

AT ISSUE
THE MARKETING OF THE NEW
REPRODUCTIVE TECHNOLOGIES: MEDICINE,
THE MEDIA, AND THE IDEA OF PROGRESS

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Reproductive technologies provide a case study of the U.S. fascination with high-tech, high-publicity, and high-drama medical solutions. Such medicine is also high cost and high risk. Bolstered by the idea of progress, reproductive technologies get portrayed as technological break-throughs. Images of progress pervade the print and electronic media representation of these technologies. And in the name of progress, reproductive technologies have quickly become an accepted coverage of many U.S. health insurance plans.

Progress, however, is elusive. Philosophers write about it as an idea. Yet, progress is most fully captured by the theological framework of eschatology. Within Christian theology, eschatology is what is hoped for, what fulfills the future, or the goal of history. In Christianity, eschatology was concretized in images of the Kingdom of God, eternal life, and the second coming of Jesus. One way of examining reproductive technologies is to study how they often function as eschatological statements – more promise than performance. This is especially evident in the language, images, and themes conveyed in the media representation of the new reproductive technologies. It is also evident in the past histories of promising drugs and technologies that turned perilous.

IMAGES OF THE NEW
REPRODUCTIVE TECHNOLOGIES

Reigning themes and repetitive images in newspaper and magazine articles set the tone

for public consumption of the new reproductive technologies. Dorothy Nelkin, in her work *Selling Science: How the Press Covers Science and Technology*, points out that science journalists are brokers who, in reality, frame technological issues for their readers and help mould public consciousness. Reporters do not act alone – in turn scientists shape reporting. In an age of competitive research funding and in a race for public support, fame, and favorable press coverage, scientists, through their respective institutions, have set up a vast public relations apparatus that has been very successful in marketing technology to the public through the media. Chomsky and Herman, in their analysis of a “propaganda model” of the mass media, refer to this symbiotic relationship between the media and powerful sources of information as “shaping the supply of experts” (Chomsky & Herman, 1988, p. 23).

In general, science journalism in the United States and in many other western countries is *promotional* focusing on the great promise of technological break-throughs. Many articles convey the message that technology is instrumental in constructing a better world. “But the message is polarized – we read of either promising application or perilous effects, of triumphant progress or tragic risks ... the long-term political and social consequences of technological choices are seldom explored” (Nelkin, 1987, pp. 173–174). And the message of peril is usually not heard until after the fact.

Press coverage of new reproductive technologies initially makes use of a language of promise. In some of these articles risk is warned about, but mostly in a futuristic or abstract dimension and never in the historical context of past reproductive technologies gone wrong. Reproductive and genetic engineering are often covered as a series of dramatic events with the stress on technological miracle, magic, and mystique. Today reproductive and genetic engineering have become a national symbol of U.S. progress, comparable to the space program of the 1960s and 1970s.

For example, Keith Schneider, a regular science reporter for the *New York Times*, wrote an article entitled "Repro Madness" for the U.S. *New Age Journal*. The title, and the lead paragraph of the article, indicate that "new and costly medical technologies are producing brave new babies for infertile couples – and troublesome ethical questions for the rest of us" (Schneider, 1986, p. 34). (Presumably they are producing "troublesome ethical questions" for the couples too!) Although the article gives the appearance of a balanced presentation quoting two critics of the technologies, their words are restricted to two short paragraphs. The bulk of the article – six pages – is a promotional brief for the technologies, especially the services of the Comprehensive Fertility Institute directed by Bill Handel in Los Angeles.

Progress metaphors and discourse pervade the article. These technologies constitute a "reproductive revolution." Humanity is propelled to the "edges of an altogether new frontier." Schneider even invokes religious metaphors, calling the developments godlike. This is a "pivotal period in which ordinary men and women will mimic God, actually designing sons and daughters in their own images" (Schneider, 1986, p. 36).

Exaggerated claims abound. The Kingdom of God is truly at hand. The fertility enterprises promoted in Schneider's article will soon be capable of pinpointing many

genetic defects. After that, parents will not only be able to correct chromosomal abnormalities, but will choose from a list of hereditary options such as blue eyes, blond hair, high intelligence, physical strength, and even delayed aging. "An entire generation of supersmart, superstrong babies is a distinct possibility." And other prospects hold promise of artificial wombs in which "customized embryos" can grow to term. "No fuss. Satisfaction guaranteed" (Schneider, 1986, p. 36). The reproductive supermarket has arrived.

There is much homogeneity in popular magazine claims for new reproductive technologies. Although the style and details may differ in these articles, most of them focus on the same claims, pursue the same sources of information, and review the technologies in similar ways. In an article on embryo research published in *Vogue Australia*, we see the same pattern of hyperbole, enthusiasm, and list of future options as in the U.S. *New Age Journal*. Research on embryos "could lead" to a better understanding of miscarriage and infertility, the development of new contraceptives, and the treatment of disorders in infants. In addition, it may also help treat cancer and heart disease. "In time" embryo research could "wipe out" disabilities such as Down's syndrome, cystic fibrosis, haemophilia, and sickle-cell anaemia. In theory, "children would no longer be born with inherited physical or mental handicaps" (Downie, 1988, p. 20). "In theory," the shopping list is endless.

While scientific rationality is supposedly the basis of medical journal articles, scientific romanticism pervades the popular press. Metaphors of conquests for all sorts of diseases, of reproductive technologies on the frontier of life, and of miracle babies, celebrate unlimited possibilities of progress. Yet much of this progress is postponed to future development, future research, and future funding. Each new technology "*promises* a transformation of everyday life, whether for good or ill ... Conveyed is a sense of awe

about the power of technology . . . whereas science appears in the press as an ultimate authority, technology appears as the cutting edge of history, as the new frontier” (Nelkin, 1987, p. 34). But that frontier is never quite realized.

Other newspaper accounts focus on the bigger and better claims for reproductive technologies. For example, Australian newspapers carried lead articles entitled: “In-vitro babies better adjusted” (*Canberra Times*); “Babies: They’re Better from Glass” (*Sydney Morning Herald*); and “Test-Tube Babies are Smarter and Stronger” (*The Australian*). In 1988, Carl Wood, one of Australia’s leading IVF pioneers, described artificial conception as “superior to natural conception” in attacking the Victorian government’s control of IVF. Later in 1988, Wood contended that not only are the babies superior; infertile couples as well are better equipped for the task of parenting because they are “quite different to the fly-by-night parents of naturally-conceived children who succeed with little thought and brief pleasure” (Quoted in McDonnell, 1988). (Encoded in this statement, but not articulated by Wood, is that these conceptions only succeed to the small extent that they do because women subject themselves to more pain, more intervention, more risk, and more bodily intrusion.) Mainstream US. newspapers were more moderate in claims for IVF. The *New York Times* reported in 1989 that “babies conceived in a laboratory process are as healthy and mentally alert as those conceived normally” (*New York Times*, 1989, p. A17).

As so often happens with science journalism, the media pendulum swings from eschatological endorsement to disillusionment. This is not accidental but often happens after dissident groups are able to articulate their opposition and have an influence. Dorothy Nelkin notes, “typically, reports on high technology and biotechnology swing from claims of miracles to visions of apocalypse,

batting readers back and forth from celebration of progress to warnings of peril, from optimism to doubt” (Nelkin, 1987, p. 41). In the Australian press, one year after Carl Wood’s initial claim about the superiority of IVF babies, articles became more critical due to the initiative of feminist groups such as FINRRAGE Australia.

In 1985, headlines in the Australian Press shifted to: “IVF babies four times more likely to die at birth.” *The Australian* quoted a study of Australian and New Zealand hospitals, undertaken by the National Perinatal Statistics Unit at the University of Sydney, documenting that IVF babies are four times more likely to be stillborn or to die within the first 28 days after birth (Beach & Howard, 1985). The study also showed that congenital abnormalities among IVF babies are greater than expected, while the number of IVF conceptions occurring outside the uterus is almost five times that of natural conception. In addition, letters to the editor of *The Australian*, where the superior test-tube babies remark of Carl Wood had been initially published, pointed out that Wood’s claim had been based on a meagre sample of 25 children conceived by IVF, and aged between 1 and 3 years. “These are lies, damned lies and statistics... To correlate this small survey with the statement of your headline is at the very least naive and at the very worst a cheap trick in sensationalism” (Kildea, 1984).

Wood’s hyperbolic claims for IVF babies in the Australian press was promotional coverage designed to raise public expectation, cultivate public support, and protest non-scientific interference with technological development. These claims were met with media glow until the unqualified optimism of the press was dimmed by the National Perinatal study. Then the press shifted to the opposite standpoint. And the public who had invested IVF with the key to progress becomes preoccupied with technological risk, coming to doubt the very technologies on which it was

told to depend. The press uses terms such as *cruel illusion* or *naïve exaggeration* to speak of technologies gone wrong, with no acknowledgement that it had been party to the exaggerations and illusion.

Sometimes however, even in the face of negative evidence, the media interprets risks and dangers in the context of technology's promises not yet realized. The explanation of medical catch up is offered. Citing the history of organ transplantation as a "paradigm in medical progress" in the *Hastings Center Report*, Leonard Bailey makes the case for all the failures in this area adding up, "on balance" to success. "Transplantation is the best it's ever been and will get even better as the science develops and as donor resources improve. To be sure, there are many troubled areas of ethical concern to be ironed out, but that sort of thing takes time or ought to" (Bailey, 1990, p. 27). After all, every frontier has its dangers that have yet to be challenged and conquered. No matter that the press "frequently relocates this frontier, as technological advances occur in different fields or the novelty of an innovation wears thin" (Nelkin, 1987, p. 34). In the 1960s and 1970s, we were treated to eschatologies of space; in the 1980s, to computer and reproductive and organ technology scenarios.

Furthermore, the *lingering power* of technology remains. Doubt must translate into almost absolute peril before a technology loses its staying power. In the wake of the reported studies on the risks and dangers of IVF – to babies, of course, not to women – U.S. Americans read in the 1990 *U.S. News and World Report Health Almanac*, entitled "You're A-Z Guide to Health":

Researchers at Eastern Virginia Medical School in Norfolk, VA, have quelled fears that test-tube babies would not develop normally. In a study comparing 93 children ages 1 to 2 ½ with 83 conceived in vitro, they found no significant differences in

physical or mental development. In fact, the test-tube kids generally had slightly higher IQ scores. (*U.S. News & World Report*, 1990, p. 90)

What then are we to conclude? IVF babies are better in the United States than in Australia? Our clinics make babies better than they do? Like all popular press articles, whether chronicling success or failure, there is no perspective given. These press accounts provide people with high or low drama but with little way to interpret the findings. Risk, unlike promise, is ignored or downplayed.

Many articles in U.S. newspapers are very much akin to the promotional language of options advertised by infertility businesses. Often such advertising appears in the newsletters of these enterprises where employees who provide reproductive services to satisfied customers are featured. For example, a *Los Angeles Times* article was headlined: "Surrogate Mother Extols 'Joy of Life' in Novel Experience." This article featured a "happy surrogate mother" who spoke of the baby she had conceived and delivered for clients of the center as "the son of a friend of our family, but one who I'm more interested in ..." (Larson, 1987). The "happy surrogate" is a feature of many newspaper articles intended to offset the bad publicity given to surrogacy by the 1987 New Jersey legal battle over Baby M. It is quite clear from reading these articles that they are mainly promotional journalism where often the only persons featured are the director of the infertility center, in this case Bill Handel again, and his employees. Another article stated this quite bluntly in its byline: "Unlike Baby M, Most Cases End Happily." This article spent its print telling the reader that although the Baby M tale is a sad one, it "appears to misrepresent the typical surrogate birthing experience." The final line concluded: "No matter how many times there's a birth ... it always is a miracle" (Schwed, 1988).

Personal accounts of women who work as so-called surrogate mothers, or stories of the rare infertile couples who obtained babies through the IVF process with smiling baby on lap, serve as very potent biographical and pictorial accounts of technological progress. Missing from these accounts, most often, are the numbers of dissatisfied customers and unhappy women who have worked as so-called surrogates for infertility centers.

Also missing from these accounts is a long historical view that provides a retrospective on the record of reproductive drugs and techniques. It is an unfortunate lesson learned from this history that failure is often recognized after the fact of damage – damage that indeed had been evident, but not publicized, all along. It is instructive to look back on the history of eschatological technology, reproductive as well as otherwise, formerly touted as salvific, but often saving no one.

MEMORY VS. FORGETFULNESS: FROM MIRACLE TO MESS

The enchantment with new technologies is, in part, a contest of memory vs. forgetfulness – forgetfulness of past failures vs. a memory of promise. Today's promise is too often tomorrow's peril. Nowhere have these technological and chemical perils loomed larger than in reproductive medicine. Yesterday's technological frontiers become today's hazardous wastelands.

There was the promise of DES, a drug initially given to pregnant women to prevent miscarriage. The tragic history of this drug is well-known for causing cancer and infertility to DES daughters and reproductive malfunctions in DES sons. More graphic in consequences was thalidomide. Given as a sedative during pregnancy to thousands of women, mostly in Europe, it led to the death and disfigurement of their children. Contraceptives like the Dalkon Shield, the Pill,

and Depo-Provera have all been the subject of public debate in the United States. Some, like the Dalkon Shield, have been proven to the satisfaction of the experts to be more recognizably dangerous than the Pill. This enlightenment often occurs when litigation is threatened.

Studies continue to find pill links with cancer, only to be challenged by other studies later on. This has been the contradictory professional certification of the Pill since the 1960s and, even more, of its counterpart, hormonal (formerly estrogen) replacement therapy. No combination of estrogen and progesterone has made the reported side-effects disappear.

Other "promising" treatments, such as Depo-Provera, have been banned in this country as a contraceptive but exported to third world women. When reproductive progress is countermanded in the first world, we often export our "progress" to the "unprogressive" third world. Moreover, the National Black Women's Health Project has recently revealed that, although Depo-Provera is not licensed for contraceptive use in the United States, many Black women regularly receive the drug from their doctors (Ross, 1990, p. 11). In 1987, the U.S. Indian Health Service was continuing to prescribe Depo-Provera as a contraceptive for American Indian women (*New York Times*, 1987). Thus, Depo-Provera remains a contraceptive also for third world women in the First World.

There is more. Once touted as necessary to 25% of the birthing women in the United States, half of these one million caesarean deliveries are now recognized as unnecessary. The diagnostic value of the electronic fetal monitor is now debated. And in a major shift of policy, a U.S. Public Health Service panel of experts is currently recommending *less* prenatal care for most healthy pregnant women. It now recognizes that many procedures and tests performed on healthy pregnant women, such as routine screening for

protein in the urine at every prenatal visit, multiple pap smears, and more than one pelvic examination, are expensive, time-consuming, and provide no real benefit (U.S. Public Health Service, 1989). Most recently, the administration of powerful fertility drugs, such as Clomid and Pergonal, have caused multiple pregnancies, hyperstimulation of the ovaries and ovarian cysts, and an increased incidence of cancer.

As a study in eschatological journalism, the case of estrogen replacement therapy bears looking at more closely. Coverage of estrogen replacement therapy (now called hormonal replacement therapy) began in 1963. The promotional journalistic hype in this case relied on the progressive image of estrogen replacement therapy (ERT) as a “cure for growing old.” Typical headlines were: “Women Forever Young” and “Preventing Menopause.” An Associated Press (AP) article quoted as fact the statement of a scientist asserting that “there is no reason why they [women] should grow old”¹ (quoted in Nelkin, p. 45). This article and others portrayed doctors reluctant to prescribe estrogen as archaic, and maintained that there were no scientific reasons for withholding this treatment from women. The news media emphasized estrogen’s progressive role in keeping women young.

This was a message very popular with female readers, but it was also a message calculated to make headlines. The major experts promoting ERT, and making their materials available to the news media, were two doctors who stood to gain much from the coverage. Author of the well-known book, *Feminine Forever*, Dr. Robert Wilson was also a gynecologist whose research on estrogen was funded by drug firms. In fact, he directed a foundation whose sole mission was to publish and distribute reports and recommendations about specific products, among them ERT. He and other scientists minimized the links between estrogens and cancer that were

increasingly becoming known. They mailed advocacy materials to newspapers and especially to women’s magazines throughout the country, and many promotional articles appeared as a result of their massive public relations efforts. The slogan became “femininity need not fade at fifty.”

Another medical advocate was Dr. Robert A. Kistner, a professor of gynecology at the Harvard Medical School, and regular consultant to drug companies. He wrote many popular articles on ERT which appeared in women’s magazines. Even after the U.S. Food and Drug Administration (FDA) had issued warnings about the relationship between ERT and endometrial cancer in 1969, he was publically critical of the warnings and the studies they were based on.

Popular articles continued to promote ERT after the much-publicized U.S. congressional hearings in 1970 that brought more public attention to the negative effects of estrogen drugs. “The press responded, conveying the message that using estrogen for birth control could be harmful for health” (Nelkin, 1987, p. 47). But using estrogen for menopause continued to be recommended in 1974 for “extra years of vitality,” and the cancer worries were called a “needless fear” in *Vogue*. Even when a 1975 article in the *New England Journal of Medicine* definitively linked ERT to increased risk of endometrial cancer and was widely summarized in the popular press, many doctors said they would still prescribe ERT.

In 1976, Ayerst Laboratories, the manufacturer of estrogen drugs, hired the public relations company of Hill and Knowlton to counteract the unfavorable publicity. Hill and Knowlton recommended that Ayerst contact science editors of major newspaper, avoiding any promotion of the use of estrogens, but instead concentrate on the menopause. In other words, they encouraged press coverage that sidestepped questions about the effects of estrogens.

Estrogen replacement therapy was resurrected in the 1980s as “hormonal replacement therapy” (HRT) – a new name and, supposedly a new drug. By combining estrogen with progestin, the drug companies hoped to circumvent earlier warnings about ERT. The press now acknowledged problems with estrogen taken *alone*, but promoted the new mix of estrogen and progestin as offsetting the earlier risks to women of estrogen taken by itself. Despite the bad reputation of estrogen replacement therapy, it is now back as hormonal replacement therapy, along with claims that it’s safer and more effective than ever. The press now played up the role of progestin in counteracting the danger of endometrial cancer. Dangers, however, have not disappeared.

Whereas the media had earlier promoted HRT as reversing the effects of aging, it now upheld HRT’s role in preventing osteoporosis. Ayerst again conducted a public relations campaign through major U.S. women’s magazines such as *Redbook* and *Women’s Day*, trumpeting the use of its drug, Premarin, for the debilitating disease of osteoporosis. The debilitating disease had changed – in the 1960s and 1970s, it was aging for women. In the 1980s, it is osteoporosis.

The active role of the pharmaceutical industry, and its mediation in the press, has been crucial in the construction of ruinous female pathologies for which drugs are the major answer. The two go together – the creation of the debilitating disease and then the arresting drug. These two are modified depending on time, place, and the media pendulum swing from progress to peril.

Once more, after an initial outburst of favorable coverage in the early 1980s, the press began to chronicle studies of more unfavorable developments. In 1989, the *Washington Post*, repeating articles that had appeared in other major mainstream media, reported: “Hormone Use in Menopause Tied to Cancer.” The study, which had been published

in the *New England Journal of Medicine*, found that combination therapy may increase the results of developing breast cancer. Other reports maintained that while estrogen might increase a woman’s chances of developing breast cancer, it helped to ward off heart disease. Again, the media seesaw teetered on the brink of progress/pitfall.

What is to be learned from this past history of progress? First, that scientists and the media use the same eschatological language today as they sell the wonders of reproductive technologies. A vulnerable infertile population is willing to try anything that offers a ray of hope and that is touted as innovation.

In the debate over embryo research in England, a group called Progress claimed that embryo research was necessary to cure and prevent infertility, to prevent miscarriage, to improve contraception, and to prevent genetic disease. An embryologist writing in the *New Scientist* was prompted to write: “Is this really the case? If we look behind the rhetoric it is clear that human embryologists are somewhat confused about what they intend to do next with the limited amount of experimental material available to them” (Rayner, 1986, p. 54).

Second, medical history is filled with examples of past miracle technologies that later proved disillusioning, if not outrightly dangerous. I have illustrated one case history of estrogen replacement therapy. The DES, thalidomide, Dalkon Shield, Depo-Provera, birth control pills, and fertility drug devastations, all mentioned above, could be written about much more extensively. Defenders of progress may be tempted to dismiss these cases as anecdotal or as exceptions to the progressive history of modern medicine. Unfortunately, they are as much the rule as they are the exception. Diana Dutton has pointed out that it is possible to evaluate medical innovation rigorously. “According to a federally commissioned study, less than half of the drugs sold between

1938 and 1962 were effective for claimed therapeutic purposes. Similarly, careful evaluation of a broad range of modern medical and surgical innovations has shown that only half offered improvements over standard practice, even without considering the costs” (Dutton, 1988, p. 4).

These statistics confirm what other critics of medical progress, such as Rene Dubos and Ivan Illich, have maintained earlier. The most significant therapies have come from environmental and public health innovations and changes. As Dubos wrote in 1959, sanitation measures and changes in environmental conditions, not medical technical measures, account for most modern health improvements.

. . . while modern science can boast of so many startling achievements in the health fields, its role has not been so unique and its effectiveness not so complete as is commonly claimed. In reality ... the monstrous specter of infection had become but an enfeebled shadow of its former self by the time serums, vaccines, and drugs became available to combat microbes. (Dubos, 1959, pp. 22–23)

Dubos points out that the overall increase in life expectancy over the last 100 years is due to the decrease in infant mortality and control of childhood diseases, which, in turn, resulted from better nutrition and sanitary practice than from the introduction of new drugs. He reminds us that very little progress has been made in the control of the adult killer diseases, such as cancer and heart ailments, since the work of the 19th-century public health and environmental reformers.

More recently, Thomas McKeown has shown that for most disease, western medicine’s preoccupation with technological and therapeutic intervention is misguided and that more attention should be given to the effects of social and economic circumstances

(McKeown, 1979). Yet for medicine and for most of the public, greater health and the conquest of disease mean more technology. “So deeply imbedded is the role of technology in our culture that the term ‘innovation’ is often used as if it were synonymous with technological innovation” (Dutton, 1988, p. 25). The same could be said about the idea of progress – it most often means technological advancement.

Third, we learn from this history how crucial the charge of antitechnology has been in discrediting opponents of a medical-technical fix. And along with this is a scientific intolerance for the views and values of nonexperts and a minimizing or exclusion of critical perspectives in the press.

Finally, I will predict that many will interpret this chronicle of estrogen replacement therapy as antitechnology. Thus I underscore that this history, and its final summary, is neither anti- nor protechnology. It is intended to set a context that is necessary in looking at the present state of reproductive technologies, and to right the balance of an unbalanced reliance on medical progress.

ANTISCIENCE AND ANTITECHNOLOGY

Technological progress has become a sort of secular religion and antitechnology, a control mechanism for marginalizing criticism. In the United States, being called antitechnology is almost like being called a communist. Antitechnology is the ultimate evil haunting western science and technology. This ideology helps mobilize the public against the critics of particular technologies. Because the idea is fuzzy, it can be used against anybody advocating even a thoughtful consideration of risks and benefits. Critics and concerned citizens are kept on the defensive by this label under great pressure to pay homage to advances in technology. And often they are lured into criticizing perhaps the more radical

critics as Luddites, faddists, and back-to-nature romantics.

The not-so-subtle message in this antitechnology name calling is that sophisticated, progressive people are not unalterably opposed to anything technological. That's simplistic, retrogressive, and absolutist and doesn't account for the vast range of nuances that a more complex calculus of the issues would recognize. This sophistication, however, masks a passivity whereby the sophisticates actually capitulate to the technologies and philosophies of progress that must march on at all costs to female life and well-being.

We are asked to believe in the progress of science. Yet, at the same time, we have seen how science is publicity-driven, that is, what gets defined as *scientific progress* is often the result of a carefully staged public relations campaign in which the substance of the science itself is not even discussed.

Science is also technology-driven. But scientists have been fond of retaining a distinction between science and technology that goes something like this: science is a particular way of knowing or body of knowledge, and technology is a particular kind of practice. However, the reason why science first succeeded was its ability to produce technology. "The proof is in the pudding," or as Langdon Winner has put it, "... the popular proof of science is technology. This is why we consider Bacon prophetic, Paracelsus quaint" (Winner, 1977, p. 25). Jacques Ellul and others have pointed out that there is no longer any meaningful distinction between science and technique – what passes for science has become so thoroughly technicized that it is now driven by technological innovation, which is a sort of technological determinism.

Since science has gone to Wall Street and the U.S. patent office, not to mention the corporate and governmental grants that keep certain research results flowing, science selects

for even more specific technological goals. One could say, in fact, that the ideal of science as a way of knowing, a free flow of ideas, and an open community of exchange is arcane. As Stanford biochemist Paul Berg said in 1979, "You go to scientific meetings and people whisper to each other about their company's products. It's like a secret society" (quoted in Dutton, 1988, p. 215).

University science faculty have consulting arrangements with industry, and growing numbers of them have equity (ownership) position in corporate ventures. "In 1984, nearly half of all biotechnology companies in the United States provided some kind of funding for university-based genetic engineering research" (Dutton, 1988, p. 206). Add to this the notion of intellectual property – not of recognition and esteem for one's work so acknowledged – but in the form of patenting of new-life forms. The distinction between science and technology collapses all the more. It is no longer curiosity that propels the science, but the future technology of new commercial products and possibilities. "A government study of over 100 cooperative university-industry research projects found that industry and university scientists both ranked development of 'patentable products' as the most important goal of their joint research" (cited in Dutton, 1988, p. 215).

In this climate of modernity, then, can we not reverse the labels and suggest that *it is technology that has become antiscience*? Technology has swallowed up science abrogating its autonomous ways of knowing. *The problem is not one of dissidents being antitechnology, but of technology being antiscience*, cutting off its independent spirit of inquiry and shackling science to preferred and profitable techniques. To particularize this even further, the problem is one of many scientists being antiscience.

Essentially, what is labelled an antitechnology stance is the belief that our most important health needs do not necessarily

require more technology. They may require more science, in the broadest sense of that term. Feminist critics of reproductive technologies contend, for example, that there is already too much technical intervention into women's bodies. Too often, technological solutions leave women ravaged, as we saw in the case of estrogen/hormonal replacement therapy. Reproduction is not fundamentally an issue of technology.

A genuine science puts its knowledge in context, not outside it. Technology is one aspect of this context. This kind of science is thus ecological, in the sense that it recognizes that everything is related to everything else. The value of a technology must be judged not only by its consequences but by its purposes, and the means it uses to achieve these. While it is true that a technology can have unintended consequences, the history of estrogen replacement therapy and other techniques, tells a different story. Many of these consequences were forecast, but the forecasters were not listened to.

Science is not only a way of knowing and a vision of the world. In its original meaning and practice, science incorporates a wisdom of values, priorities, and limits. This is as intrinsic to the scientific task as its empirical methods. Science journalism should exercise a similar wisdom of values, priorities, and limits.

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ENDNOTE

1. This discussion of estrogen replacement therapy and the media's role draws heavily on Dorothy Nelkin's excellent analysis. See Nelkin. (1987).