Technology Review

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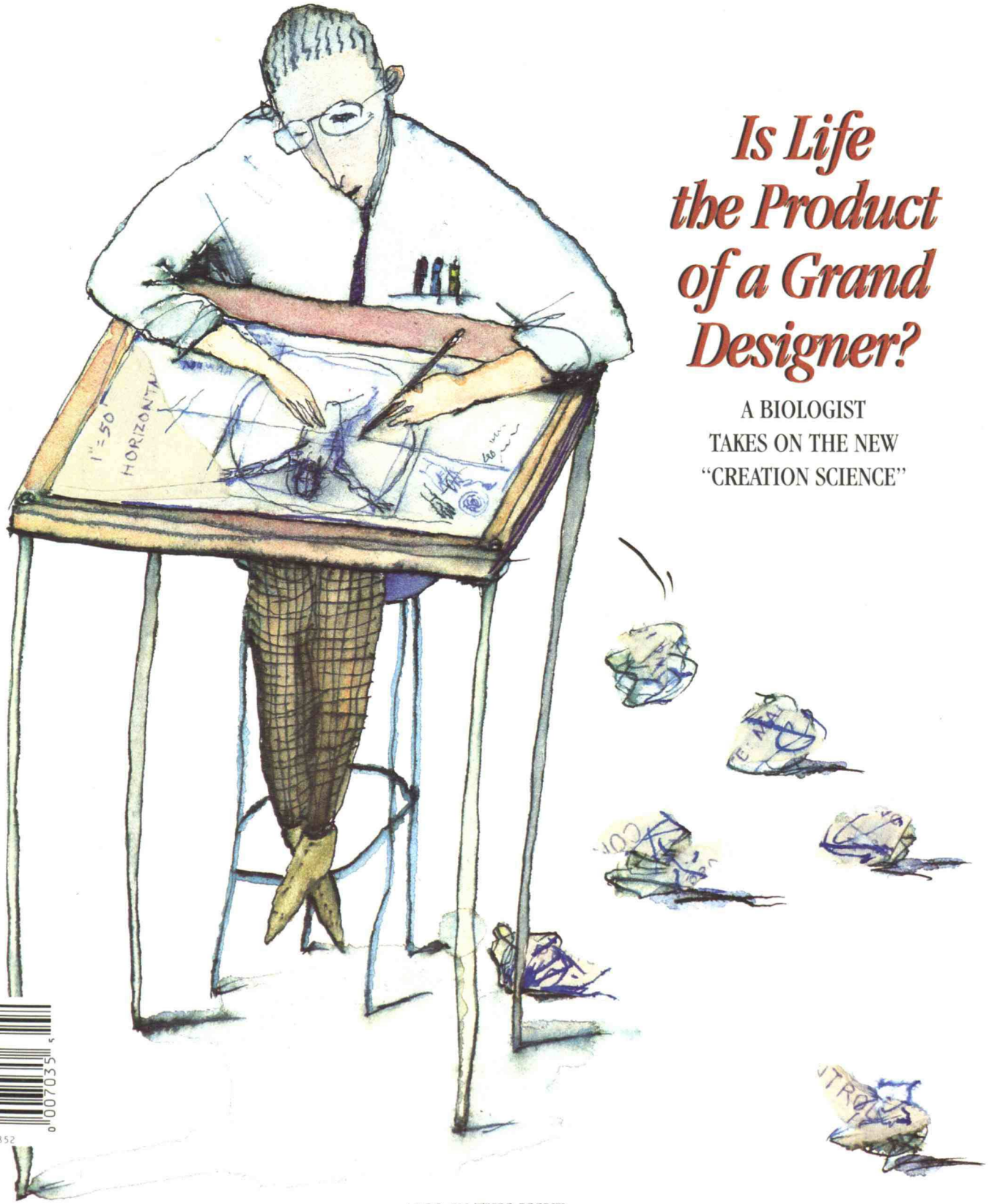

Is Life the Product of a Grand Designer?

A BIOLOGIST TAKES ON THE NEW "CREATION SCIENCE"

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FEBRUARY/MARCH 1994

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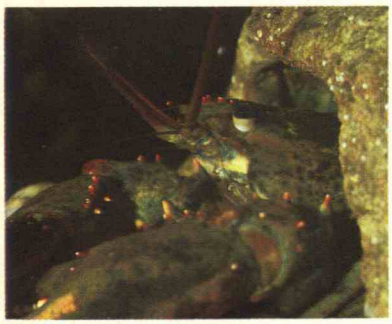

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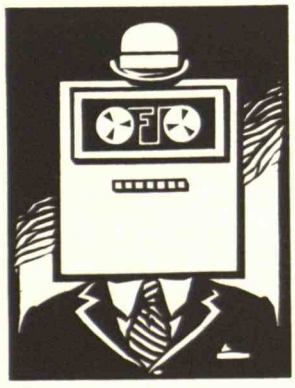

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First Line

The Latest in a Series

In my previous job as editor of *Issues in Science and Technology*, one of our advisers expressed worry one time about a too-steady drumbeat. "Steve," he whispered in my ear, "there are other health problems besides AIDS." The reference was to a series of articles we had been publishing, over a two-year period, on topics such as the AIDS research agenda, how to teach children about the disease, the spread of the AIDS epidemic in developing countries, and lower-cost but more humane ways to treat patients.

At *Technology Review*, we've been running a comparable series over the past couple of years, and I keep wondering if someone will similarly point out that "there are other people besides women." We have lately presented, among other stories, "Women of the Manhattan Project," "Confronting Breast Cancer," an excerpt from a historian's book-length analysis of centuries-old barriers to women in science and related fields, and an article on efforts to build a women's engineering institute. In this issue, we offer "Training Doctors to Care for Women," which reports on the medical community's heated debate over a proposed new specialty in women's health.

So why all that AIDS discussion back then, and why the seeming preoccupation with women now? Does either case force upon our readers some editor's personal agenda?

Actually, these articles were driven not by editorial design but by world events and principal players, some of whom became authors or major sources. In the case of AIDS, the articles were inspired by a potent and inevitably fatal new disease that had nevertheless been largely overlooked and inadequately prepared for. In the case of women, the articles have been impelled by an altogether different "disease," one that has long rendered gross injustice to half of humanity but that has become particularly timely because of the ideas of informed and influential people determined to subdue it once and for all.

Our duty as journalists is to recognize and report on such emerging and critical issues. And our duty as *Technology Review* editors is not only to illuminate yet another critical aspect of our beat of "technology and its implications" but to empower our audience—to present readers with material, covered lightly or not at all elsewhere, in sufficient depth and breadth so that they can take action to address the situation themselves if they wish.

Sometimes a single installment is just not enough.

Women clearly enjoy fewer opportunities to pursue science- and technology-related careers to the full extent of their abilities: in fields that are seemingly open, they usually rise only as far as the infamous "glass ceiling"; in others, they often don't begin rising in the first place, held down by an equally infamous "sticky floor." In either case, they receive less recognition and lower pay than men of equivalent competence.

The problem is certainly well known, and *TR* has no intention of belaboring it. We seek to concentrate instead on what thoughtful protagonists in the drama, and those who influence them, propose to do about it.

This issue's "Training Doctors to Care for Women," by physician Adriane Fugh-Berman, is a prime example. And it addresses solutions that reflect the growing trend of "separateness"—segregation, at least occasionally, in order to build peer groups, establish role models, encourage specific strengths that often get suppressed in mixed groups, and deliver improved performances. For example, building in part on the remarkable fact that women's liberal-arts colleges have long produced disproportionately more female scientists than coed schools, some proposals would take the trend to its limit and establish all-female science and engineering academies (*see "A Women's Institute of Technology?" TR April 1992*).

Similarly, experiments in primary and secondary education are under way in which girls receive instruction in science and math separately from boys. Advocates argue that such arrangements serve male and female students alike, who can then function in class in ways that best suit their sex, especially at that time in their lives.

A similar though far more extensive system is envisioned for health care: establishing medical practices administered mostly by women and exclusively for female patients. Advocates insist that this is not only a good way to improve efficiency and eliminate lapses in communication—a woman's routine health care is typically fragmented among several practitioners—but that it would much improve the quality of female health care, which, as Fugh-Berman notes, "remains deficient."

Such separation is not envisioned as the only game in town, much as girls' high-school math courses or women's engineering schools will not likely predominate. Instead, a specialty in women's health could provide a center of excellence that would spread the wealth. "The status of a specialty," asserts one of the advocates cited by the author, will "improve conditions for women by creating an identifiable pool of experts from which doctors in other specialties will learn."

Such a power base could improve health care not only for women. "It may even have a substantial impact on medicine in general," suggests Fugh-Berman, "since the philosophy behind a women's health specialty, which emphasizes treating the patient as a whole person and establishing a partnership between patient and physician, is something that many people, men and women alike, are eager to learn how to put into practice." ■

—Steven J. Marcus

TechnologyReview

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Letters

THE REAL VALUE OF THE SPACE PROGRAM

In "What Price, Columbus?" (*TR Forum, November/December 1993*), Alex Roland compares the gold and silver brought back by the Spanish treasure ships to the moon rocks brought back by the Apollo astronauts. This misses the mark entirely. The real value of the space program lies in helping to launch the information age.

Today earth satellites provide us with global communications, weather surveillance, treaty verification, and earth studies not otherwise possible. Although it will be a long time before we are able to assess the space program's impact on our lives, it is already clear that we are deriving far more benefit from it than the Spanish ever did from their treasure ships.

ALBERT M. CARTER
Greensboro, N.C.

SOVIET NUCLEAR LEGACY

In "Palchinsky's Travels" (*TR November/December 1993*), Loren R. Graham provides clues to the demise of the Soviet Union as well as important lessons for the education of engineers. Unfortunately, the effects of the former Soviet Union's "intellectually impoverished . . . and ethically lame" engineering education live on today.

During the Cold War, the former Soviet Union routinely dumped high-level nuclear waste into the earth's air, land, and water. In March 1993, a report issued by the Russian Federation indicated that the USSR had dumped 18 nuclear reactors from submarines and an icebreaker into the shallow waters of the Kara Sea and the Sea of Japan. The Kara Sea site, near major northern fisheries, is now known as the world's largest nuclear dump.

Such policies did not end with the Soviet Union. In October 1993, Russian officials claimed they had "no choice" but to keep dumping nuclear waste at sea. This announcement came after Japan protested that Russia had dumped some 900 tons of low-level nuclear waste from decommissioned nuclear submarines into the Sea of Japan.

J. RICHARD SHANEBROOK
Professor of Mechanical Engineering
Union College
Schenectady, N.Y.

NO SOFTWARE DEVELOPMENT IN DEVELOPING COUNTRIES

I share the concern of Suzanne P. Weisband and Seymour E. Goodman about the use of illegally copied software in developing countries (*"Subduing Software Pirates," TR October 1993*). I am from a developing country myself, and I have worked in another developing country where you can purchase a pirated copy of the latest version of Lotus 1-2-3 for a dollar per diskette (although its copied software manual costs at least $50).

In general, software now sold legally in developing countries costs about five times what it does in the United States. Computers are rather expensive to begin with, and adding high software prices puts them out of reach for many, especially students. Furthermore, if people don't have access to computers, they may never become computer literate, which could hurt the software industry. After all, only computer literate people can buy and use software.

But I do not believe that helping firms

in developing countries create original software, as the authors suggest, is an answer to the problem. Rather, it is in the interest of U.S. software companies to prevent piracy by making sure their products are sold in those countries at a price comparable to or lower than the U.S. price. People naturally want to use Lotus 1-2-3, Quattro Pro, or some other such program for their spreadsheets. Nobody would want to learn a different and inferior spreadsheet program when a better one is available and its compatibility is assured.

A. KERIM KAR
Visiting Lecturer
Department of Mechanical Engineering
MIT

NO DIRECT FEDERAL SUPPORT

In "Nurturing Winners with Federal R&D" (*TR November/December 1993*), Don E. Kash and Robert W. Rycroft correctly note that government support for science is "cumbersome and ineffective." Spinoff benefits from federal projects do indeed arise "randomly and at great cost," if at all. But I do not agree that "federal support of commercial technologies has to be more direct."

In fact, federal R&D spending makes sense only if markets systematically underinvest in technological R&D, and there is no reason to believe that this is the case. Even if it were, Kash and Rycroft wouldn't know what to do about it: they want the federal government to "establish a well-funded but politically insulated corporation." In Washington, D.C.? No doubt if these authors were in charge, federal R&D spending would produce much benefit. But as long as politicians occupy Congress, techno-pork projects will just happen to wind up going to the home states of the politically powerful.

JOHN O'LEARY
Reason Foundation
Los Angeles, Calif.

DRAWBACKS OF BUSES

Even a first-time reader could pick at the loose threads of Nira Worcman's

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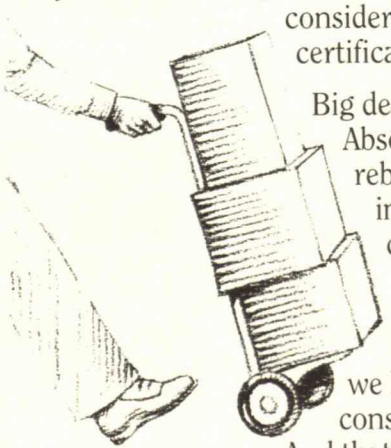

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"Boom and Bus" *(TR Trends, November/December 1993)*. For example, how many lanes of traffic are used by the buses that supposedly rival the transport capacity of one subway line? Would it even be possible to substitute the necessary number of buses for a subway? Still less believable is the claim that the government need not subsidize buses—it's backed by nothing. Substituting for real information are a picture of a glossy new bus and equally glossy statements from proponents.

In reality, the bus remains a labor-intensive, air-polluting stopgap measure, and its main charm is the ease with which service can be cut back or eliminated. In a more perfect world, engineers would be among the first to realize that no miracle of "competition" will cancel the inherent efficiency of steel wheel on rail, the long-term savings of a right-of-way, or the cleanliness of electric propulsion. What's more, the "price-setting strategy and competition" behind buses seem likely to encourage the use of unqualified drivers and discourage proper maintenance and replacement schedules.

In the long run, the bus strategy will result in polluted suburban development with no substantial investment in cost-effective urban transport. The scenario is suitable, in the World Bank's view, for a population controlled by the army of Brazil, but it's worth noting that Portland, Sacramento, San Jose, and San Diego are not interested. These cities, all of which have efficient light-rail lines, have experienced the bus era and decided they need something better. It will be interesting to see what the people of Brazil choose when—or if—they gain the ability to make a choice.

TERRY SCOTT
Seattle, Wash.

EDUCATION VS. LEARNING

In "Video Games that Teach?" *(TR November/December 1993)*, Herb Brody seems unwilling to admit the inescapable conclusion of his own analysis: that education is the adversary of learning. The simulation gaming technology he persists in treating as mere entertainment is in fact a key component of learning—and one that is becoming more and more important. In the unfettered gaming environment, the learner is truly empowered. Every effort to coopt the technology to "educational" ends works to quash that power.

The point is that education is something done to people, while learning is what people are genetically designed to do for themselves. To fail to recognize this absolute and inevitable conflict is to remain rooted in an erroneous model of learning contrived for a factory economy whose time has long since passed. The term "edutainment" resembles "horseless carriage": it implicitly recognizes that something new has arrived while clinging pathetically to the vestige of a dead era.

LEWIS J. PERELMAN
Senior Fellow
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Seattle, Wash.

LIMITS OF MARROW TRANSPLANTS

As Ronald Kline notes in "New Marrow for Old" *(TR November/December 1993)*, bone marrow transplantation, or BMT, may someday be used to treat currently incurable or debilitating conditions. But for now, the procedure should be performed only in the context of well-designed clinical trials.

Curing a genetic disease, for instance, may not reverse damage that occurred before or during BMT. A history of stroke, the most common indication for bone marrow transplantation in patients with sickle cell anemia, could mean there has been so much vascular damage that the risk of future strokes would remain despite a completely successful transplant.

Also, BMT may accelerate the accumulation of toxins from metabolic processes, and these may not be cleared for 6 months or longer. Thus, a transplant may actually hasten degeneration of neurological function. In fact, one study of BMT for sickle cell disease is being reviewed because of several debilitating or fatal neurological events among "cured" transplant recipients.

Similarly difficult issues must be considered in using BMT to treat cancer. For example, the efficacy of one form of transplantation—that of removing a patient's marrow, purging the malignant cells, and then reinfusing it—has yet to be demonstrated. Indeed, many of the studies of this therapy have been carried out in clinical situations where the risk of relapse would exceed 50 percent even if the patient were receiving marrow from a donor known to be free of disease.

In this era of limited resources, the availability of a treatment is not enough justification to use it. We must recognize that we are not entering a medical shopping mall with a credit card and infinite credit.

Rather, we must rigorously demonstrate that BMT is better than alternative therapies as measured by disease-free survival, quality of life, and cost. Alternative approaches must include preventive strategies, such as prenatal diagnosis and screening, as well as therapeutic interventions.

STEPHEN A. FEIG
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Chief, Division of Hematology/Oncology
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DISCRIMINATION: THE WAY IT WAS

"Women of the Manhattan Project" by Caroline Herzenberg and Ruth Howes *(TR November/December 1993)* opened my eyes. Most of us working at the lower levels of the project knew little of what was going on if it wasn't right around us.

I was a graduate student in organic