

# Technology Review

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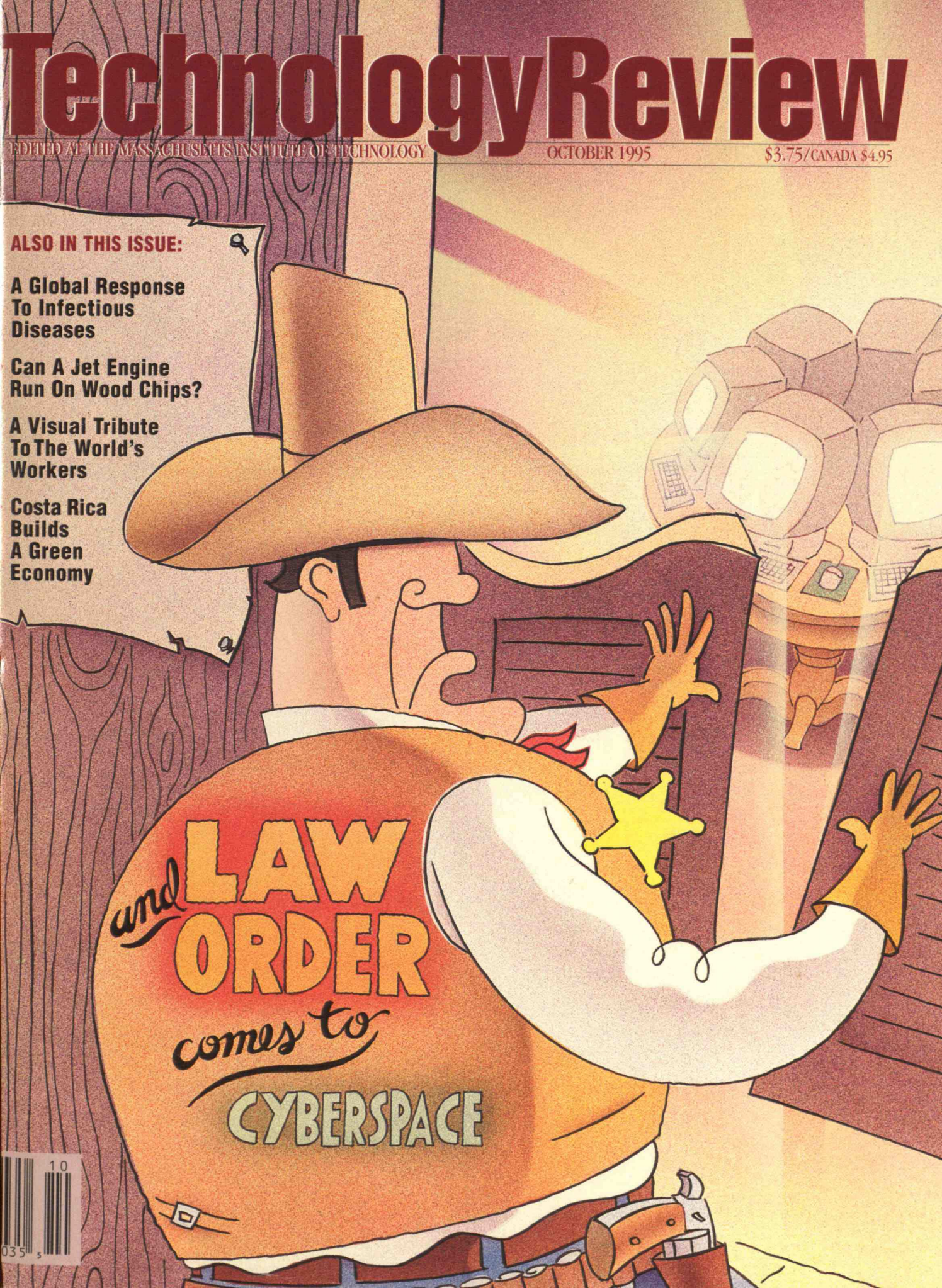
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
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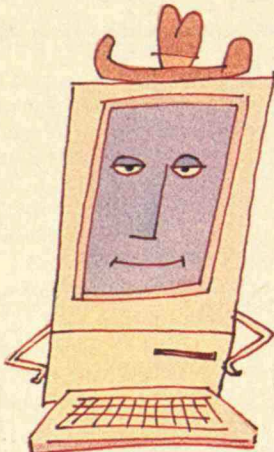
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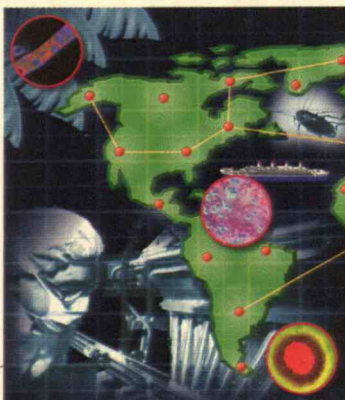
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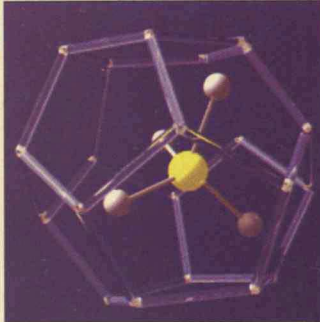


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# First Line

## Love Is Necessary But Not Sufficient

**B**ACK in the 1960s, when I was the proud owner of a funky little Volkswagen "bug"—my first new car out of college—one of my coworkers suggested that I perform my own maintenance, and he volunteered to show me how. Such things as oil changes, tuneups, and valve adjustments were easy, he argued, on this relatively simple machine, and I'd save some money.

At first I resisted. With neither the experience nor the inclination to get down there with the hardware, I told him, "I just don't have the skill." Not to worry, he answered. You care about that car much more than a mechanic does. "What you lack in skill you make up for in love."

That convinced me, and for several years I maintained the car myself. I did it no damage—in fact, it seemed to run fine—but I could never avoid high anxiety every time I set out, tools at the ready, to open the hood. What if I made some disabling error? Or what if at first the effort seemed to go well but the car suffered a breakdown on the road? Eventually, I realized that my inability to correct such outcomes was unlikely to change, and VW mechanics once again got my business. I provided the love (and cash); they provided the skill.

All this reminded me of the difference between nervous dilettantism and confident mastery—commitment, backed up by ample allocations of time and resources. Admittedly, most people don't need to become full-fledged mechanics to perform simple automotive upkeep tasks, but as car technology becomes more complex, the number of "simple" procedures shrinks and we are obliged to seek specialists. In a modern technological society, where we must rely on a wide spectrum of skilled men and women, it is essential that we invest wisely, and well in advance, so that they will be there when we need them.

For an awesome depiction of individual skills and their interdependence—of investments paying off—consider the recent movie hit *Apollo 13*. Its story, based on an actual 1970 event, shows three exceedingly competent astronauts, backed up by a battalion of resourceful technicians on earth, surviving a near-catastrophic accident en route to the moon and improvising a life raft, along with other on-the-spot innovations that bring them safely home.

*The U.S. can't produce skill,  
or attain leadership,  
simply by ardent wish.*

---

Or consider a more recent demonstration of know-how: the survival and evacuation this past June of Capt. Scott O'Grady—shot down in hostile territory in Bosnia, eluding capture for six days, establishing electronic communication with his colleagues, and then being plucked, quickly and precisely, from his ordeal.

Talk about handling a "breakdown on the road." Talk about true combinations of love and skill. If these individuals could so calmly address the decidedly nonroutine in such inhospitable and life-threatening environments far from home, why couldn't I approach, free of apocalyptic visions, a well-functioning little VW engine in the safety of my own driveway?

Some would assert that ordinary risk-averse mortals should never compare themselves with astronauts, military pilots, and others who are supposedly "a breed apart" that is outright risk-seeking. But I'd suggest that their coolness under fire derives less from superhuman fearlessness than from a profound familiarity with what they do, the result of years of training and devotion. Their knowledge and long experience give them the confidence that if anything goes wrong, they can fix it. Thus their modesty—Capt. O'Grady, for instance, insisted that he was not a hero—is genuine. They don't

see themselves as extraordinary, just as extremely well-educated people doing their jobs.

Government has an obvious role in the cultivation of "the right stuff" among individuals such as astronauts who are directly serving their country. But government also plays at least an indirect role in ensuring that most modern ventures, in space or on the ground, in circumstances unusual or mundane, are rewarding. For our ultimate technological and economic strength as a nation, we rely on the wisdom and foresight of our leaders to ensure that a wide range of sophisticated skills, both established and emerging, are being nurtured.

Government has lately seemed to take that responsibility less seriously. Proposals in Congress and from the White House, for example, would substantially trim the nation's civilian R&D budget. But as MIT President Charles M. Vest observed in a recent speech at the National Press Club, such funding is an investment in our future. Without proper support of research and education, he warned, shortsighted officials will compromise the country's next generations of "human capital."

A New York City bank used to counsel in its ads, "Wishing won't make it so, saving will." Similarly, having a sincere wish to do something—the "love"—won't suffice unless one invests the time, effort, and resources to gain the skill that turns the wish into reality. I like to think that my lack of car-maintenance savvy, for example, reveals not a genetic defect but the fact that my priorities lie elsewhere, and that if having such skill were truly important to me, I'd commit myself over the long term to acquiring it. The point is just as applicable to nations. If we really want something—say, U.S. technological and economic leadership—supportive words, however eloquent, are simply not enough. Another expression of my urban youth summed up the real requirement with streetwise conciseness: "Put ya money where ya mouth is." ■

—STEVEN J. MARCUS



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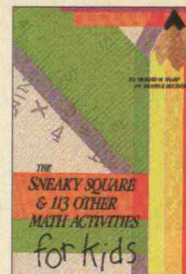
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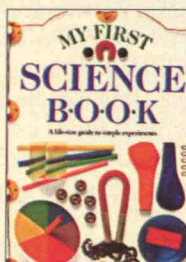


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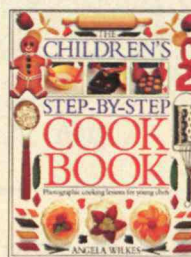


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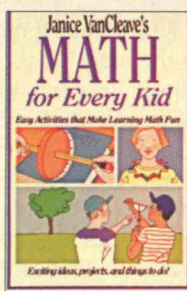


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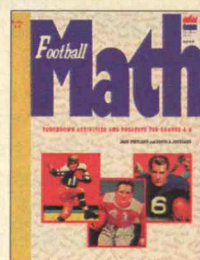


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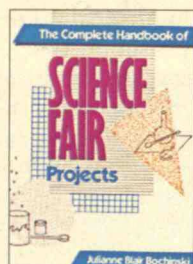


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# Letters

## SNIPPING CLIPPER

Dorothy Denning's "Resolving the Encryption Dilemma: The Case for the Clipper Chip" (*TR* July 1995) is an example of flogging a dead horse. The author's arguments asserting the government's benevolence are entirely superfluous. And contrary to Denning's argument that users will not use encryption software available on the Internet, such software is comparable to—or better than—most commercial products. Furthermore, the Internet is not the sole source of quality encryption software. "A Method for Obtaining Digital



Signatures and Public Key Cryptosystems" (*Communication of the Association for Computing Machinery*, February 1978), one of the earliest descriptions of the RSA algorithm, would enable even a marginally competent programmer such as myself to devise a viable encryption program within a few months. Clipper would simply mean that government sleuths would spend the taxpayers' dollars eavesdropping on trivial communications that did not merit encryption in the first place, and it would also succeed in destroying whatever remains of the First Amendment.

BERNARD H. GEYER  
Prescott, Ariz.

Despite Dorothy Denning's arguments, Clipper is dead. It was killed by government hubris and advancing technology. More than 15 escrowed encryption schemes already exist; many are less expensive and less vulnerable to rogue government than Clipper. More than 1,000 encryption products are available in 34 countries worldwide. Detailed lists of these products are available on the World Wide Web at <<http://www.tis.com/crypto/crypto-survey.html>> or in

my book, *Building in Big Brother* (Springer-Verlag, 1995).

Modern cryptographic theory provides communications and records that the government cannot access, even when properly authorized. If society decides that users do not always have a right to private communication, then an encryption key could be broken up and stored with escrow agents (possibly government-authorized) who are available around the clock and charge users (instead of the government) a service fee.

LANCE J. HOFFMAN  
Professor of Electrical Engineering  
and Computer Science  
George Washington University  
Washington, D.C.

Although Dorothy Denning lists Clipper's numerous protections, she overlooks a fundamental weakness in the escrowed encryption process: obtaining a court order to conduct a wiretap is too easy. None of Clipper's inherent safeguards can prevent unreasonable authorized wiretaps.

Non-escrowed encryption schemes are a better choice because only the government's ability to eavesdrop from a central point would be fatally weakened. If strong suspicion exists, the government can still conduct wiretaps by physically planting equipment in the suspect's immediate vicinity. With escrow systems, a court order would allow an all-too-convenient electronic dragnet to fish the electronic waters for incriminating conversations.

Denning's final paragraph argues that Americans do not have the right to communications that the government cannot access. One might ask the same question about thoughts. Coercive use of sodium pentothal—or even torture—might be useful in the fight against crime. Thank goodness that citizens are protected against such intrusions.

JOEL DAVIS  
Chief Scientist  
Ball Corp.  
Albuquerque, N. Mex.