

**ENDANGERED SPECIES: A LAST LOOK?**

CC484

# OMNI

APRIL 1991

**THE CONSTANT  
OFFICE:  
HOW TO SURVIVE  
THE  
INFORMATION AGE**

**INTERVIEW:  
SMART MACHINES,  
DUMB PEOPLE**

**PLUS: THREE STORIES OF  
ALIEN INVASIONS**



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# OMNI

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APRIL 1991

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# FIRST WORD

## HIGH-TECH PATRIOTISM:

The U.S. needs to look anew at research and development to compete in the evolving global economy

*Erich Bloch is former director of the National Science Foundation.*



In a decade of rapid and dramatic events, one of the most important and lasting changes has been the rise of a global economy. Transportation, communications, and information technologies have merged national markets, and new types of international economic partnerships are evolving. U.S. research and development (R&D) strategies must respond to these changes with a new approach to technology. The recently issued "U.S. Technology Policy" is a good place to start.

Intellectual capital is the critical resource in today's global economy. The ability to generate, access, and rapidly deploy new knowledge and convert it into marketable quality processes and products is a source of competitive advantage more lasting than the exhaustible natural resources or low-cost labor that, until recently, were prerequisites for industrial development.

Diffusion of technological capabilities and expansion of the technically trained workforce worldwide have strengthened the competitive position of industrialized countries and enabled many more to enter the marketplace. As a result, America's former dominance in nearly all high-tech markets is being challenged

Basic scientific research and technology development, therefore, have become crucial to economic competitiveness. The solution to virtually every problem that concerns the public—defense, health, education, environmental preservation, energy, urban development, international relations, space—depends upon the creation and exploitation of new knowledge.

At the same time, the nature of scientific and technological advances has changed. In many areas, the boundary lines between research and technology are diffusing more than ever, sometimes overlapping completely.

The United States needs a strategy for developing generic technologies and maintaining our technological base. Serving both strategic and commercial purposes, generic technologies include advances in basic concepts, processes, and instrumentation that enable firms to create new products or improve existing ones. This includes computer hardware and software, imaging technology, biotechnology, engineered materials, semiconductors, sensor technology, and other technologies. Their economic value exceeds what can be realized by a single firm, or even a single industry, because their application will benefit multiple industrial sectors. For instance, semiconductors are important not only in the information industries, but in automobiles and other consumer products.

Individual firms don't always have the manpower skills, the financial incentives, or the needed capital to develop these technologies alone. The rapidity of information transfer and the ubiquity of knowledge make it difficult for firms to capture the full benefits of privately financed R&D. And shortened product life cycles heighten the risk that the firm will not recover its investment.

Overseas, government-spon-

sored—in many cases, government-orchestrated—generic technology programs have reduced the costs and risks associated with technology development by assuring long-term financial commitment. The Esprit, Eureka, and Airbus programs in Europe, and Japan's Erato, MITI, and Monbusho programs are all examples that have proved successful in developing key industrial sectors for our foreign competitors.

The "U.S. Technology Policy," issued by the President's Office of Science and Technology Policy, describes a new framework for developing generic technologies. Rather than picking winners and losers, the policy encourages partnerships among firms, universities, and federal, state, and local governments to develop those technologies that are of critical importance to the U.S. economy as a whole.

But some of the federal government's more than 700 laboratories, or divisions or projects within them, could also be redirected to support industry coalitions developing generic technologies.

And Congress should support the President's 1992 budget initiatives in science and technology. These include the governmentwide high-performance computing and networking initiative, and the embryonic initiative in manufacturing and materials technology and processing. The proposed programs for the long-needed rehabilitation of education and human resource development are equally important.

In an era of global involvement, America's role, its stature, and its success will depend on its scientific, technological, and manufacturing capabilities. With the cooperation of federal, state, and local governments, industry, labor, and academia, the nation can move forward and ensure U.S. leadership in science and technology in the next century. **□**

# FORUM

## THE DIGITAL PATH TO FREEDOM:

Constant communication changes our work and our world. Together, we can ensure it's all for the better

**W**e live in times of peril and promise, an obvious truth made more so by the war in the Persian Gulf.

The perils are clear. In February we published an article that looked at the biochemical weapons threat. Few pieces in *Omni's* history have inspired as much comment. We'll continue to provide our interpretation of the perils the world faces. This month, though, we'll take a look at more promising subjects.

Specifically, we examine the revolution in the workplace. Work hard eight hours a day—or so the advice goes—and they will promote you to a position in which you'll get to work hard 12 hours a day. That's no less true today than at any previous time. The difference is that today those 12 hours may be spread in various increments throughout the 24. We're not really less factory- or office-bound, although much of our work is increasingly portable. Rather, we're more accessible in our non-workplace lives. Likewise, our work is more accessible to us. We can reach out, as it were, and put

our hands on information at any time, from virtually any location.

The ramifications of the information revolution in the workplace are the topic of *Omni's* special look at what we call "The Constant Office."

How has technology changed the nature of work? What are the human costs and consequences of an Information Age workplace? What are the best strategies for workers, managers, and entrepreneurs hopeful of thriving in today's increasingly electronic environment? Through a series of articles as well as an interview with Shoshana Zuboff, first philosopher of Information Age business, we endeavor to help prepare you for the changes ahead.

The changes will be dramatic, and they will spread far beyond the office. Already we're aware of how constant real-time communications alters our perception of war. As I write this during the fourth week of Operation Desert Storm, the information feed from the Gulf continues to obsess, shock, and fascinate us.

The same telecommunications technologies that make possible live combat coverage can be used toward more peaceful ends. The arrival of relatively inexpensive, eminently portable, and consistently effective digital communications has the potential to make every corner of the world a fully accessible node of the global information network. In other words, a full member of the club, at least potentially. And that sort of revolution should bring with it increased freedom and increased educational opportunities, the means for lifting less developed nations toward prosperity and away from violence.

And it can be done quickly. It took decades to wire the rural United States for telephones. For developing nations the time line is stunningly shorter.

Imagine setting up a telephone system linking several hundred remote villages... in only a couple of days. That's what the advent of digital cellular telephony makes possible. Industries are gearing up to deliver easily implemented systems that will truly link the world. Motorola plans a triad of dozens of communications satellites encircling the globe. International Mobile Machines has announced equipment that provides hundreds of remote nodes almost as soon as the equipment arrives. Arthur C. Clarke foresees what he calls "the tele-family of man": one communications technology, with many aspects, linking one world with many inhabitants.

The vision is a bold one, not without its challenges and pitfalls, but it's also a vision informed by an understanding that the future will be different from the past. *Omni's* readers have always understood this apparently simple truth. But in the business world the ability to comprehend and accommodate change remains too rare a commodity, as our "Constant Office" features show.

For individuals, businesses, or nations, the constant capability of receiving and processing information, particularly digital information, changes both the rules of the game and the game itself—whether that game is business, politics, or human interaction. Certainly we've witnessed over the past two years in Europe, China, and currently the Middle East, the part communications plays in affairs of state, domestic politics, and matters of war. Peril—or promise? Can we use these new communications tools as a means of evolving beyond war, moving away from repression and toward fuller freedoms worldwide?

Of course we can. Will we? That's up to us.

For now, take a break from your constant office, and step in to ours.—Keith Ferrell **CC**

*Digital cellular telephony is going to alter the way we think about business and personal communications.*



# OMNIBUS

## ACCESSING THE FUTURE:

One if by fax, two if by modem. The writers are coming, the writers are coming

**W**e are knee-deep in the Information Age, and with each new age comes a new vocabulary—not to mention a new psychology. What would Sigmund Freud think about the current state of things if he were still around? First, he would probably consult his computer, where he would no doubt have his case studies filed on a database.

Instead of the id, the ego, and the superego, he might be thinking in terms of random-access memory, central processing units, and neural networks. And now as we enter the era of the "Constant Office," the consequences of high technology will continue to reshape not only our attitudes toward work and philosophy, but also the pleasure principle.

After a month of focusing on the societal implications of the constant office, *Omni* assistant editor Mary Gluckman ("Dark Side of the Boom," page 36, and "Conducting Business," page 40)

began to wonder if she was suffering from technostress. "As I weighed the pros and cons of installing a fax machine in my home, I realized this technology can ultimately free us," Gluckman says. "We'll learn to balance the realities of the constant office with activities that enable us to recharge our energies, like getting away from our urban bases and devoting more time to our families and personal goals."

Writer Gregg Keizer ("As Good as There," page 39) routinely communicates from coast to coast by phone, electronic mail, and modem. He awaits the introduction of videoconferencing and televirtuality to hit the home office. When he's not writing for *PC Magazine* and *Compu*, Keizer's fiction appears in *Isaac Asimov's Science Fiction Magazine*. His story "The Gulag on the Rue des Grandes Augustines" appeared in the January 1989 *Omni*.

"Privacy could be hard to come by in the twenty-first century," says Fredric Paul ("E-Mail Comes of Age," page 35, and "One is the Loveliest Number," page 38). Paul is a senior editor at *Lotus Magazine* in Cambridge, Massachusetts, and his articles have appeared in such publications as *PC Magazine*, *Newsweek*, and *Condé Nast Traveler*.

What struck Doug Stewart about Shoshana Zuboff, professor at the Harvard Business School (Interview, page 66), was her use of language. Zuboff is a practiced interviewer who specializes in getting people to explore their feelings about their jobs. "Unlike the typical computer expert or business school professor, Zuboff talks about people's thoughts and emotions," Stewart says. "In a subculture where people seem most comfortable throwing around computer acronyms and marketing jargon, Zuboff uses words like loneliness, happiness, and pride."

Introducing Software (page 98) to *Omni's* compendium of columns, author John Voelcker maintains a home office in his small New York City apartment. Although he covers the subject of personal computers and software, his office is technically backward. "Having to walk to a friend's house to use his laser printer keeps me from staying inside for days on end, which I suspect many companies would like their at-home employees to do," says Voelcker, former managing editor of *Psychology Today* and *Mother Earth News*.

Aviation expert Martin Caidin helps launch the Transportation column (page 20), which focuses on innovations in travel. This month Caidin examines the Airbus's computer control system and its overkill in the cockpit. "It's a standard joke in the industry," Caidin says, "that pilots using computer control systems have so little to do that they are forgetting how to fly. But they're all learning to type sixty words per minute." Author of hundreds of books and articles on the subject of aviation, Caidin is also a stunt pilot for the entertainment industry.

When environmental writer Rebecca Norris (Earth, page 24) first set eyes on a 26-foot French voyageur canoe, it was love at first sight. "All I could think was, *How can I sublet my apartment and spend the summer floating down the Mississippi?*" says Norris, who spends her time writing, editing, and researching at *American Health*.

*Omni* editor at large Pamela Weintraub coauthored *You Can Save the Animals: 50 Things To Do Right Now* (St. Martin's Press) with the Humane Society's Michael W. Fox. Her text for "Animals in Exile" (Pictorial, page 55) accompanies James Balog's photographs from *Survivors: A New Vision of Endangered Wildlife*, published by Harry N. Abrams. **DO**



From top, Pamela Weintraub, Doug Stewart, Mary Gluckman, and Rebecca Norris.



# 2,000 YEARS OF THE SWORD



Napoleon's Imperial Guard

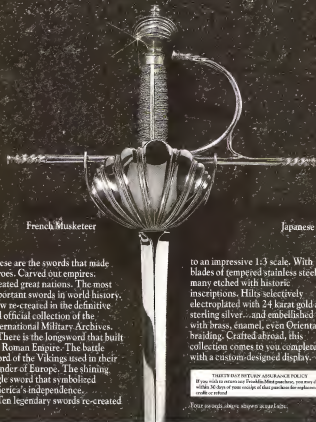
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APRIL

# COMMUNICATIONS

## READERS' WRITES:

Of messiahs, gods, pets' souls, and re-creating dead actors

### Hello, Dalai!

The Dalai Lama may be a holy man whose wisdom is more at home in the twenty-first century, as Keith Harary says in your January 1991 issue ["Dalai Lama: His Resolutions"]. But his ideas aren't so original that he should be singled out as a world leader—one, I might add, exiled from his own homeland. Although his perspectives may be comforting and provide us with hope for the future, I'm frankly tired of his leadership being pushed down our throats by New Age followers. Even so, what other potential world leaders are coming forward to offer equivalent guidance? I guess we'll have to live with the Dalai Lama until another messiah appears on the horizon.

Christopher E. Bak  
Camden, NJ

### Virtual Gods

People like Jaron Lanier [Interview, January 1991] who create virtual realities are like gods. It makes me wonder what will happen when every Tom, Dick, and Mary can play with virtual worlds. Perhaps we will do something that neither science nor religion has been able to do—namely, resolve the apparent conflict between our animal nature and our godly nature.

Richard Foy  
Redondo Beach, CA

### Pet Peeves

Your January 1991 issue asks the question, Do animals have personalities and souls? I have worked with many different types of animals. Regardless of species, each had a distinct personality. They worry, hate, fear, and, most of all, love. Even though they are intelligent, feeling creatures, however, I would not consider them equal to humans. Their intelligence is on a different level from that of humans. If positive results come from their use in research, like a vaccine for AIDS, fine, but they should not be used for the senseless testing of cosmetics, for example. As for animals having souls, religion and philosophy might be able to answer such questions as, Who are we? Where did we come from? And where

are we going? Animals either already know the answers or don't really care.

David Kveragas  
Clarks Summit, PA

### Castling Call

As an aspiring actor, I was a little more than annoyed at Robert Kilheffer's article "Live Illusions" [Pictorial, January 1991]. Just when I thought I had selected a profession that relies solely on human beings for its livelihood, along comes Raul Fernandez threatening to take away the already sparse work for actors. What is the possible good of using digital imagery in place of real human beings in film? Stunts and horror effects? Maybe. But to predict that one day "new film and television stars could be manufactured" is ludicrous.

Christopher Arnold  
Orange, CA

### Berating Technology

Marvin Cetron's First Word [January 1991] is yet another rave about the marvels of technology and how it's going to make our lives so wonderful. The temptation to extrapolate is indeed hard to resist, but far-reaching predictions usually prove to be very wide of the mark, and often downright silly. Cetron and other proselytizers of technology assume that just because something is technically possible it is bound to happen or that it will be beneficial. As the Dalai Lama points out in the same issue, scientists must ask deeper and more searching questions: Ought we to allow it? And what would be the consequences?

Working for a computer systems development company, I have become increasingly skeptical about not only the use and purpose of computers in our society, but also many of the underlying assumptions about technology in general. My own experience and research suggest that, in many areas, not only have computers failed to increase productivity in industry, but they may well have had the opposite effect, contributing to a vast waste of both human and financial resources.

Aidon Rogers  
Lakewood, NJ



# TRANSPORTATION

## A WING AND A PRAYER:

Aviation expert Martin Caidin looks at the dangers posed by "supersafe" automation systems in the cockpit

**A** British Airways Boeing 747-400 jetliner eased down from 40,000 feet to a planned landing in England in October 1989. The two-man crew monitored the computer screens and electronic flight controls that took the jet earthward. Suddenly the autosystems cut back the power in all four engines. The two pilots raced frantically through emergency procedures, bypassed the autosafety controls, regained control of the engines, and safely landed the airplane.

In the next four months, five more British Airways 747-400 jetliners also suffered an unexpected

backup instruments, which can create a dangerous situation if the computers controlling the instruments fail.

Fly-by-wire technology is the latest feat in flight automation. In this system almost every maneuver the pilot makes is sent first to a computer. If it decides the maneuver is safe in the airplane's present situation, the computer sends an electronic signal to the appropriate part of the airplane to execute the maneuver. Only the rudder and manual trim remain independent. The A320 airliner, built by the European consortium Airbus Industrie, is the first to fea-

has to take action that seems dangerous to get out of a life-threatening situation. Let's say you're piloting a fly-by-wire jetliner and suddenly another airplane is coming straight at you. The only way to avoid a collision is for each airplane to rack over into an 80° or even a 90° bank to get out of the way. The airplanes can easily handle such maneuvers and airloads, but the computers limit the airplane (as the A320 systems do) to 67° bank angles and 30° pitches of the nose up or down. Anything beyond that is classified as an aerobatic maneuver. When the maximum bank programmed in-

**Who will be flying the next airplane you ride? Computers, more than likely, with guidance from a**



**pilot. The computers in the most automated planes can even refuse a pilot's command.**

ed, significant reduction in power in all engines. Again only swift emergency action by pilots yanking the plug on the autosystems saved the day. Boeing blamed the malfunction on a bug in the "supersafe" electronics.

In large part, pilots no longer control the advanced airliners flown regularly by major airlines; computers and sensors do, overseeing all flight systems except the rudder and sometimes a manual trim. Cockpit automation has advanced far beyond the autopilot, which flies and navigates an airliner. Modern cockpits now feature an autofltrim, which controls the airplane's engines, and banks of computer screens that provide instrument readings. Some airplanes lack any noncom-

puter a fly-by-wire system that can refuse a pilot's commands.

Although the A320 has its admirers, many pilots and engineers insist that the technology reduces safety rather than increasing it. The pilot can't turn off the A320's autosystems. Except for the rudder and manual trim, the jet doesn't have any conventional hydraulic control systems that would let the pilot bypass the decision-making computer and control the airplane directly. In the past three years, two A320 accidents occurring in perfect weather have been chalked up to pilot error. Many pilots disagree, the author among them.

Although fly-by-wire systems guard against dangerous maneuvers by pilots, sometimes a pilot

to the computer is reached, it stops the maneuver. You've got 67°? That's all you got. And you collide with the other airplane.

So far in the United States, only Northwest Airlines has had much experience flying the A320. Crews officially love the big bird, but the airline has had to file suspected malfunctions of the airplanes' autosystems with the FAA.

"People may be becoming overconfident with the Airbus," says Ken Plunkett of the Aviation Safety Institute. "They're not [aware of or recognizing] its limitations."

Little by little, suspicion is growing that the automation fetish is a great mistake. The word is out: Pilots are there to fly their airplanes, the computers are there to help, not rule.—Martin Caidin **DD**

# EARTH

## ENVIRONMENTAL MISSIONARIES:

The Mississippi River Revival is cleaning up Ol' Man River and gaining followers along the way

**Y**ou'd think it was a floating family reunion rounding the bend. Banjos strum, adults and children laugh, dozens of aluminum canoes and johnboats circle a 50-foot barge, its red steel crane struggling like a fisherman lifting a hooked walleyed pike from the murky depths of the Mississippi River. At the end of the crane's taut cable, however, a dirty white refrigerator breaks the surface.

"Every year we usually pull out enough furniture for a two-bedroom house," says Jacqueline Long, chief fund-raiser for the Mississippi River Revival (MRR), an environmental group whose name sounds more like a prayer meeting or folk music concert. But don't let the guitars and good humor fool you. The organization is committed to cleaning up all 2,562 miles of the country's most fabled—and fouled—river.

During ten summers of cleanups, the group has managed to fish out everything from a vintage Studebaker to a computer, dredging up more than 200 tons of garbage in and along the northern Mississippi from the headwaters in Bemidji, Minnesota, to Bellevue, Iowa. As the Mississippi River Revival reaches adolescence, however, it plans to go after a more elusive catch: mercury and the other microscopic pollutants that make channel catfish and wall-eyed pike inedible.

By the time the Mississippi River winds 700 miles from its pristine source at Lake Itasca to the Iowa border, Minnesota residents will have discharged millions of gallons of wastewater, including toxic chemicals and heavy metals, into the water daily. True to its grass-roots organizing strategy, the group is teaching members the art of "river watching." Local chapters adopt a stretch of the river, spotting possible polluters and testing for local toxins.

The highlight of the group's activities is its flotillas. Last summer a 26-foot birchbark canoe, crafted in a Native American and French trapper style, led a host of watercraft more than 600 miles down the Mississippi. Along the way the group stopped to set up colorful booths, creating a kind of river chautauqua where local residents could learn about the river through song, theater, dance, and painting.

The MRR will also draw on tradition when it launches *Clearwater on the Mississippi*, a Mark Twain-era paddle wheeler that will serve as a resource center for river communities. Depending on the results of the fund-raising, the riverboat will be ready for action in 1992.

The organization, started by folksinger Larry Long, who took inspiration from Pete Seeger's Hudson River Clearwater Project, has hooked a variety of people.

Barge owner Jim Hartman, for example, has joined in the cleanups and now recycles his leftover cargo, selling soybeans to farmers as fertilizer instead of dumping them overboard.

Another member, artist Betsy Damon, is designing a water park, a two-story paddle wheel that will funnel the river's polluted water into narrow canals where tiny green water plants will naturally remove the toxins.

The MRR's successes, however, often take place away from the muddy banks of the river. In 1990 the MRR and the state of Wisconsin prompted the Minneapolis/St. Paul Metropolitan Wastewater Treatment Plant—known to local residents as Pig's Eye—to lower the limits of its toxic discharges into the river.

Even so, to accomplish its formidable task, the group will have to enlist support all along the way. "We really want to take this group all the way to the Gulf," says MRR environmental program director Amy Middleton. But despite a sizable following upstream, the MRR has yet to gain much of a foothold in communities below—where the river's pollution peaks.

Indeed, by the time the Mississippi flows into Louisiana, it carries tons of pesticides and toxins from the nine Northern states. And Louisiana, the country's number one discharger of toxic chemicals in 1988, poured 155 million pounds of toxic chemicals into the environment that year, much of which made its way into the Mississippi, according to the Environmental Protection Agency. The Delta's issues may seem worlds apart from those in the headwaters, but the group nonetheless remains undeterred.

"The Mississippi ties us together," Middleton says. "It won't be long before we all rally around our love for the river."

—Rebecca Norris **DO**

Members of this folksy environmental group stir up awareness of the woolly "Mighty Mississipp."





# CONTINUUM

## RAIN CHECK

You don't need a weatherman to know which way the wind blows.  
Also: A fatty rabbit test, and no rust for the weary

Why can't we predict the weather? Picnics ruined, vacations scuttled, and more seriously, lives lost in storms and floods—the number of missed weather calls is mind-boggling, even for the very next day, and despite a leap in high-technology hardware. What's going on?

I place a phone call to NBC weather reporter Willard Scott—the best known and the most eccentric of those wisecracking television weatherpeople who daily cajole and persuade us that they can forecast the heavens. "Willard," I ask, "why can't we call it right?" He is a bit rushed. I've caught him at the NBC studios between forecasting the weather and wishing happy birthday to two centenarians.

"Weather's a guessing science," Scott says. "I've been reporting it for thirty-seven years and I'll tell you that I'm seventy percent accurate forty percent of the time, and you figure that out." I can't. "Neither can I," he adds, laughing.

When Kenneth Comba, staff meteorologist for the National Meteorological Center in Washington, DC, answers the phone, he asserts, "We can call it right." When I ask for statistics, I get a runaround. "Well, it depends on what you're predicting and how you define accuracy." How I define accuracy? How about Webster's "free from mistakes or errors; precise"? "Okay," Comba says. "But the problem is there are so many ways of 'scoring' the forecast that you have to score a specific element in the weather." Score? "In a specific time period. In a specific place." So I can get a "score" for forecasting rain in Myrtle Beach, Florida, in July?

"Well," Comba procrastinates—and directs me to Paul Pojger, who specializes in weather verification at the



center. I repeat my question. "We don't keep statistics for small areas like that," Pojger says.

James Gleick, author of the best seller *Chaos*, a book that explains this strange and wonderful science, tells me that Edward Lorenz, founder of this new perspective on the universe, was himself a meteorologist. "That's because," Gleick says, "the atmosphere is a classic chaotic system. Small uncertainties grow exponentially fast. Accurate predictability for anything over three days is nearly impossible, no matter how large your computer is. At times you can't tell what'll happen an hour from now." That

sounds as gloomy as a gloomy forecast, I say. "We can't not really predict the weather," Gleick replies. "We forecast its unpredictability."

*I'm getting nowhere with this, I tell myself. I go for broke. I call a man who owns a hay farm in upstate New York. Henry Rothvoss is in his seventies and has supplied hay to local horse breeders since 1946. "Predict the weather?" Rothvoss asks. "I watch the TV weather reports just to see how wrong they are," he says. "Since his livelihood depends on forecasting, I ask for tips. "I look for the red sky in the east in the morning. Red sky and you're going to get a storm, didn't you know?" I'm a city kid, I say.*

*"No dew on the ground at sunrise, you're getting rain in the afternoon. And—and mare's tails in the sky, you know, clouds that look like mare's tails, you're getting rain, don't you know that?"*

*I do now, I say. But really, I venture, aren't these just homespun myths?*

*"Round these ways people call me for the weather forecast," Rothvoss says.—BOB BERGER*



## CONTINUUM

### WOULD MONSIEUR LIKE TO EXAMINE THE WEASEL?

The "foxy" bouquet cherished by lovers of New England wines has an unsavory tale (or tail) behind it. Terry Acree, a flavor chemist at Cornell University, discovered that the chemical responsible for the distinctive aroma of Labrus-

ca grape-based wines exactly matches a molecule found in the anal sac of the Japanese weasel.

The weasel is a close relative of the fox, which, Acree theorizes, probably produces a similar scent. "If so," he says, "it's perfectly understandable why the first European settlers who smelled this American grape called its odor foxy." Acree's discovery, however, hasn't dampened his enthusiasm for New England wines. "You can acquire a taste for anything," he says.—Kathleen McAuliffe

*A whiff of the grape: New England wines have weaseled their way into the collars of discriminating oenophiles everywhere*



### SKIN-DEEP

Scientists at Marrow-Tech, Inc., have developed a way to grow sheets of human skin in a laboratory, a process they believe will eliminate the need to graft skin from other parts of the body to promote healing in severely burned patients.

The key to the approach is a woven mesh made from biodegradable surgical suturing material. "The skin cells and mesh are placed in a sterile bag and fed nutrients," says Marrow-Tech vice president Ron Cohen. The cells grow and spread in multiple layers across the mesh to form sheets of tissue. It takes about two weeks to grow a 24-squares-inch sheet.

The process has been successfully tested on pigs, whose skin resembles that of rats and humans. Clinical trials with humans began earlier this year.

—George Nobbie

### A BAD BUG TURNS GOOD

A multinational team of researchers has tamed salmonella to produce a highly effective oral vaccine against typhoid fever, which is caused by one of the 2,000 known types of the stomach germ.

The vaccine promises enormous benefits in developing nations where inoculation efforts have been undermined by a shortage of sterile needles. When given in tablet or liquid form to 500,000 schoolchildren in Chile, for example, the

**WAMPIRE BATS SEEM TO PREFER CERTAIN INDIVIDUALS, ANIMAL OR HUMAN, THAT THEY HAVE ATTACKED PREVIOUSLY. SOME SCIENTISTS BELIEVE THEY DEVELOP A TASTE FOR THAT PARTICULAR RECIPE OF BLOOD.**

**MORE THAN 1 MILLION ANIMAL SPECIES ARE ALIVE TODAY: 950,000 OF THEM ARE INSECTS.**

vaccine was shown to reduce typhoid fever by almost 70 percent.

The late René Gorman of the Swiss Serum Institute in Basel developed the oral vaccine by debilitating the salmonella bacterium through chemical agents that alter its genes.

As a result, the organism is too weak to cause sickness but still capable of priming the immune system to protect against subsequent encounters with a virulent strain of salmonella.

Now microbiologist Bruce Stocker of Stanford University and Carlos Hormaeche of Cambridge University in England are using genetic engineering techniques to create weakened types of salmonella that may eventually protect against such deadly scourges as cholera, malaria, and AIDS.

Says Stocker, "We are determined to make this villainous bug into a superhero."

—Kathleen McAuliffe



As the world turns, Giant Jupiter, once the largest visible object in the solar system, now ranks second.

## CLOUDED JUDGMENT

"I am the largest permanently visible object in the solar system, spanning some seventy million miles. What am I?"

Surprise. It's not a planet or even the sun, but an orange cloud hanging off Jupiter. It was first discovered in 1973, but its size was vastly underestimated. Late last year Boston University (BU) astronomers discovered that the nameless cloud is ten times larger than previously believed.

The cloud consists of sodium atoms expelled from volcanoes on Jupiter's moon Io. Theoretical calculations suggest the cloud may, in fact, be twice as long as measured, with a diameter one and a half times the distance between the earth and the sun.

Another surprise: The discovery was made with a humble five-inch telescope, "not much larger than the telescope Galileo used for his observations," according to BU astronomer Michael Mendillo.

—Steve Nadis

## TICKS "R" U.S.

For those of you worried about America's stature in the world, consider this: We've still got the world's largest collection of ticks.

In the early 1900's U.S. Public Health Service re-

searchers started the National Tick Collection to help track the source of Rocky Mountain spotted fever. Today the collection, recently moved from the Smithsonian Institution to Georgia Southern University, is believed to house more

than 1 million ticks (although no one has actually counted them all).

The samples are preserved in glass vials filled with alcohol and include exotic bloodsuckers taken from big game animals slain by Teddy Roosevelt as well as from far-off locations such as Africa and the Galapagos Islands. "There are actually some beautiful ticks," says collection curator James Keirans. "Many people just don't believe it."

One of the challenges facing tick researchers, says Keirans, is distinguishing one species from another. "Most are basically small brown bags of blood," Keirans says of ticks. "We don't have an awful lot to work with in terms of distinguishing characteristics, unlike fleas, which have the most bizarre male genitalia in the animal kingdom. Ticks don't have all the spines and spurs fleas do. They're fairly conservative." —Oliver Fultz

## WASTE NOT, WANT NOT

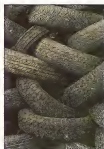
Each year Americans discard 250 million automobile tires, creating a solid waste nightmare. But researchers at the Georgia Institute of Technology are putting those retired treads to good use: cleaning up wastewater left over from food processing.

Anaerobic treatment of wastewater, a technique that has been around for 50 years, relies on bacteria to convert waste into combustible gases, primarily meth-

ane. One way to boost the output of a wastewater treatment facility is to give the bacteria a home—something to hold on to so they're not washed away when the water flow rate increases. Expensive plastics are routinely used for this purpose, but old tires work just as well or better, says Charles Ross, an engineer at Georgia Tech's Environmental Science and Technology Lab.

The basic selling point of old tires is their cost. "They're basically free, except for handling charges," Ross says. "Sometimes people even pay you to take them away." In the future, new wastewater treatment plants might be built with old tires installed in the water treatment tanks; tires could also be added to the tanks of existing facilities to increase their output. "Using one waste to treat another waste is a nice principle." Ross says.

—Steve Nadis



Bald treads: WW they find a new, greener purpose?



## CONTINUUM

### GOURMET GARBAGE

Americans generate tons of garbage each year, much of it discarded food packages. Toby Thompson of the Rochester Institute of Technology may have solved part of the problem. "Why don't we eat the damn stuff?" he asked one day. Thus the concept of edible packaging was born.

"It's nothing new," says Thompson, who designs food packages. "We eat apples and grapes and other things that come in their own natural packaging." He sees other foodstuffs following the same lead. "Rice, wheat, and other cereals could be converted to some other shape more suitable for

storage instead of being put in boxes," says Thompson. Another idea: Pasta packaging could be dropped into water and boiled off. For labeling, vegetable dyes would replace toxic inks.

Thompson has been lobbying for support from the food industry to fund further research into edible packages. So far there have been a few nibbles but no bites. "I think manufacturers are missing the boat," he says.—Curt Wohleber

**A POUND OF SHELL  
WALNUTS CONTAINS AS  
MANY CALORIES  
AS A POUND OF BUTTER  
AND AS MUCH FAT  
AS A POUND OF BACON.**

### WATER, WATER EVERYWHERE...

In zero gravity, fluids normally confined to the lower body float upward into the chest cavity. This tricks the body into thinking it has an excess of fluids, which, in turn, are excreted as urine. Back on Earth the fluid loss can trigger dizziness and low blood pressure. What's a spaceman to do?

After testing the effectiveness of several concoctions to help the body retain water—including plain water, salt water with glucose, and plain salt water—NASA is ordering shuttle crews to drink about 32 ounces of water after ingesting eight grams of salt one hour to 45 minutes before leaving orbit. John Charles, head of the Cardiovascular Lab at Johnson Space Center, reports that astronauts have not complained about the requirement. On



*Sodium shuttle: The trip home means salt, and lots of it.*

one shuttle flight, however, astronauts drank their required water 45 minutes before the scheduled landing. Then the landing was delayed for an additional hour and the shuttle's toilet had been turned off. After landing, Charles says, the crew "bolted for the bathroom, pushing each other out of the way."—Steve Nadis

### CALLING DR. VOYAGER

How could Jerry Solomon have known that his work with the Ibyger 2 spacecraft would lead to a valuable medical tool?

When his technique for comparing different images of Neptune's great dark spot was noted by Caltech neurobiologist Michael Harrington, the two scientists adapted it to study cell cultures and blood samples.

Frequently, the presence or absence of proteins in

blood samples or cell cultures is the signature of a specific disease. Harrington and Solomon developed computer software that can detect the presence or absence of these telltale proteins.

The biggest success so far has been a reliable method for identifying Creutzfeldt-Jakob disease (CJD), a degenerative neurological condition that leads to death. Harrington now hopes to identify other protein-mutated illnesses.

—Steve Nadis





## CONTINUUM



Automotive bright guys at Group Lotus specialize in refining other manufacturers' cars. Now their engineers have developed a system that fights noise with noise in a high-tech fashion.

### SILENT REVVING

If you treasure cars with a quiet ride, you'll cheer developments from Group Lotus. Engineers at the British sports car manufacturer have developed a system that effectively cancels out engine noise.

The conventional antidote to engine noise, explains Lotus spokesman Malcolm McDonald, is more sound insulation or a heavier body. Unfortunately, McDonald says, "if you add enough weight to make the car quiet, it's no longer fuel efficient." Lotus uses a high-tech approach. An electronic sensor under the hood and microphones in the cockpit monitor engine noise. A computer identifies the noise waveform and reverses it, when the reverse signal is played through the car's stereo system, the net result is no noise at all.

Lotus expects its anti-noise system to appear this year, but ironically, it won't

figure into Lotus sports cars. Instead, the company will license the new quiet technology to another automobile manufacturer.

"The Lotus is a high-performance sports car," says McDonald. "People who buy them would like them to be louder."—Bill Lawren

### MEAT MACHINE

Most American health freaks perceive East Asia as the land of healthy food: simple rice, fish, and steamed vegetables. But in Japan, at least, this "health diet" is more the result of government economic poli-

cy that restricts the import of red meat than a self-conscious pursuit of health. Starting April 1, those restrictions will be lifted, and the Japanese are looking forward to it.

"Japanese people are eating more meat," says Masami Takano, president of Hamilton Japan, a beef importer. "They would probably eat as much meat as Americans if they could buy it at a reasonable price." That's why his company will be specializing in rib eye steak for the Japanese public, available through vending machines. "We decided to sell meat by vending machine because property in Japan is so expensive," says Takano.

The meat machines were developed by Sanyo and are similar to ones already in use that vend frozen TV dinners at a chilly -20°F.

—Tom Conklin

### BORN TO VIEW

Are you or your kid at risk of becoming a couch potato? A study by Robert Plomin of Penn State University and his colleagues at the University of Colorado suggests that genetic factors have something to do with one's viewing habits.

After investigating 459 U.S. families, Plomin found that biological siblings often exhibit the same TV viewing behavior—no big surprise. But adopted siblings frequently show viewing patterns distinct from those of their adopted

family. More surprising, biological parents who give their children up for adoption usually display the same viewing habits as their estranged children, even if they've never met. Overall, Plomin says, genetic influences appear to be twice as strong as environmental factors in determining viewing habits.

Humans may not be born with a TV-specific gene, but, Plomin says, that doesn't mean viewing behavior isn't inherited. After all, no one can yet explain how other traits such as shyness and IQ are passed on. "We're not

talking about predestination," Plomin says. "But some youngsters may be at greater risk of becoming couch potatoes."

—Steve Nadis



The boob tube. Are we born-viewers or techne-victims?



# CONTINUUM

## HIGH-RISK HARES

What do mutant, laboratory-bred Watanabe rabbits have in common with millions of Americans? Both are doomed to an early death from stroke or heart disease because of faulty genes that allow low-density lipoproteins (LDLs), the so-called "bad" cholesterol, to accumulate in the arteries. But geneticist James Wilson of the University of Michigan has successfully used gene therapy to temporarily cure Watanabes, offering hope of eliminating the same problem in humans.

One in 500 Americans develops fatal familial hypercholesterolemia, triggered by just one defective gene that produces faulty liver cells. Of the men affected, half will die before age sixty; women's estrogen production partially protects them.

Wilson's treatment removes flawed liver cells and corrects them in a petri dish. When the corrected

cells are injected into the rabbits, their LDL levels drop 30 percent.

"The effect was transient, lasting only a few weeks until the cells were rejected," Wilson says. He hopes ongoing studies will produce "prolonged if not permanent correction" that may one day apply to human patients.

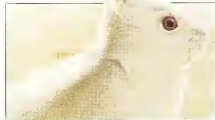
—George Nobble

**THE AVERAGE PERSON EATS ABOUT 50 TONS OF FOOD AND DRINKS 11,000 GALLONS OF LIQUID IN A LIFETIME.**

**CANNED FOOD WAS INTRODUCED IN 1820 BUT THE CAN OPENER DID NOT APPEAR UNTIL 1860.**

**CHEAPER BY THE RUSSIANS**

When American clothing manufacturers want to save money they have



Ordinary rabbits, like this one, have little in common with humans, but not so mutant Watanabe rabbits



Fate of the forgotten: Most assaults on types of metal that a new application may replace instead of fix.

**JUST GALVANNEAL IT**

As any car owner knows and musician Neil Young sings, rust never sleeps. But a Lehigh University materials science professor may have developed a technique that could make rust extinct in this near future.

The protective zinc-iron coatings used to insulate auto bodies from rust can break down during welding or when paint jobs are heated. According to Arnold Marder, however, a sudden application of heat, about 400°C, transforms the atomic structure

of zinc-iron coatings into a rust-proof substance called delta galvanneal. Applying such a process to automobiles would require an extra but very worthwhile step in the manufacturing process.

"Using heat, we're trying to rearrange the atoms into something that's stronger, and more resistant to heat and corrosion," Marder says. His team is collecting data to support their theory that delta galvanneal's properties make it more malleable, permitting it to be easily shaped into lightweight, aerodynamic, fuel-efficient car designs.

—George Nobble

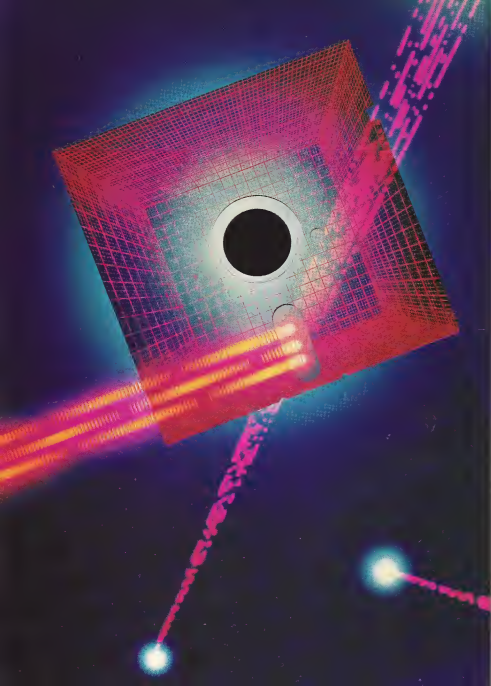
their goods made in places like Sri Lanka or Haiti where labor is cheap. American scientists are beginning to do the same thing. Their source of cheap labor: the Soviet Union.

Yuri Sheslov, a Boston University computer scientist who immigrated from the USSR in 1974, asked his old comrades if they would be interested in doing some software modification for Intelligent Resources International (IRI), where Shes-

lov works as a consultant. "The response surprised me," Sheslov says. "They were eager to do whatever I suggested." And IRI was eager to have the Russians, who provide expert services worth \$60 an hour in the United States for the equivalent of \$3 an hour. Sheslov says Soviet university faculty salaries are so low that experts are happy to do the work "just to get bread on the table."

—Bill Lawren





what is said, not who is saying it.

As electronic work groups become more sophisticated, incorporating voice, image, video, and other enhancements, they are "making access to information much more humanlike," says John Seely Brown, vice president of Xerox's Palo Alto Research Center (PARC).

"Participation in the creation of insight" is a subtle process, Brown says, and requires interaction that often isn't possible with text-only systems. You need a link that does justice to subtle communication mechanisms, such as gestures and intonation. Additional richness brings "tranquility and calmness" to electronic interactions, Brown says. PARC aims to create systems that allow "work at a distance with the level of copresence."

That "link" is critical to creating trust. Without it, says Robert Keidel, a management consultant specializing in team-work issues, the efficiency of electronic work groups may rob people of information they need to commit to something important.

"You need more foreplay," he says. Enhancing text operations with video and voice also expands the applications for electronic work groups. Nynex is experimenting with work groups at four Boston hospitals.

Tom Super, corporate director of research and development for Nynex's Science and Technology unit, says the operations, which involve moving images, data, text, and voice over networks, have the "potential to dramatically change health care" by letting patients "more easily have access to the people best suited to make a decision."

Electronic work groups encourage working at home. Telecommuters using text-only systems often

## THE CONSTANT OFFICE

feel cut off from background information that workers share casually in an office.

Multimedia work groups will help alleviate that isolation.

Even with better links, however, telecommuting may make companies fuzzy around the edges. "Being together all day creates a sense of common purpose," explains Sudhir Ahuja, department head of the Integrated Computer Communication Research operation at AT&T Bell Laboratories.

"Without that, it can become hard to pinpoint exactly where the company is."

"You just don't build the same bonds" with electronic communication, agrees Bellocore's Kraut, no matter how sophisticated. Instead, loyalty becomes increasingly attached to the worker's profession, instead of a company.

Electronic work groups are already reshaping corporations by reducing the traditional role of the middle manager. Management ranks are thinning as systems replace people for passing information up and down the hierarchy.

Middle managers won't be the only ones left out. "A lot of the benefits have to do with how much one's skills are in demand," says Kathleen Christensen, director of the National Project on Home-Based Work at the City University of New York.

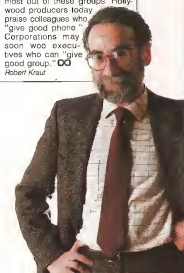
Electronic work groups will create a demand for people with the special skills needed to get the most out of these groups. Hollywood producers today praise colleagues who "give good phone Corporations may soon see executives who can "give good group." **OO**

Albert Kraut

AS ELECTRONIC  
MAIL SPREADS THROUGH  
COMPANIES,  
COMPANIES CHANGE.

**E-MAIL  
COMES OF AGE**

BY FREDRIC PAUL



## THE CONSTANT OFFICE

Changes in the way we work and how our offices are structured come at us faster and faster. Waves of state-of-the-art information technology and instant telecommunications capability let us reach anyone anywhere, and speed is key now. Most of us are too busy struggling to keep pace with ongoing innovations to question the implications of our new electronic authority figures. According to a number of psychologists, however, the need to stay on top of the information flow and the consequent degree to which we remain in touch with our offices exact a profound toll on us as individuals. Radical changes in the workplace cause subtle shifts in our perceptions of the work we do and the role it plays in our lives. In order to rise to the challenges presented by changing configurations of time, space, information, and relationships between management and workers, they say, we must look closely at how individuals respond to the new technology.

Mass exposure to technological innovations in the workplace has come too recently for psychologists to reach a consensus on its societal implications. Many agree, however, that one of the first signs of the struggle to adapt to the electronic office is often technostress, a cognitive shift that results from an identification with information systems. Psychologist Craig Brod, who coined the term in his 1984 book of the same name, says people become accustomed to the patterns set by electronic tools—accelerated time, yes/no logic, and a desire for perfection—and internalize these patterns. Eventually some lose the ability to tolerate ambiguity. They begin to have difficulty moving between elec-

tronic spaces and human relationships. "When they leave the office or go home," Brod says, "they need complete isolation to recuperate from the effects of the technology."

Brod warns that overreliance on electronic tools could also have serious repercussions on our ability to think creatively and develop new ideas. Because we don't create in a vacuum, he points out, we need to avoid the temptation to replace informal gatherings to bounce ideas off colleagues with electronic networking. It's also more difficult to spot errors or even evaluate the shape of a project embodied solely in identical characters on screens. "As the speedup occurs and we're connected by fax machines, electronic mail, and phones that forward calls to us thirty thousand feet over the ocean, we're always responding to something that's happening in our environment," he says. "The rejuvena-

tion necessary to develop qualitatively new thoughts gets reduced."

Electronically networked offices can also make it increasingly difficult to convince ourselves that we're doing an adequate job and accumulating enough information to make informed decisions. Philosopher Daniel Dennett points out that modern technology eliminates the possibility of unavoidable ignorance. As the opportunity to amass information grows larger, the obligation to make accurate predictions—the "right" decisions—becomes more onerous. Instead of consoling ourselves that we're doing as good a job as we can, we are tormented by the knowledge that the world of information is limitless. "You have to have a tremendous amount of internal control to override your ability to work all the time," says Brod.

For executives near the top of the office pyramid, the benefits of the electronic revolution—like telecommuting and flexible scheduling—may outweigh the disadvantages of being continuously on call. But in the recently published *Workplace 2000*, authors Joseph Boyett and Henry Conn describe a future in which millions of people now charged with analyzing information and making routine decisions will be replaced by lower echelons using "intelligent" software as mind prostheses. Boyett and Conn predict that time will be the currency of the Nineties and a cult of performance excellence will engulf most businesses.

The millions of people on the bottom levels of electronic hierarchies are increasingly likely to spend their days in an isolated no-man's-land, subservient to intelligent information systems that report their

CONTINUED ON PAGE 78



STATE OF SIEGE: WHETHER  
THE INDIVIDUAL IN  
THE INFORMATION-DRIVEN  
WORKPLACE?

## THE DARK SIDE OF THE BOOM

BY MARY S. GLUCKSMAN

## THE CONSTANT OFFICE

How many telephone numbers do you have?

For many Americans, the count could go as high as four or five: one for home, another for the office, a fax number, maybe another for the car phone, and still another for a weekend retreat.

Within a few years, however, a combination of advanced switching and radio technology will mean that a telephone number will no longer revolve around a particular place and time but will represent a person, no matter where he or she may be located. You'll have just one number, whether you're at home in the suburbs, at work downtown, at a client's factory in another state, or driving to your vacation home by the lake.

Researchers for local telephone companies, cellular carriers, and a variety of equipment makers have already developed most of the necessary technology. Tests are under way throughout the United States, in Japan, and in Europe.

The concept goes by several names, depending on who's talking about it. Some call it personal number calling, or PNC. For others it's the personal communications network, or PCN. Acronyms aside, the first pieces of the new service are already appearing, full-scale service should become available in two to three years, and tens of millions of subscribers could be signed up by the year 2000.

PCN depends upon two very basic elements: an intelligent network that knows who is associated with each number, and a universal access and registration system to tell the network exactly where that person is.

Ed Thomas

### THE INTELLIGENT NETWORK

The intelligent network would be composed of high-powered computers and vast interconnected databases designed to link individuals with their particular telephone number and set of calling services. Like a super-efficient secretary, "It would know who you are, where you are, and what you like," says Benn Kobb, editor and publisher of *Federal Communications TechNews*, a Washington-based newsletter.

Much of the necessary technology is already being installed in telephone networks. Ed Thomas, corporate director of advanced technology development at Nynex Corporation's Science and Technology unit, claims that just about everything else needed is already up and running in the lab. "We know how to do it," Thomas says. "We're convinced we have demonstrated the technical feasibility."

Pieces of the technology are already showing up in cellular "roaming" systems that let callers reach people with cellular phones anywhere in the country, even if the caller doesn't know where they are. McCaw Communications' Cellular One systems will kick off "seamless roaming" in several markets this year, and the company says other nonwireline cellular carriers nationwide are showing interest in joining. Several companies, including Bellcore and AccessPlus Communications Inc. in Bellevue, Washington, have systems that tell callers to hold the line for a minute or two while they page the call recipient. The call recipient then dials an 800 number to connect with the caller. Maurice Lampell, district manager of experimental services planning at Bellcore, calls it "a poor man's PNC."

Japan's Nippon Telegraph and Telephone Corporation, meanwhile, plans to introduce a sophisticated call-forwarding system based on smart cards next year.

### SHIRT-POCKET COMMUNICATIONS

To let intelligent networks deliver true one-number calling, you also need a way to stay in constant contact, telling them where and how to reach you, whether you're near a conventional telephone. Several companies have developed low-powered digital radio systems—short-range pedestrian versions of today's cellular mobile telephone service—designed to do just that. Wireless shirt-pocket-size personal telephones would make and receive calls, while constantly informing the network of their current location.

"We have prototype equipment running in the laboratory," says Don Cox, division manager of radio research at Bellcore. "If all the ducks fall in line, we could start something like this in two or three years." Once such a system is complete, Cox adds, subscribers would never need to use a wired telephone.

Interim systems are already on the way. Later this year, for example, Nynex plans to offer New Yorkers a low-power digital radio service it calls PTS, or personal telephone service. PTS will use hand-held personal communicators, but without the intelligent network component. Similar personal communications systems, also not linked to an intelligent network, are being installed today in the United Kingdom.

### HANG ON A SECOND

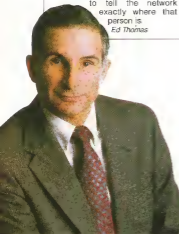
Although most of the necessary tech-

CONTINUED ON PAGE 33

ONE PERSON,  
ONE PHONE NUMBER,  
MANY PHONES...  
ANYWHERE.

**ONE IS  
THE LOVELIEST  
NUMBER**

BY FREDRIC PAUL



## THE CONSTANT OFFICE

Too little time, too much to do. The constant office pushes the limits of time management. Demand for time already exceeds supply. The workplace of the Nineties will make even more insistent claims.

You can't be two places at once. But with a sophisticated approach to business communications, you can be virtually there. Your words, face, even your artificial, computer-generated soul can fly across the country or around the globe without so much as a boarding pass.

Business communications will make it possible to hold discussions in which participants drop in and out over hours, interjecting ideas as they're formed. Or meet for a show-down over project deadlines with your company's European division, without wasting time in the air—or risking travel during wartime. Or share computer-made worlds where you touch and use a product before it exists in physical form.

Adjuncts to traditional letters, memos, meetings, and telephone calls are poised to replace paper, travel time, and dead ends caused by misunderstandings. The offices of 1991, 1995, and 2001 will feature several ways to project your business persona across time and space.

Meetings over days and weeks may seem contrary to a world where speed is essential. But by downshifting time and letting the decision-making process carry on 24 hours a day, a unique form of business communication is possible.

Computer database providers like CompuServe and Prodigy have made it practical. But it's a tiny on-line community called The Well that connects staffers and volunteers of the Seva Foundation, a nonprofit service organization. Using standard

PCs and modems, devices that translate computer characters to digital signals for transmission over phone lines, Seva nurtures public health projects from the plains of South Dakota to the mountains of Nepal.

"We work in a very decentralized manner," says Suzanne Gilbert, executive director of Seva. "But we also operate by consensus."

The Well reserves 10 to 12 private on-line meeting areas for Seva, each addressing a specific project or concern. One is devoted to Seva's efforts with Native Americans, another deals with fund-raising, another with the foundation's blindness prevention programs. Staff, board members, and volunteers log on to The Well, often from home PCs, read exchanges and discussions entered since their last visit, and respond from the keyboard. Discussions stretch across days, weeks, even months. Since a complete record of the meeting is always available, it's clear who proposed an

idea, who supported it, and even why decisions were made.

Computer conferencing doesn't involve staff members serving as coordinators to usher communication flow," Gilbert says. "If we didn't have The Well, we would have a lot of conference calls and be using astronomical amounts of overnight mail. But it's not without its shortcomings. It lacks emotional expression. It took us a while to use it effectively, to capture the nuances of a person's point of view."

With half of Seva's communication needs met by computer conferencing, the foundation couldn't operate without them. "We're really spread around. We have four offices, projects around the globe, board members on five continents," says Gilbert. "Computer conferencing are very helpful for communication."

### THE CAMERA REVEALS

To send your face, not just your words, through time and space, you need a videoconference room. Packed with cameras, displays, specialized video computers called codecs, and supporting hardware, videoconference rooms have popped up at companies eager to enhance business by conducting meetings over telephone lines.

At NEC's new Super Tower in Tokyo, an impressive videoconference room arranges 42 chairs around a table, each chair facing its own video monitor that can switch from commercial television news channels to a live feed from NEC America on Long Island. NEC America, in turn, can link its headquarters videoconference room with several sites in

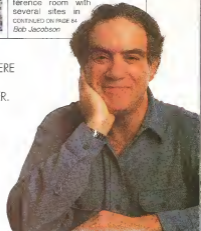
CONTINUED ON PAGE 54  
Bob Jacobson



REMEMBER  
VIDEOPHONES? THEY'RE HERE  
AT LAST, AND  
THEY'RE BETTER THAN EVER.

**AS  
GOOD AS  
THERE**

BY GREGG KEIZER



## THE CONSTANT OFFICE

Imagine arriving at a concert hall to hear a world-famous symphony orchestra and finding four deputy conductors-general and 60 vice-conductors among the 400 musicians. Everybody has the same score, but instead of feeding off each other's notes to create a seamless, exquisite rendition, the musicians play by rote, concerned only with satisfying their particular vice-conductor.

That's how big businesses have traditionally been organized, says economist and management expert Peter Drucker, adding that he believes the symphony orchestra will be the model for corporate management in the twenty-first century. According to this dean of modern management science, whose twenty-fourth book on the topic came out this year, information technology has made middle managers virtually superfluous. In the future, he says, we will avoid them altogether by pushing responsibility up and down.

Each individual in a company will essentially become a minimanager—of information.

Most managers, experts in business science agree, will succeed or fail in the Nineties based on how quickly they adapt to a chimerical workforce and a workplace newly configured with tools of the information revolution. The biggest challenges facing managers today, say Drucker and other authorities, include learning people skills and devising adequate means of organizing and disseminating the vast amounts of available data. Managers must acknowledge the rise of independent contractors and midsize companies. And if they want to retain employees increasingly able to sell their skills elsewhere, they'll have to offer new incentives and benefits packages.

Quality will become the paramount goal across the board in the next decade, says Joseph H. Boyett, who manages the A.T. Kear-

ney Center for Excellence in Total Quality Management in Atlanta. In fields like design, engineering, manufacturing, and marketing, says the author, with Kearney head Henry P. Conn, of *Workplace 2000*, everything will have to be done right the first time and every time. The 95 percent "good" quality most companies are now happy to achieve no longer measures up; indeed, that quality level will be considered a disgrace. "You can inspect out all the bad quality or you can do it right the first time. The only people who can do that are the company's employees," Boyett says. "That drives you to much higher levels of employee empowerment and involvement."

In order to succeed in an environment where quality—not quantity—is king, managers will have to delegate authority and share information with wider ranks of employees. "Managers and supervisors are becoming

CONTINUED ON PAGE 64

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#### BOOKS

BOYETT, JOSEPH H. & CONN, HENRY P. *Workplace 2000: The Revolution Reshaping American Business* (1991), Dutton

BROD, CRAIG. *Technostress: The*

*Human Cost of the Computer Revolution* (1984), Addison-Wesley

Publishing Company

CETRON, MARVIN & DAVIES,

OWEN. *American Renaissance: Our Life at the Turn of the 21st Century* (1989), St. Martin's Press

PENZIAS, ARNO. *Ideas & Information: Managing in a High-tech World* (1989), Norton

TOFFLER, ALVIN. *Powershift: Knowledge, Wealth, and Violence at the Edge of the 21st Century* (1990), Bantam Books

TURKLE, SHERRY. *The Second Self: Computers and the Human Spirit* (1985), Touchstone

ZUBOFF, SHOSHANA. *In the Age of the Smart Machine: The Future of Work and Power* (1988), Basic Books. **DC**

STREET SMARTS:  
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STRATEGIES FOR  
SUCCESS IN THE NINETIES

## CONDUCTING BUSINESS

BY MARY S. GLUCKSMAN

Surface mount technology adds to reliability and facilitates miniaturization

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Rubber grippers on each side make phone feel more secure and improve shock resistance

Keypad is a single sealed piece so dust won't get between numbers

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SHORT STORIES  
BY BARRY N. MALZBERG,  
WILLIAM RELLING,  
JR., AND TERRY BISSON



## ALIENATION

WHAT I DID TO BLUNT THE ALIEN INVASION BY BARRY N. MALZBERG: I talked to them. "Be reasonable," I said. "Consider the conditions here. Consider the nature of our circumstances. We are struggling toward a kind of equivocal democracy, equivocal poise, equivocal justice. Marx's alienation effect is only an intermediary stage on the road to Nirvana." And so on, and so forth. A modicum of learning, a flutter of ped-

PAINTINGS BY RALLÉ





antry, even some scatology now and then to show the great comic vision which, ultimately, underlies the human condition. They nodded solemnly but did not make their position clear.

2. Carried the word to the President, to Congress, to the press as best I could. Not only through letters to the editor, not only through the vox populi sections of the newspaper and by phone calls to the district office of our congressman, but through the great common network of our evolving democracy, the talk shows, "Alien Invasion," I said, "Creatures from the far Centauria, from the proximate Centauria coming in disguise to infiltrate our customs, our cities, the stereotypes of our lives, disguised as fellow citizens, dogs, horses, houseplants. Against their cunning we must be unavailing, nonetheless I think you are entitled to know. The full story." Also small notices in the classified sections of the local daily, not much but all I can afford. ALL THOSE WHO ARE OF THE ALIEN INVASION PLEASE CALL (my number) OR WRITE POST OFFICE BOX (my post office box). I did what I could, certainly, to bring alertness to the populace. My modest funds, my lack of true credibility, all of these were very much against me, but nonetheless, within limits, I tried.

3. Discussed the issue with Susan. I made no attempt to hide my distress or my growing awareness that perhaps between the loathsome, threatening presence of the alienness and all of those circumstances which are our democratic way of life, I stood alone. "I don't know what you're trying to tell me, George,"

she said. "If the aliens are coming, why are you the only one who knows this? The rest of us haven't heard a word."

"I don't know," I said. "How can I possibly know?" There is, after all, only so much of an accounting one may give,

and yet the woman is endlessly demanding. "Perhaps the rest of the population is narcotized or drugged,"

I said. "Perhaps it is only for me to carry the tale." And so on and so forth. Even within the context of a difficult living situation, a situation built, I think, upon my need to reach out to Susan, to humor her, to treat her as if she were a sensible, rational woman and not the raving, neurotic pain that I know her to be, even within that

context, I tried to be ultimately reasonable. "You can see why I'm somewhat preoccupied," I said. "You can understand now why you may find me somehow abstracted on various occasions. I'm trying to work out a plan to blunt the alien invasion. This takes all of my mental powers."

She laughed and laughed and it was at this point in our dialogue, usually although not exclusively, that she would begin to hurl objects at me. I do not wish to discuss this any further. Of the true and mordant nature of our relationship, of the dark and tumbling necessity of our connection, I will inform in another context. At this time we are dealing with the public rather than the private (and hence irrelevant) consequences of our activity.

4. Remonstrated with myself. Had genuine agonies of conscience, crisis de coeur in the deep insertion of the night. "Perhaps it is a delusion," I was driven

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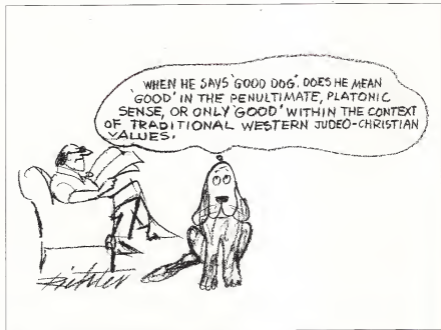
so far by the insensible Susan as to admit. "Perhaps there are no aliens, let alone an imminent invasion, I have concocted all of this out of heavy drugs, phantasms, and the need to establish some aura of personal significance. But no, no, this cannot possibly be, the corporeal reality of the aliens has been proven over and over again, and I have no reason whatsoever to fantasize." I am of course compressing this internal monologue significantly while at the same time preserving its essence. It is of the essence which I am speaking now. "No, I have examined the issue wholly and profoundly and I know that it is only I who can sound the warning," I concluded. Would conclude these remonstrances and hearing internal monologues composed of equal parts self-revelation and determination. "It is not internal disintegration but objective necessity. That necessity can be proven by the very conditions in which we find ourselves. The times bespeak invasion. Well, don't they? How much doubt can there be about the nature of delocation?"

5. Rendered pictures of the aliens for talk show hosts or congresspersons who might want physical evidence. Using Crayola<sup>TM</sup> and perspective drawing, rendered them as they had appeared in my hallway on that fateful afternoon

in June of 199—when all of this began. Eight-foot aliens with thin lips and square shoulders, the aspect of soccer goalies or perhaps a new breed of astronauts, all of them with intense, winking blue eyes and highly conspicuous genitalia of the requisite kinds. Whiskers and cilia, representative balloons to display their dialogue, which came in only slightly fractured English with what seemed to be a cockney accent. "Are you serious?" Susan said, seeing a cache of these drawings one night, looking as she so often looked in places which were none of her business. "What are these things, what has happened to you?" Pointed at the representations of genitalia and with crooked forefinger made an inexplicable but wholly repellent gesture. "This is too much for me," she said. "It's one thing to have a living arrangement, strictly business and all that and another, quite another to realize that you are living with a home-boy lunatic." And further statements of a kind which cannot be paraphrased and need not be included in this otherwise true bill. The pictures, faithful reproductions of the aliens as they appeared to me on that doomed late Saturday the cones and slants of dim summer light infiltrating the walls of this tenement, have been carefully preserved and are available at any time for inspec-

tion and further consideration.

6. Tried in the absence of any fair response from congresspersons, call-in hosts, covivant, or the corrupt, self-serving press to take the issue directly to the streets. "They are already among us," I said, "eight-foot caterpillars with purple genitalia masquerading as people and they have so clouded our minds with dangerous drugs and global corruption that we do not notice, we think it is merely part of urban decay. When several hundred thousand of them, a critical number, have infiltrated the populace, they will have reached a kind of Heisenbergian mass and through use of the uncertainty effect will topple entropy itself. Oh, we must be alert, we must be alert, we must be aware!" I pointed out, gesturing somewhat floridly (but in a controlled and geometric fashion) in the park on that and other difficult evenings and I would like to say that I drew a crowd and some enlightened response but due to the very dreadful and imminent conditions created in part by the aliens themselves, I am afraid that I was unable to elicit the kind of response which was deserved under the circumstances. Tried then in the presence of few and the absence of many to make the situation entirely clear but, met only by wailing indifference and at last the



tanks and brutalities of the guardians, was able to shout no more.

7 Tried to consider all parts of the issue, all phases, and alternatives. "Perhaps I am fantasizing," I told them when they had called me in for further investigation, "but that doesn't mean that it isn't true, that they aren't here; it just means that I have no hard evidence, that I cannot produce them. Not that I am fantasizing, you understand, although I will make that stipulation for the purposes of argumentation. I have a serious mission, this is serious business, we are talking about the alienation effect," but their faces were bleak and implacable, oh, I know something of bleakness and implacability, it must truly be conceded, although it is not these qualities alone which will suffice when they come tunneling through our streets, using their massive weaponry, dismembering our civilization.

8. Seized Susan in a sexual embrace and tried to convert her to understanding through sheer will, some Reichian orgone box of the spirit, performing upon her otherwise unprintable and desperate acts which need no explication within this difficult compass. "You've got to listen," I said as she struggled. "You've got to hear me out, you have to understand that there are aliens among us, they may even as I speak

have seized me just as I seize you," and the desperate cries of her resistance sped me only further on my way as I joined with her in an absolute cold infusion of knowledge, a spiraling knowledge of spiraling aliens as pointlessly she resisted the knowledge which would free her.

9 Begged the aliens, as they clutched me, as they took me away, to heed my pleas for the sake of our destiny. "Behold truly, I will not betray my race before cockcrow," I said, "not one time, not twice, not three times," and invoked what frail Scripture I knew to try to change their course, our destiny. "Comfort me with apples," I said, "and leave us time and season," but beggars, like betrayers before cockcrow, cannot oppose with reason that which is implacable and doom ridden, although I tried and tried.

10. Offered my services as administrator. "All right," I said to them, in the consultation room, being allowed as was their policy (they said) one interview in which to make my position known. "You need an intermediary, someone you can trust, someone who can speak to both sides and surely I have done that throughout. Consider Pétain," I said, "consider Quisling, consider the occupied territories. Consider how truly dapper and assimilated I

will look in my eight-foot disguise," and so on and so forth, there are, after all, as many species of failure, as many varieties of submission as there are of success and if fell upon me—it has always fallen upon me, consider the condominium split with Susan—to make the best deal I can. "After all," I pointed out to them, "who better than me, who better than the prophet of Tompkins Square and the Marxian diocese would know how to manage the true destruction, the latter exculpation of Earth? Who, O friends and brothers? Who, then?"

#### ALONG THE MIDWAY OF THE CARNIVAL OF SOULS

BY WILLIAM RELLING, JR

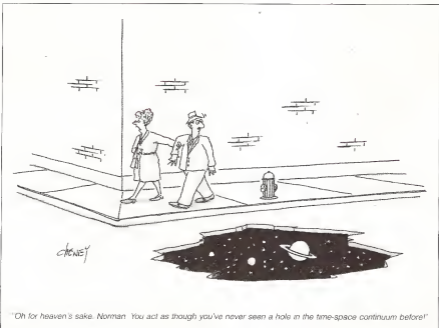
1. Jesus Saves, Mary Rents, Holy Smoke, I Am a Clone  
FADE IN:

A long aerial shot above the U.S. government's germ warfare testing facility at Dugway, Utah. There is an explosion, and a monstrous greenish-gray cloud escapes into the atmosphere. Winds blow the cloud eastward.

To the town of Monmouth, Utah: Population: 210. The cloud arrives at half past one, Mountain savings time, on the afternoon of September 1 and blots out the sun.

And it rains.

The effect of the rain on the popul-



"Oh for heaven's sake, Norman. You act as though you've never seen a hole in the time-space continuum before!"

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tion of the town is swift and disastrous. Two hundred and nine men, women, and children are transformed, inexplicably, into Sylvester Stallone. The entire population of the town—save for one man, a Vietnam veteran played by James Caan (in an important comeback role for him). He has a steel plate in his head, a reminder of the horror of U.S. involvement in Southeast Asia. He is unaffected by the fallout from the strange cloud, which dissipates soon after the rain has fallen.

Immediately the population of Monmouth wants to write, direct, and star in motion pictures. They all receive backing from major studios in Hollywood, and they begin to crank out movies.

The climax occurs the following April at the Academy Awards ceremony in Los Angeles. All five nominees for best actor are Sylvester Stallone.

Will James Caan arrive in L.A. in time to halt these fiendish proceedings? Or will he, too, succumb to the sinister lure of Hollywood and accept a co-starring role and a percentage of the gross?

## 2. A Bulket for St. Nicholas

DISSOLVE TO

An interior shot of a grungy office in downtown San Francisco. Printed in reverse on the grimy windows overlooking the docks of the bay are the words

SEAMUS O'SHEA PRIVATE INVESTIGATIONS.

O'Shea—played by Kurt Russell—is at his desk, nursing a quart of Wild Turkey. He has not had a client in weeks.

There is a knock at the door. Entering the office is a short, bandy-legged, round-bellied man with a chubby, florid face and close-cropped white hair. He is dressed as a bum. He smells bad. He tells O'Shea that he's been an amnesiac for six months that he regained his memory only this morning. His name, he says, is Kris Kringle.

O'Shea offers the man a drink and listens to his story. The man says that while vacationing in Baja California he was attacked by a gang of evil elves led by someone who has since taken his place as an impostor Santa Claus. The impostor's nefarious purpose is to ruin Christmas for everyone. With only twenty more shopping days 'til Yuletide, there isn't much time to stop him.

Eventually Kringle convinces the cynical, hard-boiled O'Shea of his veracity. The two of them spend the next week and a half assembling and training an assault team that will fly to the North Pole and retake Santa's Workshop from the impostor and his henchmen. But the bogus Santa Claus—played by Ronald Reagan in his comeback role—has a spy in Kringle's ranks (Kim Basinger as Mrs. Claus).

Kringle O'Shea, and their team of crack commando elves wing their way northward, unaware that their enemies have laid a deadly trap for them.

Will they fall into the trap? Will there be Christmas this year or ever again?

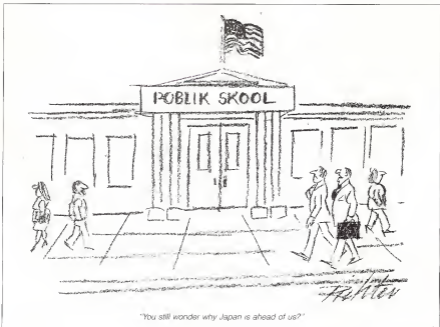
3. Old Home Week in Sodom and Gomorrah

DISSOLVE TO

The massive private office of Rev. Jerry Falwell at Liberty University in Lynchburg, Virginia. Falwell is sitting in a chair, watching a double feature on television of bootleg videotapes of two yet-to-be-released Hollywood films. He likes both of the movies—particularly the one that has his old friend Ronnie playing Santa Claus.

But neither movie really cheers him. The troubles, the troubles. So many troubles these last few years. The scandal involving the Bakkers and the collapse of PTL. The flap concerning Swaggart and his disgusting tart. The dissolution of the Moral Majority. The ratings decline—and concurrent loss of revenue—affecting his own programs.

And now this. One by one over the past few weeks, his colleagues have been dying in mysterious, unsettling ways. The details concerning the deaths have been sketchy, but the pattern is unmistakable. First Jim and Tammy. Then Swaggart. Then Pat Rq-



berison. Oral Roberts. Kenny Copeland. The Crouches in California. That obnoxious pip-squeak Randall Terry. Even Schuller, the most genuinely upright of us all. Schuller, for God's sake. Falwell switches off the television, abraiding himself for thinking a blasphemous thought. "Forgive me, Lord," he says under his breath.

A voice dry as desert sand utters softly, from behind him. "No."

Falwell whirrs around, startled. Standing there is his cleaning lady, a wizened, ancient black woman whose name he can never remember. He glares at her, rising to his feet, his face darkening with rage.

"What are you doing in here?" he demands harshly. "It's your turn," she whispers in a voice as old as time. He gazes at her with wide eyes.

"You keep on claimin' to know God," she says. "You claim to speak for Him, to know His mind. But you don't know Him at all. And He's tired of you sayin' that you do."

Falwell's face reddens. He begins to sputter, but she holds up a hand to quiet him. She says to him, "You and your friends, you been makin' God very, very angry. He's been keepin' an eye on y'all for a long, long time. He's everywhere, you know."

At last Falwell explodes. "Do you know what you're saying to me? Do you know what I can do to you? DO YOU KNOW WHO THE HELL IT IS YOU'RE TALKING TO?"

She nods. "I know who you are. But you don't know who I am." He stares at her.

She says softly, "I'm God." And she turns Falwell into a pillar of salt.

With that, we happily  
FADE OUT  
END

## THEY'RE MADE OUT OF MEAT BY TERRY BISSON

"They're made out of meat."  
"Meat?"

"Meat. They're made out of meat."  
"Meat?"

"There's no doubt about it. We picked up several from different parts of the planet, took them aboard our recon vessels and probed them all the way through. They're completely meat."

"That's impossible. What about the radio signals? The messages to the stars?"

"They use the radio waves to talk, but the signals don't come from them. The signals come from machines."

"So who made the machines? That's who we want to contact."

"They made the machines. That's what I'm trying to tell you. Meat made the machines."

"That's ridiculous. How can meat make a machine? You're asking me to believe in sentient meat."

"I'm not asking you, I'm telling you. These creatures are the only sentient race in that sector and they're made out of meat."

"Maybe they're like the orloto. You know, a carbon-based intelligence that goes through a meat stage."

"Nope. They're born meat and they die meat. We studied them for several of their life spans, which didn't take long. Do you have any idea of the life span of meat?"

"Spare me. Okay, maybe they're only part meat. You know, like the wedding. A meat head with an electron plasma brain inside."

"Nope. We thought of that, since they do have meat heads, like the wedding. But I told you, we probed them. They're meat all the way through."

"No brain?"

"Oh, there's a brain all right. It's just that the brain is made out of meat. That's what I've been trying to tell you."

●The man says  
that while vacationing  
he was attacked  
by a gang of evil elves  
led by someone  
who has since taken his  
place as an  
impostor Santa Claus. ●

"So... what does the thinking?"

"You're not understanding, are you? You're refusing to deal with what I'm telling you. The brain does the thinking. The meat."

"Thinking meat! You're asking me to believe in thinking meat!"

"Yes, thinking meat! Conscious meat! Loving meat. Dreaming meat. The meat is the whole deal! Are you beginning to get the picture or do I have to start all over?"

"Omigod. You're serious, then. They're made out of meat."

"Thank you. Finally. Yes. They are indeed made out of meat. And they've been trying to get in touch with us for almost a hundred of their years."

"Omigod. So what does this meat have in mind?"

"First it wants to talk to us. Then I imagine it wants to explore the universe, contact other sentences, swap ideas and information. The usual."

"We're supposed to talk to meat?"

"That's the idea. That's the message they're sending out by radio. 'Hello. Anyone out there? Anybody home?'

That sort of thing.'

"They actually do talk, then. They use words. Ideas, concepts?"

"Oh, yes. Except they do it with meat."

"I thought you just told me they used radio."

"They do, but what do you think is on the radio? Meat sounds. You know how when you slap or flap meat, it makes a noise? They talk by flapping their meat at each other. They can even sing by squirting air through their meat."

"Omigod. Singing meat. This is altogether too much. So what do you advise?"

"Officially or unofficially?"

"Both."

"Officially, we are required to contact, welcome, and log in any and all sentient races or multibeings in this quadrant of the universe, without prejudice, fear, or favor. Unofficially, I advise that we erase the records and forget the whole thing."

"I was hoping you would say that."

"It seems harsh, but there is a limit. Do you really want to make contact with meat?"

"I agree one hundred percent. What's there to say? Hello, meat. How's it going? But will this work? How many planets are we dealing with here?"

"Just one. They can travel to other planets in special meat containers, but they can't live on them. And being meat, they can only travel through C space. Which limits them to the speed of light and makes the possibility of their ever making contact pretty slim. Infralightsal, in fact."

"So we just pretend there's no one home in the universe."

"That's it."

"Cruel. But you said it yourself, who wants to meet meat? And the ones who have been aboard our vessels, the ones you probed? You're sure they won't remember?"

"They'll be considered crackpots if they do. We went into their heads and smoothed out their meat so that we're just a dream to them."

"A dream to meat? How strangely appropriate, that we should be meat's dream."

"And we marked the entire sector unoccupied."

"Good. Agreed, officially and unofficially. Case closed. Any others? Any one interesting on that side of the galaxy?"

"Yes, a rather shy but sweet hydrogen core cluster intelligence in a class nine star in G445 zone. Was in contact two galactic rotations ago, wants to be friendly again."

"They always come around."

"And why not? Imagine how unbearably how unutterably cold the universe would be if one were all alone. □□



## ANIMALS IN EXILE

PHOTOGRAPHS BY JAMES BALOG

*I*n primeval times, said philosopher Joseph Campbell, man was the newcomer in a world of unexplored plains and forests. Our immediate neighbors, the wild beasts, were our guides. But according to Campbell, animal envoys "no longer serve to teach and guide mankind." Instead, "bears, lions, elephants, ibexes, and gazelles are in cages in our zoos."

Campbell's sad observation about the plight of animals has special mean-

ing for photographer James Balog, whose pictures of disenfranchised wildlife appear here. Disturbed by what he terms an animal "holocaust," Balog has set out to capture endangered species in their new and stinging habitats—the twilight zones of preserves, animal amusement parks, and zoos.

Balog sensed the glimmering of his photographic vision as a boy growing up in the burgeoning bedroom community of Watchung, New Jersey. As civilization encroached upon nature,

young Balog watched bulldozers mangle oak trees and learned to recognize the peculiar scent of fresh earth mixed with diesel fuel. Harboring these powerful early impressions, Balog set out to record his relationship to the planet and its creatures on film.

In an early body of work, he captured images of people from Mud Lake, Idaho, controlling a jackrabbit population by clubbing thousands of the creatures to death. Later he produced a book on big game hunting.

Then, in 1986, while photographing an Indian rhinoceros at the San Diego Zoo, he was, he says, "hit with a lightning bolt out of the sky." Why not photograph these endangered animals as they really are—"adrift in the ether of a planet made alien to them, a place they must now call home"?

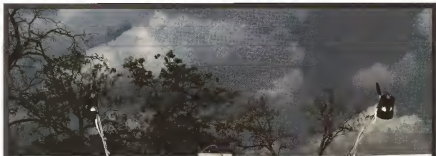
"One of the cherished illusions of our culture," Balog says, "is that animals will always live contentedly in idyllic wilderness. Through television, magazines, books, and calendars, we feed ourselves an endless stream of imagery, showing wildlife surrounded by glorious vistas, exquisite plant life, and Technicolor sunsets. Such romantic imagery creates the sense that all is right with the world, that Eden is still out there, that the idyll will exist forever.

"But the reality of the present, not to mention the future, is radically different from this vision. In the temperate and tropical zones of the earth, humans have destroyed much of the world's original habitat in a relentless search for farmland, living space, and materials.



The chimpanzee named Beau (opening page) was born in Florida's Bush Gardens; his brethren in Africa have been decimated by habitat loss and poaching. On this spread, counterclockwise from top left are the Dama gazelle, the golden lion tamarin, the Madagascar ground boa, the white rhinoceros, and the gray wolf. The gazelle, a full-grown adult male, was photographed at the Fossil Rim Wildlife Ranch in Glen Rose, Texas. Two of the five subspecies of this gazelle are already extinct; the rest are regularly stressed by large sport-hunting parties, which sometimes slaughter dozens of these creatures at a time.





WHITE FABRIC SIMPLIFIES THE WORLD, ENABLING THE PHOTOGRAPHER TO FOCUS ON THE ANIMALS' INHERENT AESTHETIC QUALITIES.

As a result, the age of truly wild animals is nearly over. Unprecedented numbers of mammals, birds, reptiles, and amphibians are becoming extinct. Nearly nine hundred species and subspecies of animals are severely threatened, hundreds more require the protection of humans if they are to survive.

"Many of the species that survive this wave of extinction will see their original wilderness reduced to enclosures landscaped by foam rocks," Balog says. "Their home range will be sur-

rounded by human dwellings and fast-food franchises. Their mates will be chosen by computer selection, and their sex acts will take place in petri dishes."

To capture the animals' grim and solitary fate, Balog traveled the world, visiting facilities from Gatorland in Orlando, Florida, to the Manila Zoo. He photographed species as diverse as the chimpanzee, the crocodile, the Asian elephant, and the pink pigeon.

But no matter what the species, Balog never took a picture without striving to tune in to the moods and feelings of the animals themselves.

"Though all the animals photographed for this work were in captivity," Balog explains, "the great majority had been neither handled nor trained, and their actions were unpredictable. It was thus critical to understand and accept the animal's wishes and emotions. Was he or she tired or energetic? Too hot or comfortable? Impatient, curious, or bored? Irritable or content? Skittish or placid? How long was the animal's attention span? Usually it was twenty to thirty minutes, but it ranged from no interest and cooperation at all to as long as an hour."

The drill on this page, a 13-year-old male, hails from Carmen Hall at the Ringling Brothers and Barnum & Bailey Circus in Rochester, New York. Drills, with native habitats in the tropical forests of Cameroon and Nigeria, are on the verge of extinction in the wild. Animals on the opposite page include the scimitar-horned oryx (top) and, on the bottom row from left to right, the bald eagle, the Galapagos tortoise, and the Asian crocodile. Animals in captivity on the next spread include the Humboldt penguin, the ocellot, and the hamadryas baboon (left page, top row, left to right); the Asian elephant (left page, bottom); and the Himalayan black bear (right page).





STARVING ASIAN ELEPHANTS OFTEN RAID BANANA, COFFEE, OR JUTE FIELDS. THEN THE ANIMALS ARE SUMMARILY KILLED AS PESTS BY NATIVES.



To get the most out of the animal images, Balog experimented with unconventional photographic techniques. In the end, he says, he decided to use artificial lighting and white backgrounds, created through the use of white fabric and transparent plastics. "White simplifies the world so that you focus on the animals' inherent aesthetic qualities—the lines, colors, and textures—without distraction. The white at once generates sculptural counterpoints that set the animals off, and creates a void in which the animals float."

Much of this photographic technique, Balog adds, was appropriated from contemporary advertising technology, "whose contrived 'look' is aimed at creating desire for superfluous consumer goods such as cosmetics, liquor, jewelry, and clothing." In one sense, he says, "the use of those techniques is an ironic commentary on our society, which is so adept at turning the meaningless into the priceless. In another sense, I use those techniques to separate the truly priceless from the meaningless. By changing the context in which animals are seen, we have a different basis from which to answer one crucial environmental question of our time: Are these 'objects' of exquisite formal beauty worth saving? I believe they are."

Balog, however, says the technique generates an alchemy that's hard to explain. "On the deepest level," he says, "the pictures should let you experience these animals in a far more direct way. The animals look vulnerable, lost, alienated, alone. As you look at them, you should see the shock of yourself in this weird, technological, disenfranchised world, where you may breathe recycled air and not even feel the sun for days."

The most important thing about these pictures, Balog believes, is the ancient connection they help to reestablish between the beasts of the earth and man. "These pictures are not a window into the lives of the animals," he says, "they are mirrors. Looking into one of these mirrors will reveal not only the animal, but also, ourselves transformed."—Pamela Weintraub **DO**

# BUSINESS

CONTINUED FROM PAGE 40

ing coaches and facilitators of employee efforts to solve their own problems, rather than functioning as problem solvers themselves," he says. "That's a totally different set of skills."

Managers will also have to respond to individual personalities and needs as they attempt to forge relationships with new kinds of workers. According to Drucker, freelancers, consultants, and independent contractors will represent an increasing segment of the workforce. Many organizations already rely on independent contractors for much of their ongoing work. People may work regularly and full-time for the same company for years, but not as employees on a payroll. "These are new partnership relationships we will have to learn to manage," Drucker says. "You can't order, you have to persuade."

Successful managers must also understand that good work can be done in different ways, in a variety of places on different days, says Gil Gordon, human resources consultant and publisher of the *Telecommuting Review*. He points out that the youngest segment of the workforce, like the generations that will follow them, grew up with PCs and other electronic tools. They take

them for granted as transportable business adjuncts that can be modified at the flick of a switch. Add to that the reality of streamlined middle management and department consolidation in many organizations. With the typical manager now facing a lesser degree of control over twice as many people, letting high-tech electronic tools dictate the shape of the work becomes an organizational imperative.

"The use of things like electronic mail, phone mail, and telecommuting to help a group work more efficiently is almost mandatory," Gordon says. He believes managers throughout the business world will increasingly rely on telecommuting to alleviate the office space crunch, expand the scope of their labor pools, and address commuting costs like traffic congestion, pollution, and downtime.

Managers accustomed to doing business with all the perks of huge corporations or with all the quirks of their entrepreneurial counterparts will have to adapt to a different scale. According to Drucker, the big companies are all on the defensive—not just in the United States, but worldwide. He likens many of today's huge corporations to dinosaurs, which lived a long and healthy span, lasting longer than any other species of animal. But information technology has largely eliminated the handi-

caps under which midsize organizations traditionally operated. "The center of gravity has shifted from the big companies to the medium-sized ones," says Drucker. "The entrepreneurs have not succeeded or contributed. They can't compete. The medium-sized ones—which are today a hundred million dollars to a billion dollars—are where the growth is; they are where the employment is."

Along with new configurations of businesses and their workers, many management scientists see radically different kinds of benefits packages. Most corporations will offer employees a smorgasbord of fringe benefits packages with individual selection limited only by a dollar figure, says Marvin Cetron, president of Forecasting International and coauthor with Owen Davies of *American Renaissance: Our Life at the Turn of the 21st Century* (St. Martin's Press). The ubiquitous dual-career couple will be able to tailor their benefits to their family's needs. "Your spouse will take psychiatric care and a retirement fund and you'll take dental care and elder care," Cetron says. Because people will be able to carry packages of health, insurance, retirement, and other benefits with them when they change employers, increasing their mobility, companies will have to provide new incentives to retain valuable workers. The assurance of flexible work hours to cope with family needs will become an important fringe benefit. Cetron believes that merit pay—rewarding the quality of performance—will become a standard incentive across the board.

Leadership skills will be the attributes managers need most to succeed in the future, says Boyett, who believes a change from management to leadership will reshape work environments by the turn of the century. "Managers command and control," he says. "Leaders inspire and empower. They visualize a larger reality and transmit that vision to others. They are great communicators."

Managers who would be leaders, Boyett says, must be intuitive, politically adept visionaries who identify and develop talent, emphasize intangibles, and accept occasional failure as a natural consequence of exploring unknown territory. Leaders build trust among their followers, encourage individual development, and use persuasion rather than coercion to galvanize their teams.

Drucker emphasizes the importance of people skills as managers attempt to lead a more and more heterogeneous workforce into the future. "They will have to learn to think globally and work locally, which very few people can do."

Those people who can, however, will thrive and prosper in the electronic executive suite, the constant office, the open workplace. ☐



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In the electronic workplace, the smart machine requires ever-smarter workers.

Yet many organizations remain oblivious to the machine's demands, warns this investigator of the computer revolution and its impact on the human psyche

## INTERVIEW

# SHOSHANA ZUBOFF

**A**s a social psychology graduate student in her mid-twenties, Shoshana Zuboff moonlighted on the side as a consultant. Her specialty was to watch and listen to people at work and draw out their feelings about their jobs. One client, a large Wall Street bank, had just spent a fortune on computers for its clerical workers. Contrary to expectations, productivity did not soar but plummeted, and the office was in a state of

incipient chaos. Errors multiplied. Gasping crescendoed: "Instead of falling in love with the machines," Zuboff recalls, "employees were distraught at the new way of doing the job." Zuboff's investigation into what was going so unexpectedly wrong became the springboard for *In the Age of the Smart Machine: The Future of Work and Power*. Since the cool blue light of video terminals began bathing millions of American workers in the late

PHOTOGRAPHS BY RICHARD HOWARD





**NAME:**  
Shoshana Zuboff

**AGE:**  
Thirty-nine

**OCCUPATION:**  
Professor of Organizational Behavior and Human Resource Management, Harvard Business School

**PH.D. THESIS:**  
"The Ego at Work"

**CROWNING ACHIEVEMENT:**  
*In the Age of the Smart Machine: The Future of Work and Power* (Basic Books)

**FAVORITE FANTASY:**  
To take a record nineteenth-century mill workers talking about their jobs

**FAVORITE HANGOUT DURING THE 1980's:**  
Control room of computerized paper mill

**FAVORITE HANGOUT DURING THE 1990's:**  
Executive offices of organizations pioneering the "informed" workplace

**FAVORITE BOOK:**  
*The Civilizing Process* by Norbert Elias

**LANGUAGES SPOKEN:**  
English, Spanish, Russian, French

**MEMORABLE QUOTE:**  
"Learning is the new form of labor."

**NEW WORD COINED:**  
Informing: What computers do

Seventies, hundreds of books have either welcomed or warned against the computer revolution's impact on the human psyche. Painstakingly researched, carefully reasoned, elegantly, even poetically written, *In the Age of the Smart Machine* set a standard that remains unchallenged.

Zuboff spent years at nearly a dozen factories and offices, places where work that had once been manual was now mediated by computer. She shared cubicles with claims adjusters and phone-company clerks. She stayed up all night in control rooms with pulp-mill operators.

Her thesis is that computers have suddenly reversed an age-old trend in industrial history—of people doing progressively less work as machinery does more. In the electronic workplace the smart machine requires ever-smarter workers. Yet many organizations, Zuboff warns, remain oblivious to the machine's increasing demands. The obsolete paradigm of automation—of "workless" jobs and push-button ease—continues to bedazzle those in charge.

Doug Stewart interviewed Zuboff at her office at the Harvard Business School, where she teaches, and at the weekend home she shares with her husband, Jim Maxman, near the Maine coast. Zuboff is a tireless researcher and an impossibly well-read scholar, yet her gracious manner bears no trace of pedantry or academic gravitas. Rather, she is excitable, almost glib, as she discusses her work.

At her office, rescheduling a meet-

ing with a student whom she had accidentally stood up, she placed a hand on his arm and said, "Thank you for being compassionate." The student laughed in flattered embarrassment. During the Maine interviews, Zuboff continually jumped up to rearrange logs burning in the cabin's fireplace. After darting over to reposition one inoffensive-looking log for the third time, she apologetically admitted, "I'm a perfectionist in all things."

**Omni:** How are computers changing our experience of work?

**Zuboff:** Computerization is part of a long-term historical process in which work has become increasingly abstract. For ninety-nine percent of human history, work meant physical exertion—straining muscles and expending energy. With the growth of white-collar work, a new experience of work emerged, one that didn't require physical exertion so much as interaction with a symbolic medium, such as words on paper. In the nineteenth century, only a tiny fraction of the labor market in America and Europe was involved in abstract work. During the twentieth century, and particularly since World War II, these abstract work activities have grown. Computerization has accelerated this trend not only incrementally but exponentially.

**Omni:** Aren't words on paper abstract, too?

**Zuboff:** For most people, interacting with computer information is even more abstract than interacting with words on paper. Paper at least is tan-

gible—you can pick it up, carry it around. When I first started interviewing employees for whom computer work was new, they'd say things like, "I can't touch my work anymore," "My work is floating in space," or "My work is lost behind the screen." The work seemed almost ethereal. It was outside their immediate sphere of physical control.

**Omni:** How is computerization different from automation?

**Zuboff:** Automation strives to substitute machines for bodily effort. It takes all those skills that someone needs to perform a task and turns them over to the machine system. The human's job is easier because the machine is doing the work faster and more reliably than the human can. The human, meanwhile, has less and less contribution to make. One management rule of thumb associated with automation has been, The smarter the technology, the dumber your people can be.

With computers, something very different is happening. Computers translate the physical tasks they're automating into a symbolic medium—the medium of electronically presented abstract information. The worker has to be able to interact with this computerized version of the physical tasks in order to understand what's going on and what to do about it. I've coined the word *informing* to describe what the computer is doing—taking three-dimensional objects and events and then translating and displaying them as data.

**Omni:** How would informatizing make a worker's job harder?

**Zuboff:** Mentally, it requires a much higher degree of effort! As more people spend their workdays interacting with computer screens, they have to pay attention more intensely than when they were handling paper and talking with co-workers. Now their attention is largely fixed on a single dominant channel of information, the computer screen. To make sense of that information, people have to be thinking. Information technology represents a fundamental discontinuity in industrial history. It's the first technology to reverse the process of simplifying work. When your work is not just automated but informatized, you have to be paying attention to the information, understanding it, responding to it, problem-solving with it, extracting meaning from its patterns.

This heightened mental effort applies to blue- as well as white-collar jobs. Many jobs we associated with physical exertion, even five or ten years ago, are becoming mental jobs. In factories, people now sit in control rooms watching computer screens and analyzing the abstract information they present, rather than spending their time on the floor physically doing things. There, too, demand for mental effort has been ratcheted up a notch.

**Omni:** Yet a paper mill you studied, Cedar

Bluffs, promised that its new computerized job would be "push-button easy." Is that an oxymoron, then?

**Zuboff:** Yes, but that is the whole dream of automation, and Cedar Bluffs was built as one of the most automated pulp mills in the world. The expectation was basically that you'd push a button and the whole complex operation was going to run itself. People had this image of "workless jobs—just kick back and watch the computer screens. Well, it turned out to be a lot more demanding than they ever imagined. People still had lots of work checking and maintaining equipment. And they underestimated the degree of mental exertion and commitment required.

Still, the dream of automation remains a powerful one—the idea of a clockwork world running without human intervention but generating enough wealth that everyone can go fishing, read books, and study art. There are wonderful animated films made for worker education fifty years ago, showing this vast cornucopia spewing forth automobiles, refrigerators, vacuum cleaners, and so on while worker and boss sit on top, toasting each other and having a jolly old time. Symbolically, they are now equals, and no one has to work. But it's a fantasy.

There is a germ of truth in that fantasy. Today there are many fewer peo-

ple working in direct manufacturing sectors. Less than three percent of our population works in farming. Both are a result of automation. While there is far less direct labor required in most processes, workers are still needed to manage computerized information.

**Omni:** Don't workers sometimes develop a "black box" mentality instead?

**Zuboff:** When a computer goes down, I've seen workers just sit and stare at the blank screen. Pretty chilling, isn't it? That's common with automation. If you tell people the system's going to do it all, that it's taking over for their judgment, they feel diminished and intimidated. Sometimes I saw a genuine sense of stupefaction, of simply not knowing what to do. They've become so accustomed to hitting a button and seeing something happen, they don't have an alternate way to pursue the task if the computer isn't delivering. In other cases, the response is a kind of vengeful passivity. "I can see that things aren't working, and I know how to do it better, but you wanted me to let the computer do it, so that's what I'm going to do. It's your problem."

**Omni:** Your description of clerical work at one newly computerized insurance company is nightmarish. What was wrong there?

**Zuboff:** Like most other companies, Consolidated Underwriters was using the technology strictly in an automation logic. Clerks there are at the very end of the line of automation; their jobs have been made as simple as possible. They're glued to their screens, inputting data all day long. One manager told me, "Our productivity is limited only by how fast they can move their fingers across the keyboard." The next step is to automate these jobs out of existence with optical scanning and imaging systems. No wonder these workers feel so dreadful—they've become extensions of the machine.

But in other organizations, people who were simply secretaries before are now producing reports, putting together financial numbers, interrogating databases, advising customers—doing all kinds of things much richer and more complex than being a human input device. By generating all this information, computers can reinvest these tasks with a richness they lack when they are simply automated. Both trends are occurring in the clerical world. The end of one era of simple automation is overlapping with the beginning of a new era of informatizing.

**Omni:** These are bottom-rung workers you're describing?

**Zuboff:** Top and bottom is not a useful metaphor in thinking about the new informatized workplace. I call these new workers, who interact most closely with customers and respond to data most quickly, the "front line." These are



*"Your prognosis is good, but of course a complete recovery depends on your insurance company."*



# ANTIMATTER

## UFO UPDATE:

Is the urban borough of Queens, known as the home of the New York Mets, also a hotbed of UFOs?

The urban borough of Queens in New York City is home to the Mets, La Guardia and Kennedy airports, and almost 2 million people. But is it also a hotbed of UFO activity? According to Bill Knell, spokesperson for a Long Island-based organization called Island Skywatch, the answer is yes. In fact, although many people consider UFOs a phenomenon of back country roads and deserted mountaintops, Queens has had several UFO sightings over the past couple of years.

One Queens UFO, says Knell, has even "left concrete evidence behind." The sighting in question

took place about two years ago in March on a cool, clear, smog-free night. Passengers on a Q65 bus spotted red and white pulsating lights floating over Kissena Park Lake. According to Knell, "The passengers first thought that the lights were a helicopter or downed airplane. But after the bus driver stopped for a closer look, no helicopter or plane could be seen."

The next day Bill Knell was called to the scene to determine what the passengers had truly seen. After conducting three weeks of taking soil samples and interviewing park rangers, he concluded that aliens really had visited the park.

The first bit of evidence, Knell says, includes so-called landing circles—two barren, gravel-covered areas in the middle of a lawn near the lake. Knell also discovered a dying willow tree that was burned on the side facing the circles. Finally, after taking a compass to the iron lampposts that face the circles, Knell determined that they were "all heavily, even abnormally, magnetized."

Evidence in hand, Knell alerted the media. The resulting news stories eventually prompted the New York City Parks



Department to call on resident astronomer Greg Matloff to investigate the site himself.

Going through the park with care, Matloff agreed that the willow tree was dying but found no evidence of burn marks. Matloff then asked some park rangers to test the magnetism of the park's lampposts. His conclusion: "All of Kissena's lampposts have the same degree of magnetic charge as the ones facing the circles." This, he believes, "is because they're made of cast iron, and the electrical charge running through each lamppost turns it into an electromagnet." Matloff agrees that the

gravel within the circles is found nowhere else in the park. But he says the gravel probably comes from New Jersey. Still, if the circles have a terrestrial origin, why wasn't the parks department aware of their presence until Knell "discovered" them? Matloff explains, "I can personally attest from a recent jog through Cadman Plaza Park in Brooklyn that bare patches larger than the ones considered here are the rule, not the exception, in New York City parks."

Still, according to Bill Knell, the book on the Queens UFO isn't closed. For instance, he declares, two attempts to seed the circles with grass have failed. To resolve the issue, the parks department finally sponsored a UFO program that drew a rare SRO crowd to Kissena Park.

"We were surprised at the numbers and at the types of people there," says ranger Mary Anne Eater. "We had everyone from UFO followers to people who looked like they just walked out of a heavy-metal concert to families whose houses face 'the UFO park.'" Even now, a week doesn't go by when the rangers aren't asked directions to the UFO landing site.—ALLEN SALZBERG



# ANTIMATTER

## GHOSTS AND REAL ESTATE

When a ghost takes up residence in your attic, does the value of your home increase or decrease?

Manhattan's Jeffrey Stambovsky believed it would plummet. Last year, after plunking down \$32,500 on an 18-room Victorian home in Nyack, New York, with a spectacular view of the Hudson River, Stambovsky heard rumors that the house was haunted. He immediately sued for the return of his down payment.

On March 15, 1990, the New York Supreme Court cited the legal principle of "buyer beware" and ruled against Stambovsky.

One day later, on March 16, *The New York Times* ran an article about Stambovsky's suit. Soon the realtor, Murray Jacobs, was flooded with

calls from prospective buyers—"everyone from a patient in a psychiatric hospital to the mentalist *The Amazing Kreskin*." Result? According to Kreskin, "The house's asking price soared from \$650,000 to almost \$800,000."

Despite all the hoopla, the house sold last August for \$625,000, a fair and realistic price. The buyers were a young family that doesn't believe in ghosts. According to Rachel Taub, the realtor who finally sold the property, "They were looking for a nice house near the water."

The moral? When it comes to real estate, forget ghosts and concentrate on those three important words: location, location, location.

—Allen Salzberg

## THE YOUNGEST NEAR-DEATH EXPERIENCE

In a near-death-experience (NDE) people report otherworldly happenings while clinically dead or near death.

Now health science experts William Serdahely of Montana State University and Barbara Walker of Eastern Illinois University say they may have traced the experience back to infancy.

Their evidence: a subject who experienced recurring nightmares replete with typical near-death-experience imagery—including a tunnel of light—while still a little girl.

These nightmares, Walker says, ended at age six.

But what makes this of particular interest is that the girl had been born dead and revived after five minutes. The subject herself started believing her dream images captured an early NDE after watching a TV program on the topic at age eighteen.

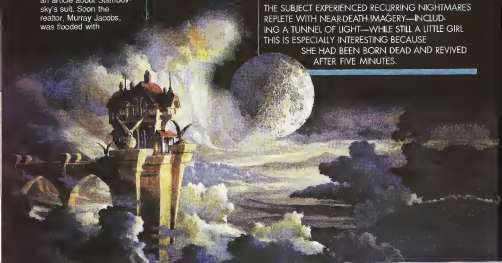
"The woman had the dreams as a child," Serdahely says, "because they were the only way that she could conceptualize her proverbial experience."

Ken Ring, a psychologist at the University of Connecticut and a prominent NDE researcher, isn't sure he agrees. "A case in which the subject is so young," he says, "is suggestive but may be ultimately unconfirmable."

—Paul McCarthy

THE SUBJECT EXPERIENCED RECURRING NIGHTMARES REplete WITH NEAR-DEATH IMAGERY—INCLUDING A TUNNEL OF LIGHT—WHILE STILL A LITTLE GIRL. THIS IS ESPECIALLY INTERESTING BECAUSE

SHE HAD BEEN BORN DEAD AND REVIVED AFTER FIVE MINUTES.







## MESMERIZING MYTH

According to University of Kentucky psychology professor Robert Baker, hypnosis can't possibly trigger memories of past lives or UFO abductions—and

it can't wipe out your cravings for nicotine or sweets either. In fact, insists Baker in his recent book, *They Call it Hypnosis* (Prometheus), the altered state of consciousness dubbed hypnosis doesn't even exist.

"I've studied and practiced hypnosis" for more than twenty years," Baker says, "and there is absolutely no physiological evidence for a special state." "People usually go to a hypnotherapist for a reason, to stop smoking or lose weight, for example, and they are motivated to do whatever the doctor tells them," Baker says. And those who suddenly remember bizarre events

like UFO abductions while under hypnosis are fantasy-prone personalities led suggestions by their hypnotists. "Many people are highly suggestible," Baker says, "and to them, these suggested alien encounters seem real. But it's their imagination at work and not a memory retrieved by hypnosis." He also explains away reports of painful medical procedures endured with no anesthesia other than hypnosis: "This is simply an example of the placebo effect or distraction."

University of Utah School of Medicine psychologist D. Corydon Hammond, vice president of the American Society of Clinical Hypnosis,

says Baker has overlooked research that proves hypnosis is real. For example, Hammond claims he has taken a patient through four hours of surgery using hypnosis as the sole anesthesia. "People simulating hypnosis are not able to control severe pain the way deeply hypnotized patients can." In addition, scientists have evidence that the amygdala and hippocampus areas of the brain may be involved in mediating trance states.

"Hypnosis is a multi-dimensional phenomenon," Hammond concludes. "And an abundance of research suggests an altered state of consciousness is involved."

—Sherry Baker

## DECLINE OF THE PET CEMETERY

Arizona State psychologist Robert Kastenbaum is worried. He says that urban renewal and sprawl, as well as bad management practices, are sending some pet cemeteries to an early grave; others are succumbing to lack of use. This is unfortunate, he adds, "because people often grieve for their pets just as they would for another person."

According to Kastenbaum, American pet cemeteries received a boost in the 1930's, when film stars posted pet obituaries in newspapers and bid their animals good-bye with formal eulogies and limo service. This makes sense, says Kastenbaum, since pet owners bond with their animals,

often over 10 or 20 years. "When a pet dies, our lives are not quite the same again." Non-pet owners don't understand this, so the bereaved often keep their grief to themselves. This gives the pet cemetery importance, he says, because it allows people to make their feelings public.

But veterinarian Wendell Morse, who heads up the International Association of Pet Cemeteries in South Bend, Indiana, says Kastenbaum's fears are misplaced. While some "mom-and-pop" cemeteries have gone out of business, says Morse, the industry is actually growing. In fact, he adds, prospective pet cemetery owners can learn sound business practices during one-day seminars put on by his group.—Paul McCarthy



# DARK SIDE

CONTINUED FROM PAGE 26

progress to unseen supervisors far away. Because computers measure quantity better than quality, such systems tend to reward employees who work faster more than those who work better. There's a sharp rise in loneliness and disconnection as individuals blindly forge ahead. Service people on the telephone or at a cash register curtail terminate attempts at dialogue because their performance is being electronically monitored. Once judged on their ability to communicate with customers or troubleshoot unexpected situations, they're now evaluated by the number of transactions they complete in a shift or the number of keystrokes required to draft a document. In these "electronic sweatshops," the computers are running the people, not the other way around.

"I think people are going to feel an increased fragmentation of self. They won't be able to hold the pieces together," human resources consultant Philip Nicholson says. "How do you keep a coherent space if you're going in and out of spaces that don't exist?" A graduate of the law-psychiatry program at Stanford University Law School, Ni-

cholson has advocated preventive psychiatry since a Vietnam-era Air Force stint spent designing programs to alleviate drug abuse and race relations problems. He likens the psychic numbing of electronic information overload to symptoms of post-traumatic stress syndrome. In office wars, people become overwhelmed by the sheer amount of information available, internalize the diversity of the world outside, and fear losing control over their own lives.

"You operate from a position of chronic performance anxiety and background stress," Nicholson says. "In fact, I think it fosters a kind of mass self-hypnosis. When you're working on the computer, it's you and the screen and your mind. That's exactly what happens when you go into a hypnotic trance."

If we are to survive the speed-drunk, world-girdling challenges of information-driven, hardwired offices, says Nicholson, we need to provide psychological support systems. "Our whole environment has become so complex that we live our lives in splinters. For each splinter, someone reflects back to us, but it's difficult to find someone who reflects back the whole sense of who we are."

While no one has yet measured the social cost of the workplace revolution, some psychologists are mobilizing ef-

forts to pool information as it is derived. Nicholson started the Technostress International Information Network in Chestnut Hill, Massachusetts, last year to foster an exchange of data and ideas on the effects of computerization and information technology. (Readers with a professional or personal interest are invited to submit reports and suggestions; see "Tools for the 21st Century," page 40.) Brod wants to examine the parallels between electronic work environments and "sealed-cabin ecology" like space capsules or submarines, both totally automated artificial worlds in which people live in highly confined circumstances surrounded by technology that dictates the tenor of their days as well as their survival. He is petitioning other psychologists to convince the American Psychological Association to form a specialized study group.

In the meantime, Brod suggests that we reexamine our value systems and that we make greater allowances for privacy and disconnected time in order to circumvent potential revolts against technology. "We need to coevolve with technology," he says. "These are wonderful tools, but if we exploit them without imposing appropriate values on their use, they become alienating and dangerous." ☐

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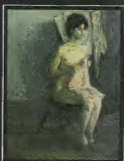
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was good!



## LOVELIEST

CONTINUED FROM PAGE 38

nology already exists, making one-number calling a reality will take massive investments in network infrastructure, a dramatic reallocation of the electromagnetic spectrum by the FCC, creation of an array of new standards, and an unprecedented level of coordination among numerous government entities and private organizations.

Millicom Incorporated in New York hopes to leapfrog the frequency spectrum issue with spread-spectrum technology instead of requiring the FCC to carve out a dedicated chunk of precious radio spectrum. Millicom's system communicates over a wide array of frequencies to share bandwidth with existing users, primarily point-to-point microwave users, without disrupting ongoing services. The FCC has granted Millicom an experimental license to test its technology.

With the breakup of AT&T and the Bell system, getting the kind of nationwide cooperation required will be a challenge. But for Nyxex's Thomas, the real question is, "Can we make a buck out of this thing?" Nyxex's trials will focus on pricing and customer receptivity as much as on technology.

One-number billing won't be a picnic. Since callers will no longer know how far their calls are going, if call pricing remains linked to distance, they could be in for rude shocks when they get the bill. Call recipients may have to assume part of the cost, a technique used in cellular systems.

More important, who really wants to stay in constant contact? "The idea of everyone wanting to be in communication all the time is a myth of the type A personality," contends telecommunications analyst Herschel Shostek, president of Herschel Shostek Associates Ltd. in Silver Spring, Maryland. It turns out that what people want is "not just instant contact," Shostek says, "but instant knowledge of people trying to reach them."

The intelligent network responds by handling different calls in different ways, putting some through, alerting the subscriber to others, and diverting others to a voice mailbox. Users could program the network to allow varying levels of access depending on the time of day, the identity of the caller, and the user's willingness to be interrupted at a given moment.

Sometimes you just don't want to be interrupted, no matter how important the call.

"If I were spending the evening with an attractive woman," Shostek says, "I would turn the thing off. If I were the attractive woman, I'd be insulted if I didn't." **DD**

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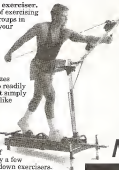
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## **GOOD**

CONTINUED FROM PAGE 39

the U.S., including a California sales office and a manufacturing plant in Oregon. "People aren't always able to come together for a meeting," says NEC's Lourdes Cogswell. "This is a way to extend meetings beyond headquarters and eliminate travel for some."

Telecommunications companies, including AT&T and U.S. Sprint, have assembled video networks that tie together public videoconference rooms—sites like a public telephone where you pay hourly rates—to private rooms within companies like Apple Computer, Rockwell International, and Xerox. "Videoconferencing gets key executives in front of our customers," says Donna Collins, product manager for videoconferencing at Apple. "It gets geographically dispersed people to work together."

"Videoconferencing effectively eliminates distance," says Jim Posko, marketing manager of AT&T Video Services. "I have literally spanned the globe in one day," he adds, describing meetings with European contacts before eight A.M., conferences with American colleagues during the day, and calls to Japan in the evening. "American businesses need to be in constant contact with their international distributors, partners, and manufacturers." Of more than 1,000 video sites on AT&T's network, hundreds can be dialed up much as you'd dial a telephone. "Dial-up capability brings to videoconferencing the dynamics of the office environment, the ability to literally pick up the phone and dial the other end, hold the [video]conference on a spontaneous basis, exchange information, get the project done, make a decision, and then hang up," says Posko.

Companies reluctant to travel overseas during the Gulf war substituted videoconferencing for face-to-face meetings, illustrating another benefit of electronic business communication: safety. AT&T reported a 75 percent increase in videoconference bookings in the first week of the war as firms wary of terrorism clamped down on travel.

Videoconferencing, too, bring more to business communications. Back in 1964, when the first transcontinental video telephone call was placed from the New York World's Fair, people thought Picturephones were just around the corner. Only 30 years later will videoconferencing have an impact. "You'll see videoconferencing in business by the mid-Nineties," says Posko. "And you'll see the high-end consumer as an initial purchaser." Home offices will sport video workstations simply by adding another card or two to the PC. Cellular videoconferencing shouldn't be a problem with the transmission rates the new models use.

"Visual communication will have as much impact on American business in the Nineties as facsimiles and PCs had in the Eighties," insists Posko. "We are predisposed to interactive video. The pace of business demands it."

### **BEING THERE**

"Videoconferences aren't very successful undertakings," says Bob Jacobson, associate director of the Human Interface Technology Lab of the University of Washington in Seattle. "The medium is inherently stupefying. Television produces a very artificial, two-dimensional, flat, pacifying environment."

Fighting words. What the HIT Lab creates may replace on-line telecommunications and videoconferencing with an interactive, three-dimensional world.

Virtual reality partners powerful computer workstations and special devices such as motion-sensing gloves and stereoscopic goggles to create artificial worlds. Though such worlds exist in the computer, you can visit them with equipment that lets you see and interact with the synthetic environment. Virtual objects, though not real, can be touched and turned as if they were.

The HIT Lab hopes to help businesses create real-world applications. The ideas range from prototyping and biomedical research to televirtuality, a new communications medium tailor-made for the next century. "Televirtuality is the sharing of virtual worlds by two or more people in remote places or even at different times," says Jacobson. "This world exists in computer memory, which is stored somewhere on a communications network, and the people partake of that model to experience the place as if they were really there."

Rather than use telephones or video cameras and screens to pull together scattered executives, for instance, a company could transmit a complex, artificial, three-dimensional world over fiber-optic telephone lines. Participants would see the same computer-created room, perhaps filled with a computer rendering of a prototype. Participants could see the prototype in three dimensions, move around it, even enter it. "A problem in describing these things is that we're all thinking in terms of a one hundred percent synthetic world, when actually we might be sitting in our own office and only sharing aspects of a virtual model," Jacobson says. "Maybe only the product is in three-space."

A meeting could adjourn for an instant field trip to gather information, without anyone getting out of his chair. "We could do presentations as if we were all around the same table, but with the ability to move about, not only move about in that space but take everyone to another space. If you're talking about public reaction to a particular product, take them out of the conference room

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and move them out among the public—  
as created by the machine—and see  
how the product's being used."

The HIT Lab's corporate sponsors include Boeing as well as such computer makers as Digital Equipment and Sun Microsystems and such telecommunications companies as U.S. West. "We've had to stick pretty close to ground zero, the firms that have the most to do with information technology," Jacobson says. That's understandable, since one of the problems facing televirtuality is the slow speed of data transmission in today's telecommunications networks. "If we can get the phone companies behind our effort, we'll have a serious product within three to five years at least in terms of being used by large customers initially," Jacobson claims. Today a single televirtuality system costs around \$100,000. Three years ago the same capability would have run \$1 million. "We're trying to drive the cost down by a factor of ten every couple of years," Jacobson says. By the time all the technological hurdles are overcome, a televirtuality rig may cost only \$10,000. It wouldn't take many plane tickets to recoup that cost.

The rig might include dazzling hardware. Lasers that bounce pictures directly onto the retina. Voice recognition systems that control computers. A tiny wand that guides you through the world of televirtuality, like a conductor's baton. It's premature to say televirtuality will replace the telephone or videoconference. Only now are research and development labs like HIT talking with companies. "These problems in implementing televirtuality are all engineering questions, not profound questions of science," Jacobson says.

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Time shifting with telecommunications. Gathering decision makers for televised meetings. Putting the CEO into a computer world to visualize a project, product, or data. Business communications during the next decade will let the worker be several places at once.

Inevitably not only will the pace of business pick up, but it will press against the very limits of our time. Technology, whether practical or simply the gleam in a researcher's eye, has to come up with the answer to the constant office worker's mournful cry of "Where's the day gone?"

We're hopeful, most of us. "A person can become an information channel," says Jim Posko of AT&T. Others sound a cautionary note. "We may be lucky if we learn from the technology and focus in on the information transfer function," the HIT Lab's Bob Jacobson says.

The beginnings of the constant office surrround today's workplace. A shove or two will turn the nine-to-five world upside down. **DC**

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# INTERVIEW

CONTINUED FROM PAGE 70

people in immediate contact with the day-to-day functioning of the business. If a company takes this concept seriously, its employees learn so much about the business at the front line that they can move into other career levels. There's no iron curtain between worker and manager. In one West Coast high-tech manufacturing company, ninety percent of the management came from the front line. The distinction between worker and manager really goes back to a distinction between mental and manual work. That distinction is no longer appropriate because manual work is disappearing—quickly.

**Omni:** Is informatizing inevitable once a company wires up lots of computers?  
**Zuboff:** Yes, but there are two forms it can take. Informatizing can be a purely technical process—all those computers generating all this information. In that sense, informatizing is autonomous, computer technology is making it happen. On the other hand, informatizing can be a conscious strategy, creating organizations and workforces that can translate information into real knowledge. Unfortunately, organizations doing this successfully are few and far between.

**Omni:** In the long run, are the companies that don't informatize going to fall by the wayside?

**Zuboff:** That is my belief. It's an empirical question, in the end. But the companies I'm tracking now that are successfully pioneering in this direction all share a belief that their long-term survival is at stake.

**Omni:** What skills will people need in the informatized workplace?

**Zuboff:** Intellectual skills having to do with understanding information, recognizing patterns, solving problems with it, and using it to think conceptually and abstractly. The electronically presented information we interact with during the workday may be in the form of words or numbers or graphics, but in the larger sense it forms a text scrolling continuously through the organization's computer system. This text is created by many information systems being increasingly linked together—transaction, financial, messaging, imaging systems, and so on. The more these systems are integrated, the increasingly vast the electronic text becomes. This integration gives the skilled worker a window into the organization and its workings. The dynamics of the business become, in effect, transparent.

The question is, Who benefits from this transparency? In the informatized or-

ganization, you give it to everyone so people can all do their jobs better. In the old-style automation paradigm, you give it only to the managers so they can have a better view of what their workers are doing, thus increasing top-down control.

**Omni:** So transparency can actually reinforce old-style hierarchies?

**Zuboff:** That's right. At Metro Tel I spent time with workers whose job was to diagnose and fix problems on telephone lines or other equipment. They'd arrive at work and first log onto a computer, which listed the problems, the order they were to be fixed, and a time allotment for fixing each one. During the day they had to check in with the computer as they went along on these tasks. Obviously, the workers themselves could use this system to manage their own work flow. Instead, it was a one-way system. Workers put in information, but only managers could see it. The managers used the information to monitor workers and give them efficiency ratings.

Because of the system, managers had less face-to-face interaction with workers. One foreman told me, "The computer is my face. It's telling my workers what to do." People managed just by tracking numbers on the system. Workers felt they were being reduced

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to a log-in function of the computer. Some of them got hold of passwords and began to fudge data and change the time allocations so they'd look more efficient than they actually were. It was considered a normal means of survival, even by some managers.

The point is, informing creates enormous transparency in the workplace. If you use that transparency for surveillance, to police people, they react with a whole range of dysfunctional behaviors. They sabotage the data by becoming passive. They withdraw effort and caring from their work.

**Omni:** What's an example of workers using transparency to do jobs better?

**Zuboff:** At Tiger Creek, another paper mill I studied, workers were given a new computer system that gave them a real-time cost breakdown of everything happening in the paper machine. These workers began to play if-then games. If we run it this fast, or keep the moisture content at this level, how much money will we save? On their own, these hourly workers—not managers—began to learn what conditions would result in the lowest cost operation. In one year they saved the company half a million dollars, which was unprecedented.

I first learned about all this by accident. During my first tour of the plant's control room, I overheard some workers talking about meeting on the graveyard shift in order to play with this computer system. This shift was the only one with no managers around. The managers were so intent on controlling workers that they kept them from experimenting. To the managers this kind of creativity was threatening. By teaching themselves things that had been solely management responsibilities, workers were making significant savings that managers couldn't take credit for.

**Omni:** When knowledge and authority are at odds, won't knowledge win out when it helps the company?

**Zuboff:** Ah! You see, that's the same old dream of automation: perfect rationality. But organizations aren't machines. They're human systems, and people aren't merely rational. People have ego needs. They need to feel important, powerful, purposeful, and recognized. As long as managers feel that the only way they can experience mastery and purpose is by exercising their traditional role—supervision, policing, and control—then they're going to hang on to that role.

One way we've distinguished between who's a manager and who's not is by who has the information. Managers are the people who get to have information because they're supposedly the only ones who can understand what it means. That's why we think managers have to have bachelor's or business degrees. In a world where authority is equated with ownership of infor-

mation, sharing that information becomes very threatening. If you and I have the same information, what is my purpose as manager? In a workplace that is facing this kind of discontinuity between the past and the future, between automating and informing, more information for my subordinates can seem like less power and status for me. Instead, we need to redefine the managerial role and purpose. By taking traditional authority roles away from managers and not giving them anything new, we're creating real barriers to change.

**Omni:** If cooperation and information sharing become the new work ethic, then what happens to the solo over-achievers who climb so well in the traditional workplace?

**Zuboff:** They change. And often they're liberated by that change. They discover new rewards. Many are competitive not because they prefer it but because that's the only way they can be recognized and promoted. If they can be generous and collaborative and actually be rewarded for that, it's like shedding a huge burden. The more abstract the work becomes, the less anyone is certain what's going on—it's too abstract! So there's less call for work done in isolation, and more need for joint problem solving, for collegiality.

**Omni:** Will some people simply lack the smarts or ambition to survive in the informed workplace?

**Zuboff:** There are going to be some people who can't be trained or educated to reach the higher levels of performance needed. And others will simply choose not to get that involved in their work. There is no question that in terms of skills and education, the barriers to entry in our workplaces are rising. Those left out are the people whose skill level is so low and who are so unable or unwilling to raise it that they can't make a useful contribution in this new, intellectually demanding environment. This is a real public policy issue now. As a country, we have to get serious about education as a keystone of our economy and society. In the past the labor market had much greater diversity. You could drop out of high school and still get a decent-paying job in an auto plant or some other kind of blue-collar work. Those jobs today are few and far between.

**Omni:** You've written that workers in the future will need more than education. They'll need creativity and insight.

**Zuboff:** That's right. And more and more we're learning that those things are neither purely inborn nor can they be measured by your level of formal education. But these abilities can be developed. In the future, companies themselves will take a greater role in educating their own workforces.

**Omni:** Do you mean basic education?



*"This explains why we so rarely see their footprints!"*

**Zuboff:** Absolutely literacy, numeracy, conceptual thinking, abstract reasoning—basic education, in addition to specific job skills. I'm not just talking about sending people to a classroom, which is the old model—you learn here, you work there. Increasingly, education means using information systems in the workplace to encourage learning while someone is actually engaged in a task. The learning is embedded in the task. Our next big challenge is to explore the convergence of work and learning.

This means the manager really becomes an educator, a driver of learning instead of a driver of bodies. The manager becomes the person responsible for making sure his or her people have the opportunity to learn new things and contribute more. Managers, right up to the very top of the company, will be getting their personal rewards not from giving commands and eliciting obedience but from educating and nurturing the people under them.

This is not an easy change. A manager at a paper mill once said to me, "Well, Shoshana, when you finish your book, your dean is going to evaluate you based on how good it is, right? Now, imagine that your students were going to write your book instead of you, but that you were still going to be evaluated based on the quality of that

book. How would you feel?" I said, "Like hell they're going to write my book!" It was a brilliant analogy. That's exactly the shift you have to make if you're a manager in an informed organization. So you'd better do a damn good job of educating your people.

**Omniv:** Might the company-as-school idea work better in Japan, with its tradition of lifetime employment, than in the United States, where workers jump from job to job?

**Zuboff:** A lot of that movement in the U.S. is because companies give their workers nothing but a wage. The companies in my new study have very stable workforces, not only because wages are good but because workers are getting empowerment, recognition and opportunities for development. When people get all those things, they're much less likely to just hop over to the company down the street for an extra twenty cents an hour. One of the key things that keep people loyal is a sense that they're important and expected to make a contribution.

**Omniv:** Has information technology eroded the traditional boundaries between work and daily life?

**Zuboff:** There's no question that boundaries we inherited from the industrial age are breaking down. Technology lets us access information at home, at work, on the road, in an airplane. For

some people it will become useful not to have boundaries between home and work. If your work does not require face-to-face interaction, if it's sufficient to communicate with others electronically, if you have access to all the information you need to get your work done and to send it to whoever needs it, then it's useful to be freed from those boundaries. You can work when you feel like it, which some people would argue is a more natural human rhythm. In an agricultural society, which we lived in for much of human history, you worked intensely during some periods and not at all during others.

**Omniv:** In the future, couldn't an AI [artificial intelligence] program study the top performers' text and learn to do as well or better?

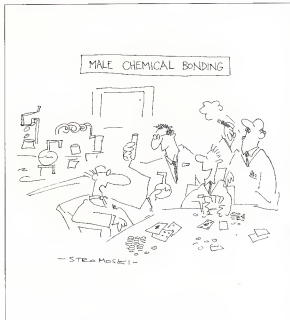
**Zuboff:** There are certainly people in the AI community who have ambitions to create systems operating this way. But so far, AI has proved to be much less adaptable to the workplace than people had imagined. An expert system, for example, gets out of date very quickly as knowledge in a field changes and as the context of that knowledge changes. AI does have a role to play—to help codify and organize knowledge. But I don't think it's going to massively supplant human beings doing any kind of complex intellectual work.

**Omniv:** How has the electronic workplace changed since the late Seventies, when PCs were new?

**Zuboff:** The big change is that we're required. It's harder for people to notice and to be articulate about changes brought by computerization because their memories of how things were have faded. A social amnesia has set in. The fundamental issues I write about have not changed—transparency, informativity, work and learning—nor have the explosive implications for organizations and the importance of finding a new paradigm of work. Those issues are getting more acute, pervasive, and universal every day. But the freshness of the first-person experience, the sense of wonder, of discomfort—all those rich emotions from which I was able to pluck insights—are much more difficult to tap into today. You'd probably have to go to another country to find them. The Soviet Union, maybe.

**Omniv:** Tell me about your fantasy of time travel.

**Zuboff:** I've always dreamed about visiting the workshops of the Industrial Revolution and talking to the workers of 1848 or 1798, when new forms of work organization were being pioneered. The idea that people would leave home in the morning and collect at one central workplace, of regularly paced work and careful supervision, of working with simple and then complex machines—this was all brand-new at one time. It was the basis for fundamental thinking



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about capitalism—the *Communist Manifesto* was written in 1848. Both Marx and Engels were captivated by what was going on in these new factories. Yet when one combs the historical materials, it is very difficult to hear workers talking in their own voices about how it felt to be suddenly subjected to these very new conditions.

**Omni:** In researching your book, did you feel like an anthropologist who'd discovered a lost tribe?

**Zuboff:** I felt there was this brief window in history, and unless I was out there with my tape recorder, that window would be closed forever. I looked for situations where computerization was relatively new, a year or eighteen months old, so that people could still compare working with computers to working with paper or objects and could articulate a sense of what was gained and what was lost in the transition. I became obsessed with recording these people's experiences for posterity. I was there when it was happening, and now there would be a chronicle of these experiences forever. That was my driving motivation in writing *In the Age of the Smart Machine*.

**Omni:** It sounds as though we need new role models.

**Zuboff:** That's very much the approach of my new research. By writing about pioneers of the informed workplace, I'm hoping to provide tangible role models that will give a more concrete sense of what the informed organization is and how we create those conditions. The will to power and the need for status differentiation run deep in our natures. So it takes exceptional leadership to help people get over that and, more importantly, to fashion alternative sources of psychic satisfaction.

As we have gone into different historical eras marked by changing technologies, rarely have we understood what we were getting into or what the choices were, so we've just muddled through. I'm trying to delineate some of these choices and so heighten the probability that people will choose the right ones. The ball is very much in our court. We have an opportunity to reach for an optimistic resolution of what is a near crisis in our workplaces. It's our choice.

**Omni:** You've written that your grandfather taught you about the dignity of work. How so?

**Zuboff:** My grandfather, Max Miller, started out with an auto body shop and in the end owned a large manufacturing company in Connecticut. When I was a young girl, he used to take me to the factory with him. He loved his factory. It was clean and beautiful, but it was still a factory. He knew everybody, their families, their troubles and he cared about them. He always had—his pockets full of candy to dole out—this

sounds terribly patronizing and paternalistic today [laughing]. He'd even walk up and down the assembly line singing "Me and My Shadow" and his other favorites. People would call out "Hello, Mr. Miller!" He treated his employees with enormous dignity, and they were extremely loyal to him. I absorbed his sense of joy in seeing a product well made, and also the respect he felt that the people who make these products deserve.

Another powerful experience was spending a great deal of time in South America when I was younger, in rural Argentina in particular. I've lived in a preindustrial as well as an industrial world. You experience a different sense of time in a community that works the land. Human relationships aren't professionalized or contractualized, family and friends take primacy. Life has much more continuity than discontinuity. There's a great deal of poetry in everyday life. My love and respect for the people in that preindustrial world have heightened my sensitivity to nuances of the industrial world and its discontinuities. The experience has alerted me to the way human sensibility changes as the material and working worlds change. It's sensitized me to history in a living way.

**Omni:** Can you remember the worst job you ever had?

**Zuboff:** To support myself during college, I once worked in the office of a factory typing serial numbers from refrigeration units that were going into vending machines. I'd get thousands of cards (this was pre-computers), and each card had a square where the serial number had to be typed in. It was kind of a Zen experience. [Laughter] It gave me a way to understand boredom, and the vice of underutilizing human beings. And it taught me the importance of coffee breaks. ☐

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# SOFTWARE

IT DOES WINDOWS.

*Ensemble* breathes new life into old PCs by giving them an easy-to-use, Macintosh-like interface

**B**y now most personal computer owners have very probably encountered a "graphical user interface" consisting of windows, menus, and icons, usually controlled via a mouse. Apple's Macintosh introduced the concept to the mass market in 1984. Microsoft says its Windows operating system does the same for IBM and compatible personal computers.

There's just one catch: Windows requires at least a PC AT equivalent. And for Windows to operate at a decent speed your PC needs an 80386 processor, two megabytes of memory, and a 40-megabyte hard disk, which, if brand-new, will run you a couple of grand. This obviously leaves millions of PC users out in the cold.

GeoWorks' *Ensemble* brings the graphical user interface to low-end PCs with a hard-disk drive,

a mouse, a graphics card, and at least 512K of memory. The software runs on top of DOS and boasts a word processor, drawing program, calendar, and address book. Virtually every feature of the best windowing systems is included: for instance, multithreaded, preemptive multitasking, which enables your PC to run several applications at once, doling out processor time to each as needed. Another plus is the program's scalable outline fonts, which let users display or print typefaces at any size or angle without sacrificing image quality.

For novice computer users *Ensemble* offers the "appliance" mode for certain programs. Instead of the full—and sometimes confusing—set of window-and-menu options, the screen displays simple graphical "buttons" that access only the most basic features. As their skills and needs grow, beginners can switch to the full "professional" interface. However, the word-processing and drawing programs, two of *Ensemble's* main applications, are not offered in appliance versions. The remaining appliances—including a calculator and notepad—seem no more than gimmicks. (*GeoWorks'* chief executive officer, Brian Dougherty, prom-

ises another level of scalability in *Ensemble's* next release, scheduled for this fall. First Look will offer a larger array of each application's basic functions than the "appliance" mode, without showing every possible option.)

Equally intriguing is *Ensemble's* latent ability to let users specify the graphical interface they desire. If they prefer not to use the default Motif interface, *Ensemble* will be able, starting this fall or perhaps earlier, to supply interfaces that work just like *Windows* or the *Open Look* interface on Sun workstations. This could be quite handy if you want a PC at home to behave just like the one at the office that runs *Windows*.

*Ensemble* sounds almost too good to be true, and there is a hitch: Only applications written specifically to run under *Ensemble* offer all these benefits. You can launch standard MS-DOS applications, but they will run as such, without the graphical interface and its fancy frills. Moreover, you can use only one at a time—no multitasking. And *Ensemble* can't read or write files written under non-*Ensemble* programs that perform the same basic applications. *Ensemble's* word-processing program, for example, cannot understand a file created with *Microsoft Word*. Help is on the way, though: *GeoWorks* promises a document-format translator in the next release. Also, several companies are working on versions of their programs for *Ensemble*, and the first of them may be ready by year's end, Dougherty says.

Software retailers sell *Ensemble* for around \$80 less than the nominal price of \$199.99. User demand for *Ensemble* is clearly there: Even the White House computer department asked for an evaluation copy. Meanwhile, if you've wanted a PC alternative to the Mac but don't have \$2,000, *GeoWorks* has the only game in town.—John Voelcker **CC**

For beginners, *Ensemble* offers scaled-down versions of some of its programs that have simpler displays accessing only the most basic features.



# COMPUTER GAMES

## MY SWEET LORD.

After you've been God, what's next? Feeding the power hungry and exploring Middle Earth

The design and programming team at Bullfrog went for the toughest gig in the universe with the award-winning *Populous*. In that deity simulation, players became omnipotent beings tossing earthquakes at the unrepentant and bestowing wealth and glory upon the faithful. It was the ultimate administrative position, but a little removed from day-to-day decision making. What would-be demigods want is Electronic Arts' *PowerMonger* (IBM, Amiga), Bullfrog's latest anguif-and-devour delight that cuts you back down to size.

In many ways, *PowerMonger* is the first true war game, adding politics, resource management, and environmental issues to the manipulation of military might. Only political generals with an ecological worldview will succeed in expanding their national borders.

Like *Populous*, *PowerMonger* is controlled by an ingenious icon system that simplifies access to the game's complex options. Also like *Populous*, you preside over an on-screen three-dimensional portion of your world complete with mountains, valleys, villages, and tiny people who pursue their lives while you meddle in them. But *PowerMonger* also adds some state-of-the-art embellishments that turn the game into a graphic showpiece and a strategic masterpiece. Zoom in on the landscape and get information on individual citizens. Or to get a better perspective on the action, rotate the 3-D view of the world. As you conquer more peoples, other generals sit with you around the war table and carry out your orders.

We generally avoid playing and praising war-oriented products. Though military strategy has a legitimate role in computer simulation, there is no good reason to promote mankind's most destructive impulses. But *PowerMonger* rises above mere troop movements and artillery fire. Whether your motivations are the betterment of mankind or simple land grabbing, *PowerMonger* has the breadth and the depth to re-create a world in your own high-flown or low-down image.



ACCESSING J.R.R. TOLKIEN Computer games have not done well by *The Lord of the Rings* and *The Hobbit*. Interactive adaptations of Middle Earth were not much more than weak reminders of the brilliance of J.R.R. Tolkien's original. However, we may finally have an interactive electronic Tolkien that rings true. Interplay Productions' *The Lord of the Rings, Volume 1* (IBM) is the first of a trilogy of role-playing games that allow players to vicariously explore the hills, caves, and villages of Middle Earth.

Interplay's efforts to enshrine the spirit of Tolkien distinguish *Lord* from other computer role-playing games. Since combat and magic play less of a role in Tolkien's novels than they do in conventional computer games, Interplay's first volume emphasizes

exploration and character interaction over bloodletting and spell casting. The result: a role-playing adventure with high fantasy and more balanced conflict that encourages exploration of Middle Earth without threatening defeat at every turn.

The game, moreover, opens in the Shire—conceived by the designers as a training ground to help acclimate players to the game mechanics while completing a few brief but rewarding quests.

As Frodo, you'll meet fellow travelers who may become members of the Fellowship of the Ring or help you discover what has happened to Gandalf. While the game does follow the novel, original adventures and characters have been selectively added to the game to keep even Tolkien worshippers on the edge of their seats.

Of course, Tolkien purists might argue the authenticity of *The Lord of the Rings, Volume 1*. But whatever its merits compared to the book, this newest computerized Tolkien is a refreshing advance in computer role-playing, challenging the experienced player and providing rich, nonthreatening interactive entertainment for the newcomer.—Bob Lindstrom □



# GAMES

## PAPER CHASE:

Searching for modern folklore on the office bulletin board

Anthropologists who study folklore collect and catalog all those traditions and stories that are common knowledge in a society; the creators anonymous voices from the past. In preliterate groups, tales are passed on orally, with slight variations, from one generation to the next. Modern urban folklore, however, is more often written, photocopied, or even faxed, then tacked to office bulletin boards. The tribe has become a network of colleagues who pass along cartoons, joke slogans, gag memos and letters.

Even so, bulletin board humor is folklore that's been copied and recopied in so many variations that no one knows who originated it. Who drew the first droop-nosed Kilroy? Or the first "happy face"? You have probably seen slogans propped up on desks or taped to office doors. For example:

- YOU DON'T HAVE TO BE CRAZY TO WORK HERE... BUT IT HELPS
- IT'S DIFFICULT TO SOAR LIKE AN EAGLE WHEN YOU WORK WITH TURKEYS

Some authors get down right elegant. "NOTICE—The objective of all dedicated company employees should be to thoroughly analyze all situations, anticipate all problems prior to their occurrence, have answers for these problems, and move swiftly to solve these problems when called upon. However, when you are up to your ass in alligators, it is difficult to remind yourself that your original objective was to drain the swamp."



Many examples use the familiar phrasing of the interoffice memo. "Management regrets that it has come to their attention that employees dying on the job are failing to fall down. As it has become impossible to distinguish between death and natural movement of the staff, any employee found dead in an upright position will be dropped from the payroll."

Some folk writing is quite long. A "final exam," handed

out to college freshmen for decades, fills a page with joke questions from every department. For example, economics: Restructure the national debt. Medicine: Under your seat you will find a razor blade, gauze, and a bottle of scotch; remove your appendix.

Alan Dundes, professor of anthropology and folklore at the University of California at Berkeley, has been studying bulletin board lore for decades. In *Work*

*Hard and You Shall Be Rewarded: Urban Folklore From the Paperwork Empire* (Indiana University Press, 1978), Dundes and co-author Carl Pagter classified bulletin board humor, carefully noting dates and places where each piece was first recorded, and analyzed what it says about our society. With their second book, *When You're Up to Your Ass in Alligators* (Wayne State University Press, 1987), they gathered enough new material for yet another collection, *Never Try to Teach a Pig to Sing*, which Wayne State will publish this spring. The title comes from a common pig cartoon: Never teach a pig to sing; it wastes your time and it annoys the pig.

Dundes will help us choose the finalists in Competition #53. Dot down your own favorite bit of bulletin board humor, suitable for printing in *Omnib*, include the date and place where you found it, or how you got your first copy. (Do not create your own original bulletin board humor.) Then photocopy it and mail it to *Omnib* Competition #53, Paper Lore, 1985 Broadway, New York, NY 10023-5965. All entries must be received by May 15, 1991. In the event of duplications, the earliest postmarked entry will win. The grand prize winner will receive \$100, nine runners-up will each receive \$25. All ten will get copies of *The Emperor Who Ate the Bible and Other Strange Facts and Useless Information* (Doubleday).

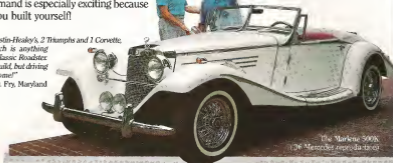
—Scott Morris **DD**

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# LAST WORD

## THE INCESSANT OFFICE:

Consummating a business deal in bed could be the ultimate aphrodisiac

*Inventor Robert Blxby is working on a device that will allow answering machines to talk with each other.*



It was a typical trade show: parties, pub crawling, hung-over stringers staggering past booth after booth of science-fiction solutions to problems most people don't even know they have. Vendors touted vaporware, nonexistent equipment and software with impressive specifications, and promiseware, things you could buy today but whose tendency to cause cancer or burst into flames had prevented their approval by the federal bureaucracy.

I'd found that a firm called Gimcracktronics had the solution to my own, real dilemma: the difficulty of occasionally being out of touch—for example, when I am walking from the car to the house or using the lavatory. When I added it up, I was shocked to discover that over the course of a year whole days might be spent out of reach of my agent, stockbroker, or bookie.

I found the booth and attracted the attention of one of the glad-handing PR reptiles.

"Gidley Guatemala," he said, pressing his card on me. "Have you seen this?" He held up a pen. "The world's smallest computer printer." He showed me the parallel interface input on the side, plugged in the cable, and put the pen in my hand.

The pen went crazy. Fortunately there was a piece of paper on the table. I recognized the document as it emerged, written in my own barely legible handwriting. Seconds later I had a handwritten business letter and complete loss of sensation in my fingers.

"Always a few little kinks to work out," Gidley mused. "Theoretically, we could generate twenty-five pages per minute with this, but when we tested it at full speed, people's hands fell off."

"I'm sure it'll sell like mad."

"Ready by the second quarter," he promised.

He lovingly fingered the tiny electronic gadgets on display. "Telephone implant. Hardwires your brain into the international telephone net. Sometimes the ringer gets stuck and you can't turn it off, but we'll have it ready by the new fiscal year."

"Subcutaneous quartz watch. Looks like the correct time is tattooed on your wrist. The only problem is that implantation requires major surgery. We'll figure out how to bill medical insurance pretty soon. Third quarter of this year at the latest."

He flashed his cuffs. "How about these little numbers?"

"Nice cuff links."

"Thanks. But they're not cuff links. They're uplinks. I can uplink fax transmissions to a satellite, receive telexes, and bring wide-body airplanes screaming out of the sky."

"Why would you do that?"

"You wouldn't. It's just that the cuff link transmission can be misinterpreted as the radar vector used to guide commercial aircraft. That's something you'd probably want to avoid. We'll put a warning label on it."

I explained why I'd come to his booth. "I hate to feel so disconnected. What if somebody's trying to reach me?"

He held up an oversized helmet. "With the Incessant Office,

you're never out," Gidley said. "It's the office of the future. The homeless office."

I put the helmet on my head. Instantly I was transported to the floor of the New York Stock Exchange, ankle-deep in paper.

"You can buy and sell stocks just by looking at on-screen menus and issuing a couple of voice commands," Gidley said.

I was about to sell all my Gimcracktronics stock when Gidley intervened. "It's good for entertainment, too." He pressed something on the outside of the helmet and I was watching an episode of *The Jetsons*.

"Try making a call," George Jetson said. But then I realized it was Gidley talking. His voice was changed by some bug in the circuitry. "Just speak the numbers." I called Sd, my agent. He looked uncannily like Mr. Spacely. I told him, "You're never going to believe where I'm calling from."

"Why are you talking like an old cartoon?"

"It's this new Persistent Office thing that the Japanese have come up with."

"Incessant Office," Gidley put in. "It's Korean, actually."

"Using this," I said, "I can take the office with me everywhere. On the road. Even on vacation."

"Driving," Gidley added excitedly. "Making love. You haven't lived till you've consummated a business deal in bed."

"I'd take it everywhere."

"You could. But the FCC will probably put a few restrictions on it. For example, we've discovered that using it near intercontinental ballistic missile sites can result in premature launchings."

"I can see where that could be a slight drawback."

"Don't worry. Nothing can happen unless the nuclear warheads are armed. We're working on the problem. Just give us until the second quarter." **DO**