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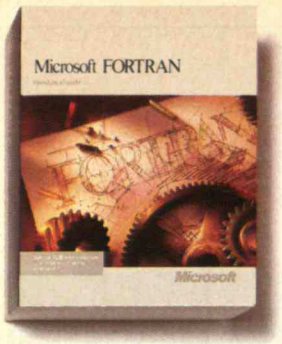

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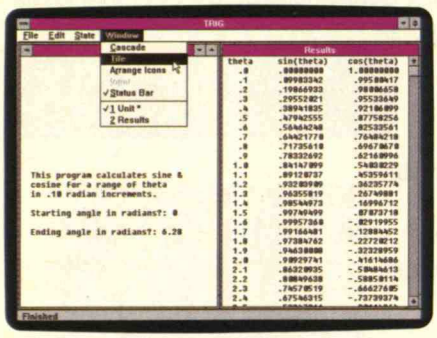

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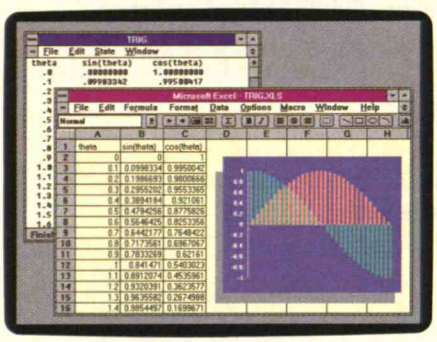

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- *Use the /MW option with the FL command to invoke the QuickWin library. For example: "FL/MW MYAPP.FOR" is all it takes to make MYAPP a Windows-based program.*
- *Use the ALLOCATE statement to dynamically size arrays and to access more than 16MB of memory on a 386.*

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First Line

Shutting Down the Ghetto

ACCORDING to a recent study by the Scientists' Institute for Public Information, science journalism in the United States is on a downward spiral. SIPI found that the number of weekly newspaper sections devoted to features on science and technology has dropped from a high of 95 in 1989 to 47 in 1992 and, as reported in its quarterly *SIPIscope*, that "most of those remaining are not in very good health."

"The overall impact" of the decline, concludes Fred Jerome, SIPI's executive vice-president, "is likely to be less science coverage." He cites Joel Greenberg, science editor of the *Los Angeles Times*, who calls it "a major loss for science."

Yet where exactly is the loss? On the one hand, Jerome suggests, the diminishment will adversely affect coverage of "the critical science policy issues facing our nation (e.g., science education, federal funding priorities, fetal tissue research, retooling our industrial base)." On the other hand, he observes, "such issues have *not* been the focus of most newspaper science sections, which have tended instead to emphasize medical discoveries, technological inventions, and breakthrough-of-the-week stories"—what editors often dismiss as "gee whiz." The situation recalls the Catskills one-liner: "The food in this hotel is *poison*—and in such small portions!"

Some observers are therefore unalarmed. "I'm not mourning the decline," says Ben Patrusky, executive director of the Council for the Advancement of Science Writing. "Dealing mostly with health and medicine, the science sections didn't have so much science in the first place." And as Jerome notes, "some veteran science writers have long held that 'ghetto-izing' science in a separate section cuts off many readers from important stories," and that without such sections "science will actually get better coverage."

Nils Bruzelius, editor of the "Health/Science" section of the *Boston Globe*, maintains that while a science section may be a ghetto, "if it's a *nice* ghetto, with good graphics and journalistic 'value added,' it provides a home base for science in the paper" and a useful anchor for interested readers. Patrusky counters that science sections "are as much *ex*clusive as *in*clusive," since stories confined to the ghetto tend to be "encyclopedic" while those reporting the news appear elsewhere. And although such "educational" stories may be valuable for teachers and students—Jerome laments the decline of the science sections as a particular loss for grade schools—most adult readers greet them as the kiss of death. Says Patrusky: "They're *homework*—more of a turn-off than a turn-on."

Sprung from specialized newspaper sections and magazines, science reporting may be free at last.

Why am I, as editor of a magazine, talking about newspapers? Because science sections essentially are—or were—weekly magazines within newspapers; because their rise and fall so closely parallel the fate of science magazines created during the 1980s; and because the debate about general pages vs. ghettos is just as relevant to magazines.

Science journalism saw some moments of self-proclaimed glory during the 1980s, when writers, editors, and businesspeople alike discerned an enormous public appetite. They were right. But they were wrong to assume that concentrating science stories in special sections or magazines would be commercially viable. The audiences were often large, but not the right kind. Although students indeed loved these publications—I used to recycle my copies of *Discover* and *Science 80-x* to a friend's preteen daughter—they failed to attract enough adults who would in turn attract advertisers. Such has also been the lot of science sections in newspapers.

But these were merely "pilot projects," says Patrusky, from which good experimenters learn. And the lesson is that science-related stories don't have to self-consciously highlight their science content. Most grownups prefer their news whole—not segregated, predigested, annotated, or forcibly administered as necessary medicine. The general interest in science, therefore, should largely be addressed in the general pages of newspapers and in general magazines.

In fact, "there is a certain value to 'generalist' newspeople," said Jerome during a seminar at MIT in 1979, shortly after the Three Mile Island accident. "They feel what the general public feels, they doubt what the public doubts, and they ask the questions that the average person wants answered."

Technology Review is one of those general publications because it deals plainly with social, economic, and political questions; in so doing, it illuminates for the public many of "the critical science policy issues addressing our nation." And despite the science background of much of its staff, we are journalists not much different from "generalist newspeople" everywhere. Our aim is not to lay on the "gee whiz" but to present thoughtful, balanced, relevant, and timely articles to a demanding but generalist audience. When "education" is truly indicated, we deploy the most credible educators—expert authors—to do it; but even then the editors work closely with these sources to avoid tutorials and to tell a *story*, not for colleagues but for the public.

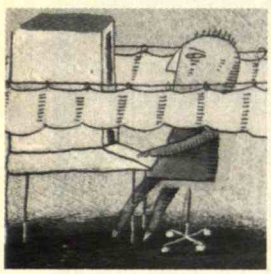
Science journalism is alive and well, not only in our own pages but in magazines such as the *Atlantic*, the *New Yorker*, and *Newsweek*, which cover even wider ranges of issues. And science and technology are well represented in your daily paper from front to back, often subtly or anonymously or even in disguise, but nevertheless manifesting their basic role in human affairs. ■

—STEVEN J. MARCUS

Letters

Privacy in Computing

In his thoughtful article "Of Bytes and Rights" (*TR November/December 1992*), Herb Brody describes the dark forces on the horizon in networked computing. But he neglects to mention some facts that counterbalance those forces. First of all, with regard to nodes such as electronic bulletin boards, imagine that we are talking about houses, shops, and other buildings interconnected by streets instead of computers hooked into a network. Some buildings may have no doors at all, while others might have the flimsiest of barriers, such as rice-paper curtains, and still others may have metal doors and concrete walls. Information systems can be set up in a similar way. Establishments like hospitals, police stations, and banks that deal with critical personal data should be required to have a minimum security level. And no establishment should have in public view material that society would regard as offensive or dangerous. But beyond that, people who use computers on networks should be free to install protective mechanisms or not as they see fit.



Say you are at the "gateway" of one of these electronic establishments. The door may be open and it may have no signs whatsoever. Will you enter? Obviously, that will depend on your values, style, courage, beliefs, habits, and other personal characteristics. If you do enter and you see unspeakable or unbearable sights, get out . . . just as you would in the street. And if you want to be totally safe, ask someone what the place is like before entering, or don't enter at all.

Also, the fearsome image of an evil person charting your entire life by using your social security number and searching over the nation's databases for your whereabouts is unrealistic. The first and biggest safeguard against this is the inherent difficulty of finding such information: when little is known about a person, there are just too many computers to be tapped. And even if the right computer can be found, it may be hard to penetrate, either because of its protective barriers or, more frequently, because different systems have different ways of filing and indexing information. The problem is so serious that even large companies complain that they cannot find the information they need within their own computer systems. And, mind you, they have the advantage of knowing how they organized these systems and what they are looking for.

MICHAEL L. DERTOUZOS
Director
Computer Science Laboratory
MIT

Keeping the F-22 On Track

Members of Congress would do well not to take the advice David Callahan offers in the "The F-22: An Exercise in Overkill" (*TR August/September 1992*). If they move the F-22 to the back burner until needed, they could face formidable problems. They would be loath to turn on the $100 billion program to build the craft until there was a threat so far developed that they could show pictures of it to the folks back home. Unfortunately, this could be years beyond the first clear intelligence indications. And then there is the sheer amount of time it takes to produce an aircraft—full-scale development for the F-22 started last year, but the plane won't be available until 2001.

Also, Mr. Callahan writes nothing about the capabilities of the F-22 in the most likely scenarios. We know that politics in our ally countries may preclude a U.S. base of operations next to, or even close to, a future conflict. Therefore, we'll need air superiority with reduced numbers of aircraft, long ferry ranges without inflight refueling, and the ability to operate efficiently from austere bases. These are unique F-22 attributes.

PAUL A. WIESELMANN
Los Angeles, Calif.

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.

WHY VOC-ED MATTERS

We at the U.S. Department of Education share Ray Marshall and Marc Tucker's concern about training the work force (*"Building a Smarter Work Force, TR October 1992*). The Tech-Prep Associate Degree Program, which the department funds and supports, is already prompting structural change in schools. Tech-Prep integrates academic and vocational education and provides a course of study that lasts four or more years and results in a certificate or degree in an occupational area.

Tech-Prep does not train narrowly; it seeks to develop workers with broad math, science, and communication skills, a desire to learn, and a good understanding of the workplace. Through the framework of Tech-Prep, communities can design successful school-to-work transition schemes that include career development and job placement. Work-based learning programs such as youth apprenticeship, cooperative education, and internships play an important role.

In conjunction with the U.S. Department of Labor, we are funding consortia representing business, industry, labor, and education to develop world-class skill standards for specific industries. For the first time we will have clear goals for training and will be able to measure ourselves against our global competitors.

BETSY BRAND
Assistant Secretary for Vocational and Adult Education
U.S. Department of Education

Marshall and Tucker would have done well to address a problem I remember from my own high school experience—the rigid divisions between college-bound and voc-tech curricula that can keep college-bound students out of courses aimed at teaching how to hammer nails, fix faucets, repair cars, and perform other basic work. Had it not been for a major revolt among the college-bound juniors at my high school, I would not have been allowed to take a course in typing and might still be computer-illiterate.

FREDRIC S. BERGER
Washington, D.C.

COLOR-BLIND TECHNOLOGY

I enjoy reading *Technology Review*. I'm disappointed, however, that we are almost into the twenty-first century yet the people in the photos accompanying the articles are pure white. I thought Boston was an international city. Also, as we all know, technology is color blind. So show it already.

R.C. CZAPIEWSKI
North Hollywood, Calif.

NURSES AND STEREOTYPES

Suzanne Gordon's "The Importance of Being Nurses" (*TR October 1992*) no doubt struck a strong chord with every nurse who read it. Real nurses, such as the ones Gordon writes about, bridge the mysteries of high-tech medicine and the frailty of the human condition. Through their efforts, anxiety gives way to reassurance, fear is replaced with safety and comfort, and death is transformed into deliverance.

Yet stereotypes do not die easily, and the nursing profession suffers as a result. The idealized vision of nurses as angels of mercy stationed at the bedside is a reflection of a kinder, gentler, and less technological age. No nurse is this perfect. At the other end of the continuum is the menacing Nurse Ratched of *One Flew over the Cuckoo's Nest*: a kind of Darth Vader character in a starched white uniform who taps into the primitive fears associated with feminine figures gone awry—fears that are particularly strong in situations where people are vulnerable. And as if that weren't enough, nurses

are also represented as nubile airheads in porno movies, day-time soap operas, and prime-time TV shows such as *Nightingales* (which thankfully folded several seasons ago after the producers, networks, and sponsors were bombarded by complaints from nurses and professional associations).

Most members of the public don't find out what nursing actually entails until they or a family member becomes a patient. Knowing that I am a nurse, people I've met socially have often talked about how much a nurse once helped them, their mother, husband, or best friend. These stories are shared with an air of "insider" knowledge, and with respect for the nurse's primary contribution to either the recovery or the dignified death of a loved one. Unfortunately, however, these real-life encounters have not yet laid the stereotypes to rest.

NANCY M. VALENTINE, PhD, RN
Administrator for Nursing
McLean Hospital
Belmont, Mass.

THE HOW AND WHY OF AGING

The statements Michael Rose makes in "Finding the Fountain of Youth" (*TR October 1992*) need to be put in perspective. It's especially important to understand that gerontological theory may be bundled into two sets: the why approach and the how approach. The why approach, of which Rose is a representative, draws mainly on evolutionary theory and contends that adverse physiological changes late in life are not "selected against" because reproduction tends to occur before those changes can set in. The how approach, on the other hand, studies the actual mechanisms that might help bring on such changes—everything from mutations to wear and tear.

Perhaps the key difference between these two approachs reduces to the level of the explanations being sought. Why-approach researchers seek truly global predictions. But investigators of specific functions are happily absorbed in their grotty details and don't feel the need for a transcendental theory. Many are enthusiastically studying the causes of abnormal growths during aging; others are trying to find out how diet restriction slows aging in rodents, or why Huntington's and Alzheimer's genes cause specific kinds of degeneration. In contrast to Rose, most of these workers—I am among them—sense no "intellectual collapse" in gerontology. In fact, we tend to be more optimistic than ever because advancing technology allows us to pry more effectively at the complexities of aging in our favorite organisms. It matters not if each animal is its own model; we want to find out how it works, how it ages, and what can be done about it.

CALEB E. FINCH
Andrus Gerontology Center
UCLA

AUTOMOTIVE AUDIOPHILES

Thomas Magliozzi may be an expert car mechanic, but he's no audiophile, as is clear from his article "If It Ain't Broke, Don't Break It" (*TR October 1992*). The graphic equalizer, which he derides, is truly one of the best-designed human interfaces in consumer electronics. The equalizer's easy-to-use sliders allow drivers to adjust a car's audio system without taking their eyes off the road.

I'm sure Magliozzi would prefer the rally instrument grouping with tachometer, vacuum, and oil pressure gauges. But I'll take my equalizer instead.

DAVID DIAMOND
Mt. Laurel, N.J.

In "If It Ain't Broke, Don't Break It," Magliozzi wishes for a refrigerator with a central axle and rotating shelves. In 1955 General Electric had just such a refrigerator on the market. Our family bought one, and last year, when we gave it away because we were moving to smaller quarters, it was still in good working order.

YVONNE B. BROWN
Camp Hill, Pa.

New Titles from Technology Review

Do's and Taboos Around the World

Edited by Roger E. Axtell

This fascinating guide helps thousands of high-powered executives and tourists avoid the missteps and misunderstandings that plague the world traveler. It includes facts and tips on protocol, custom, etiquette, hand gestures, body language, idioms, and gift-giving. *Paperback, 200 pages, $10.95*

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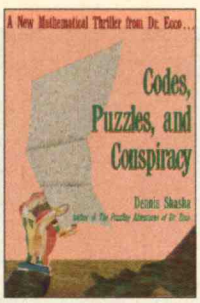
by Dennis Shasha



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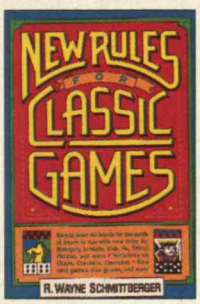

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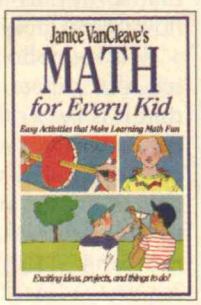
by Janice VanCleave



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by Steven Caney

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by Shar Levine and Allison Grafton

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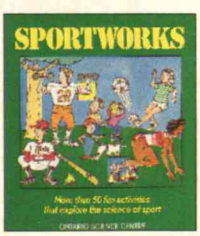

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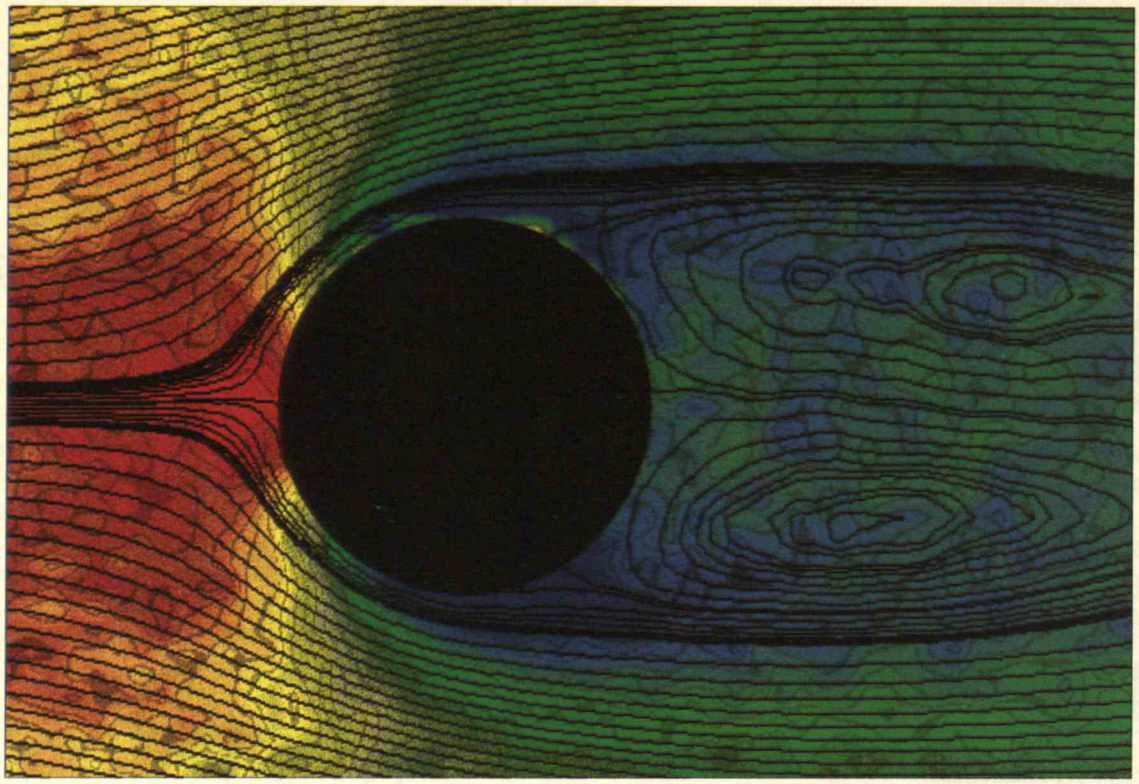

A new mathematical system, reflecting the mechanics of colliding molecules when air flows around objects, may reduce the need for extensive amounts of wind-tunnel testing. For the cylinder at left, red indicates the greatest pressure, blue the least.

A New Way to See the Way the Wind Blows

With a fair degree of accuracy, computers can predict the strength of a bridge span or display the structure of a drug molecule. But one only needs to watch a TV weather report to sense how far computers have to go in their ability to track atmospheric flow. Even trying to model how air passes around an object becomes highly uncertain as soon as turbulence becomes a factor, notes Paul Rubbert, head of aerodynamic research at Boeing. Hence, every new jet wing still has to be tested extensively in wind tunnels, at a cost of several thousand dollars an hour.

To try to reduce the amount of wind-tunnel testing, a team headed by Kim Molvig, a theoretical physicist at MIT, has created a mathematical system called Aerodynamica that the team claims can calculate on supercomputers and desktop computers alike the flow of molecules.

Most computerized flow calculations start with a theory of how fluid circulates under different conditions. To describe the numerous possible curving paths of so-called fluid particles in a complex flow, the theory relies on a series of difference equations that break the smooth curves into small, discrete steps. Each such calculation results in a tiny error. When many millions of paths are calculated by this method, the errors can add up to a significant deviation, says Molvig.

Aerodynamica, by contrast, is based on a 20-year-old mathematical technique known as the lattice gas method. This approach divides a volume of fluid into discrete parcels, and treats each parcel as though it were an individual molecule. It then relies on basic laws of physics to predict how the parcels will bounce off one another or other obstacles within a three-dimensional lattice.

By accounting for factors such as the slight compression that occurs when molecules hit one another, Molvig says, Aerodynamica can produce an average flow of parcels in any region of the lattice that is virtually identical to the average flow of real molecules in such an area.

Molvig, who has not yet published scientific papers on his approach, claims that it is better than other calculations for computing fluid flow because it relies on "a physical system that has all the characteristics of real air" while other techniques rely on numerical approximations. And, he adds, his system requires at least 1,000 times less computational work.

Previously, other researchers had limited success when they tried to use the lattice gas method to efficiently simulate the kinds of turbulent fluid flows that interest many engineers. Molvig claims that the underlying problem was that the method did not account for all the inherent thermodynamic properties of air at a microscopic level. To resolve this, Molvig says he applied knowledge—reflecting the mechanics of how molecules exert pressures on one

PHOTO: EXA CORP.