

George

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BILL GATES
TALKS TO JOHN KENNEDY
ABOUT MURDOCH,
MONEY, AND WORLD
DOMINATION

CAN
POLITICALLY
INCORRECT'S
BILL MAHER
MAKE IT IN THE
BIG TIME?

INDICTMENT DAY:
WILL HILLARY
GET BUSTED?

CARL SAGAN'S
FAREWELL
ADDRESS

EXCLUSIVE:
THE INSIDE STORY OF
JIMMY CARTER'S
FINAL DAYS IN OFFICE

THE END OF
SOCIAL SECURITY:
WHAT'S BROKEN AND
HOW TO FIX IT

SURVIVAL GUIDE TO THE
FUTURE

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OH! SAY CAN YOU SEE...

"We should all be concerned about the future because we will have to spend the rest of our lives there."

—Charles Franklin Kettering

Listen to the speeches of any politician out there and you're almost assured of hearing at least one reference to the future. After all, we don't seem to want to elect politicians unless they offer a hopeful vision of what lies ahead. But when the future finally comes around to the present, it usually resembles nothing of what we were promised, so we blame the folks in office for fooling us.

But we are all at least as responsible as the politicians, because we as voters set up the rules of the game that scorches us. If you play three-card monte against someone promising big wins and you lose your shirt, whom do you blame? The fellow who scammed you? Or do you blame yourself for being silly enough to believe you'd win?

In this issue we've tried to provide a rough picture of what you can anticipate in the years to come—in everything from sex to war, the environment to education—so you don't have to rely solely on the words of those who trade you a pair of rose-colored glasses for your vote. After all, it's the New Year, the inauguration is just over, and it's time for the stocktaking State of the Union message. If you're like us, you're probably tempted to look beyond the prosaic present and a frigid February and wonder for a moment, What's next?

There's something goopy about much of what you read about the future, because it's usually all speculation unsupported by hard facts. So in

I'm just a Bill (ionaire): Gates at Microsoft. **this month's survival guide, we tell you how eight critical political issues will evolve and which people will effect all those changes come the year**

2020. There's no magic in our choice of year other than if you're approximately my age, that would be about the time when your Social Security checks will, if we keep on our current course, bounce. But we have some solutions for that unpleasant possibility, too. Two of the biggest names in the investment industry, Peter Lynch and Peter G. Peterson, explain why the Social Security trust fund will go bust, and they offer some practical solutions that could keep it an entitlement for generations to come. Given that a bipartisan blue-ribbon panel has been unable to agree on any of a number of proposed solutions for keeping the fund solvent, the Peter principles are especially topical.

As a general rule, beware of those who predict the future, except, of course, those who study it or own it. In this issue, Edward Tenner, author of a recent book about the revenge effects of technology, talks with Wendell Bell, a futurist professor at Yale University. Carl Sagan looks into the cosmos to imagine a world in which he is president. And Bill Gates answers the looming question "If all politics is local, what happens when we're all connected in the global village?"

Finally, no explanation of the future would be complete without a recitation of the past. We are particularly proud to have in this issue a piece by historian Douglas Brinkley on the final days of the Carter presidency. As Bill Clinton begins his second term, it's worth reflecting on how similarly situated both men were coming into the White House and why their fortunes parted. Each was a popular governor of a southern state who trumpeted his separateness from the Washington political establishment. And though Clinton hints occasionally of a chilly relationship with the Washington elite, stemming from his meteoric rise from humble southern roots, he has forced their acceptance of him by circumstance if

not choice. Carter, we learn, was done in by the very qualities that got him elected in the first place: his unwillingness to play politics the Washington way, his aloofness, and his rigid sense of morality. But today it's Carter's particular character that has earned him respect as a statesman, which he never enjoyed while president.

So we hope you enjoy *George's* take on the future. Why not put it in a safe place somewhere and take it out in 20 years? To paraphrase a great Englishman, it may not get you what you want, but you just might find, it will get you what you need.

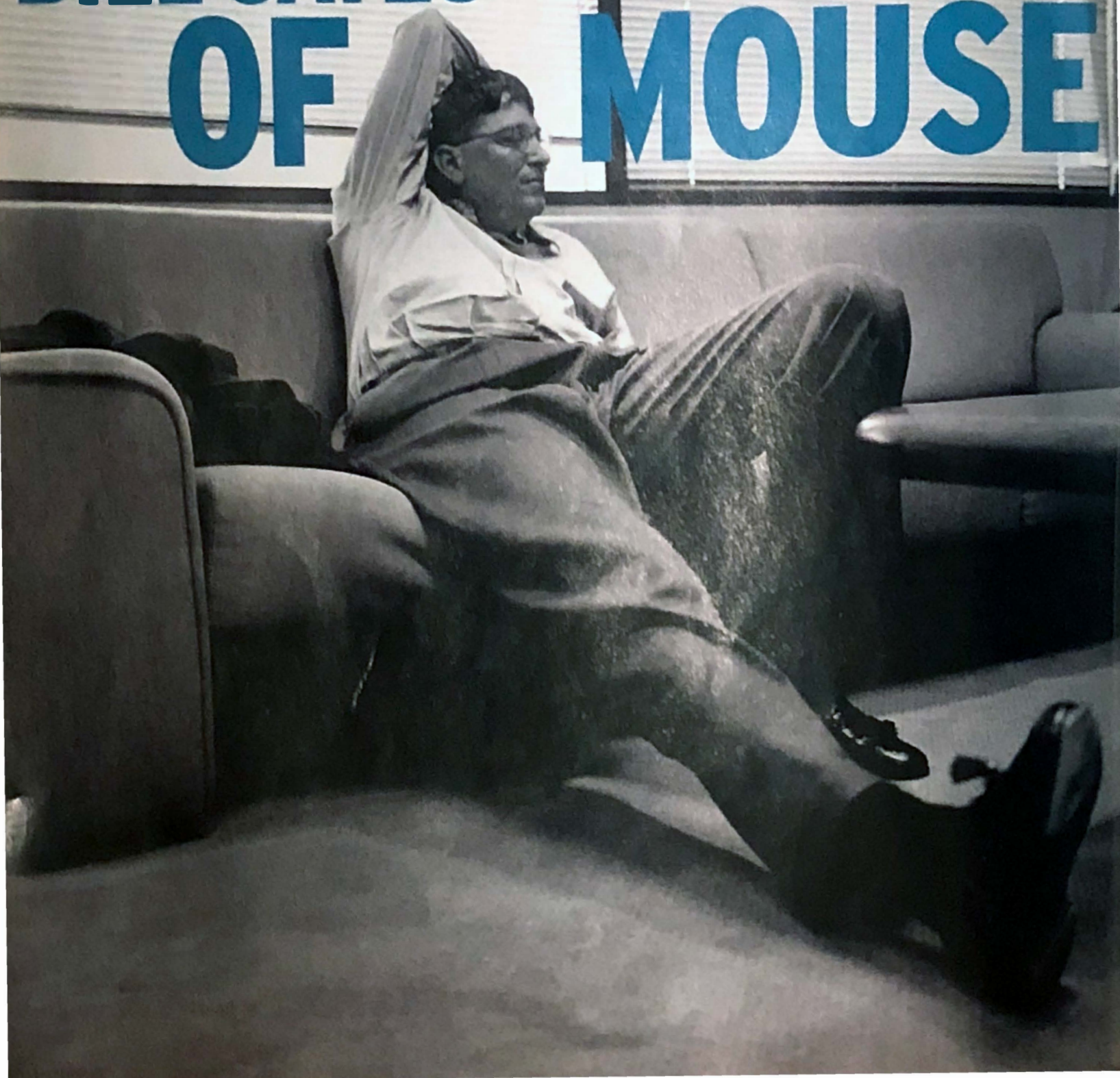
John Kennedy



STEVEN SCHEINING

John Kennedy talks to the head of
Microsoft about money, Murdoch, and why he's
a politician's favorite photo-op

BILL GATES OF MOUSE



& MAN

In the United States, great wealth is often acquired with great speed, but no one has ever amassed so much so quickly as has Bill Gates, the 41-year-old co-founder, chairman, and chief executive officer of the Microsoft Corporation. With a personal fortune in excess of \$20 billion, Gates presides over a company whose net worth (in excess of \$100 billion) is more than ten times the gross domestic product of Zaire. Not only that, his name has become synonymous with the information revolution. His achievement is all the more astonishing when you consider that the young Gates was sure enough about his vocation in 1975 to drop out of Harvard University in his sophomore year and team up with his high school friend Paul Allen to lay the foundations of the Microsoft Corporation.

It's hard to believe that the calm, modest, boyish-looking Gates—the opposite of the stereotypical swashbuckling entrepreneur of old—has transformed not only the computer industry but also how millions now work and communicate with each other. In the business community, however, there are those who say that Microsoft, the epitome of the modern company, has adopted the predatory business practices of old-fashioned industrial behemoths such as General Motors or IBM, that Microsoft's share of the software market is approaching a dangerous monopoly. In 1995, Microsoft had to drop its plans to take over software producer Intuit amid accusations that the acquisition would represent a breach of antitrust legislation. Indeed, during the course of my interview the only occasion that disturbed the placid exterior of Microsoft's chairman was when I brought up this issue.

With his software programs a ubiquitous feature of offices and homes in the Western world, Gates is now hoping to alter the practice and the perception of government. In Gates's view, so long as government is prepared to embrace the information revolution, then we can all expect government to become smaller, more accessible, and infinitely more accountable.

Yet there are some who believe that Gates's vision of the future—a computer-driven democracy in which the individual, liberated by technology, will be self-sufficient—might easily lead to the scenarios predicted by Aldous Huxley in *Brave New World* or George Orwell in *1984*. Far from connecting people to each other, Gates's critics allege, the computer age will herald an era of social alienation, a world where everything can be acquired or communicated via one's workstation and where there will be little need to participate in what we understand to be civic life. Worse still, it might allow government to pry more effectively into our lives.

As I walked through the Microsoft campus in Redmond, Washington, just outside Seattle—the only city people move to so they can be closer to nature, as a writer once joked—I couldn't help noticing a utilitarian quality about the place. Here, Gates is known by all simply as "Bill," and there's a collegiate feel to the buildings. As for the people who work for Bill Gates, they walk around looking relaxed and just fine (some earnest Microsoft employees insist on wearing shorts year-round, regardless of the temperature outside), but there's also an air of overwhelming purposefulness. You are less likely to find a tie or suit hanging on the back of a door than a sleeping bag—for catnaps during those long northwestern nights, programming the next generation of Microsoft software. Just how far the appearance of the place matched the temperament of its maker I would only learn after I had entered Building 8 and climbed to Floor 2, where the chairman of Microsoft has his surprisingly modest office.

John Kennedy: *There's a lot of speculation these days about how the Internet will change our lives. I'm particularly interested in how you think it will change politics and people's interaction with government.*

Bill Gates: There's an opportunity to improve politics and democracy whenever you have an advance in communications technology. The Internet is a tool that lets you find information in a much better way than anything else. Historically, most tools of communication were either broadcast—which meant your material had to appeal to millions and millions of people—or personal and able to address only a very small audience. But the Internet provides a single individual with access to virtually unlimited information on any given topic.

How can that improve the political process?

Well, let's say they're cutting \$5 billion from some program in the budget. Most people don't have enough background to know whether this is a wise move or not. They don't know the key political issues, what the trade-offs are, or how this particular budget item has been spent historically. With the Internet, not only can you take that news item and have it linked to background information, but you can also reach out and

Left: Behind closed blinds with Bill Gates.

Below: On-screen during the launch of MSNBC, Microsoft's joint venture with NBC, in 1996.





find other people who are interested in that issue. The Internet is scalable in the sense that if something really catches your eye, you can become as educated and involved on the subject as you want to be.

So one of the things that the Internet has changed is the dynamic between elected officials and their constituents. Suddenly, the folks in Washington aren't the only ones with access to all the relevant information on a given issue.

Clearly, elected officials are more accountable now. For example, if there is a big vote in Congress, I can quickly find out exactly how my congressperson voted and even what he or she had to say. You cannot get that level of detailed information in a national news article. About 40 percent of U.S. homes have personal computers now, and that's rising. So the implications of this kind of accountability are significant.

Constituents also can now swamp their representatives with data as opposed to the other way around.

Well, it must be pretty hard with the paper mail nowadays, because people try to bombard a congressperson's office with various opinions. Electronically, it's a lot easier. Congresspeople can use e-mail as a sort of poll to see how many people were for something and how many were against it, though I feel sorry for the person who reads the president's e-mail, because I'm often copied on the same junk e-mail. [Laughs]

That sounds like Ross Perot's notion of a direct democracy. Is that where we're headed?

In the future, direct democracy will be feasible. An extreme example would be to say, on a weekly basis, we'll take an issue and have every-

body vote on it. But personally I think representative democracy is better. Elected representatives can be a lot more thoughtful; they have the time to listen to both sides of an issue and often come up with the nonobvious solution. In the future, we'll have to choose representative democracy not because it's the only system available but because we believe that it's the best approach available.

In your book *The Road Ahead*, you describe people becoming more self-sufficient through technology. You say it will allow people to eliminate many of the tedious routines of everyday life. What are the implications for our government? How will the burgeoning electronic community change our national community? Is government being rendered obsolete?

I don't think there's much that government does that you can eliminate altogether. Certainly technology will make the government a lot more efficient. In the future, instead of filling out paper forms or standing in line and talking to somebody in a governmental department, people will simply go online. So the government can be smaller than it is right now. But it's not dramatic. I mean it's not like you say, Oh, this is the world of the Internet; let's get rid of the VA hospitals.

How do you respond to the argument that the cost of this technological self-sufficiency is the loss of our traditional sense of community? If you can get everything you need through your phone or TV, you lose those kinds of human exchanges that keep us connected as citizens.

It cuts both ways. Say that I'm from Israel and I want to listen to a radio broadcast from my homeland. Today you go on the Internet and, boom, you are there. No matter where you are located, you can maintain contact with any cultural group you belong to. On the other hand, physical communities were really primary when we were all just farming together and there were no telephones and no books. As you make the world a smaller place, ties to people in your proximity are paradoxically reduced. But those physical communities impose cultural standards in a stronger way than when you are free of those constraints and don't have that kind of attachment.

Will online communities ever replace physical communities altogether?

It's nonsense to say that people are just going to sit at home and use their computers. But people shouldn't underestimate how much we are going to improve the nature of that computer experience; there will be talking 3-D images of yourself that will enable you to sit and converse with people, play games with people, and a lot of neat things. We will never replace the idea of "Let's go on a picnic together" or "Let's climb a mountain together." In fact, as technology increases our efficiency, we will have extra time to engage in leisure activities with one another. Let's take shopping as an example. Sometimes shopping is purely utilitarian. I need to get soap, so I get on the Internet, type in *soap*, and the soap gets delivered. But sometimes shopping is an experience with a bunch of people, when you want to window-shop and all that. In no way does the computer mean you are not going to make that choice.

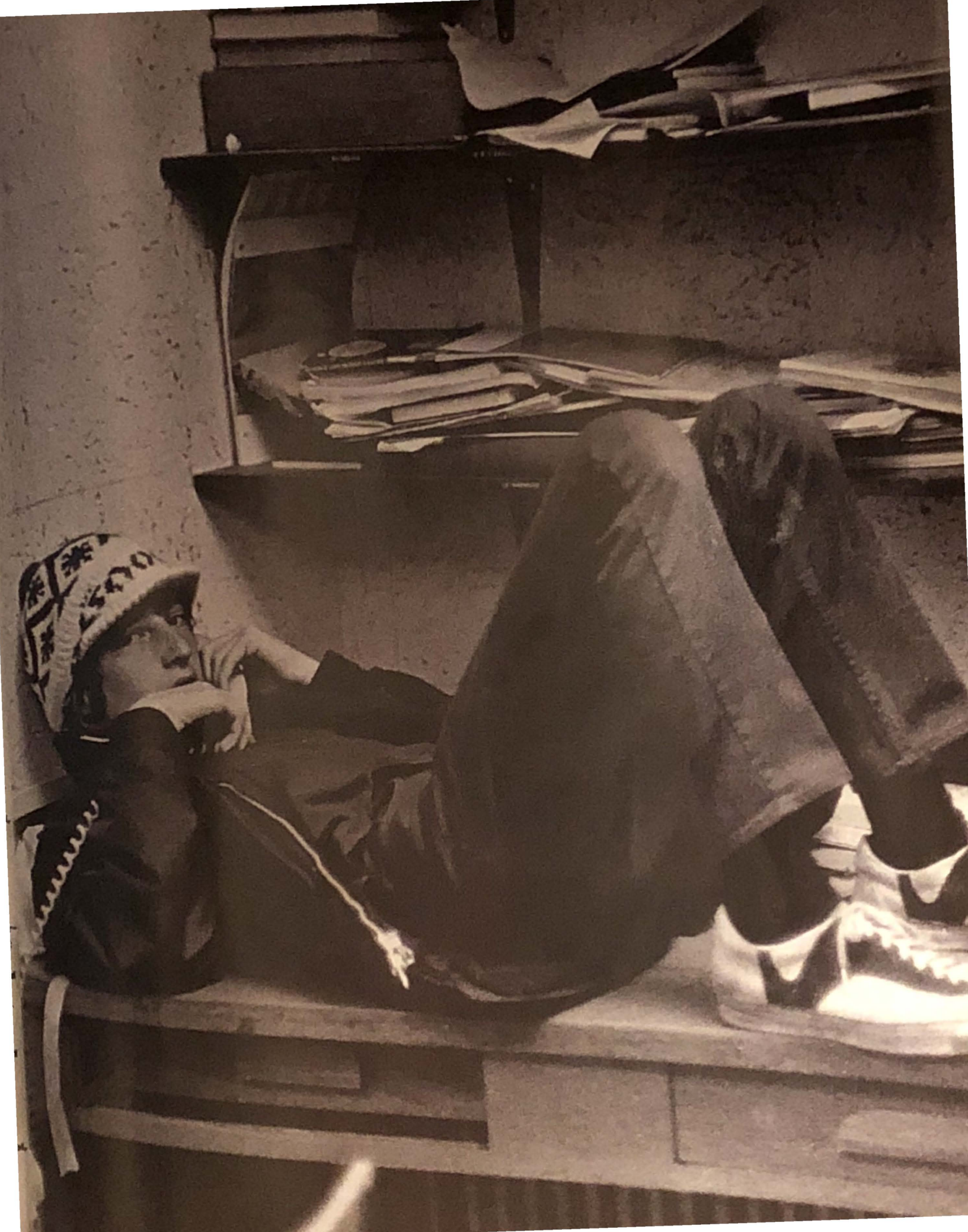
Do you think that people who are disposed to experiment with technology have a kind of distinct political orientation or identity?

Well, there are a lot of people involved with technology who are very optimistic about what technology will provide. They tend to think there's got to be a way of structuring incentives so as to greatly reduce government involvement. So you will probably find a lot more libertarians in the technology sector than anywhere else.

What about people on the Internet?

The Internet has grown enough now that you find people of all political stripes out there. I think the Internet represents the future. That's why you had Bob Dole giving out his Web site (continued on page 101)

Top left: Bill Clinton on the presidential campaign trail, listening to Gates spell out his vision for the next century. Bottom left: Gates with former Microsoft VP Patty Stonesifer and the DreamWorks team—David Geffen, Steven Spielberg, and Jeffrey Katzenberg. Right: Gates working the telephone at his high school back in 1973.



Bill Gates

(continued from page 80) address in a presidential debate. Every politician wants to be associated with the future. There's no country where I've gone where there hasn't been interest among the top political leaders in sitting down and talking with me. Part of it is the legitimate issue of talking about how their country can exploit technological advances, and part of it is just trying to associate themselves with technology and the bright future that comes with that.

What do you see as government's role in developing the Internet? Bill Clinton has drawn analogies between the information superhighway and Dwight D. Eisenhower's highway building program in the '50s.

The highway analogy would suggest that the government should be deeply involved. The government built the highways. But in the case of the Internet, no one is suggesting that the government needs to do anything of the kind. Whenever you have something new like this, it's best for the government to sort of sit back and see how it develops. And where there are problems, fine, the government can step in. For example, some people said, Let's have the government come in and set standards on the Internet, so all these systems that are formatted differently will work together. Thank goodness the government didn't choose to do that, because the de facto standards that have evolved are working super, super well. So, to date, the government's role in setting standards has been quite modest.

But aren't some new laws necessary to deal with this new world?

It's always surprising how well old concepts carry over into the new medium. It's overly idealistic to act like, Oh, the Internet is the one place where people should be able to do whatever they wish: present child pornography, do scams, libel people, steal copyrighted material. Society's values have not changed fundamentally just because it's an Internet page. Take copyright. Sure, there should be some clarifications about copyright, but the old principles work surprisingly well in the new medium. Anybody who says you have to start over—I don't agree with that.

Will it be possible to maintain our privacy in a digital world?

Privacy is a very interesting issue. I think people are a little naive about how much data exist about them electronically today. Some countries are already issuing these "smart cards" with all your vital information on them; you use them to claim medical benefits, to vote, to identify yourself to the bank, and so on.

Sounds Orwellian.

You know, the degree of privacy afforded each individual will always be a political decision. It's a decision for each society. The U.S. is the ultimate we-believe-in-privacy country, so the government will probably never issue smart cards.

At the same time, attitudes can change. If, for example, the U.S. went through a terrible period of terrorism, people might decide to draw the line about privacy a little differently.

Speaking of the government, do you think that the antitrust investigations brought against Microsoft are fair?

Well, the industry we are in is very important. We've been immensely successful, so at some point it was going to be worthwhile for the government to look at our industry. We don't have any issue with the way the laws are written or even with the idea that very successful companies like ours are going to be looked into. What's interesting is that in terms of power in the marketplace, none of us in the world of high technology have the kind of power that, say, Coke has in the soft drink market. In our business, not even the most successful companies, like IBM or Microsoft, can stand still. If we stand still, we are going to get replaced pretty quickly. Our business is less forgiving than any other that I can think of. We reached a consent decree with the Justice Department freely and fairly, and we are perfectly satisfied with what came out of that. But as long as we are successful, competitors will try to exploit the situation and try to hobble us as a competitor.

[After protracted negotiations, Microsoft signed a consent decree with the Department of Justice in July 1994 to settle charges of antitrust violations. The company agreed to monitor itself—primarily to consider whether new acquisitions would lead Microsoft to further dominate the software market, and to cease the acquisition if it would.]

What about the criticism that Microsoft's dominant position in the industry is anti-competitive, that the industry should be reconfigured so that a thousand flowers can bloom instead of one big tree that dwarfs everything else?

Anybody who would say that doesn't understand our business. There are more new companies created in our industry than in all the other industries put together.

Wouldn't the competition and variety be even greater in the PC industry without a dominant player like Microsoft?

No. Someone had to come in and play the role that we play: that is, create the standards and really evangelize the platform. Why are there a hundred times more software companies today than before? It's because they are writing software for a standard environment that Microsoft created. Why are there so many hardware companies offering all these choices? Because there is a standard hardware environment that we created.

How do you respond to the criticism that, basically, Microsoft behaves toward new entries into the field the way IBM behaved when Microsoft was just getting started? Your early success was predicated on maintaining an

open software environment, promoting the compatibility of your products with other products. But now that you are a market leader, some are saying you advocate a closed software architecture.

The word *open* is just an abused word. It started out as a slogan for workstation vendors. What counts are innovative software products that work well with what people have. We and other companies created the current computer industry regime: You can buy one brand of PC on Monday, another on Tuesday, and your software still works and you get a choice. This has made computing very successful, and we're the key element there. So the openness that counts is the basis on which we and everybody else compete, and because of our products, we're doing very well in that regime.

Ralph Waldo Emerson said that "an institution is the lengthened shadow of one man." In what sense is Microsoft a reflection of you?

In the sense that we love great software. We're very optimistic about what software can do. We're very product oriented, very much looking for the new things we can do. It's a bit of an engineering culture here, fairly fast moving. A lot of companies waste a lot of time congratulating themselves about what's going well. When I sit down and talk about a product I just focus on the opportunities to make it better. You can save a lot of time that way.

Microsoft just entered into a partnership with NBC for a news channel/Web site called MSNBC. You've also recently launched Slate, an online magazine. As you get deeper into the information business, will your own views color the content of the news you provide the way Rupert Murdoch has set the Fox News Channel up as an antidote to the perceived liberal bias of the establishment press?

I'm not interested in doing that. I'm surprised Rupert is able to retain quality people with that approach. I mean, that's very dangerous and perhaps inappropriate.... He claims he's just reacting, that the rest of the press has a liberal bias. I personally don't see that. The people you hire to be editors and writers, they have their own opinions. That is their job. My job is to run a great, great software company. I'm very careful to keep my political views separate.

Why do you keep them separate?

Because the alternative is inappropriate. I have my personal views. Then there's Microsoft, a company that gets involved in very few political things. My own views are those you'd expect from somebody who feels like he's been very, very lucky and that the resources under his command are really society's resources. And I have to be clever about how I'm going to funnel those back in. I fund education projects, I fund population control, I'm very big on the United Way.

Bill Gates

Do you mind whether I ask you if you're a Democrat, a Republican, or an Independent?

Well, it's a tricky issue because, as I said, I try to keep my political views separate from the company's. I went to an event where I said I was a Democrat, and that was covered publicly. When it comes to issues of how business is treated and managed, I wouldn't subscribe to a lot of Democratic views. When it comes to social issues, you'd find me very much on the Democratic side.

What did you think of Ted Turner's notion that extremely wealthy people like you and [billionaire investor] Warren Buffett would donate more of your money if someone published a list of biggest donors similar to Forbes magazine's list of wealthiest individuals?

Ted said some things that just weren't true. He said that Warren and I didn't give money away, because we want to be high on the list of the wealthiest—that is just a total fabrication. Warren and I have both said that we don't believe in passing huge amounts of wealth on to our heirs and so, one way or another, my wealth will go to various causes. I think the fascination with wealth is always going to be there. It's unfortunate in that it creates a simplistic view of who I am and what I care about. It's sort of an invasion of privacy. I wish the list wasn't there. But, hey, what's free about the press if you can't make a list like that, you know?

So you're planning to give most of your money away when you die?

I'm giving away \$30 to \$40 million a year now, and [since 1992, I have donated \$200 million] to my foundation. So I'm already doing some things. But as a percentage of my wealth, I'll do most of it when I can put a full-time effort into that. That's the only caveat. My work now is focused on trying to keep Microsoft successful.

How does the immensity of your wealth affect your life?

It's a very strange thing. I think it's unusual that someone can have so much money.

It strikes you as strange?

Oh, very. Are you kidding? Somebody who has this much money has a command on society's resources. In my view, it all comes down to how you use it.

What do you see on the "road ahead" for the Microsoft Corporation?

We're based on a vision of computers becoming an incredible tool for everybody. It's a vision that's very far from being realized. Computers can't listen to what you're saying. They can't speak to you. They can't see. They don't learn. I mean, computers are still pretty limited today. My entire life has been devoted to the future, and exciting new things are on the way. There is something called Moore's Law, which says that basically every two years computers get twice as good. That's a sure thing. ☐

Power Surge

(continued from page 93) political cover for other Democrats to oppose 211.

The funding was easy. The "old economy" of companies that service Silicon Valley—banks, accounting firms, and insurance companies—gave as much as \$1 million apiece to Taxpayers Against Frivolous Lawsuits (TAFL), the campaign's umbrella organization (which was formed with help from the California Chamber of Commerce). In addition, Valley companies wrote exceedingly large checks: Cisco gave \$610,000; Intel and Sun Microsystems \$500,000 each. "It's chump change," says Cypress CEO T.J. Rodgers. "I gave \$100,000. My company will spend \$100,000 during this telephone call."

Some of the money went to the California Technology Alliance, which was busy meeting candidates and writing checks. Though Tom Proulx says it supported aspirants from both major parties, the CTA was especially generous to Democrats who had opposed their party organization on 211. At one meeting, Larry Stone says, he pestered a high-tech executive on behalf of a candidate who hadn't received a promised donation. "So this guy pulled out his checkbook and wrote a check for \$10,000. Just to get me out of his hair."

Working with a political consultant named Wade Randlett, the NO campaign pursued a strategy that would have done more-seasoned politicians proud. While Randlett and Celia Fischer, co-director of the state's Democratic coordinated campaign, laid the groundwork, feeding the White House background on 211, local politicians such as Stone and San Jose mayor Susan Hammer reinforced how important the issue was to the Valley. Brook Byers was delegated to land the president. At a July 23 fundraiser at fashion designer Susie Tompkins's San Francisco penthouse, Byers approached Clinton, who told him he was against the initiative. Two weeks later, after a number of high-level phone calls between Washington and the West Coast, Clinton met with several Valley executives in the cafeteria of San Jose's John Muir Middle School and agreed to go on the record opposing 211. The Valley had got what it needed from Clinton.

In the weeks following the Muir school meeting, Doerr and a handful of executives worked the phones, putting together a Valley endorsement of the president. They ended up with 75, and on August 20 held a news conference in San Jose, with Clinton and Vice President Al Gore patched in from Washington. "This administration really gets it," Doerr happily told reporters. David Brady, a professor of business and political science at Stanford, is a bit more sanguine about the endorsement. "They liked it because the president came out and kissed their fanny," he says.

On September 11, Clinton came back to California for an intimate dinner with a core of the


new power brokers. That night, though, Clinton and Leon Panetta, his then chief of staff, dined with eight Valley executives and I. The menu featured heirloom tomato salad and aged beef with chanterelle mushrooms. As Peet's coffee, they talked about nongovernment, encryption, and export controls, \$50,000 a head.

All of which—the fanny-kiss incident—set off rampant speculation about the Valley's new power. Mulcahy describes their political variation of the statement "I'm fiscally conservative and socially liberal." By which generally means he'd like the capital gains tax to be lower (making him not quite a Democrat). He has absolutely no interest in banning gay marriage (making him not quite a Republican). In the past, most Valleyites just wanted to be left alone to go to work in their Tech Valley. One midlevel executive put it, "As long as [the Reserve chairman] Alan Greenspan is in the country, we assume everything's fine."

On the far side of this spectrum is T.J. Rodgers, whose mantra is "Free minds." Rodgers says he's so opposed to the idea of the CTA that he refused to support it during the 211 battle. Rodgers says he gave \$200,000 to the campaign and had another \$100,000. "Tom Proulx called me up and wanted me to give the second \$100,000 to the political action committee. And he said how it was going to start the political action committee working all of the legislature, all of the state, to get things for Silicon Valley. We're not having these surprises. We've gotta be proactive to get what we want." Rodgers says he'll give his cash. "This concept—you've gotta be proactive or get screwed—I don't buy it," he says.

To Doerr, that's the old Valley talk about "turning back from activism," he says. "The days of activism in garages are over. The Valley now has important economic interests that we need to involve the public."

No one, says Doerr, expects Clinton's involvement in politics to stay at the level of the 211 campaign. "There won't be that has this level of intensity and passion to understand that." But as Wade Randlett says, it doesn't need to run that high. "It's \$40 million worth of intensity. We need \$2 million worth of intensity." At that level, says Joy Alexiou, deputy director of the Democratic coordinated campaign in California, "if some part of them want to get out of Democratic party politics, it could have a big effect. If they decide they want to be more amenable to them, it would be over a few years by spending more



NO POLITICIAN EVER LOST A VOTE BY INVOKING THE FUTURE. YOU KNOW, OUR CHILDREN DESERVE A BETTER ONE, AND BILL CLINTON IS BUILDING A BRIDGE TO A BRIGHTER ONE. IT'S THE MOST OVERUSED WORD IN THE POLITICAL LEXICON, YET DETAILS ARE, AS USUAL, SPARSE. WHAT DOES THE FUTURE HOLD: A NEW WORLD OF PROMISE OR APOCALYPSE? WE LAUNCHED A DISCOVERY MISSION TO THE NEXT MILLENNIUM TO FIND OUT WHAT'S ON THE OTHER SIDE. SO BUCKLE YOUR CHIN STRAP AND HOLD ON AS *GEORGE* ENTERS THE TIME WARP AND RE-EMERGES IN **THE YEAR 2020**

PLATFORM

A SURVIVAL



TRANSPORTATION

ENVIRONMENT

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DISEASE

SEX & DRUGS

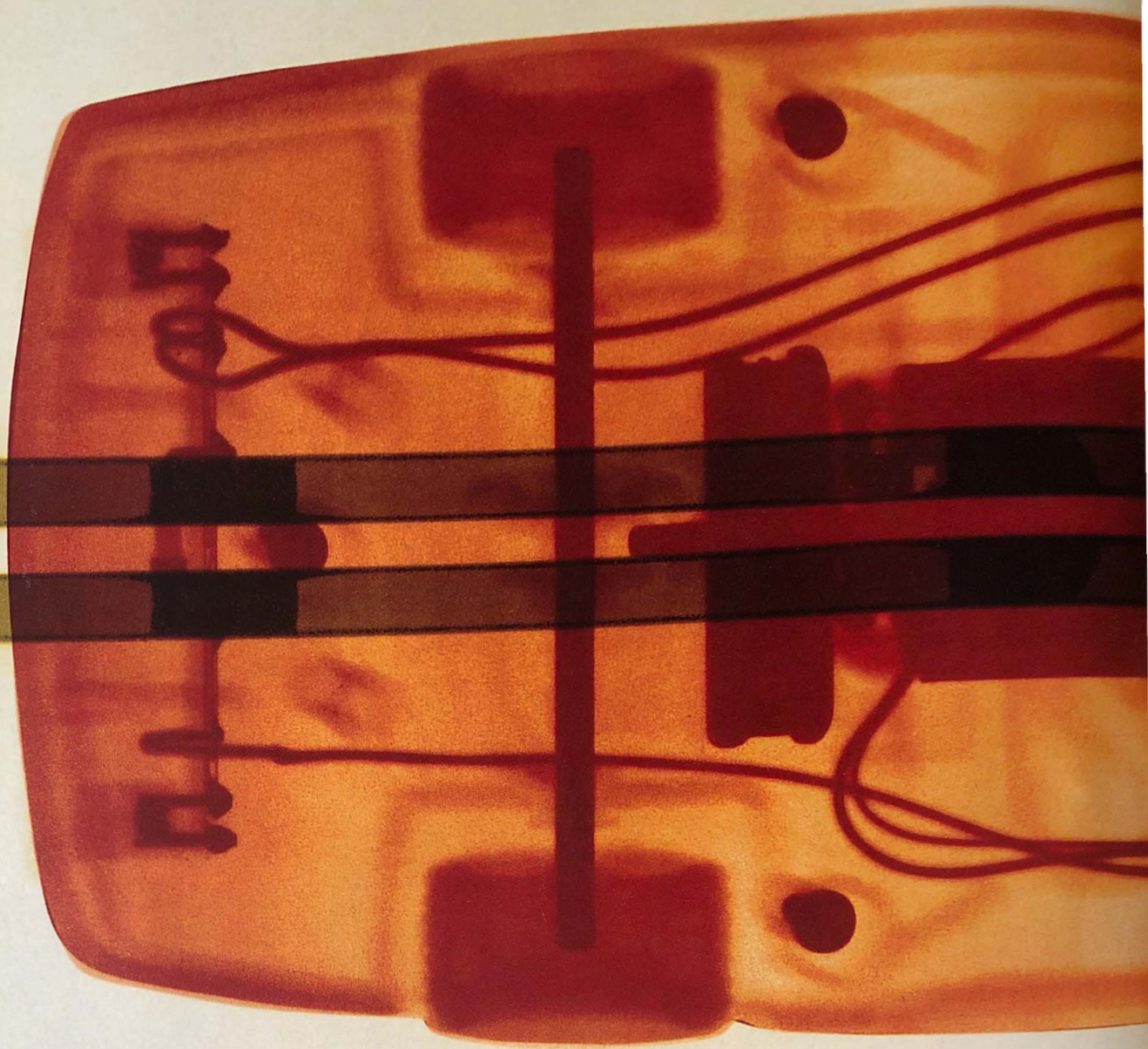
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GUIDE TO THE FUTURE



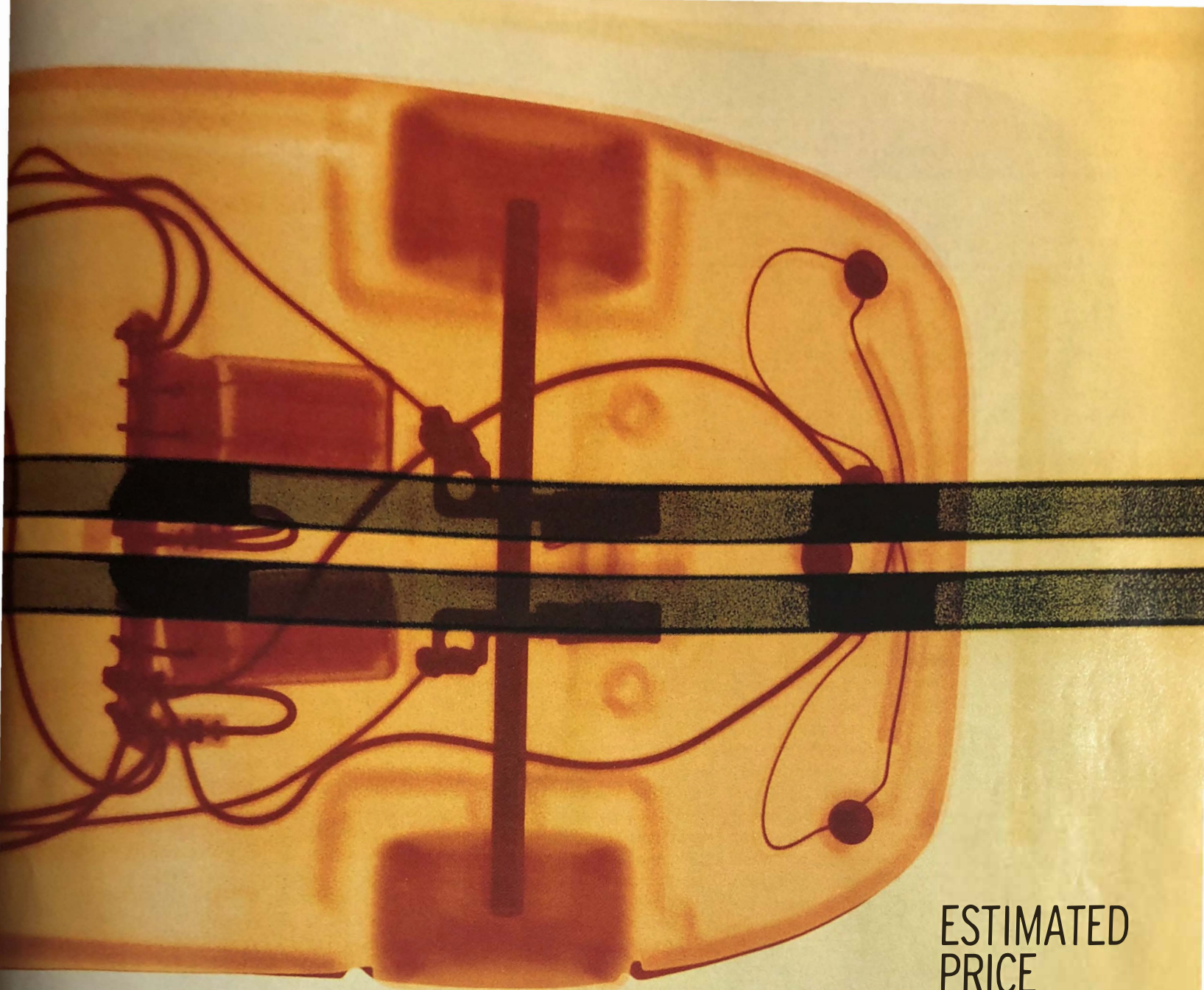
TRANSPORTATION

TRAINS, PLANES, AND SKYCARS *BY JAKE TAPPER*

A NATION'S FUTURE FORETOLD

WHAT'S HAPPENING NOW Based on today's developments, the future of transportation looks a lot like the sci-fi world of Buck Rogers. In 1993 the government and the Big Three—Ford, Chrysler, and GM—formed the Partnership for a New Generation of Vehicles to create an environmentally friendly family sedan that gets 80 miles to the gallon. Prototype^s are due out in 2004. In the world of locomotives, the Germans and the Japanese^e have been working on magnetic levitation—*maglev*, for short—which propels trains above a rail of magnetic energy at 300 miles per hour. But one mile of track may cost up to \$20 million, so the U.S. is settling for 1⁸ new high-speed trains on the Boston-to-Washington route by 199⁹, with a top speed of 150 miles per hour. Most vehicles of the future will be guided by the \$19 billion Global Positioning System, which is already fully operational. The satellite-based navigation system allows travelers to determine their three-dimensional position anytime, anywhere, in any weather.

X-RAYS BY MARIN+CORKER



ESTIMATED
PRICE
OF A SKYCAR:
\$995,000

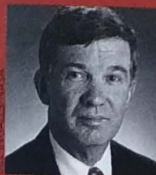
FAST-FORWARD TO 2020 All the cars of the future will require special sensors if they have any hope of making it off the ramp onto the Automated Highway System. In this elaborate version of cruise control, cars drive themselves on lanes equipped with sensors. And get ready for the Jetsons-esque Skycar, developed by Moller International, an aviation research and development company in Davis, California. This small flying commuter vehicle will be tested later this year. Other identified flying objects: NASA is currently testing the High Speed Civil Transport, a faster, bigger, more fuel-efficient Concorde due as early as 2010. At a speed of Mach 2.4 (approximately 1,500 mph), it will make the trip from Los Angeles to Tokyo in four and a half hours.

With the new global transportation network, you'll be able to transfer easily from one mode of travel to the other. (Catchword of the future: *intermodular*.) If, for example, your weekend in Vermont gets interrupt-

ON THE CUTTING EDGE



PAUL MOLLER, a former professor of aeronautical engineering, had a vision of a lightweight, four-passenger aircraft that could coast high above rush hour traffic. The inspiration for the Jetsons' hovering cars, Moller's "Skycar" could actually be flying by this summer, 30 years later.



ROBERT WHITEHEAD, associate administrator for aeronautics at NASA, supervises teams working on the Concorde-like High Speed Civil Transport. This supersonic jet will carry 300 passengers while flying at more than twice the speed of sound at an altitude of 65,000 feet.

FACTOIDS

- Projected number of air travelers in the U.S. in 1997: 540 million
- In 2020: 1.1 billion
- Number of planes on order worldwide in 1994: 347
- In 1996: 1,009

ed by an urgent call summoning you to Shimoda, a coastal town in Japan, the trip could be one seamless journey. With the aide of a Skycar, a few lanes of automated highway, an HSCT traveling at Mach 2.4, and a maglev train or two, you could make the trip in just over ten hours. Of course, there's no guarantee your luggage will make the same journey. *Jake Tapper is a freelance reporter based in Washington, D.C.*

THE ENVIRONMENT

BUGS TO THE RESCUE! BY BRAD WETZLER

NOW A decade of wrangling between activists in Zodiacs and execs in corner offices has led to an earth-friendly truce. Ecosystems, they concluded, are easier to preserve than repair. In 1992 corporations agreed to phase out the gases in aerosol cans and refrigerating systems, which tore a hole in the ozone layer. In recent years governments have committed greater attention (and funds) to saving endangered plant and animal species, such as prairie grasses in the Great Plains and gray wolves in the northern Rockies. Meanwhile, back in Washington, enviro-buff Al Gore still has to earn his green stripes in the upcoming (and long overdue) rewrites of the Clean Water Act, which protects lakes, rivers, and streams, and the Superfund program, which cleans up contaminated land.

2020 Because China's prospering population will eat more meat, more of the earth's open spaces will be converted to grazing terrain. With fewer forests to absorb the carbon dioxide exhaled by humans, weather will get weirder, as higher temps melt glaciers and more violent storms wallop the coasts. Already, the new hot air is allowing tropical plants and insects to thrive in places they never did before.

POLLUTION-EATING MICROBES WILL GOBBLE UP OCEAN OIL SPILLS.

As humans adapt to these changes, scientists and politicians will turn to nature to take care of its own healing, letting some rivers run wild and forest fires burn to encourage regeneration. Instead of spraying pesticides, tomorrow's farmers and agribusiness execs will take up "integrated pest management," releasing hordes of ladybugs, praying mantises, and wasps, which feed on crop-destroying insects in their fields. And pollution-eating microbes, engineered by scientists, will gobble up oil spills, chemical leaks, and mounds of garbage.

Brad Wetzler is a New Mexico-based writer for Outside magazine.

EDUCATION

THE THREE T'S BY RICHARD J. MURNANE AND FRANK LEVY

ON THE CUTTING EDGE



LAUREN RESNICK, a professor of psychology at the University of Pittsburgh, is developing new ways to test students' mastery of skills, especially their ability to think. Her organization, New Standards Project, researches alternatives to multiple-choice tests.



ANTHONY J. ALVARADO, superintendent of District 2 in New York City, has proved that large-scale improvement is possible in urban public schools by focusing on teacher training. His district is now ranked second out of 32 in reading and math skills, up from tenth nine years ago.

FACTOIDS

- About half of all American students are being educated for jobs that pay less than \$10 an hour.
- Number of experimental charter schools nationally in 1992: 1
- Number in 1996: 482

NOW In the spring of 1994, Congress passed the Clinton administration's education bill, known as the Goals 2000: Educate America Act. Despite the aversion to Big Brother interference from Washington, now flourishing in the states, governors have welcomed the main thrust of Goals 2000, which is to establish higher academic standards in public schools. For most of this century, schools focused on preventing kids from dropping out, often by dumbing down course content. After an infamous 1983 report called "A Nation at Risk" concluded that there was "a rising tide of mediocrity" in the nation's schools, more than 45 states began developing academic standards to restore what had become the almost meaningless title of high school graduate.

The push for higher standards has been fueled by the realization that the education that was good enough for the 1970s economy is just not good enough for today's. Now, certain skills, known as *soft skills*, determine earnings much more than they did in the past. Jerome Murphy, the dean of Harvard's Graduate School of Education, sums them up as the three T's: thinking, teamwork, and technology.

2020 In addition to reading, writing, mathematics, and computer literacy, a high school diploma will certify mastery of soft skills, now required for good jobs in an economy in which most simple tasks—assembly-line work, for instance—are done by computers and robots. These skills include the ability to make written and oral presentations and to work in groups to solve problems.

Tests will no longer be multiple-choice. Using virtual-reality technology, students will have to solve complex simulated problems on computers, using video, text, and sound. Scores for these exercises will make it easier for parents to know whether schools are effective.

In fact, interactive computer programs will overtake textbooks as the main teaching tool. Talking computers and other multimedia technology will allow students to participate as actors in simulated historical settings, such as the Battle of Gettysburg, or examine the problem of global warming in three dimensions. Without leaving school, kids will also complete virtual internships supervised by online mentors in the private sector, connecting schools to the world of work. Finally, innovation will be the norm, thanks to charter schools.

Richard J. Murnane and Frank Levy are the authors of Teaching the New Basic Skills (Free Press).

ON THE CUTTING EDGE



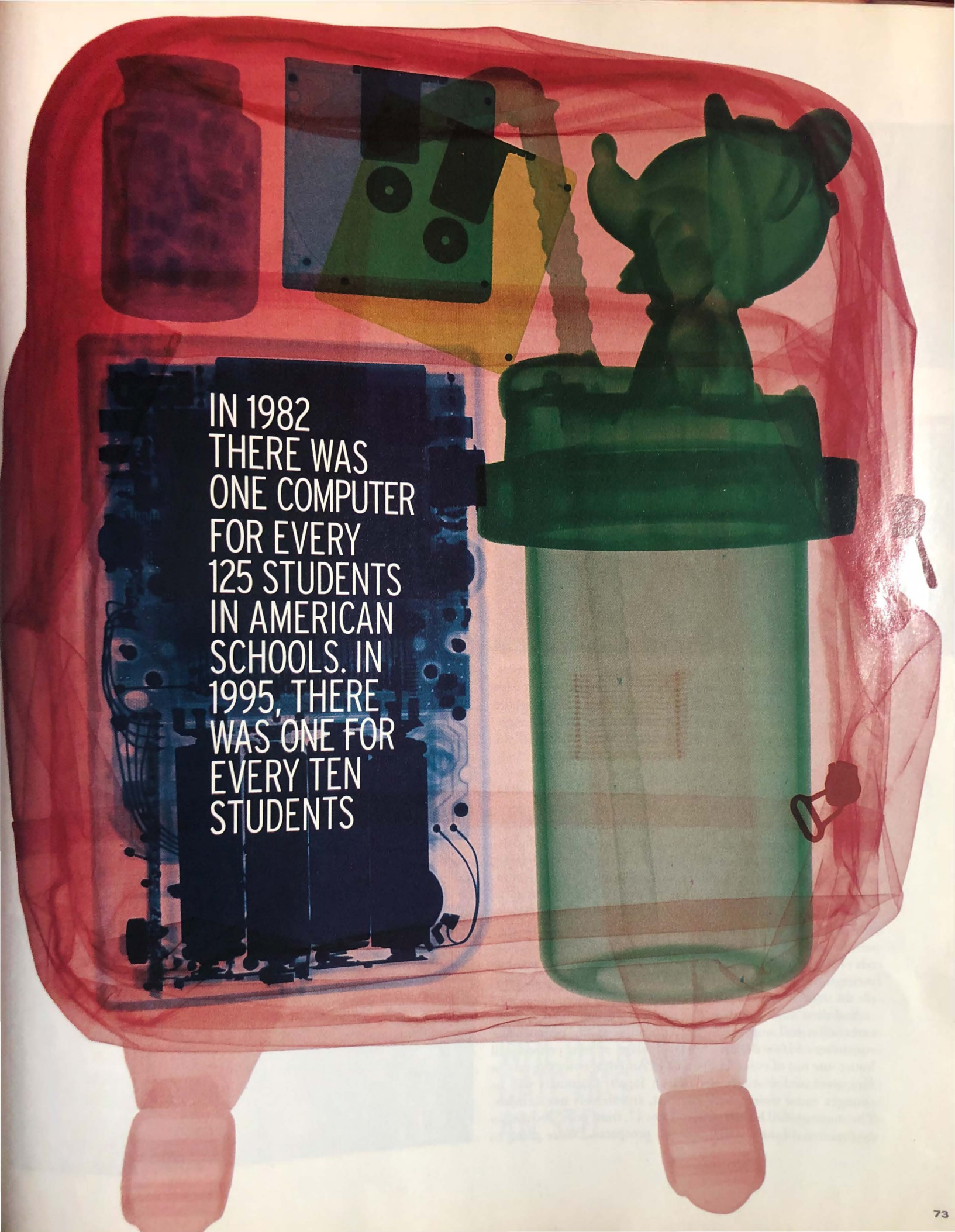
WILLIAM CRONON's books are environmentalists' gospels. The ecohistorian argues that people have wrongly convinced themselves that humans are "unnatural," while nature is holy and pristine. He questions whether strip malls and cities are indeed artificial. When a beaver builds a dam, is that unnatural?



TERRY BACKER is a former Connecticut fisherman turned environmental advocate. When oyster beds dried up in the Long Island Sound, Backer sued the coastal towns for allowing seaside pollution. Then he ran for the state legislature, where he ended up drafting many of the state's green laws.

FACTOIDS

- Reduction of automotive lead emission from 1970 to 1993: 99%
- Atmospheric temperature increase in the last century: 1° F
- Projected increase in the next century: 4° F

A red mesh bag is shown, containing several items. On the left is a blue printed circuit board (PCB) with various electronic components and wires. In the center is a green water bottle with a matching green lid that has a dinosaur-shaped top. To the right of the bottle is a small, dark, rectangular object. The bag is laid flat, and the items are clearly visible through the mesh.

IN 1982
THERE WAS
ONE COMPUTER
FOR EVERY
125 STUDENTS
IN AMERICAN
SCHOOLS. IN
1995, THERE
WAS ONE FOR
EVERY TEN
STUDENTS

CRIME

A CASHLESS COUNTRY BY JAMES NEFF

NOW Crime rates were down by 9 percent nationwide in 1996, thanks in part to new crime-fighting techniques. Community policing, for example, was introduced in New York City in the 1990s by the former police commissioner William Bratton, who believes that small crimes lead to larger ones. Thus, the police let panhandlers, prostitutes, and squeegee men (who offer to wash car windows, or else) know they must behave or face arrest. Cops also question small-time hoods about neighborhood problems and crimes. Since 1992, crime has dropped an astounding 36 percent in New York City, a trend that appears to be sweeping the country.

In other promising news, the crack epidemic appears to be dying out nationwide, perhaps as the second generation of potential

THE CUTTING EDGE



REUBEN GREENBERG, the chief of police in Charleston, South Carolina, has been recognized across the country as an anti-crime innovator. He has stationed cops as quasi doormen at public housing projects and encouraged detectives at crime scenes to explain what's happened to onlookers.



GEORGE L. KELLING, a criminologist at Northeastern University, is considered by many to be the father of community policing. Along with James Q. Wilson, he formulated the "broken window" theory of crime, postulating that public disorder and nuisances lead to serious crime. Police chiefs nationwide are listening.

FACTOIDS

- Number of crime stories on network news in 1991: 644
- In 1995: 2,574
- Percent of Americans who think crime is a serious problem: 90
- A serious problem in their neighborhood: 14

users realizes the devastation the drug wreaked on its parents. Inner-city drug use, in general, has fallen substantially. More kids are staying in school and off the streets; black and white teens are now graduating from high school at the same rate. "We're not going to see crime rate increases," predicts James Austin of the National Council on Crime and Delinquency.

2020 Despite this optimistic picture, recent opinion polls show that Americans—perhaps thanks to the movie industry's apocalyptic visions—conjure up a future filled with frightening images of violence: rampant drug abuse, a gun in every glove compartment, and a RoboCop on every corner. But ask some leading criminologists and crime fighters, and a jarringly different picture emerges: clean streets, graffiti-free subways, well-groomed parks with unattended children playing until dusk. Many crime experts believe this generally rosy scenario is highly likely if several current trends continue: Violent crime rates keep falling; new methods of crime fighting take hold; and we move closer to a cashless society, in which the ubiquity of electronic transactions will cripple the underground economy.

And there's also a fall-back measure. Experts predict that incarceration will outstrip higher education as the number-one consumer of state dollars. An archipelago of new prisons will house one out of every 192 people in America, twice the rate in Singapore and 14 times the rate in Japan. Criminals will be younger, more violent and recidivist, and fiercely unreachable. The majority will be males, ages 14 to 17, from poor, abusive, or dysfunctional homes, with slim job prospects. "We're going to

have two societies," says Peter Greenwood, director of the criminal justice program of the Rand Corporation, a respected think tank. "One wired and cashless, another that's illegitimate and hasn't graduated from high school."

Crime-writer James Neff teaches journalism at Ohio State University.

DISEASE

KILLER COOTIES BY ARNO KARLEN

NOW Twenty-five years ago many experts said that antibiotics and vaccines would soon make infectious diseases a plague of the past. Yet for every disease conquered, such as smallpox, a new one has emerged: AIDS, Lyme disease, Legionnaires' disease, toxic shock syndrome, Ebola fever, *E. coli* infection (strain 0157:H7), and about a dozen others. And each time a disease has been brought under control, another has resurfaced—diphtheria in Russia, cholera and dengue hemorrhagic fever in Latin America, malaria and drug-resistant tuberculosis in American inner cities.

New illnesses have a number of sources: human contact with microbes from other species (AIDS, for example, which came from African monkeys); changes in the environment (Lyme disease, from reforestation and suburban development); new technology (Legionnaires' disease, from air-conditioning and water-heating systems); microbial mutations (toxic shock syndrome) and their adaptation to antibiotics (drug-resistant tuberculosis).

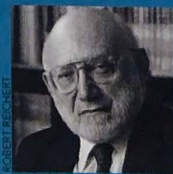
2020 For decades to come, the toll of infections will be worst in poor and unstable nations, but new diseases will continue to appear in the prosperous ones as they have for decades. America will have aged, and age brings greater risk of infection. People over 60 will benefit, perhaps more than others, from advances in medicine, but they will face new threats as well. Cancer treatment and organ transplants will be more successful, although one resulting problem may be greater vul-

WORST-CASE SCENARIO? AN OVER-POPULATED PLANET CHOKED TO EXTINCTION BY A LUNG-ATTACKING VIRUS.

ON THE CUTTING EDGE



DR. GAIL CASPELL, chairman of the Department of Microbiology at the University of Alabama, predicts that by 2020 some causes of death and common health complaints, such as coronary heart attacks or chronic arthritis, will be proved to be the result of infectious agents—and may be curable.



DR. JOSHUA LEDERBERG, professor emeritus at Rockefeller University and Nobel Prize winner, is an expert in the field of emerging infectious diseases. He believes that once-curable illnesses, such as measles, will become far more resistant to drug therapies and therefore more prevalent.

FACTOIDS

- Number of people worldwide who died of AIDS in 1995: 1.3 million
- Number who died of TB in 1995: 3 million
- Number who died of Ebola worldwide in 1995: 276

nerability to infections after surgery. As more people live longer, they will spend more time in hospitals and nursing homes, exposed to the drug-resistant microbes.

Some people have built careers hawking the worst-case scenario: an overpopulated planet being choked to death by lung-attacking Andromeda viruses, for example. It's true that frightening global epidemics could arise from a new retrovirus, a killer flu, or an Ebola-type pathogen running out of control. Because our technology and our behavior have sped up microbial evolution, reducing the threat of new plagues will demand thoughtful efforts—slowing population growth, keeping our food and water clean, and setting up global systems to monitor infectious diseases and microbial drug resistance, for instance. Human extinction, however, is unlikely, not least because the human immune system is a marvel of resourcefulness. Infection is a universal fact of nature, and microbes share the environment with us. For some microbes, we *are* the environment! The greatest threat may not be microbes but our failure to protect ourselves.

Arno Karlen is the author of Man and Microbes (Touchstone).

SEX & DRUGS

MICROBICIDES AND PROZAC BY MELISSA ROTH

NOW Sex, as everybody knows, can be dangerous, and it will only get worse. According to the Institute of Medicine, sexually transmitted diseases (STDs) are the “hidden epidemic,” the driving force behind the spread of HIV in the heterosexual community, as well as the reason for the surging rates of tubal pregnancy, infertility, and cervical cancer. Non-HIV sexual diseases cost taxpayers \$10 billion annually, according to the institute, but the public sector spends only one dollar to prevent STDs for every \$43 spent on treatment and other costs. “We spend less [in real dollars] today on STDs than we did in 1950,” says Peggy Clarke, president of the American Social Health Association.

As for illicit drugs, teen use has almost doubled since 1991, according to the University of Michigan’s Monitoring the Future study, and there is no shortage of blame: Bill Clinton, Nancy Reagan, the CIA, Snoop Doggy Dogg, 1960s parents, depraved youth. In the meantime, jails are overflowing with nonviolent drug offenders, while rapists wait for vacancies, and governors scramble to pay for more prisons. If recent polls and new state laws are any indication, the time is ripe for drug policy reform. In 1996 voters in California and Arizona approved legalizing certain drugs, such as marijuana, for medical use, and in Arizona, they even agreed to replace jail sentences with rehab for petty drug offenders.

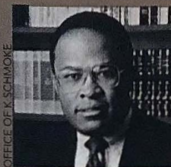
2020 Dr. Felicia Stewart, director of reproductive health at the Kaiser Family Foundation, foresees a day when all of us will carry a date decision maker, a sort of Magic 8-Ball with a built-in sweat sensor to detect whether a person has an STD. Get your potential partner to palm the sensor, and a digital message will let you know whether you should proceed. If you forget your Magic 8-Ball, a simple home-based STD test will render a quick verdict the morning after. “There will be a code on your toothbrush that says, ‘Get a chlamydia checkup today,’” says Stewart. Also, the Department of Health and Human Services recently dedicated \$100 million to research microbicides, gels that kill sperm, HIV, and STDs while keeping reproductive organs intact. In the year 2020, microbicides will be part of the daily regimen, like deodorant.

On the drug front: According to Drug Strategies, a nonprofit think tank, future prevention efforts will be based on developing kids’ confidence, using peer-led role-playing techniques to help them say no

ON THE CUTTING EDGE



DR. FELICIA STEWART, director of reproductive health at the Kaiser Family Foundation, is passionate about educating kids about STDs: “Ninety-five percent of Americans believe teachers should provide information,” she says. “Preventing STDs is like getting kids immunized. It saves costs.”



KURT SCHMOKE, mayor of Baltimore and a leader in the debate over drug legalization, started a needle-exchange program for intravenous-drug users, whose HIV transmission rates then dropped. He calls for a national commission on drug policy similar to the one in the 1920s on prohibition.

FACTOIDS

- Percent of Americans with STDs: 25
- Percent of sexually active teens who use condoms: 54
- Percent of high school seniors who use illicit drugs: 48

to drugs. Meanwhile, grownups may be saying yes to performance-enhancing drugs. “Prozac has become more culturally acceptable,” says Ethan Nadelmann, director of the Lindesmith Center, a drug policy and research institute. “As these drugs improve, we may see employers preferring to hire people who take these drugs.” Nadelmann also sees greater acceptance of psychedelic drugs—citing the federal government’s recent decision to resume a long-mothballed study of LSD as a treatment for alcoholics—and acceptance of stimulants, such as low-dose cocaine in coca tea, which is widely consumed in Bolivia and is considered no more dangerous than caffeine. *Melissa Roth is a freelance writer who covers youth and health issues.*

WARFARE

REALLY SMART WEAPONS BY HOLLY YEAGER

NOW Techies designing the weapons of tomorrow are looking for ways to wage war while keeping our troops out of harm’s way.

The buzz in the air is what the Pentagon calls unmanned aerial vehicles. Using radar and sensors to scan the earth below, these drones, now limited to spy missions, can loiter over an area for hours, an assignment too risky for human pilots. Bombing runs sans pilots could be 20 years away. Trekkers take note: Airborne lasers to jumble enemy electronics are only a decade away. Inspired by Ronald Reagan’s Star Wars dream, the Pentagon is also at work on a handful of schemes to blast incoming missiles out of the sky. An interceptor fired from an airplane could be ready by 2005.

Over in the navy’s yard, the pet project is the arsenal ship, a floating fortress. Commanders miles away could launch the ship’s 500 missiles deep into enemy territory. With a crew of just 50, this futuristic dreadnought will be far cheaper than conventional fighting vessels. The demo model could be in the water by 2000.

The army thinks its silver bullet may be a “digitized battlefield.” The plan is to wire all the good guys with commu-

WE’LL
ALL CARRY A
GADGET
WITH SWEAT
SENSORS
TO DETECT
WHETHER OUR
DATE HAS
AN STD.

nications and mapping devices that would give them the location of friend and foe alike.

2020 One thing is certain about war in the future: It will take place on new battlefields. One of them almost surely will be outer space, warns Andrew F. Krepinevich, Jr., who, as director of the Center for Strategic and Budgetary Assessments, in Washington, D.C., maps out

ON THE CUTTING EDGE

GENERAL CHARLES C. KRULAK, the top marine, has crystal-ball visions of terrorists brandishing high-tech weapons. He has set up a "war-fighting" lab to prepare for these battles of the future. Some early answers: nonlethal guns, which shoot sticky foam, and a rapid-response team to clean up after a chemical or biological attack.

MAJOR RALPH PETERS, an army intelligence officer, writes futuristic novels that caution against Pentagon cuts. In *The War in 2020*, Americans use electromagnetic projectiles but are outdone by Japanese radio waves. Peters predicts combat "in the streets, sewers, high-rise buildings, and industrial parks."

FACTOIDS

- Amount the world has spent on nuclear weapons since 1945: \$8 trillion
- Number of human lives lost worldwide in the 250 wars of the twentieth century: 109.7 million

detailed scenarios of potential future wars (a nuclear Iran closes off the Strait of Hormuz in 2016). Whom America will be fighting is harder to predict: maybe another superpower, such as China. Or the U.S. might weigh in on civil wars and regional disputes in, for example, the Middle East or between the Koreans. (North Korea is developing a ballistic missile that has a range of 2,170 miles and could threaten Alaska and Hawaii within a decade.)

Whatever the case may be, sensors in space, on planes, and on the ground will deliver a crystalline view of any conflict.

ROGUE WARRIORS COULD WREAK HAVOC IN CYBERSPACE, WHERE AN ATTACK ON U.S. COMPUTER SYSTEMS COULD DISABLE THE MILITARY.

And the details will be fed to more precise versions of the Gulf War's "smart weapons." Long-range missiles and armed drones will handle many of the tasks of today's tanks and fighter planes, so Uncle Sam may need fewer good men and women. But smaller ground forces may still be needed to lay claim to cities, and in particular, strategic sites, such as skyscrapers and tunnels.

Rogue warriors will become more dangerous, armed with chemical and biological weapons, ballistic missile systems, cheap satellite imaging, and pinpoint navigation systems.

They could also be dangerous in cyberspace, where an attack on computer systems could disrupt the nation and disable the military—a sort of real-life version of the movie *WarGames*. *Holly Yeager writes about the military for Hearst Newspapers.*

FOOD TAKEOUT IS IN *BY MICHELLE STACEY*

NOW Here, on the cusp of the millennium, you can walk into a supermarket in a midwestern city and buy enoki mushrooms, Thai peanut sauce, and baby arugula. But every day 7 percent of Americans eat at McDonald's. Hundreds of new products are low- or nonfat, yet young Americans have gained eight pounds in the last ten years. And while scientists have engineered healthier foods—pork that is about 30 percent leaner and eggs that have less cholesterol—serving sizes have nearly doubled in the last 30 years, canceling out any waistline benefits.

Federal efforts to improve our diets have failed. Introduced in the early 1990s after battles with meat and dairy lobbies, the USDA's revised Food Guide Pyramid recommends at least five total daily servings of fruits and vegetables. But average consumption remains stubbornly at about three and a half servings (perhaps, in part, because the same year that the National Cancer Institute spent \$400,000 to promote the new guidelines, Kellogg spent \$1 million to advertise just one cereal, Sugar Frosted Flakes).

To add to the confusion, the rich have swapped diets with the poor. Before the wealthy learned to revere a Third World diet of grains and vegetables, they gorged on meats, cheese, and sweets, now the materials of cheap fast-food. These days, the poor are also dying of the so-called diseases of affluence, such as diabetes, stroke, and heart disease.

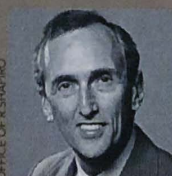
2020 Two factors will always matter most in food selection: price and convenience. As a result, Harry Balzer, a consumer-marketing researcher based in Illinois, guesses that hamburgers will rank, as they have since at least 1975, among the top three favorite restaurant entrées. But the most salient point about the future of food, it seems, will not be what we're eating but who is preparing it. Cooking at home is likely to be reduced entirely to hobby status. "The kitchen will be the great recreation spot," claims Clark Wolf, a New York-based food and restaurant consultant. The vast majority of daily meals will be prepared by professionals, to be taken home or delivered (perhaps to specially designed, refrigerated drop-off slots in the facades of homes).

Is a prepared-food society a sign of cultural decline or a scheduling triumph for people who have better things to do than chop and sauté? Says Balzer, who has studied the increase in take-out eating, "We'd be moving in a direction we all want to go in—toward having our own cook." *Michelle Stacey is a magazine writer and the author of Consumed: Why Americans Love, Hate, and Fear Food (Touchstone).*

ON THE CUTTING EDGE



ALICE WATERS, owner of Chez Panisse, in Berkeley, California, is considered by many to be the mother of healthy gourmet food, called California cuisine. She put farmers' markets on the map and advocates a diet based on organic, locally grown foods.



ROBERT SHAPIRO is chairman of the agricultural technology firm Monsanto, which has developed genetically modified tomatoes, corn, and potatoes. Genetic engineering may help feed 2020's estimated worldwide population of over 8 billion.

FACTOIDS

- Percent of U.S. food dollars spent on takeout in 1993: 43
- Projected percent in 2020: 57
- Pounds of salty snacks consumed per American in 1994: 22
- In 2020: 48

