswomen whose job is to hawk the latest fashion in phone-lines displayed in the new phone boutiques. In a Warren, Michigan office in 1981, only four installers remained out of the original 26.⁶

Computer programming has suffered the same fate as other jobs altered by computerization. Though some computer programmers retain their high-status jobs, confirmed by high income and some autonomy in the production process, much of computer work has been simplified. Consequently, skilled computer analysts design programs, monopolizing this specialized knowledge, while keypunchers, predominantly female, repeat the same set of codes for eight hours a day.⁷

Degradation of work can be seen in retail sales as well. Fewer workers are needed, as a result of the installation of scanning devices, which are in operation in more than 2,200 retail food stores, or about 7% of the nation's 33,000 supermarkets.⁸ Stock persons have become almost obsolete because the scanner automatically prices the good, records the sale, and notes the change in inventory from the pre-coded bars called the Universal Production Code. But the new technology eliminates jobs and degrades work not only by performing the functions of skilled workers but by making it easier for managers to institute speed-up on the job. Cashiers now can and also *must* complete their jobs at a faster rate, due to the technologically increased potential for supervision.

Supervision

Automation has extended the capacity of management to monitor worker productivity. Supervisory ranks have continued to swell while workers are laid off in large numbers. Since the monopolization of the Bell System in the early 1900's, a growing army of managers has kept its troops in line. The manager-worker ratio has increased dramatically over the years. Today there is one supervisor for every three workers.⁹ Since 1970, 600 more managers have been gainfully employed by the U.S. Postal Service while 42,644 fewer clerks pick up paychecks.¹⁰

At first glance, the promotion of workers to management appears irrational according to the logic of capitalism. But with a closer look, the management

explosion serves to discipline workers on two levels: 1) It creates the illusion of upward mobility, which reinforces the ideology of meritocracy. (In reality, service jobs offer limited possibilities for advancement to workers without college degrees.) 2) It weakens workers' organizational capacities. When a strike occurs, managers assume the empty jobs and keep the system operating. In the telephone company, supervisors and other low- and mid-level managers have kept services fairly undisturbed during strikes. Recently in British Columbia, telephone operators outsmarted their "supervisors." Instead of a walkout, they staged a sit-in preventing management from scabbing.¹¹ More often, management utilizes new technologies to deter workers' ability to organize.

The new alliance between management and technology has increased the capacity of supervisors to monitor employee performance. A telephone operator, Penny Stroud, explains how computerization has changed supervision:

The "stat pack" provides computerized measurement of how much time you're spending on calls, how many calls you're taking, and what your average is compared to the rest of the girls . . . The stat pack adds up the number of calls handled for each operator, then it compares how well you did against the average. All the data is kept every day. Then every month you'll get an average of what you do. It's all computerized.¹²

What Penny neglects to add is that failure to meet the office average is possible grounds for dismissal, or at least for "coaching" by supervisors.¹³

The scanning devices in grocery retail follow the same principle. The number of items passed over the scanner and the time to complete the task is stored. One cashier commented that the supervisor expects an average time per customer. He would complain if this average was not met, even if it was a slow day. How could the standard be met when there were not always customers to be served?

Clericals who work on visual display terminals encounter similar problems and lack of understanding from their bosses. Their performance must meet an office average. One person who works in a clerical factory processing dental claims remarked on the arbitrariness of the compliance demanded by management. She said that they did not consider the individual's variable abilities nor the difference in difficulty of each stack of claims. In one stack there might be no problem so a worker could easily meet the standard, whereas workers who did encounter problems would run over the allotted time—they would rush to meet the average though the time given would never be sufficient.¹⁴



Management's heavy hand is veiled by the relations embedded in the development and implementation of technological change. Electronic monitoring makes it technically possible to disguise the control function of workplace technology. Technology appears as a neutral instrument propelled by its own agency, as the underlying antagonistic relations between workers and owners are obscured. Speed-up, then, seems inherent in the technology, rather than the result of restructuring the labor process for profitability. For example, with computerization, operators answer approximately a call every 30 seconds, whereas with the old system operators could linger up to two minutes per call. The speed-up seems to be a consequence of the technology when in fact computerization adds only a slight advantage in speed. The office average itself seems to flow naturally from the machines rather than the comprise part of the political practices devised by management.

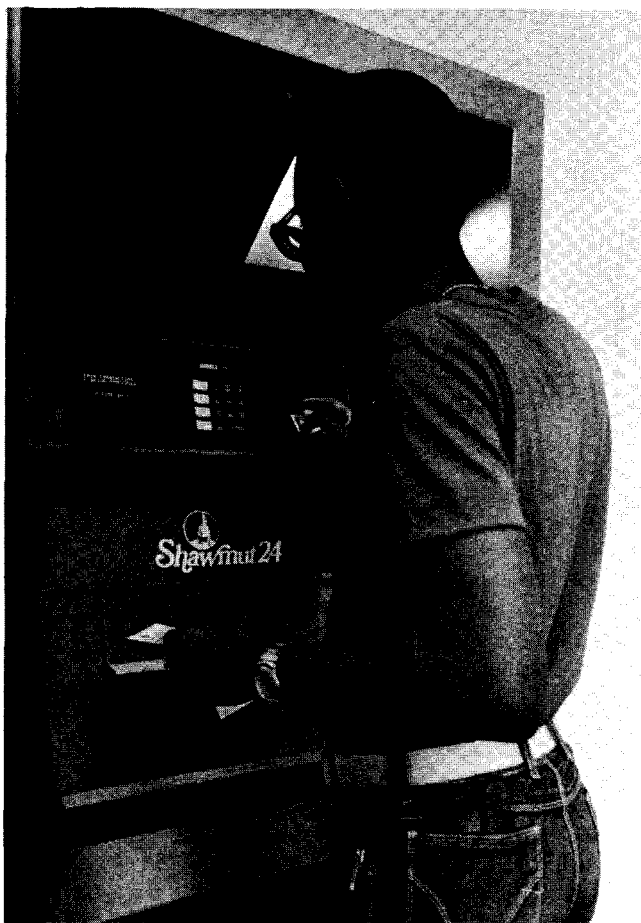
The Consumer

Most discussions about technology avoid mention of the effect of automation on the consumer. Are new technologies for the improvement of services and the convenience of consumers, as firms would like us to think? Do we really get a cost reduction, or are we paying indirectly for what we seem to get from service automation?

Self-converted modular phone jacks do decrease the apparent cost of phone installation, and automatic tellers speed the processing of simple bank transactions. However, rather than improving services, many of these technological changes actually curtail service. Now when we need a new phone, for example, we pick up the modular unit from the phone store, bring it home, and convert the old jack, thus completing the installation. In banking, similarly, we key-in the appropriate information, make our deposit or collect our withdrawal. Now we consumers participate in the provision of services which companies previously provided (for example, gas, phone, fast food, banking, "do-it-yourself" home improvements).

The consumer must engage herself in the labor process, thereby becoming a consumer-laborer, in order to get the service. For this work, consumers, primarily women, do not receive a wage nor always a price reduction equal to the value of the labor. This transformation results in the deskilling of work and loss of some jobs for formerly skilled workers. For the company, utilization of consumer-laborers means a reduction in the wage bill and in the capacity of employees to organize.

Labor struggles in the future will need to involve consumers. Consumers must be made aware of their impact on the condition of workers. First, as technology is implemented for its capacity to control the labor pro-



cess, it incorporates the consumer into production, linking the fates of consumers and workers (including the unemployed). In addition, consumers must be informed of the ways in which technology structures work so they do not blame workers for system malfunctions. Often a central computer goes down and manual operations or some less sophisticated process must take up the slack. Contingent systems cannot be operated with the same speed, and service slows down. Consumers come to expect a certain speed and do not distinguish the machine from the machine operator. Both are fused in our minds as we impatiently tap our foot or harass workers for not performing up to par. This contributes to managers' ability to pressure workers to speed up the work process.

Contradictions in Technological Change

Technology contains both constraints and possibilities for labor and capital. The introduction of technology creates conditions for possible collective actions on the part of workers.¹⁵ The first factory production was introduced to bring workers under one roof, insuring productivity—work done in the home could not be supervised. Working together in the factory revealed to

workers their common exploitation and led to collective actions by workers. Clerical factories offer the same potential for collective struggles.

Centralization of the work process through computerization means fewer people are needed to disrupt production. For example, by "accidentally" pushing the wrong set of keys clericals could alter data in storage necessary for company business. Another new possibility has been referred to as the "computer strike." In the British civil service, fewer than 5000 computer operators out of 530,000 civil servants paralyzed all financial transactions of the country.¹⁶ Even Maggie Thatcher was forced to settle the dispute or otherwise face further damage in her already crisis-ridden government. The threat of the computer strike has led managers to re-evaluate the use of computerization to solve their labor problems. Although the computer strike has not yet penetrated the U.S. borders, there is no reason it could not become a tool here. □

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Two Women's Experiences

FIGHTING CANCER AND THE MEDICAL ESTABLISHMENT

Interviewed by Terri Goldberg

Terri: What is your professional and personal background? What is your background in science?

Rita: I came to the states in 1965 after studying genetics and molecular biology in Italy. I worked first at Brandeis and then at Harvard Medical School doing research. After that I became more interested in social aspects of science. I now work for an alternative education program, Union Graduate School. There I'm mostly involved in projects around women's studies and health—holistic health.

Pat: I was premed as an undergraduate and did a masters in biology working on viruses and bacteria. I left school for financial reasons and taught at the University of Massachusetts at Boston for five years. Then I did doctoral work in science education—everything but my thesis. My interests turned from research to presenting science (making it understandable to everyday people) by demystifying it. However, I left that after my cancer three years ago. Now I use my science background in a less stressful occupation—medical textbook indexer. I work at home and am gloriously happy.

Terri: Can you talk about your experience with cancer? What kind of cancer did you have, what were your

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Rita Arditti and Pat Brennan have been long-term members of Science for the People. They coedited Science and Liberation.

medical treatments and your reactions to the disease and the medical establishment?

Rita: First, I found a lump in my breast in 1974. I wasn't sure for awhile what to do. After a few months I went to see my gynecologist. That was really my first experience in raising my consciousness because he couldn't feel it. I wondered, "Am I crazy? Is it in my imagination?" For a moment I felt like

wanted to run away, and wasn't going to have treatment because I didn't want to do what he wanted me to. When I said I wanted time, *then* it turned out that an alternative was possible. I could have a needle biopsy to find out if it was malignant and then talk about a mastectomy. I had the needle biopsy and the result was cancer. I still remember that he told me over the phone that it was cancer. It

They wanted me to have a mastectomy right away. The worst thing was the thought of going under anesthesia and not knowing when I woke up whether or not I'd have a breast.

standing up, walking out, and saying "OK, if he doesn't feel it, fine." But instead I took his hand and put it exactly where I felt the lump. After awhile he said, "Oh, yes, now I feel it."

They wanted me to have a mastectomy right away (maybe four days), and sign the papers, at the time of the preceding mammography, for the mastectomy—just in case the lump was malignant. The worst thing was the thought of going under anesthesia and not knowing when I woke up whether or not I'd have a breast.

Pat: They tried to get me to have a mastectomy very fast, almost right away. They really put the pressure on.

Rita: I don't know how I had the courage to say that I wouldn't do that because they weren't offering any alternatives. I argued with my doctor because he thought I was hysterical,

was like he couldn't tell me face-to-face.

After that I started exploring what I could do. I had the Harvard Community Health Plan and they wanted me to have a modified radical mastectomy, an operation in which they remove the breast and lymph nodes but not the muscles (which are removed in a radical mastectomy). I consulted a couple doctors at Massachusetts General Hospital (I now realize they were ahead of their time) and they recommended a lumpectomy to be followed by a mastectomy only if necessary, depending on the type of cancer. I felt a lot of pressure to have the modified radical mastectomy which I did in June 1974. They found 6 of the 18 lymph nodes were malignant. That was not a good prognosis so I underwent radiation therapy. In those days there was no chemotherapy (it began in 1975).

I was well for about four years until in 1977-78 I developed a cough that wouldn't go away. I had x-rays and the whole work-up; nothing showed up. After a year and a half of this worsening persistent cough, x-rays showed fluid in my pleura (the lining around the lungs). When they removed the fluid they found tumor cells in it. Then more consultation at the Sydney Farber Cancer Institute, and on and on, here and there. The suggested treatment was to remove my ovaries. The idea was that breast cancer in premenopausal women (I was 44 then and still menstruating), can be sensitive to estrogen. The cancer feeds on estrogen. By removing the source of estrogen from the body, the cancer could be shut down. The fact that the cancer remained dormant for so long raised the suspicion that it might be estrogen-dependent. So, I had my ovaries removed in March 1979.

By the time I was recovering in the hospital I had totally lost confidence in the medical establishment because I had a recurrence. And when I had the recurrence they couldn't diagnose it for one and a half years. Four months before that diagnosis, x-rays had shown something "funny," a retake was negative, so my doctor was never informed. I realized that I was on my own.

I started reading about nutrition, physical exercise, and the Simonton approach to cancer. This method uses visualization, relaxation, exercise, and imagery as an introduction to emotional work to increase the resistance in the immune system. I accepted the idea that getting cancer reflected some weakness in my immune system, and maybe I could strengthen my immune system by proper nutrition, exercise, and by learning ways to deal with stress. I started Simonton training by going to workshops, and I started trying to apply the ideas to my own case. I learned of many ideas about the importance of the mind, the emotions, and always remembered that I am the one who knows best what is going on with my body. I use myself as the main observer, and have tried to learn as much as I can about how to strengthen myself.



Pat: Three years ago, when I was 37, I learned that I had breast cancer. I saw a woman resident doctor at Beth Israel Hospital (teaching hospital for Harvard University). She followed me for about a month to see if there were any changes, or whether it was a cyst. A month later she thought it had gotten slightly larger, and suggested I go to the breast clinic. There I was examined by three or four doctors. They didn't think it was serious. There was a 98% chance it was benign. I was told it should come out the next day.

They asked if I would like to participate in a study dealing with the relaxation response, and attitude and healing in breast cancer. If I would, they would teach me how to relax. I was excited about the word relax, so I said yes. I was to have a lumpectomy without anesthesia, it would take only ten minutes. It took 30 minutes, and I

was awake. They inject Novocaine into your breast, then cut, then inject more Novocaine. I knew by the look in the doctor's eyes that it was cancer. I was asked to come back in two days to see the doctor at which time I was told it was malignant. It was very small though, stage one breast cancer. The tumor had been less than 0.5 centimeters and they recommended that I not have a mastectomy. Instead they recommended five weeks of radiation therapy and what they called a radium implant.

My reaction to the knowledge that it was cancer was shock and emotional devastation. My life flashed before my eyes. I felt I hadn't lived, that my life had been geared towards doing what I should: studying hard, being intellectual and smart, and pleasing people. I thought I was going to die and decided to do what I wanted to do with my

life. I looked at my life and at what really made me happy and gave me joy. Dancing gave me joy, drawing and color gave me joy, and learning about myself and writing. And that's what I was going to do. I decided I wanted to live. I was lucky to have Rita as a friend.

It was very hard for me to discuss life at that stage. One doctor said that I must be willing to take chemotherapy along with the radiation if they found the cancer had spread; . . . "If you know you won't take chemotherapy under any circumstances, then it is silly

about myself. I found I had to, for my self-preservation, change the way I looked at people, and who or what I let into my life. I also learned to accept from people. I'd always been very independent—I could do it on my own. When I was weak I found that I couldn't, and had to learn how to ask for and receive help. Perhaps one of the biggest things I learned is how to say no. I think that I was very much a traditional woman who puts needs of other people first. I said to myself, "I'm not going to take care of anyone but me, I come first."

had the cough another problem arose not directly related to the cancer. I had a rectal abscess and was hospitalized for a few days during which time they took x-rays—routine before any surgery. The resident doctor asked, "Do you have a cold, any virus?" I said, "No, I don't, why?" He told me, "There's something funny, I see a shadow in the chest x-ray. I'll take it again." The second x-ray was apparently fine. The first mistake—I didn't call them on that. This was four months before the discovery of the pleural effusion.

Following a request to see my medical records, I confronted my doctor about how in the hospital they really had picked it up and hadn't communicated it to him. He agreed, saying that in the hospital the communication really breaks down. So, four months passed before an important piece of information reached my doctor.

The second mistake—this one, a horror story. Before the oophorectomy I felt a lump in my remaining breast. I told my doctor about it and he forgot about it. I called him up just before the oophorectomy and reminded him of the lump. He scheduled a mammography two days before the oophorectomy. It turned out that it wasn't another lump, but for the moment it looked like I was going to have another mastectomy. And, *he had forgotten* about it!

Pat: For me, my ability to think analytically and scientifically, in a way, did not matter a bit. When we were discussing data from this or that paper, and the percentages that lived five years, or whatever, my mind did not want to process at that intellectual level. My gut reaction was, "My god, I'm going to die." I was happy bringing a trusted scientific friend along. I guess my scientific background did help me feel a certain strength behind confronting my radiologist when he stood me up, and when I told him I wasn't going to be another piece of data, and that what I needed from him was to hold my hand sometimes and not treat me brusquely.

I want to get back to the business of the initial diagnosis. When I was receiving radiation, not only did I sit

By the time I was recovering in the hospital I had totally lost confidence in the medical establishment because I had a recurrence. And when I had the recurrence they couldn't diagnose it for one and a half years.

for us to do the operation." So, before I had found out whether or not it had spread, I had to say whether or not I would take the treatment—which would be a heavy treatment. I was overwhelmed. The week before I was thinking about how to get money for completing my doctorate in science, now I was thinking I would like to live five or ten years.

I had five weeks of radiation therapy which I found very difficult. My experience with the other women at Beth Israel, who were undergoing similar treatments was one of denial. They denied that anything serious was happening. I was very bereaved for myself and angry at my doctor, especially when he stood me up for an appointment. I was angry at the medical staff who seemed to treat it casually. I felt that insufficient care was given to the person with cancer who needs to be treated with lots of love and care. Of course there's a stigma about needing help. Be strong. There is a whole "be strong" and efficiency model going on out there. I was lucky to have a lot of support from friends.

That summer I had three operations, five weeks of radiation, and one week with the implant. When it was all over, I was emotionally drained. I'd learned an incredible amount about people and

Terri: How does having some scientific background help you cope with this situation as compared to other women who have no background in biological sciences?

Rita: Being a scientist, I was more in a position of understanding some of the words they would sling at me. However, that is only a really small part. They have a whole lot more information that what they give. This has a lot to do with what I think is the male-female dynamic. Women constitute 99% of the people with breast cancer. Nearly 100% of the oncologists, surgeons, and staff are men. They call the shots in terms of timing of events and the treatments. You can know what you want, but with what you are offered, you still have to either take it or leave it.

Another thing I think is important is this stuff about how you're supposed to be a good patient. In my case, the surgeons liked that I was a scientist because I would understand their way of working, their mode of operation, their treatment. So, I was under even more pressure to be a good patient than somebody who is more ignorant or questioning. I had a doctor's degree so I was one of them, almost (right?).

A couple of important mistakes were made during my treatment. While I

among the “deniers,” but I also met at least three women who had been misdiagnosed. One was a 32-year-old graduate student. Her doctor had told her it was nothing. A year later it had metastasized so much that they wouldn’t operate, they wouldn’t do a mastectomy. So, with the fact that in a five-week period I met three people who were misdiagnosed, and having heard Rita’s story of having to show the doctor the lump, I’m convinced that you really have to take responsibility for your own body.

Terri: How do you see feminism and cancer as related?

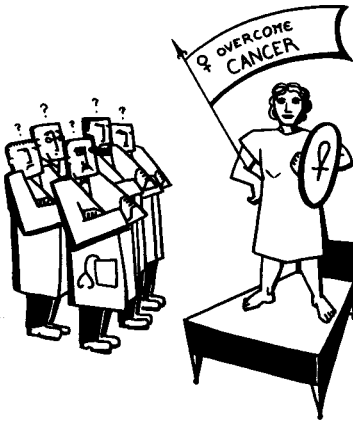
Rita: One thing I learned is that cancer is just one more disease. I no longer see it as so unique. What is different about cancer is that the treatments are particularly horrendous and there don’t seem to be any more efficient treatments.

I now tell women when they get a diagnosis of cancer, that the first thing they should do is take assertiveness training because they will have to deal with a medical profession that comes down on them reinforcing all the little girls’ roles. Also, they will have to deal with all the fears and anxieties of family, friends, and lovers who, because ‘they love you,’ will want you to be obedient to save yourself. Following the assertiveness training, women should learn about alternative approaches and then decide what to do.

Pat: I think of cancer as another disease. Some people have a weakness or predilection for getting cancer. This was true in my case, it was in my family. More significant to me is the fact that I had breast cancer. It is the most objectified part of my body, the part most owned by male-dominated society—its meaning in sexuality and nurturance. The idea is connected to women not owning their own bodies. As adolescents girls are taught to dislike breasts, or they are supposed to belong to men, or be for another people. Women’s sexuality is supposed to be for other people. One of the greatest lessons I’ve learned from all of this, and I keep learning it at deeper and deeper levels, is to be for myself. I exist in the world for no one else. I feel a great resurgence of strength, like I’m

going to get up and march about breasts. It is a very feminist issue, the issue of women’s bodies.

Terri: Would you like to briefly talk about what you’ve been doing since you finished your cancer treatment?



Lynn Roberson

You really can't look at the whole illness process without looking at the whole person because the emotional component will affect the body.

Rita, I know you’ve been teaching courses in Tapestry,* please talk a little about some of the alternatives that you see and the work you’ve been doing lately.

Rita: Well, one of the turning points for me was, as I mentioned, when I started reading about the Simonton method. The book made a real impact on me but I still wasn’t sure how much I understood. When they came to town I participated in a two-day workshop. I then understood that good medicine meant looking at the whole mind and spirit. So, when I got it, I got it—you really can’t look at the whole illness process without looking at the whole person because the emotional component will affect the body. I then took a five-day training which they give to counselors who work with cancer patients. I wanted to make this approach available to more women. So, I started working with a friend, and the two of us have given a class or workshop on what we call *Women Moving Towards Health*. It is based on the Simonton method to which we added a feminist

*Tapestry is a Boston-area feminist counseling and support center.

perspective. One problem with the Simonton method is that it does not present enough understanding of the particular stresses and the sexism that women encounter when they have a health crisis. The idea of the course we taught is that once you empower yourself and lead a better life, your body is going to be strong and you will want to live and enjoy the better life. Another problem with the method is that it is still blaming the victim.

Pat: The blaming the victim critique of the Simonton method is mentioned all the time. For instance, if a person has high blood pressure that may be connected to anxiety, tension, repressed anger, or whatever, there are two ways to treat it. One way is to say, ‘Oh well, if that’s true for certain kinds of people perhaps we can learn how to

reduce tension.’ The other way is to blame the victim and say, ‘Well, if you weren’t so angry and uptight then you wouldn’t have hypertension.’

It is most important to mention that I’ve been in therapy. It is very important to my life’s changes. I think that intellectuals in general are so much against therapy. It is seen as touchy-feely stuff and as upper-middle class. I’ve been earning only \$5,000 a year for the past five years and doing therapy. People fail to see it as a strength to help take control of your own life and to take risks. I’ve needed support and help and knowledge to be able to change. I want to give therapy a good name, not all therapy for all people, but for myself.

Rita: I agree. I went to therapy in order to do some of the emotional work I’ve done. It has enriched my life incredibly. My life is now much better than it was before the recurrence. Can you believe that?

Pat: Me too—we’re two of the happiest people we know.

Terri: Any final encouraging words for people who might face serious illness?

Rita: Stand up for yourself!

Pat: Love your body, love yourself! □

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Scientific Objectivity

(Continued from page 8)

If scientists take no responsibility for the uses of science, then it is supposedly up to the general public to monitor the social application of scientific research. But when community groups do become alarmed (as in the case of recombinant DNA research) they may be readily discounted as uninformed, and even as "hysterical." As in the case of Three Mile Island, the problem may be formulated in terms of popular "anxiety" instead of in terms of social responsibility. The "experts" are more often called upon to quiet public distress than to articulate the grounds for concern. We are told that the production of scientific knowledge must be independent of politically motivated interference or direction. Yet we see scientists testifying before congressional committees, we find scientists in law courts, we find scientists involved in disputes at every level of public policy, and it is obvious that the experts take sides. It is also obvious that these "experts" are very often funded by corporate interests and that there are few penalties for those who find that their research supports the positions of these powerful lobbies.

We may still treasure the mythology of the individual scientist, alone in "his" laboratory and isolated from mere daily concerns, wrestling with fundamental problems of the physical universe. In reality, the scientist today is a salaried worker, part of an institutional hierarchy—perhaps a small cog in a corporate research team—working on some small aspect of a problem which has probably been formulated by others. Her or his survival depends in a very concrete way on the structure of funding decisions made far from the laboratory; she or he is usually dependent on economic and political decisions beyond her or his control or influence. In what way is the average scientific worker independent of the larger political process, and how can we say that science as a whole is autonomous of social organization?

A moment's reflection shows us that the production of scientific knowledge is highly structured and organized, and is closely integrated with structures of political and economic power. It is naive to present the idea of scientific objectivity as though science itself were above or beyond politics. The assertion of objectivity is, however, used to mask the actual conditions of scientific work. Any society will attempt to generate the kinds of scientific knowledge which best fulfill its social, economic and political needs. Determines the kinds of questions which can be posed, and the tools available for answering them. Greek philosophy, or *scientia*, the production of natural knowledge, was divorced from the practice problems of technological production because in a slave society, the citizen-philosopher had no need to be concerned with manual labor, and the slave had no

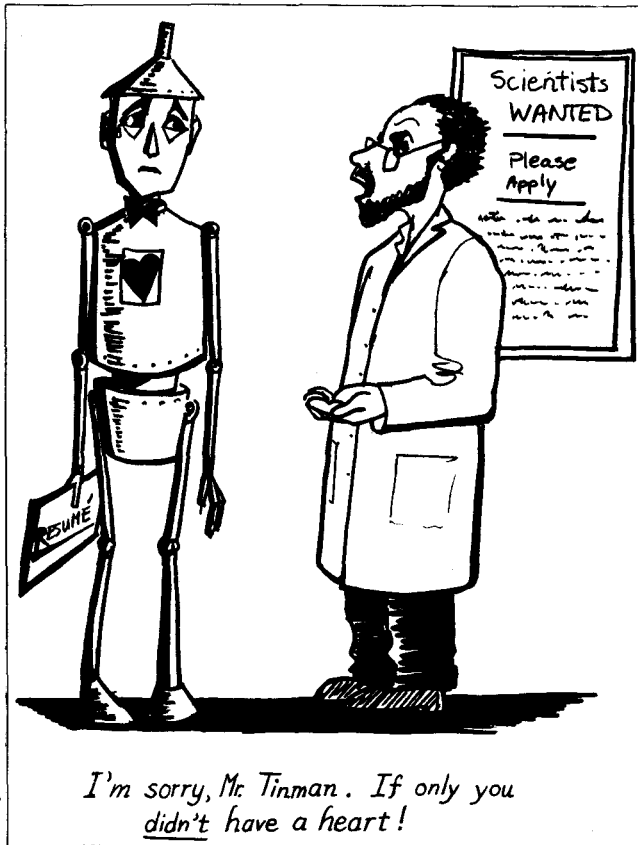
social possibility for producing formally articulated knowledge. What we know as modern science developed only with the capitalist mode of production and its new kind of practical activities and economic needs.¹³ Mercantile capitalism required accurate methods of navigation; the Italian city states required the talents of engineers to develop the science of ballistics. The effort to develop more accurate cannons spurred the investigation of the laws of motion of a moving object and required the construction of a new mechanics. Mechanics, the science of moving objects, satisfied very concrete social needs, just as a new astronomy allowed the construction of new navigational tools. As capitalism matured and became concerned with techniques of production, transformations of matter became more important and the appropriate sciences were developed to deal with this new set of concerns: chemistry, metallurgy, and later, thermodynamics. Thermodynamics made possible the deliberate construction of a more efficient machinery, just as the study of chemistry permitted the production of new compounds and more efficient methods of extracting raw materials for production.

Even in the early stages of industrial production, the production of scientific knowledge was itself only minimally organized; not until the late nineteenth century with the accumulation of capital in large industrial enterprises were scientists deliberately and systematically employed to develop their knowledge in the direct service of production. The early German chemical and electrical industries began the employment of scientists as salaried workers, whose research led directly to new methods of production in the service of capital accumulation. At the same time, the German research effort showed that pure research could be even more productive in terms of new industrial and military technologies than research too closely tied to immediate utilitarian ends. Science became a major social investment, to be funded by the state, and reproduced in universities as well as in private corporations.

To understand the social position of scientists, then, we must study social organization and its relation to production at various levels. At one level, the identity of the scientist is a secondary question, not because he or she is above politics, but because scientists must fit into an existing political reality. The funding and organization of science follows social priorities as established by existing relations of power. At another level, we must recognize that scientists have a certain autonomy within these structures, and therefore have a special responsibility to examine the ways in which particular forms of research may help or hinder the goal of human liberation.

Prospects for a Feminist Science

If we are to move in the direction of a more fully human understanding of science, we should resist rigid separations between the production and uses of knowledge, subject and object, thinking and feeling, expert and nonexpert. This requires readmitting the human subject into the production of scientific knowledge, accepting science as a historically determined human activity, and not as an abstract autonomous force. If we admit that scientific activity is not neutral, but responds to specific social agenda and needs, then we can in turn begin to see how science, and scientists, might relate in a different way to social, including feminist, questions.



Lynn Roberson

It follows from what has been said about the relationship of science to society that we should expect a sexist society to develop a sexist science. The modern context of the production of scientific knowledge demonstrates the difficulty of developing a specifically feminist science within our existing economic and political system. At the moment, the production of feminist knowledge is a cottage industry; it depends on the energy and ideas of a small number of women, working individually, in response to a collective social movement, but without any significant institutional or financial base. This material reality does not allow for the production of any fully elaborated scientific theory.

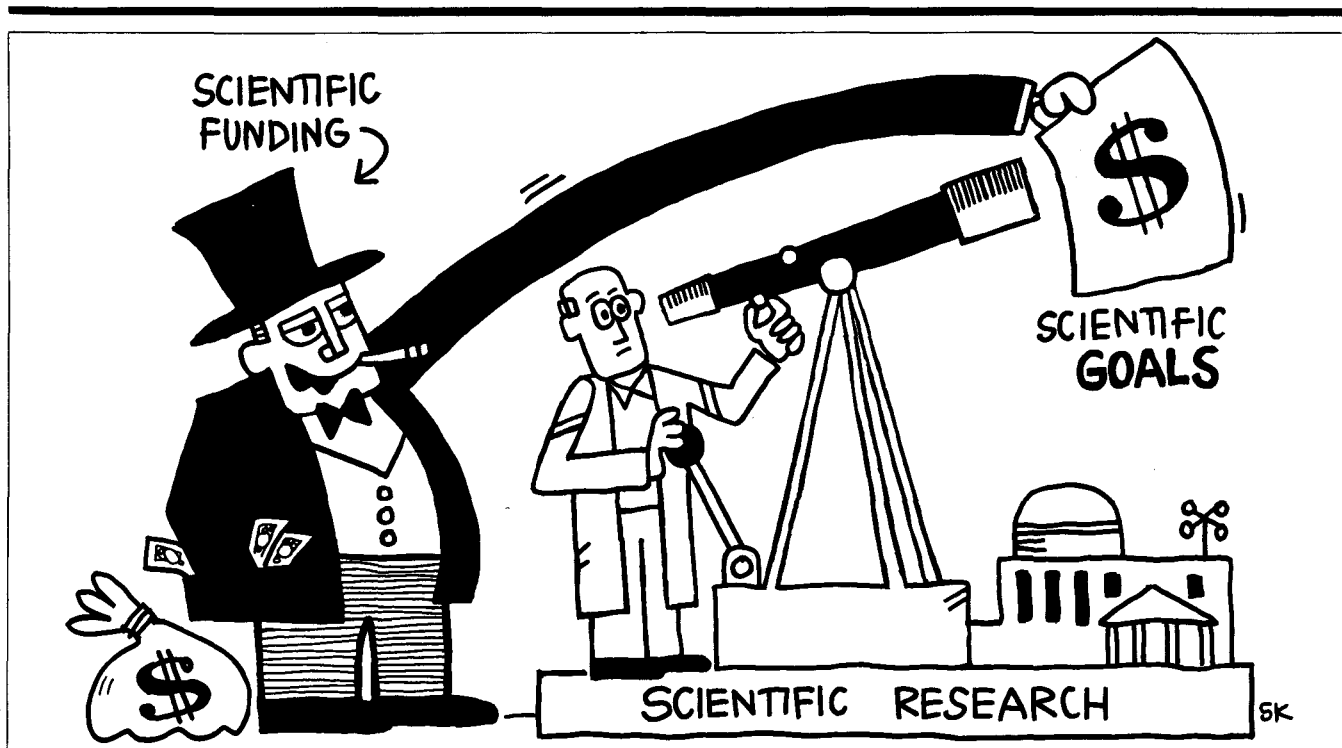
Because scientific research necessarily requires significant capital investment it is closely integrated with the reproduction of social and economic power.

At this historical moment, what we are developing is not a feminist science, but a feminist critique of existing science. For us to imagine a feminist science in a feminist society is like asking a medieval peasant to imagine the theory of genetics or the production of a space capsule. Although our images are, at best, likely to be sketchy and insubstantial, we are free to consider the criteria a feminist science should fulfill. We should neither confuse this with the actual production of a scientific theory, nor should we take our inability to imagine a fully developed feminist science as evidence that a feminist science is itself impossible.

Let us then begin to imagine what it might mean to readmit the human subject into the production of scientific knowledge. As a simple example, we can look at the doctor-patient relationship. We are familiar with the situation in which the patient complains, "doctor, it hurts here," and the doctor says, "nonsense, it can't possibly." If the patient's subjective experience does not fit readily into the doctor's trained perception of objective reality, then that experience must be discounted. There is really "nothing wrong."

The women's health movement has given a new visibility to women's actual experiences, and thus offers the possibility of opening up new questions which can potentially expand the boundaries of scientific knowledge. This may require changes in our understanding of what is "real"—a shift in our perceptions of objective and subjective phenomena. Such a shift lays the groundwork for consideration of illnesses previously discounted as psychosomatic, or for the study of kinds of healing attributed to the placebo effect. These changes do not mean the collapse of medical science or the denial of everything that has been achieved by the previous paradigm; rather, they offer the possibility of moving towards a more complete form of knowledge.

The recent history of occupational health research in the Italian factories offers an important model for the development of new forms of scientific investigation.¹⁴ Prior to 1969, occupational health research was done by specialists who would be asked by management to investigate a potential problem in the factory. The expert collected individual, quantifiable, information from each worker by means of questionnaires, interviews and medical records, and then statistically combined and manipulated the data to test hypotheses about the causes of the problem. The procedure was rigorously objective; the results were submitted to management. The workers were the individualized and passive objects of this kind of research.



In 1969, however, when workers' committees were established in the factories, they refused to allow this type of investigation. Instead, workers would collectively produce the information needed to define and solve a problem. Occupational health specialists had to discuss the ideas and procedures of research with worker's assemblies and see their "objective" expertise measured against the "subjective" experience of the workers. The mutual validation of the data took place by testing in terms of the workers' experience of reality, and not simply by statistical methods; the subjectivity of the workers' experience was involved at each level in the definition of the problem, the method of research, and the evaluation of solutions. The workers had become the active subjects of research, involved in the production, evaluation, and uses of the knowledge relating to their own experience.

This example shows us what overcoming the distance between subjectivity and objectivity might mean in practice. In principle, the same kind of process could be established between scientists and any sector of the population whose experience raises specific problems for investigation.

Historical investigations of the "woman problem" have considered women as natural objects and as passive in relation to the creation of knowledge; at this stage, we can only imagine what it might mean to be the active subjects in the creation of knowledge about ourselves and the world around us. At this point, while it is necessary to argue the case for the entrance of women into the scientific professions as presently constituted, it

is also important to push the epistemological critique of science to the point where we can begin to construct a clear vision of alternate ways of creating knowledge. The feminist critique should be used as a tool for seeing what it might mean in practice to liberate science from the inherited habits of thought resulting from the previous separation of human experience into mutually contradictory realms. Overcoming the dualisms that feminists have identified as being associated with sexual dichotomies may offer the prospect of a radically transformed science, one that is as yet only faintly visible as a possibility for the future. □

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Russian Women Scientists

(Continued from page 18)

time went on, and in fact returned to Russia before their studies were complete in order to devote their full energies to the political underground

Repression

The number of women studying in Zurich grew steadily in the late 1860s, until in the summer semester of 1872 there were 44 women on the medical faculty and ten on the philosophical faculty (which included mathematics and some science). In addition, there were several women studying the sciences at the Polytechnic Institute in Zurich, and a number of unofficial auditors at both institutions. As mentioned above, the political life of the women was as intense as their university studies, and the Russian government came to hear of the discussions and plans of the various Zurich political groups. Tsarist officials, alarmed by the outright revolutionism espoused by a significant fraction of the students, decided to call a halt to what they quite rightly saw as a threat.

In June 1873, the Russian government issued a proclamation recalling all women students from Zurich. Any who remained there after January 1, 1874 would not be hired in any capacity by the government, could never take any licensing or qualifying exams, and would be barred in the future from any Russian institutions of higher education. In addition, the government insulted the women in the crudest of ways by claiming that the reason so many were medical students was so that they could perform abortions on one another.

The women were shocked and deeply offended by both the content and the tone of the proclamation; but most of them decided that they had no choice but to return to Russia. Many of them had cut themselves off from family and funds when they chose to study abroad, and so could not afford to endanger their chances of obtaining employment. The Russian government was their main hope of a job as doctor, agronomist or teacher; so for the most part they felt forced to accede to the conditions of the proclamation. Moreover, many women were naive enough to believe that they would soon be admitted to licensing exams and Russian universities if they obeyed the government order. Thus, the youngest, the poorest, the most naive, and also the most politically active women returned to Russia in late 1873 and early 1874.

However, not all women studying abroad allowed themselves to be affected by the proclamation. Some of the more advanced Zurich students felt it would be absurd to abandon their studies when they were so close to obtaining their degrees. Maria Bokova-Sechenova, for

example, was about to defend her dissertation on diseases of the eye; Serafima Panteleeva was completely immersed in her physiological researches, and was requested by her advisor not to abandon her excellent work; Elizaveta Litvinova was in the middle of a function theory thesis that her professors found profoundly interesting. None of them went home, and they suffered the consequences. Litvinova, for example, was never hired as a full-time teacher, was refused access to the exam which would have qualified her to teach in the higher courses of the *gymnasium* and university, and was denied pension rights. She was an excellent mathematics teacher, though, and by her example attracted many women to the subject. Nadezhda Krupskaya, later a famous Bolshevik, was drawn to the study of mathematics by Litvinova's teaching.¹⁷

Other women sought various means to circumvent the government order to return. Some accelerated their studies to a killing pace in order to defend their dissertations before January 1. At least one woman, Anna Kleiman, finished her work in time and defended her degree, but was so exhausted and weakened by the pace she had set for herself that she died that summer. Her dissertation, on the causes of mortality in children, was still being cited by Swiss doctors years later.¹⁸

What Became of the Women of the Sixties

From a scientific point of view the most fortunate women were those who for one reason or another had not chosen to study in Zurich in the first place, or who were early enough along in their education to be able to transfer easily to another university. Between 1876 and 1883, Geneva University gave 67 degrees to women, almost all Russian, many of whom had begun their work in Zurich.¹⁹

A small number of women had never been part of the Zurich colony, and so were able to continue their studies in relative peace. Sofia Kovalevskaya, Julia Lermontova, Anna Evreinova and Natalia Armfeldt began their studies in the sleepy German university town of Heidelberg in 1869 and 1870. Along with Kovalevskaya's sister Anna Korvin-Krukovskaya, the women formed a small commune. Korvin-Krukovskaya and Armfeldt went on to devote themselves to revolutionary activity; Korvin-Krukovskaya took part in the Paris Commune, and Armfeldt died in prison in Siberia after her arrest for political agitation. Evreinova studied in various European universities, and in 1875 became the first woman to receive her Ph.D. in jurisprudence from Leipzig University. Lermontova and Kovalevskaya moved from Heidelberg to Berlin, but neither university would allow them to matriculate officially, so

they were forced to present their dissertations to Göttingen University. Kovalevskaya received her doctorate in mathematics in June 1874, and later the same year Lermontova defended her dissertation in chemistry. Kovalevskaya, Lermontova and Evreinova were each the first woman outside of Renaissance Italy to obtain a doctorate in her chosen field.

Of the women who completed their degree work, not all continued in their specialties. There were formidable obstacles for women as university teachers, doctors, and laboratory experimenters. In spite of the promise implied in the Russian government declaration recalling the women from Zurich, it would be many years before women would be permitted to teach in universities, sit for professional licensing examinations, or practice medicine on male patients as well as women and children. Nevertheless, many of the women of the sixties, among them Nadezhda Suslova and Nadezhda Volkova, distinguished themselves as women's and children's doctors, and midwives. Several, including Maria Bokova-Sechenova, Julia Lermontova and Serafima Panteleeva, worked in biological and chemical laboratories; and Elizaveta Litvinova became an influential pedagogue and proponent of advanced methods of mathematical instruction.

The attitudes of the Russian nihilists, the women in particular, toward the sciences is also worthy of note. For them, the idea that study of the sciences is essentially antifeminine was simply absurd.

By far the most important contributions to science were made by Sofia Kovalevskaya. A theorem that bears her name jointly with the mathematician Cauchy is basic to the theory of partial differential equations. She was the first woman outside of Renaissance Italy to be awarded a university chair, the first woman to be on the editorial board of a scientific journal, the first woman to be elected a Corresponding Member of the Russian Imperial Academy of Sciences.

Kovalevskaya, like Suslova and Bokova-Sechenova, was a phenomenon in her own time, a symbol of what women could achieve when prejudice was not allowed to interfere. Women's rights advocates pointed to her with pride, and she herself was always conscious of her status as a representative of the "new woman." She fully acknowledged her debt to the socio-political creed of the radical Russian youth of the 1860s.

She knew that without the supportive, unprejudiced, free atmosphere that attended nihilist circles when she was a young woman, she and her friends would probably never have broken away from the traditionalism of patriarchal Russian society.

So deeply engrained in Kovalevskaya's consciousness were the ideas and political convictions of the sixties that she would never think of reacting with disapproval or condescension to those women who left their scientific research to devote their time exclusively to political agitation. On the contrary, she envied their dedication and felt guilty that her own devotion to mathematics prevented her from making a total commitment of time and energy to the cause.

Lessons for Today

The experiences of the first generation of Russian women to seek out a university education and the possibility of professional careers are of more than passing historical interest for us today. In Russia of the 1860s and 1870s, advances in the position of women were closely tied to the dissemination of broader social-revolutionary views. The plight of women was seen as part and parcel of the general backwardness of Russian society. Everyone—from the tsarist government, to uninvolved observers, to the "new men" and "new women" themselves—interpreted the struggle for women's rights in the context of the full struggle for political and social equality.

To be sure, there was a small movement that considered itself "feminist" in a narrow sense, but it never attained the popularity among Russian women that such groups enjoyed in other countries at the time. Even the most prominent figures in that branch of the Russian women's movement—Nadezhda Stasova, Maria Trubnikova and others—participated in the founding of workers' education programs, and day care centers for the children of women workers. In fact, many of them would have called themselves "women of the sixties" in acknowledgment of their sympathy with the revolutionaries. The goals of the nihilists and of the less politically committed women were seen by all but a very few being in perfect harmony, especially in the 1860s and 1870s.

The attitudes of the Russian nihilists, the women in particular, toward the sciences is also worthy of note. For them, the idea that study of the sciences is essentially antifeminine was simply absurd. The sciences and medicine would bring the most use to the Russian masses, so of course the nihilist women entered those areas. The young nihilist professors in these fields welcomed them enthusiastically, and did not see any difference between the abilities of their male and female students. The physiologist Sechenov, who taught at

WOMEN, ACADEMIA, AND THE POLITICAL CLIMATE

by Harlee Strauss

In recent years women have made significant progress in the bioscience fields. Through the seventies the number of women earning bachelor degrees increased steadily, and in 1980 women received nearly 40% of the bachelor degrees in biosciences. Similar gains hold true for women earning Ph.D.s, though fewer women pursue Ph.D.s than their proportionate numbers in bachelors and masters degree programs would suggest.

While these recent data are for the most part encouraging, we must analyze the historic trends describing the academic gains of women as transient and

highly dependent on social and political conditions. During the period from 1870 to 1980, women earning bachelor and Ph.D. degrees in all fields experienced periods of academic success alternating with times of unparalleled decline. Between 1920 and 1940 women received 15% of all Ph.D.s, and in 1944-45 this figure rose to 20%. However, the successes of women in the mid-1940s were short-lived. Between 1950 and 1970, Ph.D.s earned by women accounted for only 10% of the total number awarded. It was not until 1974 that women once again realized the status quo of the 1920s and 1930s.

What accounts for these changes? Clearly the rise in the percentage of Ph.D.s in the teens and twenties coincides with the women's suffrage movement and a high level of feminist awareness—the so-called first wave of feminism. The 1944-45 peak corres-

ponds to a period when many men entered the armed forces and left university doors open to women. Later, the return of the soldiers brought a precipitous drop in the number of women earning Ph.D.s and the baby boom ensued. This drop coincides with McCarthyism and the accompanying politically conservative and antiwomen climate of the 1950s.

With the renewal of feminist awareness in the late 1960s and early 1970s came the rise in percentage of degrees earned by women, as demonstrated in the case of women involved in the bioscience fields. However, the current political climate—striking in its resemblance to that of the 1950s—should make one lesson very clear: there is no historic evidence giving women reason to expect the gains of the 1970s to remain. It is more apparent than ever that the struggles of the past are those of the future.

Harlee Strauss, a molecular biologist, is spending the year on Capitol Hill as a legislative assistant. She has been a regular contributor to the ongoing debate about women and science.

both the Medical-Surgical Academy and the Higher Women's Courses (opened in St. Petersburg in 1876), always gave the same exams to both groups; he found that one year the men would do better, another year the women would. Professors on the medical faculty in Zurich had the same experience: there was just as much chance of a woman having the best exam result as a man.²⁰

It is fascinating that in the early years of women's higher education, women were overwhelmingly drawn to the sciences and medicine. For example, in Geneva, among the 67 degrees given to women from 1876 to 1883 there were 35 in the natural sciences, 31 in medicine, and only one in letters!²¹ And when the Higher Women's Courses opened, the most popular faculty by far was the physio-mathematical faculty, which included the natural sciences.

In our own age there has been a resurgence of the use of pseudo-scientific theories to justify sexual inequality and discourage women from pursuing scientific careers. The most recent example is the infamous Johns Hopkins study, which claimed that women are biologically less suitable for mathematical thought. Although widely discredited in scientific circles, it was enthusiasti-

cally disseminated to the public in such magazines as *Newsweek* and *Playboy*. The example of the Russian women of the sixties should encourage those women today who are once again fighting essentially the same battles.

Unfortunately, many women today, including feminists, have internalized the idea that science is unfeminine or antifeminine. Often poorly trained in science and math, and therefore fearing and disliking scientific subjects, they subscribe to the mythology that natural scientists are inherently conservative, whereas social scientists and students of the humanities are their natural allies. For example, not long ago the suggestion was made to a women's group at a major state university that they put up their meeting announcements in the science departments. It met with the response: "Oh, those women won't be interested, they're all careerists anyway."

The experience of the nihilists in the 1860's and 1870's refutes this equating of science with conservatism and the humanities/social studies with progressivism. Part of the reason for the overwhelming disproportion of women in the sciences and medicine was that professors in those areas were less likely to refuse to take

women as students. In Russia, the nihilist scientists welcomed them with open arms. Even in Switzerland and Germany most of the science and medical professors were liberal enough to take women on a trial basis.

This identification of scientific study with progressivism was clearly made by the tsarist government. In 1869 the Medical-Surgical Academy was closed for a time by the authorities because the discussions within its walls bordered on the revolutionary. In 1889 the Higher Women's Courses were closed for the same reasons; and when they reopened, under tighter government control,

Women's success in the natural sciences depends upon the social and political environment. It is our task today to see that such an environment of political awareness is created and maintained.

the physio-mathematical faculty had been greatly reduced, its laboratories had been closed, and most natural science courses had been canceled. "Study languages or art," the government in effect was saying, "That ought to be harmless enough." Only after many years were the natural science and mathematics faculties permitted to grow naturally again.

This was not the first time in history that women were intentionally and effectively diverted from the study of the natural sciences and/or medicine. During the Renaissance several women held chairs of anatomy, physics, mathematics, and other sciences. But a reaction against them in the late 1700s ended that. Moreover, the story of these women was effectively removed from the historical consciousness, so that by the end of the nineteenth century, most European women had never heard of them.²²

A similar phenomenon has occurred in the case of the women of the 1860s and 1870s. Most have heard of Marie Sklodowska-Curie, and possibly Sofia Kovalevskaya, but even among radicals and feminists few have heard of the others. Curie and Kovalevskaya were merely the most prominent in a long line of Slavic women who sought education in Europe in the natural sciences and medicine. Their achievements were impressive, but they did not occur in isolation. These women should not be looked upon as freaks or aberrations. They were part of a milieu.

Women's success in the natural sciences, as in anything else, depends upon the social and political environment. It was the intensely political, activist climate of the Russia of 1860s and 1870s which provided the necessary environment for women to break through the

traditional barriers. It is our task today to see that such an environment of political awareness is created and maintained.

Conversely, modern women entering the sciences can take inspiration from the careers of the Russian pioneers who showed that the aggressive pursuit of a scientific career—motivated by a desire to serve the people—is perfectly compatible with political activism directed toward a revolutionary transformation of the oppressive social structure. □

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