# Technology Review

EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY APRIL 1993 $3.75


## *Pulling Together for Free Trade*

CLYDE PRESTOWITZ ON MAKING THE TREATY WORK

ALSO IN THIS ISSUE:

ENDING THE SCOURGE OF CHEMICAL WEAPONS

NORWAY'S BRUNDTLAND ON SUSTAINABLE DEVELOPMENT

HOW TO KEEP THE OCEANS OIL FREE

LESSONS FROM THE FUTURE

# Ask the engineer an American car


*1993 Chrysler Town & Country*

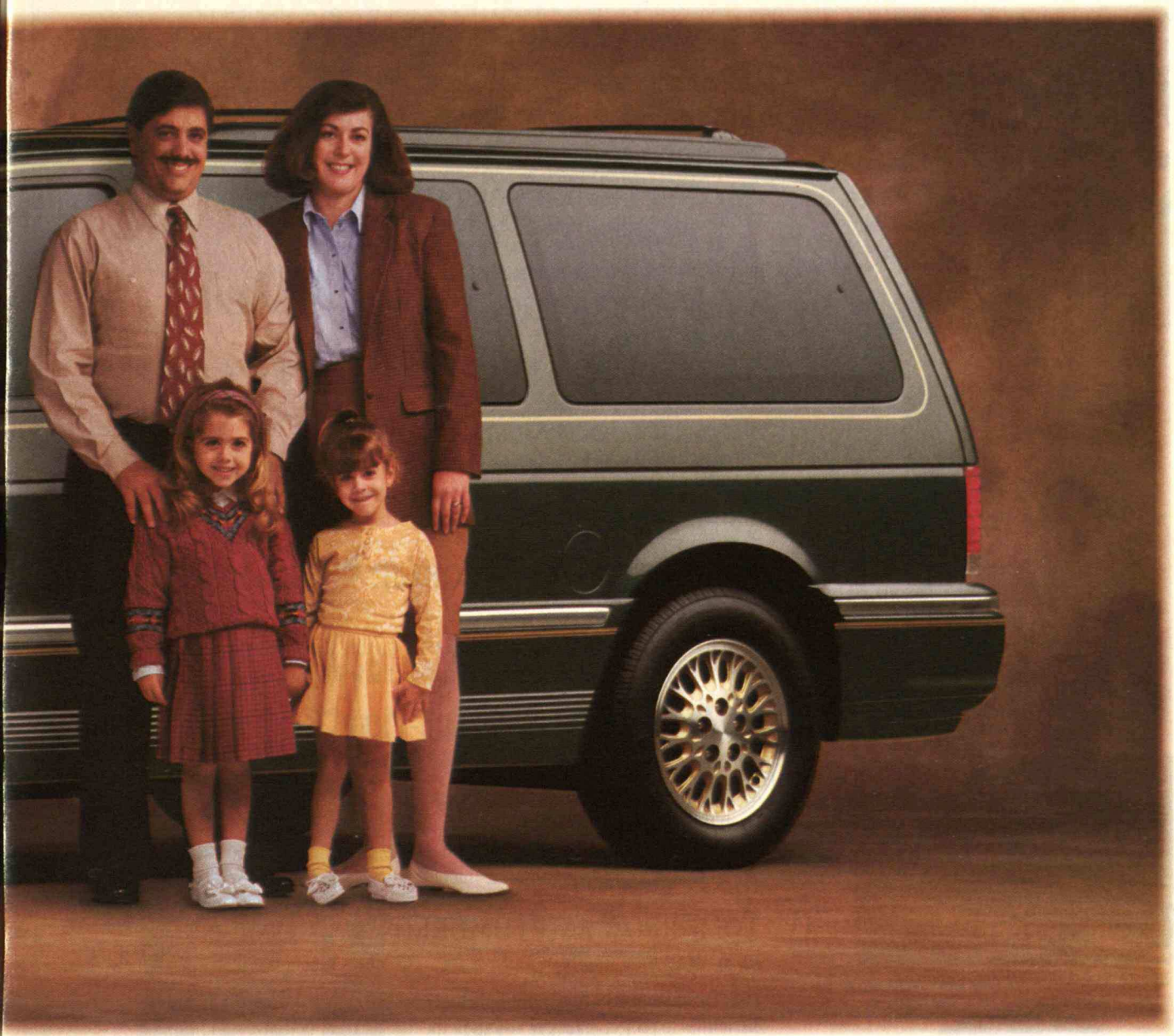
Ask David and Lisa Tarnosky, from Houston, Texas. They hadn't owned an American vehicle since 1979.

But that was before their kids tried out a 1992 Chrysler Town & Country minivan.

"Marissa and Natalie jumped in and started playing right there in the showroom. We figured they wouldn't let us go home without it.

"With all the features we were able to order, it seemed crazy not to buy a Town & Country. The

# who hadn't owned in over ten years.



airbag.† The anti-lock brakes. The separate air conditioning for the back seats.

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CHRYSLER
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TECHNOLOGY REVIEW
APRIL 1993

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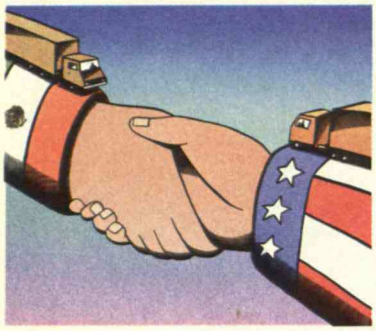

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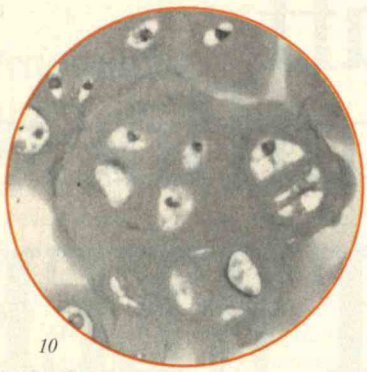

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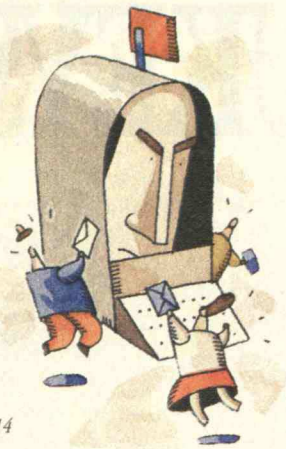

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## DEPARTMENTS



**Technology Review** (ISSN 0040-1692), Reg. U.S. Patent Office, is published eight times each year (January, February/March, April, May/June, July, August/September, October, and November/December) by the Association of Alumni and Alumnae of the Massachusetts Institute of Technology. Entire contents ©1993. The editors seek diverse views, and authors' opinions do not represent official MIT policy. We welcome letters to the editor. Please address them to Letters Editor.

**Editorial, circulation, and advertising offices**: *Technology Review*, Building W59, MIT, Cambridge, MA 02139, (617) 253-8250; FAX (617) 258-7264. Printed by Lane Press, S. Burlington, VT. Second-class postage paid at Boston, MA and additional mailing offices. Postmaster: send address changes to *Technology Review*, MIT, Building W59, Cambridge, MA 02139.

**Subscriptions**: $30 per year. Canada add $6, other foreign countries add $12. Contact *Technology Review*, P.O. Box 489, Mount Morris, IL 61054, (800) 877-5230 or (815) 734-1116; FAX (815) 734-1127.

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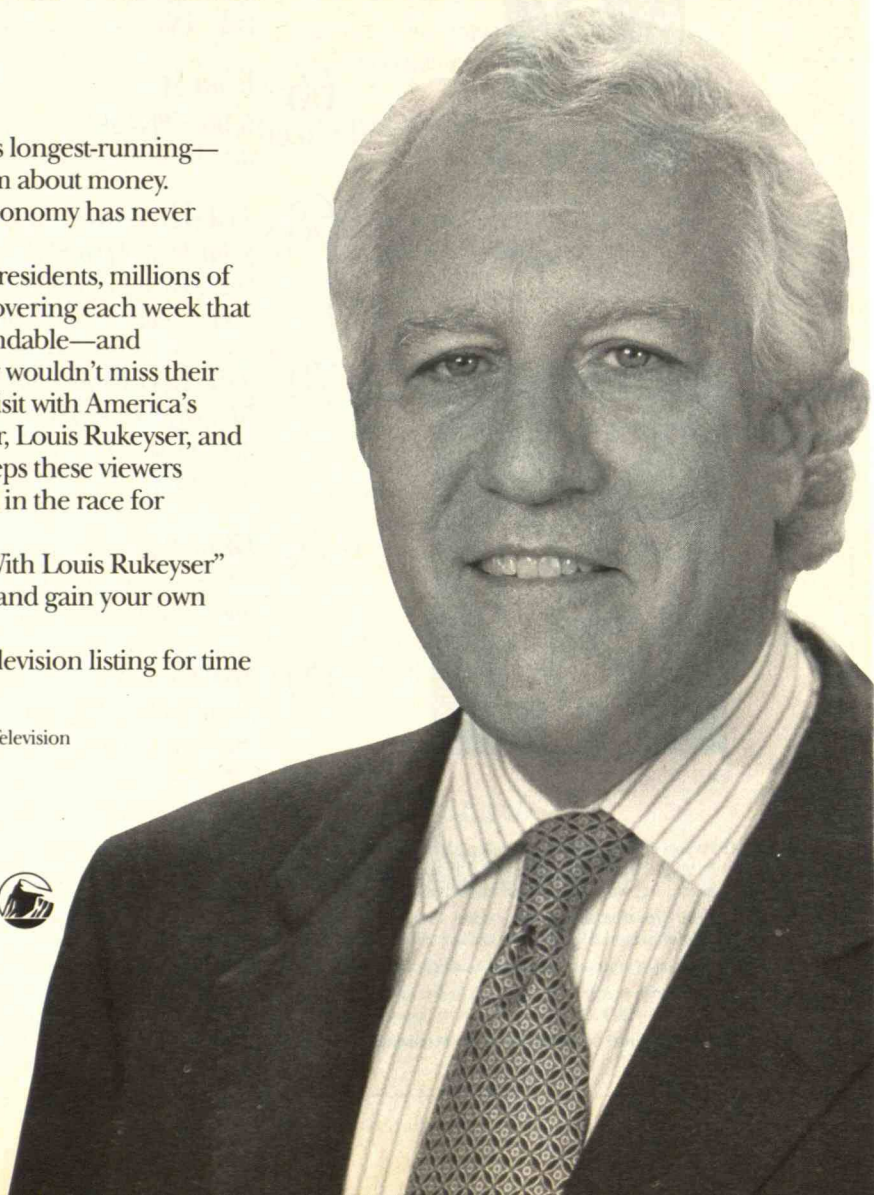

# First Line

## A Pragmatist in the White House

"Science advising at the top often resembles unrequited love," observed Daniel S. Greenberg, editor of *Science & Government Report*, in last month's *Technology Review*. While scientists are ardent in trying to edify the president, their attentions are usually spurned.

One reason is that science advisers tend to be politically naive. Unfamiliar with Washington-style negotiation and compromise, and frequently representing the interests of the science community more than those of the president, they are soon consigned to oblivion by White House staffers.

Another reason is that science advisers' recommendations, even if they reach the chief executive's ear, are of limited value because they generally concern basic research rather than the practical applications of science that directly relate to the well-being and prosperity of the country.

But there's a new day in Washington. Bill Clinton's science adviser—John H. Gibbons, director of the congressional Office of Technology Assessment since 1979—leans toward the pragmatic. A physicist by training, Gibbons shifted into technology policy early in his career. Before going to OTA, he led the environmental studies program at Oak Ridge National Laboratory, directed the Energy, Environment, and Resource Center at the University of Tennessee, and headed conservation programs at the Federal Energy Administration.

Along the way, Gibbons apparently came to believe that greater payoff can often be derived from using less and that symptoms of economic trouble, such as pollution, are best addressed at their roots. As he wrote in "The Conservator Society" (a 1988 article in *Issues in Science and Technology*), "long-recognized problems—acid rain, urban and regional air pollution, species extinction, water degradation, human dislocation, and capital shortages and debt—like global warming, all reflect the inefficient use of resources." He argued that the "careful stewardship of resources" was therefore essential to economic growth both at home and abroad. Such a point of view nicely complements that of the president, who has asserted that "our future depends on maintaining a sustainable environment, on conserving our resources [to] create economic opportunity."

This science adviser is also politically savvy, familiar with the ways of Washington, and of Capitol Hill in particular. During his 13 years at the helm of OTA, the agency—working in a hardball arena of easily dissatisfied patrons—turned out a steady stream of technology-policy studies notable for their usefulness to congressional decision makers. These reports drew on reliable expert knowledge and judgment, and they featured ranges of practical alternatives rather than partisan or advocacy-style conclusions. As Gibbons told *Technology Review* editors in a 1988 interview, his experience at OTA helped teach him how to "delve into critical political issues and not get blown up in the process."

*The new science adviser appreciates the importance of practical considerations.*

Gibbons's emphasis on technology policy, his experience at helping formulate that policy, and his survival abilities in highly charged political environments should make him not only an effective science adviser to the president but a useful colleague for the whole Clinton team. He could be of particular value to Vice-President Al Gore, the designated technology czar, himself no slouch among technology aficionados.

Gibbons could also complement the erudite but practical orientation of Laura D'Andrea Tyson, chief of Clinton's Council of Economic Advisers. Tyson is "an unconventional economist with a dazzling intellect," wrote *Boston Globe* columnist Bob Kuttner, "who chooses to work in English rather than algebra and to study the real economy rather than build sand castles."

Gibbons seems to appreciate that solutions to public-policy problems must transcend disciplines and involve more than technical fixes. When introduced to the press by Clinton in December, Gibbons reiterated that "our security and prosperity depend as never before on the sustained support of science and the thoughtful use of technology." But as he told his *Technology Review* interviewers a few years before, "part of the answer" to U.S. problems in world trade "will depend on how much attention we pay to social issues such as education. In the long term our economic hopes depend on human resources. So far we haven't spent much time thinking about the social processes by which we manage technology."

Such a human-centered approach appears to sit well with the new administration. We've heard less from Clinton on such exotica as space stations and superconducting supercolliders and considerably more on social mechanisms such as technology extension services, a new civilian technology agency, and government-industry partnerships. The president has also assigned great priority to education and training—prominent components of his much cherished emphasis on "infrastructure."

Gibbons even complements the administration in its monumental challenge to pursue such programs for improving things in the here and now while maintaining reasonable levels of basic research for the future—and at the same time keeping the tab manageable. One of Gibbons's specialties, he told *TR* interviewers, is "trying to figure out how to do something for less." ■

—STEVEN J. MARCUS

# Letters

## LIFE ON FILM

In "Photographing the Miracle of Life" (*TR November/December 1992*), Joelle Bentley presents an excellent biography of Lennart Nilsson. Unless you have worked in the field of medical imaging, it is hard to appreciate the monumental contribution Nilsson has made to the public understanding of both the anatomy and the pathology of the human body.

He is a true visionary and pioneer. To my knowledge, he was the first investigator to place a catheter, a light, and a lens at the end of a fiber optic cable to see deep inside the body. Today needles, catheters, and fiber-thin wands are performing miracle operations guided by miniature sensors—"seeing eyes" threaded into body cavities and the bloodstream. Entire surgical procedures are viewed by a surgeon on a television screen. And building on Nilsson's techniques, investigators are also making the entire range of the electromagnetic spectrum visible.

Ernest Haas, the late great philosopher-photographer, once advised his students to "do what no one else is doing in photography and do it better than anyone else." Nilsson has followed this advice.

HOWARD SOCHUREK
Delray Beach, Fla.

*The writer was a photographer for* Life *magazine from 1950 to 1970.*

## SUNUNU'S MINDSET

In "The Political Pleasures of Engineering" (*TR August/September 1992*), John Sununu displays at least four fundamental misconceptions. First, the assertion that there is no scientific basis for concern about global warming flies in the face of a broad consensus among atmospheric scientists. The Intergovernmental Panel on Climate Change estimates an average surface warming of 1.5 to 4.5° C over the next century in a business-as-usual scenario, with higher-than-average warming in temperate northern latitudes.

Second, the assertion that the United States cannot significantly reduce its $CO_2$ emissions without harming the economy runs contrary to both historical experience and a number of recent studies, including one from the National Academy of Sciences. The U.S. economy has grown by almost 60 percent since 1973 with no increase in $CO_2$ emissions. There is no reason to think that this trend cannot continue. My organization, the Alliance to Save Energy, recently joined the American Gas Association and the Solar Energy Industries Association in issuing a report that shows how more rapid deployment of energy-efficiency, renewable-energy, and natural-gas technologies could bring U.S. $CO_2$ emissions for 2010 12 percent below 1990 levels with no reduction in economic growth. Indeed, if we do not meet this challenge, we will lose world markets to our competitors.

Sununu's third misconception is that environmentalists want to stop economic development. In truth, mainstream environmental organizations have embraced the concept of sustainable development, which recognizes that economic growth and environmental protection are interdependent. The environmental community is working with industry to identify and promote new technologies that will simultaneously strengthen the economy and protect the environment.

And finally, Sununu's fourth misconception is that government has no major role to play in dealing with economic and environmental issues. The fact is that only government can make the market pay for the social costs and benefits of different options. Ideally, that job would be done through mechanisms such as pollution taxes rather than command-and-control regulations.

WILLIAM A. NITZE
President
The Alliance to Save Energy
Washington, D.C

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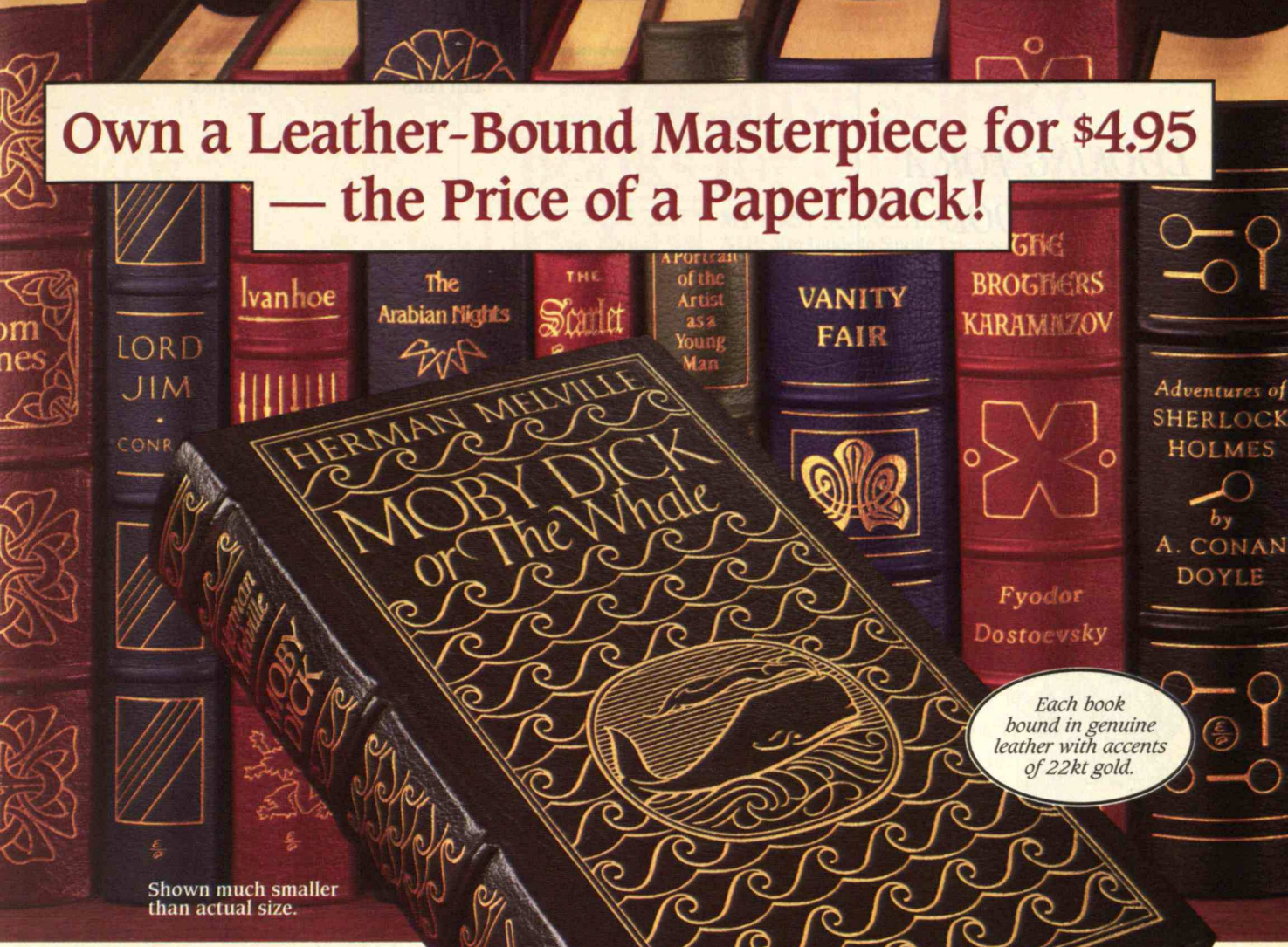


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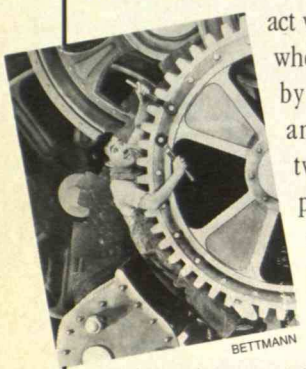
# LOOKING FOR A FEW GOOD PHOTOGRAPHERS

It may be your turn to display your work in a *Technology Review* photo essay. We are holding a photo contest on the general theme of "ENCOUNTERING THE MACHINE"—how people interact with technology, whether motivated by love, hate, or anything in between. We will publish a selection of the winning photographs later this year and award prizes of $500, $300, and $200 to the first-, second-, and third-place winners.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To enter, please send no more than six previously unpublished entries—prints or slides in a sleeve—to Photo Essay Contest, *Technology Review*, MIT, Bldg. W59-203, Cambridge, MA 02139. For sending entries by overnight mail, *Technology Review*'s street address is 201 Vassar St., Cambridge, MA 02139. All entries must be postmarked no later than June 1, 1993.

*Technology Review* acquires the right to publish the award-winning photographs, including honorable mentions, in one issue. Entries without return envelopes and sufficient postage will not be returned, and we cannot take responsibility for loss or damage. Please include cardboard for protection and your name on each slide cover or the back of each photograph, and note the type of film and photographic equipment used. We regret that we cannot take telephone calls about the contest.

Good luck!

## MARKETING ELECTRIC CARS

In "EVs: On the Road Again" (*TR August/September 1992*), Gill Andrews Pratt points out that the relatively short range and long recharge times of electric vehicles have prompted some manufacturers to concentrate on the fleet market and the "pure" commuter market—those people who own a second car almost exclusively for commuting. But a different strategy could open up the much larger market of households with only a single car, or with multiple cars, all of which are used for more than just commuting.

Aside from price, the major impediment to purchasing an EV as one's sole vehicle is the inability to use it for occasional extended trips. EV producers could substantially overcome that impediment by offering, say, discounts on occasional rentals of conventional cars, or even a weekend's free rental for every 1,000 miles the EV is driven.

ANTONY HODGSON
Harvard-MIT Division of Health Sciences and Technology

## REFRIGERATORS: BACK TO THE PAST

In "If It Ain't Broke, Don't Break It" (*TR October 1992*), Thomas Magliozzi voices his disenchantment with the design of household refrigerators. But I'd like to inform readers of a discontinued yet nearly perfect product from the once-great American consumer-pleasing corporation known as General Electric. Specifically, the product is the General Electric Wall Refrigerator-Freezer, model LW-11N, circa 1957-58. Our household enjoys two of them.

The LW-11N, which hangs on the wall like a kitchen cabinet, has a relatively shallow horizontal box with three side-by-side doors to minimize the "last in, first out" syndrome. Two eye-level compartments with lightweight easy-opening doors provide fresh-food storage. The unit also comes with a wall-mounted steel hanger for positioning it to suit the height of the household members who use it most.

Unfortunately, GE abandoned the LW-11N around 1960. It was relatively expensive and potential customers may have thought they were being cheated, since the conventional stand-up, deep-dimension boxes had greater storage capacity. But I have discovered that younger men and women tend to view our two LW-11Ns as something new and sort of wonderful, once they realize what it is that's hanging on the wall. Perhaps these admirers will be motivated to reintroduce the idea—using the most energy-efficient and low-noise mechanisms available, of course.

R.A. NUETZMAN
Pasadena, Calif.

## MAINTAINING AIR SUPERIORITY

In "The F-22: An Exercise in Overkill" (*TR August/September 1992*), David Callahan claims that the fighter plane is a bad investment because the F-15, which performed admirably in Desert Storm, is enough to maintain our air superiority. But even though the F-15 puts us ahead of the competition now, the situation is likely to change, and air superiority is crucial to our national security. As Will Rogers once said, "Even if you're on the right track, you can still get run over if you just sit there."

The success of American F-15s in Desert Storm should be seen as a validation of our past commitment to leading-edge technology—not as an excuse to ignore the inevitable aging of an aircraft's design and airframe. The Air Force will have to begin retiring those planes around the turn of the century as they reach the end of their service life—which is approximately 30 years, as has