BACK TO GRANDMA'S PLACE:

Democratizing Science and Technology

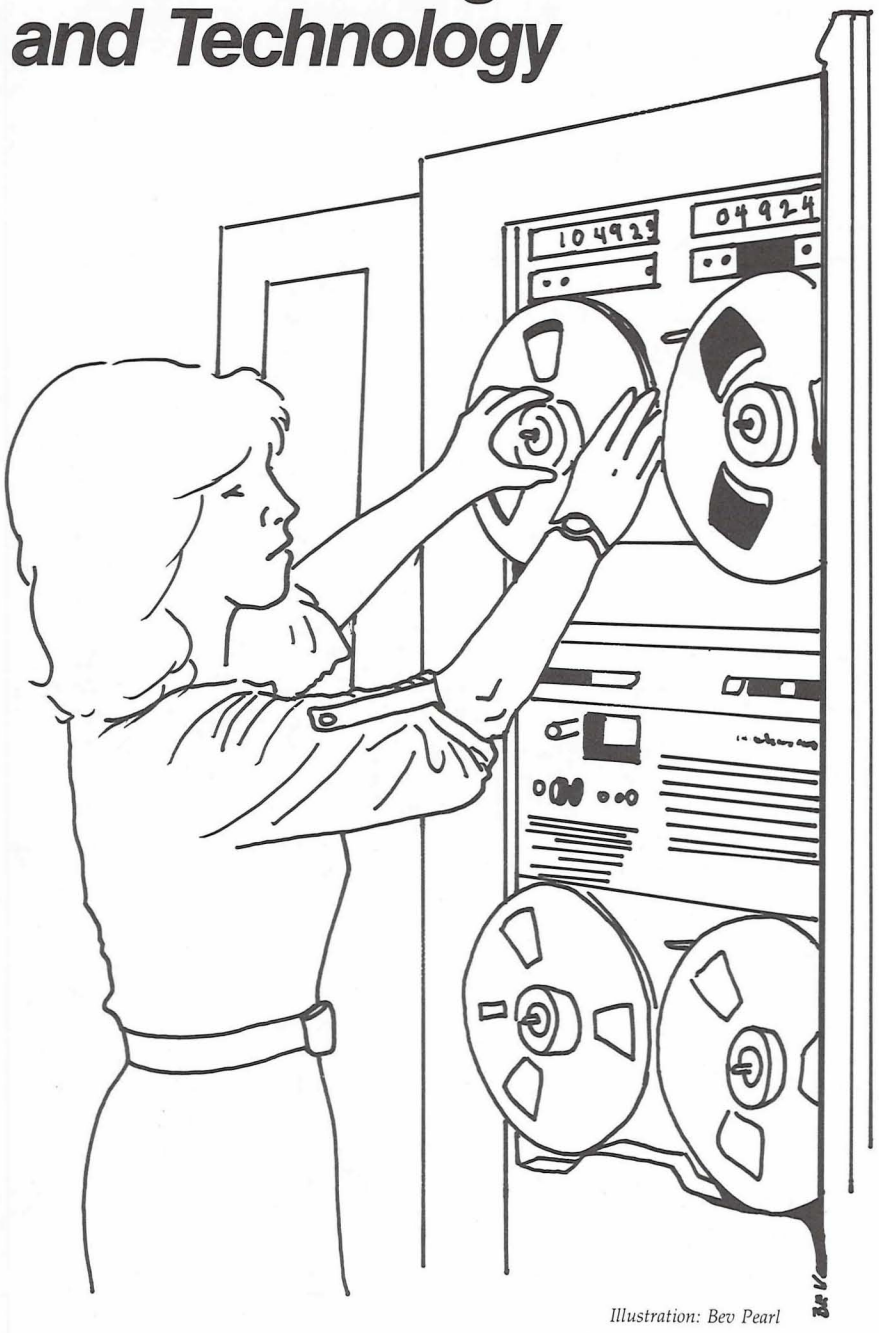

Illustration: Bev Pearl

Heather Menzies

Si nous concentrons trop nos efforts sur l'adaptation des femmes à la science et à la technologie, nous risquons, en un certain sens, de coloniser les femmes: en effet, le prix à payer pour cette adaptation, c'est la perte de la perspective d'un contexte social plus large, des expériences de la maison et de la communauté: or, cette perspective, les femmes l'ont par le seul fait qu'elles soient concentrées dans le domaine privé et exclues du domaine de la science et de la technologie. Il est donc urgent pour les femmes de montrer une certaine résistance à la socialisation scientifique, et de travailler à la transformation de la science et de la technologie en faisant ressortir une perspective plus personnelle, plus contextuelle, plus communautaire – en un mot, de démocratiser la science et la technologie.

I met a woman-scientist the other day. It was one of those round-table discussions where participants take their turn introducing themselves and saying who they are. She described herself in one word, "citizen." And that's what I want to talk about here – not so much getting women into science and technology, but getting science and technology onto women. Not so much equality for women in science, but the transformation of science through the perspectives and values of women, their experiences and their heritage, largely outside the public sphere of professions and exclusive-knowledge domains with their gatekeeper-experts.

Discussing the former issue – getting women into science and technology – has taken on the tone of a litany over the past two or three years. It begins with the research that women are concentrated in occupations (support-service work) being decimated by automation and a mere whisper of a minority in the occupations of science and technology where the best hope for future employment lies. It takes in Lucy Sell's finding that of the young women entering the University of California at Berkeley in 1975, 92 per cent lacked the math prerequisites to enter 75 per cent of the major areas of study. It includes the effect of socialization through the influence of which girls come to identify most strongly with their gender role and, specifically, with the wife-mother role as their primary role in life – an orientation which in turn disposes them first to regard work outside the home

as a secondary or fringe activity and to prepare themselves accordingly, by dropping the tough workplace-preparation courses such as enriched math; and second, to reinforce the gender role of wife-mother through their career choices: social work and support work.

There are other research findings – relating the fact of clutching dolls to one's pre-pubescent bosom, versus playing with Erector and Meccano sets, to the development of visual-spatial skills which are considered a prerequisite to the mental manipulations associated with mathematics; the effect of gender segregation on the ability to do math and science studies at school; and so on. Invariably, at least in Canada, the discussion then zeroes in on school-age and preschool girls and concludes with a how-to agenda for getting girls off dolls and onto Meccano sets – in other words, adjusting the girls to math and science.

The exercise smacks somewhat of colonialism. Whether practised by missionaries converting the heathens or by modern corporations and development agencies converting subsistence farmers, the colonizing dynamic has always been one way. The assumption has always been that "they" should learn from "us" and adapt to "our" science and technology. Only recently have we seen an alternative emerge in something other than simply one person's personal style and approach. The aid organization Inter Pares is founded on the concept of equality. Engineers and other scientists trained in Canadian universities go to third-world countries, where they learn about local methods of irrigation, fishing, or whatever. Together with the practitioners of the local science and technology, they help to devise adaptive applications of university science that are appropriate to the local-technology context.

Returning to my focus, there are two major components to transforming technology, or adapting it to women. The first is to make it, as an area both of study and professional practice, accessible to women in its structure, its language, and its culture so that science and technology become truly hospitable to women. In this category, I would suggest specific issues such as making the full program of courses in science and technology available to part-time students and at night, for all those women over the age of thirty for whom the Sleeping Beauty myth has worn thin and who, having taken charge of their lives and committed themselves to a career, have bitten the credentials bullet and are back at school – often on a part-time basis while raising a family, and often as a single parent. Here I refer to the research cited by Esther Greenglass in *A World of Difference,* to the effect that women tend to make their career decisions at around the age of thirty to thirty-three.

Universal, affordable daycare in the workplace and on campus (in the evening as well as during the day) is another key issue. A third might be the crusade to shorten the working day from the traditional eight-to-ten hours for professionals, which is probably a prescription for pathology in itself but, more to the point, is predicated on one's having a full-time wife-person to look after the domestic side of one's life.

Sexual harassment is another vital issue. It's also one of the most ubiquitous of the excluding mechanisms if one includes the subtle harassment of men's elaborate editing of epithets or, conversely, the expectation of laughter as "one of the boys" when someone tells a sexist joke or puts down one of the "girls" in the office or lab. Recently, I met a young woman who'd just completed her undergraduate engineering at McGill University. She'd been game; she'd learned to swear and to drink her beer straight from the bottle. For one of the engineering students' parties, she even went along with the decision to have a stripper as the entertainment. But when, at the event, guys started chanting, "Rape her, rape her," she couldn't take it any more.

It's not just that such behaviour will exclude all but the thickest-skinned women as surely as Meccano-set prerequisites for math, science, and technology. But if a thick skin is the price of admission, what sensitivity is lost in the thickening of the skin and what insensitivity is, however unwittingly and even unwillingly, gained?

The question speaks to the second aspect of the transformation process. It's not enough to make science pink-tone as well as blue – coldly and dispassionately blue, to extend the metaphor. To truly transform it – in the sense of radical reform – we must uproot the toning dynamic that takes the scientist away from being a citizen; that separates the "professional" scientist from the amateur scientist, researching acid rain, nuclear energy, and armaments in citizen activism; that segregates the soft sciences from the hard sciences; that alienates the creation of technology from its application and the pursuit of science from its larger context.

Recognizing and valuing the soft sciences and their sometimes qualitative methodologies; crediting the crafts and the practitioners of science and technology (everyone from native Indian women who chewed skins, dried fish, and tanned hides to modern nurses and dieticians) – these strategies will make the sciences more accessible to women by closing the gap which our mainstream culture has placed between women and science and technology. Like the other accessibility strategies, it should also help in the second aspect of the transformation process. Furthermore, it must, if these and the other accessibility strategies are to be more than superficial cosmetic changes that can easily be reversed during budget cuts and conservative administrations. Worse still, if the accessibility strategies aren't linked to a vision of and a commitment to the radical reform of science itself, women risk being colonized by science and technology while being lulled to sleep by the muting of its elitist, exclusive characteristics.

What I'm saying is that there is a difference between making science and technology gender-free in a way that merely censors those things that remind women of their gender and its exclusion, and truly including elements previously restricted to the private spheres or including what have become popularly known as the feminine and masculine aspects. To achieve the latter, true form of gender freedom, I think we must pay attention to the feminine aspect, not to objectify it and rigidify the distance between men and women, but to use this as a measure of science's continuing or diminishing exclusivity. This means celebrating the full contribution to science of Dr. Barbara McClintock, who won the Nobel Prize for medicine last year for her research work in genetics. Her great gift was not merely her work as a product – new knowledge about genetic transposition – but, mostly importantly, her work as process – her way of coming to know

things that was part artist, part rigorous scientist. As author Evelyn Fox Keller put it in her excellent biography on McClintock entitled *A Feeling for the Organism:* "she has succeeded in synthesizing the uniquely twentieth-century focus on experiment with the naturalist's emphasis on observation. The role of vision in her experimental work provides the key to her understanding. What for others is interpretation, or speculation, for her is a matter of trained and direct perception." It is only by affirming approaches such as this that we can prevent others like Barbara McClintock from languishing on the margins of scientific respectability as she did for thirty years.

We also need to dust off the records on such marginal scientists as Ellen Richards Swallow, who was the first woman to study chemistry at Massachusetts Institute of Technology (MIT), worked as the first chemist on faculty, and developed an interdisciplinary environmental science which, in 1892, she named Ecology. Swallow was somewhat heretical in thinking, first that one field of research study and action should encompass so many things to do with environment – nutrition, air and water pollution, transportation, architecture, waste disposal, and industrial health and safety – and second, in thinking that science should be democratized, in the sense of brought to the people and popularized. In a book about her life called *Ellen Swallow: The Woman Who Founded Ecology,* author Robert Clark says that she spent much of her time travelling about, lecturing and setting up demonstration projects. He goes on to say: "The subsequent history of this science is all too familiar to students of women's history. Her science, practiced by women, was soon called home ecology and later home economics. It never achieved the status of other sciences, and today the scientific roots of home economics are rarely visible. In fact, many colleges and universities do not consider home economics sufficiently respectable academically to offer on their campuses."

This story speaks to the need both to reverse the ghettoization of women's science and to resist the fear of this exclusion. For it isn't that women debase science. It's that the science that some women have dared to do has challenged the model of science that takes knowledge away from people, divides it up so that it's separable from the context, and locks it away in isolated little cells of expertise to which only an elite have access, and only through a certain socializing channel.

The job at hand is to ecologize and democratize science. It's not simple nor short term. Hence one of the great needs among women today is to meet, talk, and work together and, together, to force mechanisms for perpetuating the transformation work from one generation to the next – as well as to guarantee that the efforts of this generation are not lost as were those of the women in the early 1900s.

Talking to and about other women will not come about and carry on by wishing it, but by willing it. Having originally shrunk from Jill Vickers's call to "institutionalize the women's movement" and while still fearing the traps associated with the word, I now agree with her and applaud the courage with which she championed this concept in a keynote speech to the last annual meeting of the National Action Committee on the Status of Women.

Illustration: Bev Pearl

Rather than emphasize structures, though, I would institutionalize the processes we have developed for networking and supporting each other's efforts and visions. I look forward to the day when there is a national computerized information system in place linking all women's organizations, with shared access to each other's data bases, mailing lists, and so forth. Remembering how the scholarships made available by the American Association of University Women, founded in the 1890s, were critical to the careers of many women scientists in the early 1900s, we could also do with a major foundation to which we could all contribute annually and in our wills, from which we could help fund all the work to be done in transforming science and technology: the creation of school learning kits based on the life and work of such women in science as Barbara McClintock, Ellen Swallow, and Emily Stowe, Ontario's first woman doctor; scholarships for women doing research on women and science and technology either in women's-studies programs or elsewhere; special assistance for travel and translation, for research into those early women in science who were burned at the stake as witches; and conferences and other gatherings to celebrate and explore a woman's way of knowing, seeing, and feeling that has more to do with the interconnectedness and environmental sensitivity of ecology than the separateness of industrial-age science.

But we need to play as well as to work. We need to recreate ourselves, not just to replenish our energy and enthusiasm but to reorient ourselves as well. It is for this latter aspect of recreation that I find myself envisaging something on the lines of going back to Grandma's place. We need places or activities through which we can wash off the self-doubts, subtle co-optation, and other effects of compromising and working for change from within the system. And my best guess on how we can do this, since we don't know what it is we're striving for as we try to transform science and technology even while many of us depend for our living on living by its rules, is to gather regularly – at conferences, retreats, etc. – to celebrate a women's way of seeing and knowing, to restore ourselves, refresh our perspectives, to review and reflect. There should be good talk, physical activity, music, storytelling, poetry, and play. By calling such acitivity "going back to Grandma's," I don't hold Grandmother up as an archetype but rather as a touchstone from an era where women were wholly outside the formal economy and the public sphere, where they used technology, practised crafts, and created art and culture simply as private citizens.

Further Reading:

Robert Clark. *Ellen Swallow: The Woman Who Founded Ecology*. Chicago: Follett, 1973.

Esther R. Greenglass. *A World of Difference: Gender Roles in Perspective*. Toronto: John Wiley & Sons, 1982.

Evelyn Fox Keller, *A Feeling for the Organism: The Life and Work of Barbara McClintock*. New York: W. H. Freeman & Co., 1983.

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