

**SPECIAL ANNIVERSARY ISSUE**

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# OMNI

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**TRENDS AND PREDICTIONS FOR THE YEAR  
2000 AND BEYOND**



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Entered LTV in Italy, to  
 Leonardo da Vinci  
 the ink cover illustration multi-  
 color and math explains  
 geometry in Renaissance  
 "Face playing with  
 geometry" he says. It says our  
 face and body are one  
 in harmony with the universe

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## FIRST WORD

By Arthur C. Clarke

● *By the year 1995 the Soviet Union will have taken glasnost into the heavens and helped lay the foundation for a worldwide satellite monitoring system whose motto will be Peace through truth* ●

Many years ago the British scientist J. D. Bernal opened his marvelous little book *The World, the Flesh and the Devil* by proclaiming that there are two futures: the future of desire—what we would like to happen, and the future of fate—what actually does happen. He added: "And man's reason has never learnt to separate them."

Unless our ancestors were need no longer passively await that second future. Science has given us the power to control our destiny and to make the two futures coincide. It is a dangerous gift that will destroy us if we do not learn that technology often turns the wisdom of one generation into the folly of the next.

When no weapon could kill more than a handful of men, there was truth in the old saying: "If you wish for peace, prepare for war." As soon as a single bomb could obliterate the largest city, however, that became nonsense. As one U.S. secretary of defense remarked (a dozen years too late), nuclear weapons can serve no military purpose. Today's wisdom must be: "If you wish for peace, prepare for peace."

Yet as I write these words, 50,000 nuclear warheads are stockpiled, with an explosive force equating that of the mightiest volcanic eruption in all history (No, not Krakatau). That minor hiccup was only one hundredth as powerful. Around 1470 a.c. the destruction of Thera wiped out the Minoan civilization, creating the legend of Atlantis. We could just match its violence with our current 25 billion tons of TNT equivalent. If we did so, there would be no future Plato to mythologize us.

Another deadly piece of ancient wisdom is the belief, chanted like a mantra by retired generals, that for every new weapon there will be a counter-weapon. It is deadly because only the least important part is true. For every counterweapon there is a counter-counterweapon, and each climb up the spiral of armaments reduces security—yet at ever-increasing cost. Some of the best minds of our time are seeking a shield against intercontinental missiles. Anything better than a trillion-dollar "loopy umbrella" will require technologies as yet unknown. They may indeed exist, but if we have the bad luck to discover them, they will give us far deadlier weapons than mere ICBMs.

Enough of nightmares. Here are some of the ingredients of my future of desire. So join me around 2020 as we look back to see how we made it safely out of the most dangerous century.  
**1. THE AGE OF TRANSPARENCY** The development of military reconnaissance satellites that could identify individual weapons meant that preparations for war could no longer be kept secret. Ironically, a major step toward "Peacecraft" was made by the Soviet Union in 1987 when it put on the open market photos

showing ten times the detail given by the equivalent U.S. Landsat—which had been deliberately degraded by order of the Pentagon! By taking glasnost into the heavens, the USSR helped to lay the foundations, in 1986, of an international satellite monitoring system whose motto was: "Peace through truth."

**2. HOSTAGES FOR PEACE** No one planned this: it was an inevitable by-product of the communications and transportation revolutions. By 2000 there were at least a quarter million Americans at any one time in the USSR and 100,000 Soviet citizens in the USA. More important even than their numbers was the fact that most of them were the children of power and privilege. To endanger them was unthinkable.  
**3. SWORDS INTO PLOWSHARES** Tragically, it took the United States more than 30 years to heed the warning of President Eisenhower (no woolly-minded pacifist!) that it must "guard against the acquisition of unwarranted influence by the military-industrial complex. The potential for the disastrous rise of misplaced power exists."

The chronic misadventures of the Nineties finally drove the lesson home. By squandering implacable resources of mind and material, the U.S. almost destroyed its ability to compete in the high-tech marketplace against such countries as Japan and Korea.

When the taxpayers of the U.S. (and the United Kingdom, France, Sweden, and so on) realized that their arms industries were destroying their economies for short-term gains, the demand that they switch to more profitable—not to mention less genocidal—lines of business became overwhelming.  
**4. INTERNATIONAL SPACE YEAR** (1992) Thirty-five years earlier the International Geophysical Year had opened the road to space. The ISY—named for the year that would also celebrate Columbus—played an even graver role in making mankind realize that Earth was unique and must therefore be preserved. The stunning discoveries of the Hubble Space Telescope, the USSR's Mars rover, and the NASA/JPL Galileo probe to the moons of Jupiter also had a profound psychological effect by demonstrating what strange and wondrous worlds still remained to be explored.

**5. CONTACT** This is the wild card. If it happens, all bets are off. And it's too late to do anything to stop it. We've been shaking our heads at scores of large slides of the electromagnetic spectrum for half a century. Everyone within 50 light years knows that we're here. That is one future of fate we can do absolutely nothing to control. ☐

Arthur C. Clarke is one of the world's premier science-fiction writers and author of 2001: A Space Odyssey and Childhood's End.

# CONTRIBUTORS

## OMNIBUS



CITY SCRIPTS



THE SHAPING OF THINGS TO-COME



AT THE RAILTO



NEBULA



NEBULA



CETRON

**S**aturday 2040: The mission. Time-travel to the twenty-first century, investigate its society and culture, and send back evidence of future realities. The vessel: *U.S.S. Omni Purpose*, celebrating our eleventh anniversary. Commanding officer's summary of filed report: We began by globehopping to such tourist Meccas as London, Hong Kong, and Los Angeles to explore urban life. Omni contributing editor *Marian Long* tracked down Jan Morris, Shuki Terkel, Manuel Puig, and 17 other writers. Their insights are assembled in "City Scripts" (page 50).

"I thought only New Yorkers have a love-hate relationship with their city," Long says. "But people are the same from Beijing to Berlin. And many of the cities spokespersons were almost arrogant about the future importance of their individual cities." In Paris, according to Edmund White, the Electronic Revolution was more successful than the Industrial Revolution, with the French workforce having proved even more adaptable than their English or American counterparts. And according to Colleen McCullough, Sydney was more prepared for the future than most cities.

"I've always wanted to do the kind of journalism that would result in my being investigated by the FBI—and this assignment may have achieved that for me," Long jokes. "Someone from AT&T contacted me, wanting to know why I was calling Moscow so often. Hey, it's not my

fault that Muscovites can't call me! And I couldn't dial them directly. I had to go through an overseas operator."

The Omni crew also spent an evening with distant relatives of the Jaxsons. They served us a delightful dinner, prepared in a fully computerized kitchen by a staff of robots, who by the way make up the world's new minority. Later we sat around an "intelligent" television that produced personalized entertainment. Finding ourselves projected into the on-action action, we interacted with the fictional characters. Douglas Starr has compiled reports filed by Amy McDonald, Brendan Murphy, Asako Hada, Harzada Filla, Shoko Kurita, Al Furst, Connie Schmidt, He Shengjun, David Gumbert, and Sarah Glazer in "Brainscans" (page 66). At think tanks around the world, futuristic hell of machines so small they can be injected into our bloodstreams and travel through our bodies and of high-tech classrooms with self-guided study.

To further prepare us for traveling beyond 2000, we turned to Forecasting International president Marvin Cetron and former Omni senior editor Owen Davies. In an excerpt from their book, *American Renaissance* ("Future Trends," page 112), their crystal ball reveals many future scenarios. Videodisks, for example, enhance books by providing visual and audio information. Mass media are personalized. A computer system customizes your newspapers

As early as 1939, Norman Bel Geddes envisioned a future that captured the imaginations of visitors to the New York World's Fair. Yet the world he pioneered is only now beginning to be realized. "The Shaping of Things to Come" (Proton, page 88) offers an exclusive glimpse of his visionary vehicles, which make today's cars, trains, boats, and planes look obsolete.

During the Eighties another fertile mind, Nobel prize-winning physicist and former Fermilab director Leon Lederman, spearheaded the efforts to get the superconducting super collider off the drawing board. In the 53-mile underground enclosed ring, protons will accelerate to enormous energies of 20 trillion volts, culminating in a collision of 40 trillion volts. Lederman tells former Omni editor Dick Teresi (interview, page 98) the reasons and the methods for breaking through to a new reality D.T., phone home. Since completing the Lederman assignment, Teresi seems to have fallen into a black hole—somewhere in New England, we presume. All attempts to contact him have been unsuccessful. Should anyone sight him, notify the Omni starbase.

Physics and romance intertwine in Nebula award winning author Carole Wells's novella "At the Railto" (page 78). The coauthor of *Light Road* (*Academy Award*), Wells sits her tale in Hollywood a town where moguls alter reality by quantum leaps and bounds. **DO**



# 100 YEARS OF ATTITUDE

## FORUM

By Marvin Cetron and Owen Davies

**M**ore for emotional reasons than for any logical cause the end of one century and the beginning of another is a time when creativity flows with special freedom. As the clock ticks its way through the tenth of ten decades and begins its next 100-year cycle, the themes that have shaped human affairs since the last great transition somehow seem to reach their zenith and conclusion, while the themes that will dominate the coming years begin to take shape. Like the Cheshire Cat these new themes and ideas often seem to materialize from thin air but in reality spring from the human spirit.

We see this "end-of-century effect" in nearly all fields of creative endeavor. Sigmund Freud wrote his seminal books and papers between 1893 and 1906, roughly the same years in which Frank Lloyd Wright was creating his architectural revolution. Beethoven and Einstein did their formative work during the last five years of one century and the first five years of the next.

Ideas have taken root more quickly of late, and change has moved faster thanks to the development of modern communication networks. Before that an isolated school of artists might blossom in one country, a few religious ascetics might conclude that the Second Coming was at last at hand and begin whatever preparations they considered appropriate. But these it ended, often for years. Mass movements and rapid change could not exist when innovators had no efficient way to spread their views to other susceptible minds. Now we have television to spread the word, computers to offer new opportunities for creation and the end, not merely of a century, but of a millennium to celebrate.

We can see the turn-of-the-century effect throughout much of history. Let us begin at one historical turning point, the final years of the fifteenth century.

It had been a busy century already. This was the age of the Grand Inquisitor Torquemada, of Joan of Arc, of Gutenberg, of Da Vinci and Dürer.

But in the 1490's there came a flowering of creativity that would reshape the world not just for the next century but for all the centuries to follow. In art Leonardo da Vinci created his *Last Supper*; Michelangelo began his career under the sponsorship of Lorenzo de' Medici and then moved to Rome, where he sculpted his *Bacchus* and *Praxis*; in science Copernicus studied astronomy at the University of Cracow, the beginning of a line of thought that would eventually change man's view of himself and the universe. In technology Da Vinci created the first conceptual aircraft more practical than wax-and-feather wings. And in medicine a Swiss pig-greaser named Jakob Weller performed the first successful cesarean operation on a living woman.

In 1492 Columbus set sail for the Far East and discovered the New World. The sixteenth century would be the age of exploration.

One century later, in the 1590's and early 1600's, we find a time of scientific discovery, attempted conquest, and

the greatest literary outpouring in history. It was the time of Galileo's best works and Giordano Bruno's last, of Tycho Brahe and Johannes Kepler. When the 1590's began, the Copernican revolution had been languishing for nearly a century. When it ended, no one could honestly doubt that the sun was the center of our solar system and just one of countless stars.

The revolution in literature in the 1590's was just as historic. Above all, this was the time when Cervantes wrote the first part of *Don Quixote*, the first modern novel, when Edmund Spenser published *Epithalamion* and *Faerie Queene*, and when Shakespeare wrote his *Sonnets* (not published until 1609) and fully three-fourths of his plays over a period of 15 years.

One century later, in the 1690's, the focus had shifted dramatically. The era of baroque music was reaching its height. In 1690 John Locke published his two best-known works, *An Essay concerning Human Understanding* and *Two Treatises on Civil Government*, the wellsprings of our modern sense of human rights and in large part the inspiration for the American and French revolutions. In the New World William Penn's rights to his colony were briefly revoked; then restored, but not before the citizens of Pennsylvania developed a taste for life free of the proprietors. In Virginia the growth of vast plantations worked by slaves began to drive smaller farmers from their land, spurring the long migration west that eventually peopled the continent.

In the 1790's music and the arts still appear thoroughly classical, at least to modern sensibilities. Haydn wrote his London symphonies, and the great orators *The Creation*, and the best of his chamber music. Beethoven became his student in 1792 and a decade later had firmly established the Romantic movement in music.

Yet in politics we come at last to a period that begins to look distinctly modern. In the New World, as the decade opened, Washington had just



Do new postures expose new genders?

CONTINUED ON PAGE 30



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# JAPAN'S SPACE KIDS

## SPACE

By John Vacca

**J**apan, which once fielded a baseball team whose motto was "Practice Until You Die," has jumped into the young astronaut movement with both feet. Young astronaut clubs (YACs)—modeled on those first created in the United States—are blooming there like shiitake mushrooms. And with the help of corporate and government sponsors, they are pushing ahead with typical Japanese diligence and a crystal-clear sense of purpose.

That purpose is to prepare the next generation of young Japanese for careers in space. The effort dovetails with Japan's recently announced plan to create a space program first, beginning around 2000, will include manned space vehicles, a space shuttle, and a panoply of commercial space ventures.

To date 15 YACs exist in Japan, with more to come. The Japanese have also built four space camps (they call them astrocamps)—youth training facilities that use sophisticated spacecraft simulators and that are modeled

on the first large-scale U.S. Space Camp at Huntsville, Alabama, and the Cosmosphere at Hutchinson, Kansas.

The difference between YACs in Japan and in the United States may say something about who will most likely dominate the next century in space: not in the expensive, politically charged exploration of the solar system but in the lucrative, infinitely open field of commercial space activity.

The American clubs are formed in schools under the auspices of the nonprofit Young Astronaut Council, founded in 1964 as part of a White House effort to upgrade American schoolchildren's poor performance in math and science. "Our mission is to deliver curriculum materials to American schools to stimulate American kids to study math and science by using the space program" as a spur, says T. Wendell Butler, executive director of the group, which reaches 25,000 schools and claims 560,000 kids as members.

The Japanese form YACs in association with science museums and gear

them toward training and stimulating children who are products of the superior Japanese school system.

"The Japanese have an advantage over me," says Butler. "Their kids are already literate in science and math, so they see the young astronaut clubs as an opportunity to use our program to create the image that there is a future in space." That is, to sell careers in space to their youth.

The Young Astronaut program made its way to Japan when one day "a guy from the Japanese embassy came knocking on the door" requesting materials to start a space program. "At the time there were only a handful of other chapters in Latin America and Canada," says Butler. "It was clear they would move with us or without us. I decided it would make sense to cooperate with them."

Japanese YACs get support their American counterparts can only dream of. When the first club was organized, the Japanese government provided it with \$5 million, mostly in the form of a building for the group's headquarters. In another example, the Yokohama Exotic Showcase, a huge high-technology exposition running from March through October of this year, took as its theme "Children and Space" and gave the Japanese branch of YAC International space for a week to host the third annual meeting of the group's member nations.

"It would make me happier if we got that kind of support," says Butler. (He shuffles every year for his \$3 million budget, which comes from corporate donations, licensing deals [the group lends its logo, for a fee, to science toys and other products], and dues from member schools.)

The Japanese YACs have another advantage: Each is sponsored by a single corporation, such as Nippon Electronic Corporation or the Itochu Shikibu newspaper. In 1990 Nippon Steel will open a space camp on the island of Kyushu.

Japanese corporations, gearing up for commercial ventures in space



Nippon sponsors Camps give youngsters fun, realistic space training, and a career boost



# ADDICTION AND IQ.

## MIND

By Linda Marsa

**L**ike crack addicts found dead with half-empty pipes clutched in their hands, rats in the lab have taken lethal doses of cocaine pressing levers for the drug until they go into convulsion and die. Scientists are now beginning to understand why cocaine is so addictive and why this addiction rips away even the most ingrained instinct for survival. Two researchers at the University of California, Irvine (UCI) have uncovered some clues to addiction's mystery. And in a bold conceptual leap they propose that addiction, learning, and intelligence may involve one and the same process at the cellular level.

In a series of experiments, Larry Stein, chairman of UCI's department of pharmacology and psychopharmacology, and James Belluzzi discovered that certain individual brain cells can be trained or "reinforced" to respond to a reward of cocaine. Like Skinner's rats which pressed levers unrelentingly in anticipation of being fed, these neurons literally burst with electrical activity for a coke fix. "We were actually surprised that a single cell can be reinforced, because it would seem you'd need a whole brain, or at least many of its subsystems, to reinforce behavior," says Stein. "The fact that cells respond to a reward shows just how deeply embedded in the design of the brain this reinforcement mechanism is."

Studying the neurochemistry of addiction, reward, and reinforcement has been Stein's lifework for 30 years, and he and Belluzzi are the only scientists in the world who have given over the control of the rewarding stimulus to the cell. Allowing a cell to "self-administer" a drug, as it were, "is an extremely difficult concept for my colleagues to accept," says Stein. Most investigators apply a drug to a cell, then wait to see what happens. But in Stein's test the cell first fires in a burst of electrical discharge, then it gets the cocaine reward. Just as an animal operant conditioning, the pigeon, say, gets the piece of corn after it pecks the right button.

Stein and Belluzzi examine neurons from the hippocampus in the brain's limbic system because the electrical activity recorded when the tissue is thinly sliced is comparable to that in an intact brain. When the cells fire, microdroplets of cocaine are immediately applied to the cell body. The researchers give another group of cells cocaine randomly whether or not they fire. When the scientists pair doses of cocaine with firing, the neurons "learn" to fire for more, while the neurons in the randomly dosed control group do not. Stein and Belluzzi then do the same test using the neurotransmitter dopamine as the reward. It works just as well as or better than cocaine. And when they perform the same experiment with the powerful natural opiate dynorphin A, other hippocampal neurons learn to fire for more of that reward, too.

"In a sense, the purpose of life is to activate our reward systems," declares Stein, who thinks dopamine and the opiate peptides function as the brain's own reinforcement transmitters and may

be responsible for many forms of learning and conditioning, as well as addiction. Dopamine and the opiate peptides are transmitters in very powerful control systems based on a carbon chemistry and along come poppy seeds and coca leaves that have chemicals very similar to or can pharmacologically interact with these central systems. They go right in, do not pass go. So if you're tapping into the natural, positive reinforcement systems, then to say that cocaine or amphetamines—or heroin or morphine—should be highly appealing is an understatement."

Why use cocaine as a reinforcer? In the whole animal, cocaine is probably the most addictive of the addictive drugs, says Stein. "Of course, no one has found a good test way to give dopamine continually to see how addictive the transmitter is. Drug addiction should be treated as a biomedical brain disease rather than a failure of character. Until pharmacological approaches are developed to prevent the brain's reward system from being automatically switched on by these drugs, it will be difficult to break the cycle of addiction."

But my primary interest is not addiction, although it's a fascinating perturbation of the system," he adds. "The big question is the neurobiology of reinforcement." Stein's tests demonstrate that consequences of an event can mold behavior. Cells fire, cocaine is applied as a reward, cells fire with renewed zeal. This pattern of selecting successful behavior by reinforcement has the same logical status as the natural selection of successful structures and functions in evolutionary biology. Both are examples of selection by consequence.

Stein constructs a thought experiment: "If we had a microelectrode in every cell in a rat's brain," he says "and a giant Cray computer to keep track of all that, then we would get the rat to press a lever for food. We could see which neurons were active. If we allowed the rat to do that a hundred times, of all those cells there'd be a small subpopulation contributing directly to



Stein's brain cells crave cocaine.

CONTINUED ON PAGE 158

# DO THE RICE THING

## ARTS

By David Perry

**T**here are vampires on the streets of San Francisco. They bite at the darkness, lick their lips hungrily. *Outside Fantasy, Etc.*, a small bookshop next to a seedy theater on Larkin Street, dozens of them line up for an audience with their ruler, whole holding court inside.

Envision a vampire disguised as Anne Rice: long black hair, blood-red lips, dressed in schoolgirl plaid. Behold Anne Rice, queen of the damned, surrounded by stacks of the world she has created.

A punkish young woman clad all in black steps forward. "Here," she says, offering Rice a delicate crystal amulet. "This is for you."

Methodically autographing copies of *The Queen of the Damned*, the most recent volume in her vampire chronicles, Rice raises her head and smiles. There are no fangs. "Thank you," she says. It is the voice of an author who maintains a listed phone number so fans can call her. "Thanks very much."

Tambling, the young woman turns to

me. "Vampires are real," she says, parting. "She knows. Ask her."

Later, as Rice and I recline in the back of the white Chrysler limousine provided by her publisher, Knopf, I ask about her literary creatures.

"I've always been fascinated by the vampire, the elegant yet evil Byronic figure," Rice says. "It's easy to say it's a metaphor for the outsider, the predator, anyone who feels freakish or monstrous or out of step but appears normal."

"Yes, but are they real?" (I'm beginning to feel like the reporter in *Interview with the Vampire*, the initial volume of her chronicles.)

Rice smiles, teeth gleaming in the glow of the streetlights passing by. "That depends on when you ask me and what mood I'm in," she answers, laughing. "But ultimately, sadly, they exist only in the imagination. Vampires are powerfully mythic. They confront our fear of the dead, our fear of being sucked dry by guilt. We also long for transcendence and immortality." She utters immortality with almost religious reverence.

Some readers, I suspect to her, believe that the vampire-child Claudia, who hungers for life-sustaining blood, represents the literary immortality granted to Michelle, the daughter Rice lost to leukemia in the early Seventies.

"I'm sure that is partly true," she says. "But when I write I don't think about things like that. Only later, after it's done, do I discover things that even I wasn't aware of."

Although she wrote *Interview* after Michelle's death, Rice actually first considered a novel about vampires in 1969. "I sat down and typed the words *Shall we hold the interview here*," said the vampire. That became the seed for the first vampire book.

Rice has written about more than just vampires. Her published work also includes historical fiction (*The Fear of All Saints and Cry to Heaven*). And she has used pseudonyms to express other sides of her personality. As "Anne Rampling" she authored the Lolitaesque *Delvids* and *Exit to Eden*, a pornographic love story that falls somewhere between an Anais Nin story and the Bernardo Bertolucci film *Last Tango in Paris*. "A. N. Roqueland" has penned tales of pansexual sadomasochistic odysseys, erotic novels "for the enjoyment of men and women." Her most recent "Anne Rice" novel (soon to be a CBS miniseries), *The Mummy* is, she says, "an extended meditation on life and death, love and loneliness, guilt, isolation, alienation, essentialities, grief, and immortality," themes adroit throughout all of her work. She is best known, however, for her homoerotic "fang gang": the vampires in *Interview*, *The Vampire Lestat*, and *The Queen of the Damned*. Still to come: *The Body Thief* will continue the saga of Lestat, the vampire who first appeared in *Interview* and later became a rock star reigning over San Francisco's nightlife.

Turning off Market Street, the Chrysler cruises down Castro, a neighborhood of gay bars, Irish widows, and, if you're a believer, vampires. "One of those over there," yes, there," Rice exclaims, pointing



Interview with the vampireologist: Will her next volume be *Animal Tramps*?



1956.



1964.



1969.



1975.



1988.



1990.

You always come back to the basics.



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out the limousine window. I lean over for a better view. Any of the gay bars could be Lestat's vampire bar. But she's singling out Badlands, with its rainbow-painted corner, on Eighteenth Street just off Castro.

"Vampires transcend gender," says Rice, who once described herself as a gay man writing in a woman's body. "So where else would a vampire go but to the Castro?"

Outside Badlands is a cluster of men—half of them preppy, the other half punk—who seem unaware they may be entering a legendary meeting place. Inside, the patrons play pool, drink, smoke, murmur over the din of disco music. But in the back, behind the cigarette machine and concealed by a velvet curtain, could be the secret door known only to those whose faces are never reflected in a mirror: those creatures of the night whom society-baiters with its preconceived notions—a door for the undead.

Thinking I've been privy to a great revelation, I'm disappointed when Rice dispels my notion that Badlands is Lestat's vampire bar. The meeting place, she acknowledges, is really a composite of several gay bars.

Farther down the street, the car stops and Rice looks around her city of colorful, antebellum characters, the city of the vampire, where she has lived for 27 years with poet-husband Stan.

But right now she is tired. Hungry. It's time to feed. And quick as a bat, she alights from the car and darts into the welcoming darkness of a small Italian restaurant. Inquisitive stares follow her to our table. Who—or what—they wonder, is she?

"I'm pretty much of a recluse," she says as the waiter seats us. "I don't go out much into the world."

Based solely on her published work, I expected to meet a sadomasochistic Elvira. She's not.

No, she is not a witch. No, she's not lesbian—"although he mentally explored the idea." Her best friend may be John Preston, author of gay S&M novels, but, no, she's not a dominatrix. She was once a Catholic but now says she believes in neither organized religion nor God. The woman across the table from me is more like Aubre Meme.

Rice, I discover, is a paradox. The author who has, arguably, spilled more literary blood than any other writer tells me she believes in the "sanctity of human life." The woman who frequently puts her female characters in chains directs her own personal anger toward the "hatred of women."

Turning to the waiter who's come for our order, she requests pasta with cream sauce and a glass of mineral water. No blood, not tomato sauce or even red wine.

I decide on an entree of spaghetti with pesto sauce.

"Garfo bread?" the waiter asks.

Rice looks up at him quizzically.

"Yes," I respond, perhaps too quickly. "Lots." Is my nervousness showing? My hand lingering my tightly buttoned shirt collar, I think. Maybe I should have worn a gold cross around my neck. Better to be safe than sorry.

"It puzzles me that there is such a gap between the critics' perception of my books and my readers' response to them," Rice says when the waiter leaves. "If someone from another planet were researching what humans read and only looked at the reviews, he couldn't possibly figure out why anybody reads my novels. He'd get a better idea if he just asked the readers."

And why does she write?  
"Obsession," she says, and her latest is UFO abductions. I read everything I can on UFOs. I watch everything I can on

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TV. There is definitely something going on and, whatever it is, it needs further investigation. All I know is that these people say they've been abducted and they don't seem to be lying. They truly believe it. It's incredible—abduct to be in the dark, thinking they were carried off in a flying saucer. There are women all over the country who say they have lost their babies to aliens. This is a symptom of something. And even if it's some sort of mass hallucination, it's an absolutely fascinating one.

"It all intrigues me mightily," she says, never having seen a UFO but believing in the "logical existence" of extraterrestrial civilizations. "I was afraid to go to the bedroom alone for weeks after reading Budd Hopkins's *Interdors*. I was convinced I was going to look up and see one of those four-bodied men coming in after me."

It seems, then, that UFOs might be a subject for a future Rice novel. She ponders the possibility. "Yes," she says, finally her after-dinner coffee forgotten. "It just might be."

The toll of midnight is fast approaching

when the chauffeur returns and Rice prepares to leave. As she grants me her autograph, she invites me to New Orleans, where she will soon be living in the same neighborhood she was born in. Maybe a vampire, I think, she's a gracious, Southern one.

I broach one last question: Is Anne Rice afraid of anything?

"Yes," she answers, stepping into the limo. "The dark."

Several months later I stumble across a garage sale outside a trim, three-story San Francisco Victorian town house at Seventeenth and Rice streets. Bergen hunters we for a copper pot, a recording by the Doors, a cologne that reminds me of the joy dwelling in interview with the Vampire.

Browsing through the hundreds of books, their subjects ranging from sex and the occult to philosophy and mythology, I find many of them inscribed "Anne O'Brien Rice and Stan Rice," followed by the dates they were read. And many of the strangers milling around the front lawn don't know that this is the house vampires built.

When Rice comes out to greet me, she acknowledges that the garage sale will benefit Synergy, the private school her eleven-year-old son, Christopher, will no longer be attending. Nearby, waving a turkey sandwich, Christopher oversees the proceedings.

I admit a Ouga blood. I've just picked up and ask if she's ever used it.

"No, we got it for Christopher. I'm scared to death of it." She autographs the back of the box, waves this around my concupiscent astral flames.

"I have the greatest respect for such things, but I've never had any sort of paranormal experience," she says. "I just don't get the vibes. Our house in New Orleans is supposed to have a ghost named Pamela. And coincidentally there's a ghost in *The Witching Hour* [her next novel], but I had planned that before we bought the house."

Yes, she believes in ghosts and in communicating with them. But I don't want to see Pamela, she says. "I'll let her do what she wants, and, hopefully, she'll let me do what I want."

"And what's that?" I ask, visions of bats and blood dancing in my head.

"All I want to do is smell the magnolias, listen to the cicadas, and write my books," she says. I love San Francisco but I'm less afraid of dying when I'm in New Orleans.

Would she, if offered, accept the vampire's "Dark Gift," immortal life played out between sunset and sunrise but lacking the freedom mere mortals take for granted?

"Oh, yes," she exclaims with supernatural speed. "Wouldn't you? I'd cry a lot, but I couldn't turn it down. I'd have to take life over death." ☐



1953



1959



1968



1973



1983



1987



1991

You always come back to the basics.



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IMPORTED BY THE HOUSE OF SEAGRAM, NEW YORK, NY  
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# BIG BYTES IN NASA'S BUDGET

## ARTIFICIAL INTELLIGENCE

By Robert Fleming

**T**he major dilemma facing NASA in the next five years is the impending retirement of its key veterans—seasoned flight controllers, skilled engineers, and top managers. The statistics are staggering: 45 percent of the agency's 2,500 most experienced senior and midlevel managers are at retirement age. That number is expected to leap to 70 percent in two years. And according to William Deethridge, an aerospace analyst for Dean Witter, budget cuts during the last decade have hurt NASA by forcing many top people to seek more lucrative jobs in the private sector.

"The chickens have come home to roost," says Joanne Gabrynowicz, an associate professor of space law and policy in the space studies department at the University of North Dakota. The current staffing problems are a result of cutbacks that began during the Nixon administration. Despite the Apollo successes, which gave America the historic moon landings, Gabrynowicz

says, "For many reasons, including the cost of the Vietnam war, Nixon was no friend of the space program. He ordered the reduction of staff, budget cutbacks, and a general freeze on hiring. The agency was greatly scaled back and almost dismantled." Pioneering projects such as a manned Mars mission and a space station were put on the back burner, blueprints for the space shuttle were reduced in scope. According to Gabrynowicz, there is a dearth of engineers in the thirty-five to fifty age bracket because few new hires came online during those years.

The wave of budget crunches continued through the Ford, Carter, and Reagan administrations. NASA's budget, which hit \$16.2 billion during the Sixties, dropped to \$6.3 billion in 1986. It is now inching toward the \$10 billion mark.

Appearing before the Senate Commerce Subcommittee on Science, Technology, and Space, retired NASA administrator James C. Fletcher recently warned senators of the "potentially

disastrous situation" awaiting NASA if the budget is not increased to hire and train new personnel. According to Fletcher, the best solution to the growing experience gap is to replace some flight controllers and engineers with smart computers capable of handling reams of data, troubleshooting potential crises, and intervening if a problem arises.

The arrival of supercomputers at NASA will change the way the agency operates. In the future fewer humans will roam around the control rooms at Kennedy Space Center, monitoring shuttle launches or running missions to distant planets. At Johnson Space Center in Houston, one goal is to reduce the number of flight controllers from 15 to 5. In order to accomplish this, the machines are programmed with the actual experience and know-how of the Apollo flight controllers. These people are interviewed, and their expertise is stored in the machines' knowledge base.

Most of the engineers and scientists welcome the new machines, which allow freshman engineers to become independent very quickly, relying less and less on the veterans for advice. Even so, the new systems are not easy to learn. According to Martin Loughheed, a senior NASA engineer who managed the agency's expert systems project at Kennedy for three years, training time for new engineers trying to absorb the expert systems is six months. For a flight controller, it takes two years to master interpretation of the humongous data relayed back from a shuttle in flight.

One expert system, AT-EASE (Automatic Test Expert Aiding System Environment), helps new engineers verify the accuracy of the computer components in the shuttle firing room. There AT-EASE displays its flexibility, offering deep analytical memory and greater speed than older artificial intelligence programs. AT-EASE is like an online expert, since it guides the new guys through the process with tried-and-true methods, says Loughheed.

Some intelligent programs are already



Booted: NASA's masterminds shouldn't worry about (filing their predecessors') shoes.

# OUT OF AFRICA

## EXPLORATIONS

By M. J. Wilcove

**A**dventurer and filmmaker Douchan Gersi faced a dilemma in the early Seventies. With the opportunity to go to Borneo, he would "explore a region still unmapped, meet headhunters and live among them," he wrote in his 1987 autobiography *Explorer* (Jeremy Tarcher). "All that would fulfil my dream."

There was one hitch: Now caring for an infant daughter, his wife no longer wanted to globe-hop with him as she had in the past. "If I stay I will witness [Maroussa] growing up. I will save my marriage and have more babies like her. No more Borneo! That's it. I have made my choice!" But the result of that decision, Gersi immediately realized, might be different from what he hoped. "I am only 27 years old," he continued in *Explorer*. "How long will I be able to carry around my regrets without poisoning the lives of those for whom I give up my dreams? Regardless of the consequences, I will go to Borneo. They will hate me today. But tomorrow I will light them up with my happiness."

**DECEMBER 1988** Maroussa Gersi now lives with her mother and her barter stepfather and their four children in a large, suburban Brussels home. She excels at sports, loves animals, and spends hours on the phone. Maintaining high grades in science and Latin, the gregarious teenager wants to go on to college and study for a career in business.

Some children may fantasize about glamorous, heroic parents who will one day whisk them away to a more exciting life. But for fifteen-year-old Maroussa, such an offstage father is a reality. Indeed, Maroussa was conceived during an expedition through Morocco. She spent her infancy nestled in a wicker basket dangling from her father's arm as he traipsed around the globe showing his documentary films of Borneo's headhunting tribes. And at the age of two she traveled alone to visit her father in the United States and asked him—like any idol-struck child might do—to take her with him on an expedition.

Still, Maroussa was "a little surprised"

when her father called from his Los Angeles home and told her he was coming to take her. "Obviously he is his cinematography assistant, on what figured to be his most unusual expedition."

They would join professional hunter and guide Jits Kosi and American cryptozoologist Roy Mackal, a retired University of Chicago biology professor, in central Namibia, Africa. The foursome would search for a winged serpent that may be a pterodactyl, a contemporary of the dinosaurs long pronounced extinct. Local residents have reported sighting the creature, said to be the size of a Cassin's plane, soaring over the Namibian savannah and roosting on the kopjes (the rock formations that dot the subtropical grassland).

"I told Mama and she jumped on the telephone and started to scream at Dad," reads Maroussa's diary entry of July 12, 1988. "It's too dangerous, she said. Dad asked her what is the best memory of your life right now? Mama said, the trip you and I took in the Sahara when we were 18. And Dad said, are you ready to deprive our daughter of such an experience? Finally, Mama took me aside and said, okay, what do you think? Of course, I said, I want to go."

The following translated excerpts from her diary tracking the Namibian trek are augmented by her comments in later conversations. It's an account of a girl confronting death and emerging four weeks later with an altered awareness of the value of life.

**AUGUST 5** It's the end of winter here. It's very hot during the day, very cold during the night. What is exciting is that the country is just savannah and there are so many animals. It's like going on a safari. There are other hunters at the farm where we will be staying [outside the city of Windhoek]. And we saw kudu, antelope, oryx, and many rabbits. **AUGUST 6** Awakening at six o'clock we went to explore a kopje. We discovered a narrow, deep cave and inside I saw the remains of a young zebra. Dad



Summer in the savannah: Med monkeys, leopard lairs, and dinosaur discoveries

# BONE VOYAGE

## BODY

By Jeff Goldberg

**A**t a meeting on AIDS last June Johns Hopkins University researchers announced that they had successfully removed all traces of the HIV virus from an AIDS patient's system by giving him a bone marrow transplant (BMT). Earlier attempts to treat AIDS this way had failed because the virus quickly infected patients' new marrow cells. This time oncologist Rein Sarin's team administered megadoses of the antiviral drug AZT before and after the transplant, removing all traces of the virus. Thirty days after the surgery the patient's AIDS test came back negative.

Although the man subsequently died from a preexisting cancer, Sarin finds the preliminary results encouraging. While reluctant to call the AZT-transplant combination a potential cure for AIDS, he plans to test it further next year.

AIDS is only one of a wide range of illnesses doctors may someday treat with bone marrow transplants. According to the U.S. Office of Technology Assessment, the transplants could help conquer 34 diseases, including blood disorders like sickle cell anemia and thalassemias. Until recently the procedure remained a last resort for patients suffering from leukemia and radiation exposure. BMT surgeons are combining more sophisticated marrow-matching techniques with new ways of reducing the transplants' frequent side effects to fight a wide range of diseases that disrupt the immune system. In 1986 they performed 4,000 BMTs with good results, and by the year 2000 they hope to double the number done annually.

Before doctors can recommend BMTs as routine therapy, however, they need to perfect techniques to offset the procedure's common complications. They also need to ensure close genetic matches between donor and recipient—a formidable task, given the subtleties of marrow typing and the current scarcity of donor tissue. (Unless a transplant patient is lucky enough to have an identical twin to serve as donor, the odds of a perfect match are around 6 billion

to one.) Bone marrow types are far more unique than organs like hearts or kidneys. Marrow plays an intricate role in regulating our immune system and producing fresh supplies of oxygen-bearing red blood cells and disease-fighting white blood cells.

The vitality of transplanted marrow often complicates the patients' recovery from the procedure. Because the blood cells responsible for tissue rejection originate in the bone marrow, a less-than-perfect match can result in the transplanted marrow rejecting the patient's other organs. A potentially lethal syndrome called graft-versus-host disease (GVHD) results. It is characterized by vulnerability to many infections. Although new tissue typing techniques allow BMT surgeons to match their patients' marrow more precisely than ever before, about 50 percent of those patients still develop some signs of GVHD. The severity of the syndrome is closely linked to the quality of the match.

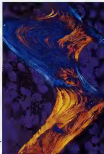
In many cases doctors can now prevent GVHD by using T cell depletion,

a technique developed by Israeli biologist Yael Reznar. In 1982 Reznar's colleagues discovered that the primary cause of GVHD was "killer" T cells in donor marrow—cells that perceive cells in a recipient's liver and intestines as foreign and thus attack them. Over the next few years Reznar experimented with different methods of removing T cells from donor marrow and found that lectin from soybeans combines with sugars on T cells. Once that's achieved, the T cells can be easily separated from other marrow cells in a centrifuge. "Using T cell depletion," says Richard O'Reilly, chief of pediatric surgery at Memorial Sloan-Kettering Cancer Center, "we have a very good testing average against GVHD."

O'Reilly's arsenal of weapons against GVHD also includes monoclonal antibodies—antibody proteins designed to bind exclusively to a single type of molecule. In this case the antibodies are equipped with tiny warheads of a poison called ricin and engineered to recognize and destroy only T cells. By injecting patients with these microscopic ballistic missiles, O'Reilly purges their blood of any remaining T cells, effectively halting GVHD in its tracks.

Still another way of offsetting the effects of GVHD comes from Sloan-Kettering researchers. They have harnessed blood cell growth factors like interleukin 1 and identified one factor, granulocyte colony stimulating factor, which triggers the manufacture and maturation of blood cells in the bone marrow. Malcolm Moore, head of the hospital's growth factors research effort, believes he can use growth factors to rebuild patients' blood streams and immune systems after BMTs. "In early fetal development these factors come in at different times to cause the step-by-step development of the various types of blood cells," he explains. "If we can duplicate that sequence, we can accelerate the same process after bone marrow transplants."

Several advances that may ultimately transform bone marrow transplantation



Marrow transplants may yield many cures.



"What does not change," wrote poet Charles Olson, "is the will to change." Those stout lines could well serve as a motto for the stunning advancements in technology, medicine, and exploration that have characterized the past 100 years. Now, you can gaze into the future by filling out...

# THE DELPHIC POLL

Below are a series of statements that predict future developments. Do you think these changes will take place before 2050? If you believe they will, check yes. If you don't think these changes will take place before 2050, check no. There are no right or wrong responses — it's your opinion that counts.

## MEDICAL

1. Computer microchips will replace damaged sections of the brain.
2. Scientists will discover a cure for cancer.
3. The average human life span will be 100 years.\*
4. Genetic engineering will enhance and magnify human abilities, creating a superhuman.
5. All surgery using knives will be replaced by non-invasive, "bloodless" laser surgery.
6. All genetic disorders will be corrected in vitro.
7. Male pregnancy will exist—men will carry a fetus full term.
8. Organ and tissue cloning will replace donor transplants.

## EXPLORATIONS

9. A manned mission will land on Mars.
10. Humans will travel to Alpha Centauri, our nearest star neighbor, 2.5 light years away.
11. Atlantis will be discovered.
12. Permanent observation satellites will be orbiting each planet in the solar system.
13. We will establish contact with an intelligent alien lifeform.
14. Humans will journey to and explore the center of the Earth.

## TECHNOLOGY

15. Small, easy-to-use aircraft will replace automobiles as personal and family transportation vehicles.
16. Scientists will find a way to control and direct weather systems.
17. Voice-activated computers will talk with, listen to, and advise human beings on psychological problems.
18. Technology, land use, and architecture will combine to make Earth a second Eden.
19. Perfect living environments will be created inside protective bubbles.
20. Electricity will power automobiles.

## LIFESTYLES AND SOCIETY

21. Acoustical musical instruments will be superseded by computerized music.
  22. A woman will be president of the United States.
  23. The moon will become a major vacation resort.
  24. The church of Techno Worship will depose traditional religion.
  25. Food will be replaced by hunger-sating, time-released nutrition implants.
  26. 3-Dimensional holographic movies will allow you to enter the picture.
  27. Mind excursions, dream-like fantasies stimulated by brain-computer hook-ups, will be used as mini-vacations.
- ## ENERGY
28. Resource scarcity will make oil and coal more valuable than gold.
  29. Lightning bolts will be captured and stored, becoming a major source of electricity for the Earth.
  30. Mining operations will be established on other planets.
  31. Fusion plants will be powered by nuclear waste.

## MISCELLANEOUS

32. Faster-than-light particles will be discovered, bursting our conventional views of the universe and of time.
33. Every plant and animal species on Earth will be identified and cataloged.

Simply fill in "yes" or "no" in the space which corresponds to the questions in the OMNI Delphic Poll:

- |           |           |           |           |           |
|-----------|-----------|-----------|-----------|-----------|
| 1) _____  | 2) _____  | 3) _____  | 4) _____  | 5) _____  |
| 6) _____  | 7) _____  | 8) _____  | 9) _____  | 10) _____ |
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| 31) _____ | 32) _____ | 33) _____ |           |           |

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# E.T., PHONE TORONTO

## BOOKS

By Robert Brody

**A**n antique dealer acquires a unique chess set, its pieces consisting of figures based on *The Lord of the Rings*. The only problem: He has never read the Tolkien fantasy and can't identify the characters for prospective buyers.

A high school student turns in a suspiciously familiar sounding science-fiction story. His teacher needs to learn whether the tale has been plagiarized.

The place to call for even the most obscure science-fiction information: the Spaced Out Library, or SOL. Toronto residents and visitors, of course, can always wander into the Toronto Public Library building and check out the science-fiction collection themselves.

A continually growing service, SOL offers approximately 2,000 novels and short-story anthologies, as well as records, newspaper clippings, artwork, and both current and out-of-print periodicals. There are also nonfiction books on such subjects as space exploration, extraordinary perception, and UFOs. Particular attention is given to

fantasies, the amateur periodicals published by science-fiction fans, and to special editions of books produced by small publishing houses. And SOL's Jules Verne Collection consists of more than 250 copies of the French author's works, in English and French, together with comic books, games, and other Verne memorabilia.

With tens of thousands of items in its archives, SOL is the most extensive public science-fiction (SF) library in North America and the third largest on the planet. Admirably, the J. Lloyd Eaton Collection in Riverside, California, and the Dallas Public Library Science Fiction and Fantasy Collection cover more ground. And UCLA, MIT, Ohio's Bowling Green State University, England's Science Fiction Research Foundation and Scotland's House of Elsinburgh also harbor notable collections. But while only scholars generally have access to such valuable research materials, SOL encourages everyone to ply its facility, even making some 6,500 books available for circulation. "SOL's purpose is to

stimulate scholarly as well as public interest in SF," says collection head Lorne Tools, bespectacled in pink-tinted, beveled glasses. "And it's illogical for a research collection to ignore material simply because it's in another format." Indeed, SOL is already "expanding its audiovisual materials" with audiotapes of interviews with science-fiction authors and future-oriented scientists. The library also offers half-hour science-fiction classes for eighth to twelfth graders. And a Futures Forum presents panel discussions and readings by local science-fiction writers. "Another level of service—movie videos—may also become available," Tools adds.

With flyers and other notices from *Hungry*, *Polish* and other SF societies, SOL's bulletin boards attest to how much the library's reputation has spread among the globe's science-fiction fans. Seeking material for their own scholarly works, researchers even fly in from other countries.

SOL dates to 1970, when Canadian SF author Judith Merril, running out of room in her own home, donated some 5,000 books to the Toronto Public Library. At the time, SF was becoming both commercial and respectable, and more scholars were developing an interest in it, Merril says. "My books were climbing the walls, and I had thought of selling them, but I knew I'd never get their full value."

During the next few years SOL operated out of an old house—until the late Seventies, when a Toronto housing inspector warned that the structure would soon collapse from all the weight. Now the collection's current location is spilling at the seams: Boxes of books are stacked six feet high in a storage room and spill out into the hallway.

Within two years, however, the library will move into new and larger quarters. Then Tools hopes to fulfill a long-standing desire: environmentally controlled rooms to protect the often-lazy pages. "Ideally I'd like an industrial size 'trezor,'" Tools says. "But not to worry. Science fiction never gets stale." **DO**



When and where was Asimov's first short story published? The answer is ten digits away.



# CONTINUUM

## MORAL PROPAGANDA

In the mid-eighties Scotland tried a novel approach to curb a sudden explosion of heroin use in the region. The experiment did nothing to lessen drug abuse but fueled the spread of AIDS, teaching a lesson that the United States continues to ignore at a horrendous cost in life. Fearing that easy access to injecting equipment might be exacerbating the drug problem, the city of Edinburgh banned pharmacies from selling syringes to anyone who walked in off the streets, as was then the custom. The addicts in Edinburgh didn't stop injecting heroin; they just started sharing needles. The rate of AIDS infection among them soared to 80 percent. Forty-five miles away in Glasgow, where the ban was never put into effect, only about 12 percent of IV drug users became infected with the virus.

As this tale of two cities spread round the globe, Australia and half a dozen European nations took steps to increase the availability of sterile syringes to addicts. But the United States, with a staggering incidence of AIDS by comparison, continues to drag its feet as inner-city areas along its main drug corridor from Boston to Miami are being decimated by the virus. Although the exact rate of infection in IV drug addicts is not known, anonymous testing of newborns gives an alarming picture of just how far the virus has spread within the community. In the most hard-hit area, New York City's South Bronx, approximately 1 in every 40 newborns tests positive for antibodies to the AIDS virus. In Newark, New Jersey, 1 in 63 babies is antibody positive. In Boston and Palm Beach County, Florida, home of the large Belle Glade ghetto, it's roughly 1 in every 96 babies.

Why, in the face of so much human suffering and death, is the United States still reluctant to protect addicts—not to mention the wider heterosexual population—through the distribution of sterile needles? Opposition comes from diverse groups, ranging from minority leaders to top-ranking officials in the Bush administration. But all are inclined to see AIDS as a secondary issue in relation to the broader drug problem. Under no circumstances, say these moral high grounders, should the nation adopt measures that might be construed as promoting drug use—without any effort to research whether needle-exchange sites do in fact increase drug abuse. Hence even pilot studies to test the approach may get held, as happened last year in Boston, or may be forced to operate under rules more restric-

tive than the most exclusive country clubs—a prime example being the embattled, year-old program in Manhattan. So far it has attracted only 200 of the city's 200,000 IV drug addicts because it demands, among other things, that enrollees submit to a blood test for AIDS and carry a photographed identification card on them at all times.

In fact, despite all the preaching to the contrary, the preponderance of data from a wide range of cultures shows that needle exchanges either have no impact on drug abuse or actually change it for the better. In Amsterdam, for example, the number of new recruits to IV drug use has decreased every year since the needle-exchange program was introduced in 1984. Critics, however, argue that such findings may not hold up in the United States, despite the beneficial results that have been documented at Tacoma's needle-exchange site, which is highly accessible to addicts. Since it began last year, enrollment in the city's methadone clinic has increased by 30 percent.

Far from worsening the drug crisis, as critics of needle exchanges widely fear, these programs are helping to get addicts off drugs and to prevent new intakes from starting. How can needle-exchange programs have this paradoxical effect? It's a classic case of the carrot succeeding where the whip has failed. The needles basically serve as bait to draw addicts to the attention of health professionals. This is no small feat given that addicts are part of an underground community beyond the reach of institutions that might be able to help them. Over time, participants develop trust in their counselors and often agree to drug rehabilitation. "When they have someone in their court for the first time," says Chuck Eaton, project coordinator of the New York study, "they are much more responsive to making positive changes in their life than anyone guessed."

In condemning needle-exchange programs as a matter of principle, critics are, in fact, exhibiting nothing more than prejudice. Their moral posturing is downright immoral, for it unnecessarily dooms millions—including innocent babies—to early graves. The nation's inner cities need highly accessible needle exchanges now, before there are no surviving addicts to rehabilitate. As Dave Purchase, who pioneered Tacoma's needle exchange, puts it: "You can get over being stupid. But you can't get over being dead." —KATHLEEN MCALIFFE



## CONTINUUM



In search of seafood: When traps go awry, lobsters suffer a slow death. Must they wait until they open the door for the feisty crustaceans may dissolve the problem.

### TRAPDOORS FOR LOBSTERS

American lobster fishermen lay down millions of traps every year—some 2 million in New England alone. The trouble is that at least 250,000 of these traps, called pots, get lost on the ocean floor, meaning that any lobsters trapped inside will eventually die of starvation. Now a scientist at Stevens Institute of Technology in Castle Point on Hudson, New Jersey has developed a solution: pots with plastic slats that

degrade in seawater.

Kenneth Gonçalves has developed four experimental variations on the common plastics polystyrene and polypropylene. When he combined these plastics with cobalt, aluminum stearate starch, and a fatty acid, he got a material that will break down in seawater over a period of no less than three months. Once the plastic slats break down, Gonçalves says, trapped lobsters can simply scuttle through the openings to freedom. Large lobsters can survive in

cool waters for several months without feeding.

The lobster fishing industry has shown considerable interest in the new pots as a means of lobster conservation. "While juvenile lobsters die in traps," Gonçalves explains, "it cuts down the harvest for the future. The more lobsters saved, the more that are available to breed."—Bill Lawren

"Lacuna tends to corrupt, and absolute lacuna corrupts absolutely."

—Edgar A. Snow

### PEDIATRICIAN ON A DISK

The latest entry in the computerized medicine field is a software package that can help parents diagnose ailments in children under fifteen when they can't reach the family pediatrician.

Lundin Laboratories, Inc. in Southfield, Michigan, says its \$99 FamilyCare program, designed for IBM PCs but also compatible with Apple Macintosh systems, deals with 650 different symptoms and can handle up to 1,600 medical questions. The program walks users through everything from eye and ear problems to broken limbs and chest pains. Designed by a team of computer scientists and three Wayne State University pediatricians, FamilyCare is an appropriately cautious program: if in doubt, the software directs you to a doctor. While it is not intended to be a complete diagnostic tool, it could help parents decide whether a particular problem requires a trip to the emergency room or can be handled safely at home.

"It will tell you," says Lundin's Wendy Sahrtske, "if something is seriously wrong," such as a cut that won't stop bleeding. "It will flash a message: IMMEDIATELY GET MEDICAL HELP NOW."

Sahrtske says the Michigan company is also developing an infant care program aimed at parents of newborns and specializing in such things as diaper rash, umbilical cord problems, and even incessant crying.

—George Nobbe

## NITRO-BUSTING BUGS

The most advanced technology for cleaning up soil contaminated with explosives is, ironically, the dump truck. Tainted earth is hauled off, then burned or buried. But according to researchers at the Los Alamos National Laboratory, explosives that have leached into the ground at munitions plants and other sites may one day be rendered harmless by bacteria. Recently discovered microscopic bugs can metabolize the explosive stuff into harmless by-products within six months.

Los Alamos biochemist Pat Unkefer collected bacteria from several sites contaminated with explosives and tested the microbes' ability to chow down on compounds like trinitrotoluene (TNT) and nitroglycerin. The results? "Nitroglycerin can be readily broken down by microorganisms in water, carbon dioxide, and nitrates," says Unkefer. "We are studying other cultures to see if we

have bacteria that can metabolize TNT."

Unkefer points out that microorganisms used to clean up explosives-tainted areas will have to adapt to a variety of weather and soil conditions. "But we are not going to use genetic engineering," Unkefer insists. "Soil bacteria are so adaptable you can grow them within the conditions you want until they adapt."

If large-scale cleanups with bacteria work, they promise to be much simpler and cheaper than current cleanup efforts. "For every dollar spent on this method," Unkefer says, "it takes between ten and a hundred dollars to do the job with dump trucks."

—Sherry Baker

"A fishing rod is a stick with a hook at one end and a fool at the other."

—Samuel Johnson

"Good behavior is the last refuge of mediocrity."

—Henry S. Haskins

## BEER BOTTLES WITH GILLS

Next time you grab an ice-cold bottle of beer, find out how long it's been sitting on the shelf. Bottled beer is not airtight and begins to lose its crisp flavor after 90 days. Now help is on the way. A California company wants to put "gills" in beer bottle caps.

The Aquanautics Corporation spent several years working on an artificial gill that could extract oxygen from water, hoping to develop



Beer drinkers get ahead: A new method to keep your brew bubbly comes as a breath of fresh air to beer connoisseurs.

an underwater life-support system. It sought a fluid that could bind with oxygen and then release it, the way human blood functions.

"We developed more than two hundred and fifty compounds to do this," says Aquanautics vice-president Steven Carnevale. But the company saw a greater potential in applying this technique to packaging oxygen-sensitive foods.

Enter Zapata Industries of New York, one of the world's biggest beer bottle cap manufacturers. Zapata and

Aquanautics will spend \$2.5 million in an effort to develop a bottle cap that will absorb oxygen, retard spoilage, and preserve carbonation.

The two companies hope to put just enough of their compound inside the bottle cap to do the job. "Beer drinkers won't even notice it's there," says Carnevale. The caps will need FDA approval and could take two years to reach the nation's brewers. You can then be sure that your brew will be as fresh as the day it was bottled.

—George Nabbie



Dumping the old truck. Soon to be absorbed by bugs?



## CONTINUUM



Where has all the Martian atmosphere gone? According to one theory, the red planet's air may have been stolen by rocks with a taste for carbon dioxide.

### MARTIAN ROCK SCENE

Four billion years ago Mars had a carbon dioxide atmosphere up to 20 times thicker than Earth's. At least that's what many researchers believe. Today that ancient atmosphere is trapped in the red planet's soil.

This is one scenario to explain the recent discovery of the mineral scapolite on Mars. Scientists at the University of Arizona estimate that it accounts for 10 to 20 percent by weight of the soil on the Martian surface.

Scapolite constitutes about one-tenth of the earth's crust. Certain compositions of this mineral incorporate carbon dioxide in their structure. If Mars once had a thicker carbon dioxide atmosphere (its present one is very thin), it's possible that the gas was locked up during the mineral's formation, says Robert H. Singer, associate

professor and director of the university's Planetary Image Research Laboratory. On Earth, carbon dioxide is locked into coral reefs, algae, and seawater; the gas is then released into the atmosphere via volcanic eruptions and other geological processes. Because Mars is a relatively stable planet, however (lacking movements such as plate tectonics), the carbon dioxide wouldn't get recycled, says Singer.

The abundance of scapolite present on Mars varies—from less than 10 percent to as much as 30 percent of the Martian surface, depending on the region.

—Dorena Pine

"Many studies have discovered a close link between prejudice and 'paternalism.' Extreme bigotry is almost always super-paternalism."

—Gordon W. Allport

### EVILS OF PRESCHOOL

Some parents throw their toddlers into preschool programs so their children will learn to socialize with others as quickly as possible. But according to one psychologist, this approach could backfire.

Lawrence Harper, professor of human development at the University of California, Davis, found that young children who weren't comfortable with adults did poorly in school. During his ten-year study of preschoolers, he watched how kids played—who was more kid-oriented, who preferred adults—and then tracked their school careers. By the time they reached third grade, children who had preferred to spend more time with adults had better academic records. Students who were kid-oriented scored lower on state achievement tests.

The key was how the students related to their adult teachers, Harper says. For this reason, preschool programs that are too child-centered might not be good for certain disadvantaged kids, including those whose parents work full-time. "Latchkey kids need to get in the habit of looking to adults for direction more than they need social skills," says Harper. If the end product is well-educated people, he says, maybe we should concentrate more on getting kids to pay attention to those teaching them rather than to those hanging out with them. —Henry Wouk

"If you want a picture of the future, imagine a boat sailing on a human face—forever."

—George Orwell

"To die for an idea is to set a rather high price on corporeity."

—Anatole France



Kids without adult interaction don't make the grade.

## ULTRASOUND SUSHI

*Alloporichthys* of sushi-obsessed Japan have unappetizing stonies of gruesome little worms in their raw fish. But if a team of scientists from the United States, Britain, and Iceland has anything to say about it, these sushi scares may someday become a thing of the past, thanks to the wonders of ultrasound.

The normal method of inspecting saw fish, which usually takes place during the filleting process, is to lay the filets out on a translucent table with a light shining from underneath and simply eyeball the fish for worms. But, says Cornell University,

food scientist Seyed Rizi, this visual inspection will miss any larvae embedded more than one fifth of an inch deep, meaning that as many as 25 percent of the worms may escape detection. When Rizi and his colleagues scanned a sample of cod fillets with ultrasound (which doesn't damage or otherwise affect the fish), they found every single larva, including some buried nearly an inch and a half in the meat.

Ryan says that it will be several years before ultrasound inspection can move out of the laboratory and into large scale commercial operation, ultrasound equipment being very expensive.

save—ranging from \$12,000 to \$250,000. But he can loanse a clay when ultra sound scanners will routinely check fish for worms in fisheries, restaurants and yes—even sushi bars. “Unless more economics of technology comes along, flow stays sooner or later they’ll probably go for it,” Bill Lawson

"No witchcraft, no enemy action had silenced the rebirth of new life in this stricken world. The people had done it themselves."

—Rochester, Canada

"Nature uses as little as possible of anything."

— ADVANCED KITCHEN



Gathering debris half or up  
with high octave

## GAS ATTACK FOR GALLSTONES

The newest treatment for gallstones is an additive used in gasoline to enhance octane. A doctor at the Mayo Clinic in Rochester, Minnesota, has successfully used methyl tert-butyl ether to dissolve gallstones. The additive was injected by a long needle into the abdomen, through the liver, and straight into the gallbladders of 75 patients. (The gallbladder is an expendable storage sac for digestive juices.)

In 72 cases the stones dissolved in 24 hours. The patients went home in one to three days and spent about a week recuperating. Surgery, by comparison, requires a week in the hospital and six weeks of recuperation. The methyl-tert-butyl ether, which is harmless, works by attacking cholesterol, which accounts for about 80

percent of gallstones. The chemical treatment does not dissolve calcium gallstones which account for the remaining 20 percent.

The new treatment, which is awaiting FDA approval, was developed by the director, Johnsen L. Thistle. He believes the ether therapy could help half of all patients requiring gallbladder surgery. Gallstones, which form when the liver puts too much cholesterol in the bile, often causes discomfort. About 16 million Americans, 526,000 of whom had their gallbladders surgically removed in 1987.

—George Nobile

"The trouble with being punctual is that nobody is there to appreciate it."

—Franklin P. Jones

Laziness is nothing more than the habit of resting before you get tired."

—Julius Heyward



As the world's largest, the world's most powerful, and the world's most innovative, for that matter, IBM is a company that is always looking for ways to improve itself.



## CONTINUUM



*If you dig deep enough in San Francisco you'll reach China—or at least pieces of China and other Asian artifacts.*

### PIONEERS UNDERFOOT

Chinatown is as much a San Francisco landmark as the Golden Gate Bridge. Little is known, however, about the people who originally settled that part of the city. Now Berkeley, California, archaeologist Allen Pastron thinks his recent discovery of one of Chinatown's original buildings reveals how the untiring Chinese pioneers lived.

Pastron, who heads Archeo-Tek, an archaeological consulting firm, was asked to investigate a downtown site in San Francisco's financial district to make sure no historic sites would be damaged by the construction of a new building. After

drilling a series of holes he struck pay dirt: a Chinese general store from the Gold Rush era. "It's not a total surprise that we found a building buried there," he notes. "But we never expected to find this quality and quantity of stuff."

More than 100,000 artifacts—including delftware, remains of food in ceramic vessels, toothbrushes, opium pipes, and gaming pieces—have already been removed from the site, and many more articles can be seen poking up from the dirt. Ninety-five percent of the items are broken, but many are so well preserved they can easily be reconstructed.

So far a 20-foot-square portion of the store, about half

of the structure, has been unearthed. Although ash was found on the building's redwood plank floors, Pastron says it was probably dynamite and not fire that destroyed the store. "It was on the edge of a district where buildings were dynamited to stop a fire in mid-1951, the year the store was destroyed." —Sherry Baker

### DONATED ALLERGIES

Bone marrow donors can give the gift of life to patients suffering from leukemia, aplastic anemia, and congenital immune system deficiencies. But researchers have recently documented that donors can also give bone marrow transplant patients something else—unwanted allergies.

William Henderson and Jen Agosti, both allergist/immunologists at the University of Washington, and Lawrence Lum of the Medical College of Wisconsin screened 12 bone marrow recipients and their donors for allergies with questionnaires and skin tests prior to surgery. According to Henderson, when the 11 surviving patients were retested a year after transplantation, about half of them were newly allergic to the same substances that had caused their marrow donors to sneeze, scratch or wheeze. "Seven of the recipients either acquired or had an exacerbation of hay fever, and two who had never had asthma developed that condition," he notes. "A couple of people developed hives, and one patient developed a hypersensitivity to

nickel. His donor had a contact allergy to jewelry containing that metal."

But there was good news for two allergic patients who had received bone marrow from nonallergic donors. "Although they had positive skin tests before transplant," Henderson reports, "after a year they had lost their allergic reactivity."

Lum explains that the transplantation process involves first wiping out a patient's immune system by destroying bone marrow with radiation and chemotherapy. Then donated bone marrow is used to generate a new, healthy immune system. "The entire immune system that develops in the marrow recipient is of donor origin," he says. "We have long known that we can sometimes transfer altered immunity—like an autoimmune dis-



*Transplanted allergies are nothing to sneeze at.*



base—as well as transfer normal immunity. So I'm not surprised that allergies, or a lack of allergies, can also be transferred."

Patients facing bone marrow transplants are so seriously ill that the risk of acquiring allergies from a donor's marrow is a small price to pay for a potential cure. Lum points out, "But knowing that allergies can be transferred could head off potential problems. 'The recipient's immune system doesn't make it back for at least a year to the point where we feel they can safely go out in public without a mask and we are constantly looking out for infections and relying on antibiotics.'" Lum relates, "If a donor was allergic to penicillin, we can predict the recipient from a serious reaction to that drug."—Sherry Baker

## HOPE FOR HICCUPS THAT JUST WON'T QUIT

All those folk remedies notwithstanding, two neurologists at Walter Reed Army Medical Center in Washington, DC, think they may have come up with a cure for hiccups—at least for some people. It's a drug called nifedipine, a calcium channel blocker, which reduces calcium absorption by tissues in the brain. Nifedipine is now commonly used to treat migraine headaches and control high blood pressure.

This drug helped relieve two of seven chronic hiccups sufferers studied by David C. Lippes and Bahman Jabban. That's a small test group which they hope to expand



*A stable conundrum: When equines are given a choice, they prefer the light side of the stall and are willing to take matters into their own hooves, without any horsing around.*

one day. But as Jabban says, "These are not people you meet every day. They hiccup day in and day out for weeks or months."

It is Jabban's theory that inappropriately high levels of calcium absorbed by certain brain tissues may trigger hiccups, an involuntary spasm of the diaphragm that snaps shut the glottis (the space between the vocal cords) in midbreath, causing the short, sharp sound. Taken orally, nifedipine halts the absorption process. Jabban believes it may also help epilepsy and prevent strokes. It's thought that excessive calcium absorption during seizures and strokes causes much of the cell damage.—George Nobbie

## BRIGHT NIGHTS, HAPPY HORSES

Next time you bet on a horse, you might want to ask if your favorite sleeps with the light on. Horses studied at Cornell University regularly turned on lights in a dark barn when given the chance, says Cornell veterinarian Katherine A. Houpt. While treating equine behavior problems, Houpt noticed that a few horses became unusually aggressive in the dark. She and her husband, Richard, an animal physiologist, decided to see what conditions horses preferred.

They put several horses in a windowless barn and arranged the lights so the horses could turn them on for

a minute by passing through the beam of a photobell inc. cell. The horses quickly learned the trick and switched the lights on at all hours of day and night.

Houpt is not surprised. Obviously horses evolved to live outdoors, where the moon and stars make nights much brighter than in a dark barn. She adds, "Some horses display claustrophobic behavior as well, and providing some light seems to better serve their welfare."—Jeff Hecht

*"Remember that the most beautiful things in the world are the most useless: peacocks and Nee, for instance."*

—John Ruskin



# CONTINUUM

## VIDEO RÉSUMÉS

A standard printed résumé suggests little, if anything, about how a job candidate talks, acts, and looks. But now there is a video résumé giving a prospective employer the chance to see up the person before the interview takes place.

Advantages? An employer can judge how well personalities will mesh before subjecting himself or the applicant to the pressure of a face-to-face interview. Just pop the video résumé into a VCR.

It's also advantageous for the job seeker. Paper résumés screen you out. Video résumés get you screened in, "says John B. Kelmian, president of Res-A-Vue, a video marketing company in Connecticut. "You can really put your best foot forward—no interruptions, no smoke blowing in your face."

Video résumés run about five minutes and cost from several hundred to several thousand dollars. To prepare one, a job seeker tells about his abilities and ambitions before a studio camera. The tape is then edited, complete with on-screen titles and background music.

The video résumé can be used to illustrate skills that might seem unimpressive on paper. For example, a human resources vice-president prepared a video résumé in which he performed magic tricks. It was shot on location all around the country. The cost: \$12,000. In another instance, a scientist out to land a promotion gave a video to his boss to prove he



What's your best? Your prospective boss may question your career history by popping your résumé into the VCR.

was management material. Says Lise Christensen, a public relations executive who recently found a job by using a video résumé: "Employers got to meet you without actually meeting you. You have an edge over anyone with only a piece of paper." —Robert Brody

TV—chewing gum for the eyes.

—Frank Lloyd Wright

## IT'S A MAD, MAD WORLD

Freudians find the explanation in the unconscious; behaviorists blame it on conditioning; and some psy chatrists say it's all a matter of genes and neurochemistry. But the real reason some people act in bizarre fashion, a new theory claims, is simply that they choose

to do so. And the rewards may be high.

Take, for example, the case of the woman with chocolate phobia. Soon after her mother died, this unhappy married woman gradually grew terrified of chocolate. She is a textbook case of what psychologist Yacov Role calls psychobizarreness. Rather than suffer the depression that enveloped her following her mother's death, the woman turned her attention to a bizarre avoidance of chocolate. Preoccupation with her symptoms brought her relief from mourning and may have saved her from suicide.

"Individuals choose bizarre behavior when they have no other means of coping with unbearable stress," says Role, who teaches at Washington University in St. Louis and at Bar Ilan University

in Israel. "The result is that the individual alleviates stress by engaging his attention elsewhere." Role discusses his psychobizarreness theory in a new book called *Repression and Fear: New Approaches to Resolve the Crisis in Psychopathology*.

Truly bizarre behavior is rare, Role asserts, and also fundamentally different from more common fears, such as fear of going to the dentist or fear of flying. As such, it calls for a different treatment. Role uses a combination of techniques to help the patient recognize the need for the bizarre symptoms, then offers tools to cope with this problem.

Role views the behavior typical of schizophrenia as the most extreme example of psychobizarreness, followed closely by agoraphobia (the fear of going out anywhere), obsessive-compulsive disorders, and multiple personality.

Usually people who choose bizarre behavior consider the monetary factors, Role adds, citing the case of a man who withdrew from social contact and avoided leaving his home—except to go to and from work. Psychobizarreness theory thus explains why agoraphobia is uncommon in men. Role reckons it's simply too costly for them, whereas women have traditionally been able to afford being housebound. —Davis Sobel

"Medicine, the only profession that labors incessantly to destroy the reason for its existence."

—James Bryce

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# ARTICLE

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# CITYSCRIPTS



"All cities are mad, but the madness is polite. All cities are beautiful, but the beauty is grim," wrote Christopher Marley. All cities evoke similar feelings: excitement, ambivalence, wonder, a high that

comes from so many contradictions, amazement at why the city runs, awe at the city dweller's resilience—and always sensory overload: fashionable ladies stepping out of black stretch limos, car horns, fragrant cleaner buses, half-naked beggars with outstretched paper cups, ambulance sirens, skyscrapers, photo shooters, stretched roofs, flashing neon signs, cathedrals, sides, museums, the call to prayer, babies in prams, rotting garbage, gardenias, dog shit, pigeons, rimes, parades, litter, three-piece suits, skateboarders, cacti, bicycles.

We've heard many dire predictions that our cities are in the throes of death, dying—from overcrowding, traffic, smog, crack, pollution, lack of money for basic



870819



Today's cities face the future (pages 50 and 51, clockwise from far right): London, as seen from the

Underground, Moscow, and Sydney. These pages: Beijing (left), London (below), Hong Kong.



services. Yet as we near the year 2000, so the experts tell us, more of us are going to head for urban areas. Nearly 75 percent of the world's population will live in cities by the turn of the century.

With that daunting prospect in mind, *Owens* contributing editor Merton Long traversed the globe to speak with a host of distinguished writers—Paul Theroux, Anthony Burgess, and Manuel Puig among them—about the future of our planet's cities. What will life be like in 50 years? Not all, however, choose to dwell on futurist projections. Some of our celebrated authors—there're 20 of them—describe the glory of past eras or dwell on the present. Octavio Paz sent a poem: "I speak of this city built by the dead ... the city I talk to when I talk to nobody ... of innocent tribes that camp in empty lots ... of the moon in the television antennae ... of the longed-for encounter with that unexpected form with which the unknown is made flesh."

Why talk to writers? Why not interview city planners, architects, mayors? "Writers," Amin Bazarak (LeRo Jones) once said, "are the antennae of the race." Writers in every age have been fascinated with



cities, seeing in them a reflection of the strengths and shortcomings of our "advanced" values and ways of life. As you explore these vastly differing cities—from Berlin to Moscow to Chicago—enjoy the visions, flavors, and styles of our authors' earthly odes, and while you're there, inhale the cities of their imaginations.

## THE FUTURE

**Beijing** The first thing that everyone notices on entering Beijing—and this has been true since about the year 2015—is the perimeter fence, called The Small Wall (Xiao Cheng). It entirely surrounds the city and seals it. It's full of gates (they use the old word *weng* for these checkpoints). No one gets into the city without permission, a so-called citizen's pass or resident's permit. Every resident has an ID number. The perimeter wall, which is square (each side is 14 miles long), was built after a series of devastating famines in China and the subsequent influx of people to the capital. For a while Beijing was faced with riots and rioting until residence was controlled by mass deportations—to the countryside, which is

still poor and picturesque, and to other walled cities, the largest of which is Chongqing, a city of 30 million.

Other strange sights in Beijing are the 60-foot water pumps, some shaped to resemble drum towers or pagodas. There is no other source of water in the city; the lakes are gone. Kun Ming Lake in the northwest and Diagon Lake in the southeast are both gardens. Water is available for residents for one hour in the morning and one hour in the evening. Available is a euphemism. Since everyone turns faucets on at once, some people never get it. In fact, faucets are always left open in the hope that water will come out.

The best place to live in Beijing is the so-called Foreign Sector, which is subducted into American, Russian, Korean, and—largest of all—Japanese. It is rumored that the Japanese have resettled millions of elderly Japanese in the Chinese countryside in walled communities. Certainly most of the banks are Japanese, and many of the signs are in Japanese and English. The presence of these wealthy foreigners often makes the Beijing citizens to test, but the mobs are bru-

tally put down by armed police.

Because of the foreigners, who constitute 11 percent of the population (and hold 87 percent of the wealth), there is always food in Beijing, always work, and fewer shortages than elsewhere in extremely poor China. Ironically, poor Chinese try to get into Beijing to get an exit visa or to gain entry to a foreign country. Millions of people wish to emigrate—to America and Australia—but without money or influence it is almost impossible.

After tea swept through the Forbidden City in 2009 it was rebuilt on a small scale. Little else remains in Beijing that looks specifically Chinese: a few pagoda roofs at the university, some self-consciously reconstructed streets of shops selling souvenirs, the interior of some of the casinos and restaurants, the decor of the brothels in the Foreign Sector.

The rest is an immensity of dusty buildings of uniform height (20 stories is the limit because of the water shortage). Brick buildings that were put up as recently as 1990 are already beginning to crack and collapse. By degree Beijing buildings—most tenements—are pulled down and

# RATING METROPOLIS

## HONG KONG

- Population, 1985—5.13 million; 1991—5.44 million; 2000—6.08 million.
- 52 girls you can amuse with a ride, catcher at a hospital, and dressings for the wound.
- Where to hang your suit, any one of 31 new hotels being built today.
- Not a lot of clean space. Horses from the Jockey Club exercise on the roof.
- Go ahead, by a bet, everyone else goes. About 21 million is wagered on each of eight races, twice a week.
- For news junkies: 40 Chinese and 25 English newspapers.
- You think you've got real problems? Hong Kong got some of the highest rents in the world here.

## NEW YORK

- 1985—15.64 million; 1990—15.65 million; 2000—16.10 million.
- So who lives here? More Italians than in Rome, more Jews than in Jerusalem, more blacks than in Nairobi, more Irish than in Dublin, more Puerto Ricans than in Puerto Rico.
- What's in a name? Manhattan is a "poverty land."

## TOKYO

- 1985—19.04 million; 1990—20.52 million; 2000—21.32 million.
- Early boom: With 1.4 million people in 1758, Tokyo made other cities look like whistle stops.
- Perched in: Too many people live in spaces less than 270 square feet.

## SYDNEY

- 1985—3.78 million; 1990—3.79 million; 2000—4.06 million.
- It's all in the game: 730 boms landed in Sydney in 1/88.
- What if they don't build a prison?
- Yikes! Do something with that raw sewage you're dumping offshore.

## BUENOS AIRES

- 1985—10.76 million; 1990—11.58 million; 2000—13.05 million.
- So you're a well-respected shrink. Where ya gonna live? "Via Freud," of course.
- No rest for the weary: All public structures "intoxicant." None of them used well.
- Big Brother's been around for 30 of the last 50 years.
- Darkness at noon and other nonpower-off times: If it's not another power shortage, then another spotlight blow—and there's no money to replace the bulbs.
- For other great bits of gardenias.

## LOS ANGELES

- 1985—10.05 million; 1990—10.47 million; 2000—10.93 million.
- Hey, gings, how's it feel to be a minority? When 2070 rolls around, whites will be outnumbered by blacks, Asians, and Hispanics.
- Where are the sidewalks? Not a one, not if you're in a "minor" neighborhood.
- The new Beverly Hillsites: Forsters. They own most of the Hills.

## MOSCOW

- 1985—8.97 million; 1990—8.39 million; 2000—10.11 million.
- They're taking about six machines all over the country. If they do that, there's a big neighborhood.

—Harrison Salisbury

## PARIS

- 1985—8.08 million; 1990—8.75 million; 2000—9.78 million.
- Big budget: the biggest cultural budget in the world.
- Who's moving in next door? Probably blacks from the Antilles and Africa or, maybe Arabs from North Africa.
- Great deal: If you've got a phone, you've got a PC.
- And what do you do with that PC? Or do dinner, drink a few thousand, no sense a salad on the Marnick's Express, or cruise someone.

## CHICAGO

- 1985—6.84 million; 1990—6.89 million; 2000—6.95 million.
- Power to the people: one of the most politically powerful black communities in the USA.
- Multiple choice: Chicago means a "great and powerful" b. "wild and" c. "stark" d. "hot (and) Rights in conflict: Remembrance Market Square, Al Capone, the 28, Valentine's Day Massacre, a romp in Grant Park in 1968, and just a few of those bitter labor disputes.

replaced with Japanese steel-and-glass prefabs. But a dreaminess settles over them almost as soon as they are erected. The windows are never washed. On many nights the city subsides into darkness as a power cut takes hold. This is especially dreaded among the millions of subway passengers because it often means a long delay sitting on a stalled train belowground. The sinister aspect of the power cut is that they are usually an occasion for some sort of antiriot or antiterrorism violence—the riots always take place in complete darkness.

There is a nervous excitement about living in Beijing because it is so hard to enter and just as hard to leave. It is an island of relative prosperity in an impoverished country. And there are dangers—street gangs, the black market, drugs, muggings and a brisk and bewildering trade in foreign passports. But the metropolitan fever makes up for the inconveniences and indignities the tiny, expensive rooms, the suffocating crowds, the aggressive policing, the ready foreigners, whose cars are everywhere.

Television is the great recreation: the numerous satellite channels, the education and language channels, which fill the Chinese with a desire to leave. Every Sunday there are the televised executions—the weeks' wrongdoers killed in close-up with the bullet to the back of the neck—the name and the crime of the victim spoken in a voice-over.

It has not rained in Beijing for nine years.—Paul Theroux

**Hong Kong** The city limps along, searching around for some means to earn a living. At one time Hong Kong grew so fast because it provided an outlet, a valve for China, but when it no longer fulfilled that role, it stopped growing. The future which seemed more or less limitless is by no means limitless now. On the contrary, Shanghai, Hong Kong's rival and the great magnet for Chinese talent and money, easily outclasses Hong Kong, a stagnant backwater.

After 1997, as China became more capitalist, the money went to Shanghai, even though Hong Kong had the infrastructure of modern finance and China didn't. Today, in 2040, the maelstromic competition is incredibly fierce in China because the Chinese market is vast, a market capitalists scarcely dream of capturing. Hong Kong capitalists want that market. But the Chinese magnates of Hong Kong aren't loyal to Hong Kong. Why should they be? They're Chinese with roots on mainland China. Many of them come from Shanghai. They're taking their money, drive, vigor, and plants to China, migrating out of Hong Kong to Shanghai and up the Pearl River to Guangzhou [Canton], where the chances are best.

So Hong Kong is searching for an identity as a place of pleasure for the international community, a duty-free shop,

a gambling place, a place to eat very well. All the Western forms of art are practiced in Hong Kong, far more than within China or Taiwan. In its decadence, Hong Kong is a meeting ground for artists, writers, producers from the East and West. A rather happy conclusion.—Jim Morris

**Delaware, Hong Kong, 2040** Architects and city planners are reclaiming vast areas from the sea, building skyscrapers where the water once was. Freeways lie on top of freeways, and roads on top of roads. They have lots of "flyovers," passages one on top of the other for vehicles and pedestrians. And the shopping malls are indecently huge. The island grows however it can, sideways up higher, further into the sea, underground.

The city serves as a model of how to deal with problems of overcrowding, housing shortages, and overpopulation. Architects have found ways of building houses, schools, offices, hospitals on

Water is available  
for one hour in the morning  
and one hour in  
the evening. Some people  
never get water.  
In fact, faucets are left  
open in hopes  
that water will come out.

land that would be considered useless in any other part of the world. If the technology is developed, you will see Hong Kong urban areas float on the seas or built on space platforms.

And they are great gamblers. They gamble at the drop of a hat. With more defensive computerization, new fads and more sensational forms of gambling spring up. At the moment the racetrack is the only form of gambling that is official and legal. The Hong Kong racetrack is the richest and most expensive gambling joint in the world.

Hong Kong is the center of the world literally and figuratively. China is the center of the earth, you know, and when you are in Hong Kong, you are in the very belly button of China. The most exciting place on Earth. Hong Kong is a place of unbelievable opportunity for anybody of any nationality, but particularly for the Chinese. It is a capitalist society where there is no floor beneath you that can sink and there is no roof. It's a free port. If you make any money outside of Hong Kong, it's tax free. Everybody is there because it's a place where people can say to gov-

ernments, "Leave me bloody alone." Everybody is excited, everyone wants to be in business. People scream, shout, pack it in, make money. They live the life of Riley.—James Clavel

**Tokyo** The big factories and warehouses along Tokyo Bay moved away from the city and the bay is now devoted to recreation and cultural purposes. Skyscrapers don't dominate the city. New transportation systems are fantastic: bullet trains, mainly driven by linear motor systems, and subways that run more than 150 feet under the ground. Tokyo is a great international city and an important center of the global society. Tokyo and New York are connected by efficient, rapid, highly technological networks. And Tokyo is a more friendly city station in east Asia. People who visit Tokyo say that even though it is an agitated city where everyone is constantly on the move, it is a city with a peaceful, tranquil sense—a mysterious quality. Even the look of Tokyo has become more like this river quality, a much more beautiful place.

The character of the Japanese people has changed. After rapid and fierce economic growth in Japan, many people became aware that economic victory is not the final human target. They looked to develop rational values with people from the West, mainland China, and Africa. The great material competition and effervescence of the late twentieth century ceased.—Sakyo Komatsu

**Sydney** The chief problem of the world in 2040 is overpopulation. There are simply too many people and very certainly too many in certain parts of the world like Japan, resulting in vast cultural upheavals and mass migrations. The history of the human race has been mass migration, and why should that stop? When these mass migrations take place, people don't settle in and deserts or frozen wastelands. They settle in cities.

Sydney becomes bigger and bigger and bigger. Sydney however, has adapted to the future with less trauma than other cities because it does not have a long conformist tradition or a long cultural heritage—an attachment to custom you find in, say, a city like London. Australians are some of the hardest people in the world, tough, very tough, hardy, cynical, unimpressionable qualities that resemble the land. The people and the land are one, and that goes for city dwellers as well as country folk. Australians are not guilt ridden any more than the Australian land is. They are not soft any more than the Australian land is.

Australia began as a convict settlement, a dumping ground. The country was founded in pain. There was great loneliness. It wasn't glorious—no milk and honey, no promise of streets paved with gold, no dream of a better place to live. But the country is still wild and magnifi-

cent, hardened earth, jungles, cliffs, a desert as red as blood, blue trees, purple distances, rainbows, water that's clear and placid, and seas upon seas of seemingly impossible flowers that need only a little rain to bloom in absolute perfection—Colleen McCullough

**Moscow:** [The author bases the following scenario on the proposition that Gorbachev remains in power and his plans for modernization succeed.] In the year 2040 the Soviet Union remains a major player on the world stage. Its population, industrial weight, and military strength assure its position. Moscow is a genuine futuristic city, not firmly large, surrounded by satellite cities with electronic methods of conveying people from place to place. Most of Moscow has been bulldozed. They just shook the housing rubble bit and it all came down. Easy job. Then they constructed permanent buildings, squirting cellular or tubular buildings out of a giant gun, using the most modern kind of preformulated materials. They saved the Kremlin and what they call the inner circle—the very oldest buildings—as a historic district to remind people of what things used to be like. No automobiles are allowed in the inner city. Instead, people travel in small cabins, like transit elevators that run along the highway. Everything is done by computer. Get up in the morning and punch in the day,

appointments, where you're going to have lunch, what you want for supper, who you're going to go to bed with. The rest of the day you are automatically transported through these different maneuvers. Housing is self-cleaning. The people eat sausage stuffed with vitamins and nutrients. A hunk of sausage in the morning would last all day. They go in for that kind of stuff. Hombie, isn't it? No ham and eggs.

A dictator with preeminent power still controls, imposing a pattern on the city and on the life of the people. The capitol the real operating head of the Soviet Union, is no longer in Moscow but in the country, a rural section with parks, fountains, and old-fashioned stuff surrounding it. Inside, however, one great computer runs the country. Everyone has a number. The government controls population by computer—precontrolled birth control. If they want more of one personality type, they punch it in, automatically releasing a certain number of people to have children.

National ethnic tensions are a serious problem, and they're increasing. It's hard to say how this issue will resolve itself, but if it goes too far, the country could just blow up. I don't think it will go that far, but it could. It could. There's nothing people get sorer about, more stubborn, or fight more about than national differences.

—Harrison Salisbury

**Moscow:** Gorbachev wants the Soviet Union to be a real power in the twenty-first century by the time the twenty-first century arrives. If the political and bureaucratic hierarchy allows the forces of reform to grow, then the Soviet Union will look and feel different when the twenty-first dawn. My hunch is that the Gorbachev crowd and the forces of history are on our side, not on the side of Marxism-Leninism, and that it will work that way. By the year 2000 the living standards of the Soviet middle and upper middle class in big cities are going to be closer to that of the West. Gorbachev may eventually generate high-speed motorists connecting Moscow with its suburbs. He may set up international trade centers. Eventually, parts of Moscow, isolated enclaves and centers, will look like parts of New York, London, or Paris, but about 20 percent of the population will live in communal apartments or literally even in log cabins around the circumference of the city.—Hedrick Smith

**Berlin:** In the summer of 2041 the Society for the Preservation of Historical Berlin calls a conference on the fate of the Berlin Wall. The Futurist faction of the Socialist Party wants to raze the old monument as a useless remnant of an unhappy age, while the conservative Ecological Party desires to preserve it. The Wall, they point out, no longer divides the city, having been permeated by 22 decorative passageways, each crowned on both sides with a letter of the Hebrew alphabet (a memorial tribute to the early twentieth-century Jewish residents of Berlin), nor does it offend by sheer ugliness as it used to. A committee of artists has covered the white surface with the world's largest mural, a mosaic depicting the undulating bodies of two fire-breathing snakes—emblems of the twin enemies who once held each other at bay in the divided heart of a Europe in conflict with itself. The faculty of Berlin's renowned Akademie für sozialpsychologische Studien also supports the maintenance of the Wall on the grounds that it symbolizes the importance of boundaries as well as openness in social relations. If you ask people in the streets for their opinion of the Wall, however, most of them think you are referring to the huge bulwark lining the Baltic and Atlantic coasts to stave off the seas swollen by the steady melting of the polar ice caps. That is a wall worth talking about. It is a feat of engineering making the pyramids, a guarantor of safety—at least from the sea—for the whole of United Europe, with its five capitals, of which Berlin is one.

When the old political boundaries were dissolved in 1992, East and West Germans were thrown into each other's arms and the reaction did not always resemble an embrace. Tensions gave rise to wild fights, even murders, all over the country and especially in Berlin, the epicenter of





East-West hostility. Berliners still remember the Wallfall celebrations of 1989, a bloody three-day battle between the residents of the formerly "Eastern" district of Pankow and the formerly "Western" district of Wedding.

By now Pankow and Wedding have forgotten their differences and even their names. Their combined area is called Alt-Berlin and has become a kind of living museum where visitors come to experience the past. There they sit in their old-fashioned pubs, the aging remains of a proletariat that has lost its economic foundations, singing and wisecracking in their quaint, clipped dialect. The country is being run by machines, which these men and their wives do not understand, and the rest of the city has not only grown out of all proportion but has changed beyond recognition.

What was once lost of New York (now sunk below sea level) is even more true of modern Berlin. The whole world comes here to live, to play, to work, to study, even to die—tourists, mystics, hungry emigrants, artists and their fans, playboys, baristas, and especially the students of the new "psychology of global conflict resolution," a kind of secular religion combining theater, chess, science, and a Western version of Taoism. The world is still a dangerous place—any local upheaval could literally tilt the globe on its axis—but at last, in this city that twice declared war on the world, the source of the malady has been isolated in the human heart. —Joel Agee

**Los Angeles:** The family is gone as a unit. It no longer exists. There's no place for it. Kitchens, as we knew them, are no longer built in houses. They are forbidden by the government, particularly during political crises. People eat in communal kitchens, great public kitchens open all the time for everybody but the rich, who eat in small restaurants. And there's bootleg food. When you hear that somebody just killed a steet, say, if you're lucky, you slip in through the back door to get a piece of meat. —M. F. K. Fisher

**Paris:** The "city of lights" has taken its place as capital of the twenty-first century. France's very highly respected position in the Third World, its diplomatic sophistication, centuries-old cultural prestige, advantageous location, and successful experience in decolonization contributed to making it the cultural, political, administrative, diplomatic center of the new order.

In the last decades of the twentieth century and the early decades of the twenty-first century the knowledge industry became more and more important to economic power. The French realized that high-tech innovations were the direction of the future and invested an enormous amount of money in taking workers from the obsolescent old industries like steel or coal

and training them for the new knowledge industries. The French work ethic proved adaptable to change, more adaptable than their English or American counterparts. The Electronic Revolution took hold in France better than the old Industrial Revolution did.

The combination of conservatism and high technology has produced wild innovations—from robots in four-star restaurants to holograms next to the masters in the Louvre. The French are intrigued with new possibilities. Paris is a great city of fads, a place where everything comes and goes. Paris's biggest commitment is to change. Even old people want to know about the latest novel, the latest dance, the latest fashion. After all, the very nature of fashion is that it is always changing, and French taste is formed around that idea of fashion, of mode, of change of habit. It's what makes Paris ineluctable but also very supple.

Cities all over the globe are desper-

*“The whole world comes to Berlin to live, to play, to work, even to die—tourists, mystics, artists, and students of the new psychology of global conflict resolution.”*

ately overcrowded, chaotic, and crime ridden. Paris has become the model city. Governors and planners come to Paris to learn how to manage a city and how to create a unified system that actually works. It is probably the best functioning city in the world. Already a vast sprawl of boulevards, Paris now extends to the English Channel.

The private lives and attitudes of the French are more liberating than ever. The French are still a very atheistic people even though they're nominally Catholics. The average French person never goes to church or ever thinks about it in any way. A lot of themes that are taboo in America are treated here in a playful way. That tremendous force for sexual conservatism in the United States simply doesn't exist in France. The French, as they have always been, are discreet in their public life. They don't show much in public, but poverty on the private scale is much more important to them.

As has been true of any established culture, everybody knows the rules. Social communication is ritualized. They send each other signals that are mutually

comprehensible. This makes for tremendous unity. People from all around the world come to Paris to learn social codes. The negative side of ritualized contact, real rigidity and less creativity. A society like the United States is crazy and heterogeneous but also potentially creative.

There continues to be a radical streak to French thought, however. Intellectual life is innovative in methods of analysis, linguistic theories, or in ways of reconceiving ideas and concepts like social roles. Paris is the place where artists meet each other, a kind of clearinghouse for artists. But of course it's still the fashion capital of the world because there is a uniformity and confidence about French taste that simply doesn't exist anywhere else. The French continue as pioneers, finding new ways to be fabulous.

—Edmund White

**London:** [The following scenario presumes that the world economy, especially that of the United States, survives. "If that budget deficit blows," says the author, "then we all blow."] A socialist government takes for the working class, educates the working class, and transforms the look and the feel of the city. There aren't such massive discrepancies in earnings. Working people have a chance of progressing up through the society. The high wages paid to teachers make it a glamorous job. London is integrated, a city in which people who perform different jobs enjoy equal facilities in the capital. The public transportation system is efficient so people move easily about the city. Architecturally the best buildings in the city have been preserved, and the endless building of office blocks for ivory has been stopped. They looked ugly, the function they performed was ugly.

—David Hare

#### THE PAST

**Buenos Aires:** I dream of a future for Buenos Aires in which life in the city becomes much like it was in its moment of glory in the Thirties and Forties. It sounds crazy; I know, to say in 50 years I want the city to be like it was 50 years ago, but what we had accomplished then in the city was a miracle. It was far ahead of its time.

Argentina was very rich then. The country, especially Buenos Aires, had grown in a way that its population was largely middle class. The country had a very, very high standard of living. And Buenos Aires was a most democratic city. Education from grammar school through college was completely free.

The heart of the town was its show business. We had at least 50 movie houses, fabulous places, and legitimate theaters which functioned all year. Movie distribution was wonderful. Films were subtitled and shown in their original versions because dubbing had never been accepted. Many of our citizens had been born in Europe—in the Thirties there were

Spaniards, Italians, Poles, Russians—and everyone wanted to see films from their countries. We had all kinds of movies from all over the world, not just American films. For example, an Ingmar Bergman film was shown in a film festival in 1953. It was presented without any publicity and became the big success of the season. Bergman was "discovered" with great acclaim in France in the late Fifties.

The theater was glorious—two performances a day, one at six-thirty and one at ten. After La Scala in Milan, the Molit in New York. We had Teatro Colón in Buenos Aires, the third best opera theater in the world. That sounds crazy now, but it was true. European companies from Italy, France, and Britain visited Argentina throughout the year. La Comédie Française stayed for months, performing their whole repertoire. Buenos Aires was a great musical center, and the concert halls were huge—big, big, great places. Buenos Aires was a peoples paradise.

After show business, restaurants and bars also characterized the city. Since we had the vast middle class, there were thousands of decent little places to eat inexpensively and without fear of being poisoned. The other big institution inherited from Spain was a confectionery, a bar with tables where you could spend the whole afternoon or evening over a cup of coffee and just talk. There was a great tradition of meeting at the bar to talk. It was accepted that you could spend the whole night with your coffee, the waiters would not bother you. There were thousands of these places in Buenos Aires.

For the future I would wish the enormous collective feeling of fun that was such a part of life at that time. Buenos Aires had a very, very long nightlife. Nobody, it seemed, ever went to sleep. But people were studying and working like crazy. And whenever you could, you would go to a bar, meet friends, and talk and talk.

Buenos Aires almost had the air of a socialist country. I mean a social democracy, a place where nobody is extremely rich, nobody is extremely poor. There was enough room for personal development and personal initiative. That is what I wish again for my country. At that time, Buenos Aires was really a city for everybody, not just for an elite. Even though it was an enormous city we had a wonderful system of subways. We could circulate it easily and do business easily. The city was ahead of its time. Yes, in those days Buenos Aires was called the Paris of South America. But there was a difference. Most of the beautiful things Buenos Aires had to offer were within reach of almost all of the population. It was a beautiful city of sidewalks and gardens, a city with lots of color, beautiful buildings and houses, a city where you could walk and meet people, where a woman could walk any time at night and nothing would happen to her. I love the Old World type

of human contact. Buenos Aires really was a most peculiar place.

All this is gone. Our economy is a shambles. A military government created gigantic external debt. I don't even know what to call it. And the people must pay it back. The miserable conditions that the military created make it very difficult for a democracy to survive. Today if you know how to talk to hungry people, make promises to desperate people, have the right kind of charisma—oh, a demagogue could win. That is a big danger.

It is a terrifying thing to think about the future, since all my worst nightmares seem to pale in comparison to present realities. But I hope the future brings something very much like Buenos Aires was 30 years ago. How confident am I that such a thing could come to pass in 50 years? I could not say, I would not pronounce myself. I think one has to be optimistic. Otherwise life makes no sense.—Manuel Puig

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● But there was  
no hope of reconstituting  
the three houses  
I had once lived in. There  
is something  
almost surgically devastating  
about the loss  
of one's physical past. ●

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Manchester. "Farwell, Manchester, sadly I depart" is the last line of a song that Bonnie Prince Charlie is supposed to have sung. The occasion was his leaving the city (and a number of pregnancies) behind after a touring drive for the 1745 rebellion. Manchester at that time had just become the queen of the Industrial Revolution. I broke away from Manchester itself when, having taken my degree at Manchester University, I joined the army. At the end of the war, like most of the demobilized, I went where the jobs were. They were in the Midlands and in the dwindling British Empire, not in Manchester. When I became a writer London was the heart of my culture. I said "Farwell, Manchester" in my twenties.

In my later sixties I said, "Hello again." A Belgian television team insisted on my returning to Manchester and, under the eye of their camera, looking for my past. The house in Manchester where I was born had long been demolished. The district of Moss Side, where I had spent my childhood and adolescence, had turned into a green wilderness set with posters promising redevelopment. While

I suffered bemused into one microphone, the Prince of Wales spoke in another for a reconstituted Moss Side. But there was no hope of reconstituting the three houses I had lived in. There is something almost surgically devastating about the loss of one's physical past.

Change, so Evelyn Waugh was always saying, is evidence of life, and we all have to register unconditional surrender to history. But it is hard to be philosophical and unresentful when, on racial grounds, one is thrown out of the Moss Side pub one's father frequented. I was politely or not so, told to get out of what had become a West Indian preserve. Very good—accept change: the Friday call of the museum instead of the Sunday summons of the bells, an Asatru Manchester instead of the European one of my youth.

The cosmopolitanism of the city used to provide its own popularity. The German Jewish element was strong, so was the Italian, and both forced Manchester into being a center of the arts, particularly music. The old city was far from beautiful. Beauty was something to discover in the Free Trade Hall or study in the Whitworth Art Gallery. Much of the old architecture has gone—the Lubbock helped—but the Town Hall remains to remind us of the messy Neo Gothic that was a kind of reflection of the mercantile mind. The progressive conscience sometimes staid in the grim city. But it was primarily concerned with cotton—the proud nickname was Cottonopolis—and engineering. Mercantile enterprise cut a canal to the coast and turned Manchester into a port. Manchester docks for a moment docks read the slogan in the frames.

Change is evidence of life, and some of the changes are good. Surely Deansgate is one of the most handsome shopping streets in Europe. But the more one looks for evidences of urban distinction, the less one finds it in brick-and-mortar solidities. The distinction is all in the people. Mancunians built the industrial world, they are the creators as well as the fruit of international modernity. Marx and Engels—and Engels was himself a kind of Mancunian—wrongly predicted that the communist revolution would spring out of Manchester's industrial strife. They thought in abstractions, ignoring the character of a people whose conservatism could be tempered by idealism but not replaced by political innovation. Manchester's innovations have all been within the cadre of capitalism—railways, seaside resorts for the workers, organizations promoting music (brass bands and choral societies)—rather than strategies of revolt. Mancunians have always been tough enough to accept oppression within limits and to soften the hard life with the amenities they made for themselves: cricket at Old Trafford, the annual performance of *The Messiah*.

We writers from Manchester have shamefully neglected our city, though I



ARTICLE

## BRAINSTORMS: THE WORLD'S TOP THINK TANKS PREDICT THE FUTURE

*From robots to supersonic trains, from intelligent homes to computers that think, professional seers conjure the next 100 years*

BY DOUGLAS STARR

Passengers cross Europe in supersonic trains. Fleets of robot taxis ply the streets of Tokyo. Diphtheria and dysentery wreak havoc in Bolivia. The poor swell the cities of Alaska to apocalyptic size. An African-Soviet spaceship lands on Mars.

To gather these images *Derivé* recruited a team of reporters from around the globe. Working from New York and Rome, Cairo and Tokyo, our correspondents captured tomorrow by interviewing the seers—prominent futurists whose job it is to speculate about the twenty-first century and beyond. For the most part our seers work at think tanks like the Rand Corporation in Santa Monica, California; the Club of Rome; and the Foundation for Israel in the Twenty-First Century, located in Kfar Sava, Israel. Sometimes, especially in Eastern Bloc and Third World countries, these famed professionals are more likely to be found at universities or companies or government bases. For instance, some Soviet predictions came courtesy of the USSR Academy of Sciences. Chinese seers hailed from the Shanghai Academy of Sciences. And we learned about South America from the Institute for Urbanism at the Central University of Venezuela in Caracas and the Institute for Peruvian Studies in Lima.

Our futurists' backgrounds are as divergent as the groups from which they come. Some are economists, some engineers, and some high-tech urban ar-

chitects. We found political science and sociology professors, as well as business tycoons whose livelihoods depend on forecasting world events.

These events will be drastically different for industrialized Japan and impoverished Peru. Indeed, while experts from developed nations talk about soaring into the twenty-first century Jason-style, Third World prophets envision a rise of overpopulation, poverty, and crime. What's more, some futurists and think tanks sew their predictions deliberately to influence the course of world events. A few predict dire consequences in hope that leaders will take corrective steps now, others point to rosy futures, hoping in that way to encourage positive change. One such group is the Amund Hammer Fund for Economic Cooperation in Tel Aviv, which predicts a series of fortunate outcomes if the Arabs and Israelis make peace.

Across the board, futurists said that machines will get smaller—some so small that they can be injected into our blood streams and travel through our bodies destroying diseased cells. Computers will become more common, changing our homes, our businesses, and our schools. No one predicted a nuclear war, perhaps everyone finds such a future unthinkable.

Indeed the us-versus-them world of the United States and the Soviet Union will disappear. In its place will rise a new order of "multipolarity" in which power is

PAINTINGS BY RUDOLF HAUSNER

•Experts from the United States and Japan talk about soaring into the next century Jetson-style, while prophets from Ethiopia and Peru envision a mire of overpopulation, poverty, and crime •

shared among many prosperous nations. At the same time new schisms will erupt between the have and the have-not nations of the world. This was the most distressing—and persistent—prediction that we came across. "It's scary to think about," said one of our correspondents. "While a minority of humanity will live in a high-tech fantasy world, the majority will live in overcrowded, filthy cities lacking basic services." Experts have even coined a name for such cities of the future: apocalyptic megalopolises.

Before diving into specific predictions, we'd like to tell you how futurists work. They don't stare at crystal balls or read the I Ching, nor do they simply make up their ideas. Futurists follow established techniques. Some survey the leading thinkers in a technology to see where today's developments will lead. Others use computer simulations. Some use a method called backcasting, in which they postulate a series of future scenarios, then ask what must take place today for each scenario to happen. Whichever scenario matches today's developments is the one most likely to occur.

Given the diversity of background opinion, and forecasting technique among futurists, we find it impossible to paint a single, unified picture of what the world will become. Instead, we present for your perusal a collection of fascinating snapshots, quick takes of dozens of possible futures as envisioned in Bangkok and Bolivia, the United States and the USSR, Israel and Peru.

The global view that follows is divided into eight universal topics: private lives, technology, communications, medicine, energy, politics, demographics, and crime. The think tanks and futurists contributing to each segment are listed immediately after the thoughts that they helped to form.

#### PRIVATE LIVES

Father: Is our house alive?"

"No, my son," Matsui replied. Such questions from his six-year-old always amused him.

"But it does everything for us. It wakes us in the morning. It has our tea ready by the time we get dressed. It heats up the bathwater without our even asking. Each night it dims the lights."

The lights dimmed as the house responded to the unheralded command. "Lights up," Matsui said. The room brightened again.

"Listen, my son," he said, taking the boy gently by the shoulders. "The fact that something moves does not make it human. It does not become a person just by listening to our commands."

But it knows us," said the boy. "It knows what kind of TV shows I want. It shows you all your favorite movies. It reminds you to call Uncle Hiroshi every week. How can it know this without being alive?"

"That's the difference between a computer and a person," Matsui replied. "A person has feelings. A person has will. A person is not programmed like a computer. A person does something because he wants to."

Matsui smiled as he stepped onto his front porch to get some air. Before he could reach the door, he stopped and looked behind him. "Open," he said softly. As the door opened, he saw his small son listening to his favorite music, illuminated by a pool of light.

**UNITED STATES:** Computers and new materials will alter the American home. Windows will be able to change their visual and thermal characteristics, depending upon weather, temperature, and sunlight. Lights will dim automatically when natural light is sufficient. Most appliances will carry computer chips for optimal operation. The toaster, for example, will never burn the toast. Heating and cooling systems will be integrated more effectively into the zones of the home.

In the baby's room, holographic mobiles will hang over the crib. These three-dimensional laser images will change according to which psychological principles parents favor. If they subscribe to the theory that babies need yellow and green when they first open their eyes and other colors when they are more awake, the mobile will function accordingly. Computer-based monitoring systems will be equipped with moisture, air, motion, and sound sensors as well as cameras. They will detect if the baby is wet, stirring, or crying.—Clement Beckel, Institute for Alternative Futures, Alexandria, Virginia

The twenty-first-century classroom will resemble a high-tech training center with workstations at every desk. Students will generally come and go at their leisure, engaging in self-guided study, hands-on learning, and study groups. When they think they have mastered the material, they will sign up for tests and demonstrate their knowledge. If they pass, they will move on. Instead of age divisions,





about one tenth as much money as a comparable airplane flight.—Hirokazu Nishimura, deputy director for ship development and planning, technology division, Ministry of Transport, Tokyo

"Once voice input technology is perfected, robots will clean the rug, iron the clothes and shovel the snow"—Theodore J. Gordon, The Futures Group, Gastonbury, NJ

#### MACHINE DREAMS

Eye Chief Lawrence stood a few hundred feet from the burning building. He tapped at a keyboard and read the display: **SECTOR TWO ALL CLEAR.**

No sign of them, Lawrence thought. He worried about Costabile and Nelson. The two men inside. The department had sent out its full complement of five fighters: Lawrence, two men, and a fire-fighting robot. They had controlled the blaze, but Costabile and Nelson hadn't come out yet. Burning timbers were collapsing.

"Dammit, come off!" Lawrence said, as he punched buttons on the keyboard. Responding to his command, the robot vehicle rumbled amid the flames. Its probes scanned for life forms. The computer beeped and displayed a new message: **SECTOR THREE TWO ADULTS STATUS ALIVE.** Despite the intense heat, Lawrence moved closer to the building, now fully engulfed in flames. He figured the whole structure would fall in about a minute. Come on, come on.

Just then a robot appeared through the smoke, crunching its way over a collapsed wall. Intermittent shooting fire-resistant chemicals in all directions. Lights flashing, it rolled up to Lawrence and came to a dead stop.

"Thank God," said Lawrence. A door opened in the car-size machine and Nelson and Costabile walked out smiling and unscathed.

**UNITED STATES:** By 2010 when computer components have become significantly smaller, business executives will use the "head office," a supercomputer so compact that it can be put into a headset, complete with voice recognition input, advanced communications technology, and a high-resolution video display. This device will make it possible to obtain up-to-date market information, perform sophisticated market analyses, and negotiate deals from anywhere in the world.

As engineers begin to work on increasingly smaller scales, they will build nanomachines: tiny machines whose component parts are small enough to manipulate molecules. To make nanomachines, molecular engineers will rely on the same processes of molecular buildup that form the machinery of living cells. They will put together pieces of molecules to form molecular machines. These machines can then be used to move and join yet other molecules to form

complex products such as tiny robot assemblers (full of gears, bearings, and drive shafts). A nanomachine consisting of these arms will manipulate molecules the way current-day machines manipulate plastic and metal. In medicine, microscopic power saws will cut away scar tissue inside the human retina. In the environmental arena, solar-powered nanomechanisms will mimic photosynthesis, creating carbohydrate food out of sunlight, water, and air incorporated into the pavement; these devices can remove carbon dioxide from the atmosphere faster than automobiles and human industry produce it.

Scientists will build "neural net" computers that think like people. Today's most powerful computers can "think" only in one direction at a time. This makes them ideal for long calculations but poor for the kind of creative thinking that humans do. In neural net computers, designers will connect hundreds of components in a

● **Microscopic power saws will cut away scar tissue inside the human retina. Tiny solar-powered machines will mimic photosynthesis, creating food out of sunlight, water, and air.**

linkage more akin to the structure of the human brain. The result: a computer that can process laterally as humans do. Such computers will excel at recognizing patterns in voices and shapes. They will be used to control intelligent robots, to direct unmanned aircraft, and to respond to voice commands.—Robert Olson, senior consultant, Institute for Alternative Futures, Theodore J. Gordon chairman, The Futures Group; Clement Bezdok, executive director, Institute for Alternative Futures; Marvin Catron, Forecasting International; Anirpahan, W. K. Eric Greider, Foresight Institute, Palo Alto, CA.

In the twenty-first century robot technology will continue to advance. Borrowing from military technologies, robots will gain in mobility, visual capability, on-board intelligence and weatherproof abilities. These automobile-size robots will have tractor-like treads or spiderlike legs. Their improved mobility will make them useful in farming, housing construction, and deep-sea exploration. Small fire-resistant robots will be sent into burning buildings to fight fires and find survivors, carrying them to safety.

Electricity-conducting glass could be used as a windshield that heats the car. A related material could be used as a glass-topped stove (with a surface as smooth as Teflon) that changes color as it heats.—Joseph Coates, J. F. Coates Inc., Washington, DC.

**EUROPE:** A high-speed rail network will propel travelers across the continent at speeds upwards of 200 miles an hour. The new trains will depend upon high-powered electric motors and smooth nearly curveless tracks. By the year 2000 these trains will connect major travel axes such as Amsterdam-Rome and London-Paris. By 2050 the transit system will operate through a technology known as magnetic levitation, in which powerful electromagnets suspend the train a few inches off the rails while rapidly pulsing magnets placed along the track work to propel the train forward. Magnetic levitation will propel trains forward at hundreds of miles per hour.

Europe's car-clogged cities will eventually ban automobiles within the city. Instead, the visitor will find fleets of public electric cars. He'll enter the car, insert a credit card in a slot for billing purposes, and drive around. At the conclusion of his trip he'll simply park the car at a recharging station and plug it in for the next customer.—Robert H. Pry, International Institute for Applied Systems Analysis, Laxenburg, Austria; Roberto Vacca, Italian professor, mathematician, and futurist, University of Rome.

**PACIFIC RIM:** Inexpensive superconductors that operate at room temperature will transmit, or "superconduct," electricity along power lines with virtually no loss of energy. The increase in efficiency will render electricity vastly less expensive. Computers packed with superconducting components will operate at unprecedented speeds. And by 2050 magnetic levitation trains will encircle Japan inside vacuum tunnels at supersonic speeds. In that same year Japanese taxicabs will operate robotically. To enter a cab, a passenger will first insert a bankcard or credit card; then he will indicate his destination by pressing a computerized touch-screen map. The cab will use stored banks of map data to navigate at high speeds around the city or countryside, avoiding collisions by using radar that emits high-frequency sound waves.—Yoshioho Kyotani, president, Technova Inc., Tokyo; Dr. Shigeru Watanabe, Tokyo Science and Technology College, Tokyo; Satsuo Ikegami, Japan Foundation for Shipbuilding Advancement, Tsukuba, Japan.

Scientists will use magnetic levitation technology along the slopes of Mount Fuji to hurl ships into space.—Yoshioho Kyotani, Technova Inc.

Elevated sky trains, or monorails, will encircle the Thai city of Bangkok, transporting workers to and from manufacturing plants in outlying areas. Ultra-

mately the sky-train system will pave the way for industrializing all of Thailand.

—Sant Sirintha, economic counselor, Royal Thai Embassy, New York

**MIDDLE EAST** The Arab world will lag in technological development because of high literacy rates and a lack of trained personnel.—Mamd El Mandira, Futuribles International, Rabat, Morocco

Israel like other small, educated countries, will adopt many First World technological developments for its own use. The country will find a niche in producing new energy technologies and electronic medical equipment such as the 3-D X-ray machines used for CAT scans.—Baruch Raz, Center for Technological Analysis and Forecasting, Tel Aviv University, Tel Aviv

**SOUTH AMERICA** Due to the richness of the Amazon's genetic resources, some South American countries will develop expertise in biotechnology—the manipulation of plant genes to produce high-yield, high-protein crops. South American researchers will create more productive strains of native plants like yucca, pineapple, plantain, and sweet cucumber. Some nations will apply for patents on the genetic structures of the plants in the Amazon.—GRADE (Group of Analysis for Development), Lima, Peru

**AFRICA** African nations have little hope of developing advanced technolo-

gies in the twenty-first century. Scientists throughout the continent lack money, scientific facilities, and government support. The region suffers from a continuing brain drain due to lack of opportunity for intellectuals and their fear of political persecution.—Economic Commission for Africa, Addis Ababa, Ethiopia

"Technical progress will challenge our morals and values. What do you say to progress in genetics, which is going to challenge our most fundamental ideas: What is a man? What is a woman? What is freedom?"—Hugues de Jouvencel, Association Internationale Futuribles Plus

#### VITAL LINKS

Congressional Record, October 14, 2033

Senator Abramson: The Chair recognizes the senator from Missouri.

Senator Truman: Thank you, Madam Chairwoman. I'm speaking on the matter of Senate bill 13-2031. As you know, we've debated this bill for several weeks now. Furthermore, we've uploaded all the relevant information into the National Hyperlink System, making it available to every American at home.

Voters who have followed this debate on their Home Information Centers now know everything we do. They've had access to all the pertinent polls. They've seen videos depicting outcomes of both yes

and no votes. They've been able to conduct their own economic analyses of benefits and costs.

Senator Abramson: Are we ready for a vote, then?

Senator Truman: I'd say so. I yield to the distinguished senator from Kentucky.

Senator Sanders: Thank you. Now if you'll all watch your monitors, you'll see the vote as it develops. Madam Chairwoman, you're on.

Senator Abramson: Thank you, Fellow citizens. Our computers indicate that you're fully briefed on the issue, so I'll cut to the matter. Please vote yes or no now. Senator Sanders?

Senator Sanders: Our tally is showing a decided trend. With two percent of the tally, our computers predict a yes vote from 27.2 million, or 62 percent.

Senator Truman: What is the exact breakdown?

Senator Sanders: The full vote won't be in for another ten minutes. But projections show it will pass with both Mainstreamers and Ethnics. Also with the Brainworkers. I think we have a mandate.

Senator Abramson: Fine. It's passed. The 2.1 million moon colonists are herewith declared citizens of the United States of America.

**WORLD** Modern communications will give the average person much greater control over his life.





This story is from *The Discoverer*, an illustrated tour into the world the naked eye cannot see. This tour includes ten scientific images accompanied by companion pieces of science fiction.

FICTION

*Almost anything at all  
can happen*

## AT THE RIALTO

BY CONNIE WILLIS

**S**eriousness of mind was a prerequisite for understanding Newtonian physics. I am not convinced it is not a hindrance in understanding quantum theory." —Excerpt from Dr. Godsalter's keynote address to the 1989 International Congress of Quantum Physicists Annual Meeting, Hollywood

PAINTING  
BY KEN JOURDEY



I got to Hollywood around one-thirty and started trying to check into the Rialto.

"Sorry, we don't have any rooms," the girl behind the desk said. "We're all booked up with some science thing."

"I'm with the science thing," I said. "Dr. Ruth Banninger. I reserved a double."

There are a bunch of Republicans here, too, and a tour group from Finland. They told me when I started work here that they got all these movie people, but the only one I've seen so far was that guy who played the friend of that other guy in that one movie. You're not a movie person, are you?

"No," I said. "I'm with the science thing. Dr. Ruth Banninger."

"My name's Tiffany," she said. "I'm not actually a hotel clerk at all. I'm just working here to pay for my transcendental posture lessons. I'm really a model-slash-actress."

"I'm a quantum physicist," I said, trying to get things back on track. "The name is Ruth Banninger."

She messed with the computer for a minute. "I don't show a reservation for you."

"Maybe it's in Dr. Mendocelli's name. I'm sharing a room with her."

She messed with the computer some more. "I don't show a reservation for her either. Are you sure you don't want the Disneyland Hotel? A lot of people get the two confused."

"I want the Rialto," I said, rummaging through my bag for my notebook. "I have a confirmation number W57426."

She typed it in. "Are you Dr. Gedanken?" she asked.

"Excuse me," an elderly man said.

"It'll be right with you," Tiffany told him. "How long do you plan to stay with us, Dr. Gedanken?" she asked me.

"Excuse me," the man said, sounding depressed. He had bushy white hair and a dazed expression, as if he had just been through a horrific experience or had been trying to check in to the Rialto.

He wasn't wearing any socks. I wondered if he was Dr. Gedanken. Dr. Gedanken was the main reason I'd decided to come to the meeting. I had missed his lecture on wave/particle duality last year, but I had read the text of it in the *JGQP Journal*, and it had actually seemed to make sense, which is more than you can say for most of quantum theory. He was giving the keynote address this year, and I was determined to hear it.

It wasn't Dr. Gedanken. "My name is Dr. Whedbee," the elderly man said. "You gave me the wrong room."

All our rooms are pretty much the same," Tiffany said. "Except for how many beds they have in them and stuff."

"My room has a person in it!" he said. "Dr. Sweeth from the University of Texas at Austin. She was changing her clothes." His hair seemed to get wilder as he spoke. "She thought I was a serial killer."

"And you said your name is Dr. Whed-

bee?" Tiffany asked, tooting with the computer once again. "I don't show a reservation for you."

Dr. Whedbee began to cry. Tiffany got out a paper towel, wiped off the counter, and turned back to me. "May I help you?" she said.

Thursday, 7:30-9 p.m. Opening Ceremonies. Dr. Helvend Onofrio, University of Maryland at College Park, will speak on "Doubts Surrounding the Heisenberg Uncertainty Principle" Ballroom.

I finally got my room at two after Tiffany went off duty. Till then I sat around the lobby with Dr. Whedbee, listening to Abbey Fields complain about Hollywood.

What's wrong with Racine? he said. "Why do we always have to go to these exotic places like Hollywood? And St. Louis last year wasn't much better. The Institut Henri Poincaré people kept going off to see the arch and Busch Stadium."

*Dr. Dinan sounded a lot like Dr. Onofrio. I wondered if he might have undergone some strange transformation during his search for room 1262 and was now a woman.*

"Speaking of St. Louis," Dr. Takum said, "have you seen David yet?"

"No," I said. "Oh, really?" she said. "Last year at the annual meeting you two were practically inseparable. Midnight, merboat rides and all."

"What's on the programming tonight?" I said to Abbey.

"David was just here," Dr. Takum said. "He said to tell you he was going out to look at the stars in the sidewalk."

"That's exactly what I'm talking about," Abbey said. "Riverboat rides and movie stars. What do those things have to do with quantum theory? Racine would have been an appropriate setting for a group of physicists. Not like this—the—do you realize we're practically across the street from Grauman's Chinese Theatre? And Hollywood Boulevard's where all those gangs hang out. If they catch you wearing red or blue, they'll—"

He stopped. "Is that Dr. Gedanken?" he asked, staring at the front desk.

I turned and looked. A short, roundish man with a mustache was trying to check in. "No," I said. "That's Dr. Onofrio."

"Oh, yes," Abbey said, consulting her program book. "He's speaking tonight at the opening ceremonies. On the Heisenberg uncertainty principle. Are you going?"

"I'm not sure," I said, which was supposed to be a pike, but Abbey didn't laugh. "I must meet Dr. Gedanken. He's just gotten funding for a new project."

I wondered what Dr. Gedanken's new project was—I would have loved to work with him.

"I'm hoping he'll come to my workshop on the wonderful world of quantum physics," Abbey said, still watching the desk. Amazingly enough, Dr. Onofrio seemed to have gotten a key and was heading for the elevators. "I think he's plotting how something to do with understanding quantum theory."

Well, that let me out. I didn't understand quantum theory at all. I sometimes had a sneaking suspicion nobody else did either, including Abbey Fields, and that they just weren't willing to admit it.

I mean, an electron is a particle except it acts like a wave. In fact, a neutron acts like two waves and interferes with itself (or each other), and you can't really measure any of this stuff properly because of the Heisenberg uncertainty principle, and that isn't the worst of it. When you set up a Josephson junction to figure out what rules the electrons obey, they break past the barrier to the other side, and they don't seem to care much about the limits of the speed of light either, and Schrödinger's cat is neither alive nor dead if you open the box, and it all makes about as much sense as Tiffany's calling me Dr. Gedanken.

Which reminded me, I had promised to call Darlene and give her our room number. I didn't have a room number, but if I waited much longer, she'd have left. She was flying to Denver to speak at CU and then coming on to Hollywood sometime tomorrow morning. I interrupted Abbey in the middle of his telling me how beautiful Racine was in the winter and went to call her.

"I don't have a room yet," I said when she answered. "Should I leave a message on your machine, or do you want to give me your number in Denver?"

"Never mind all that," Darlene said. "Have you seen David yet?"

To illustrate the problems of the concept of wave function, Dr. Schrödinger imagines a cat being put into a box with a piece of uranium, a bottle of poison gas, and a Geiger counter. If a uranium nucleus disintegrates while the cat is in the box, it will release radiation which will set off the Geiger counter and break the bottle of poison gas. Since it is impossible in quantum theory to predict whether a uranium nucleus will disintegrate while the cat is in the box, and only possible to calculate uranium's probable half-life, the cat is neither alive nor dead until we open the

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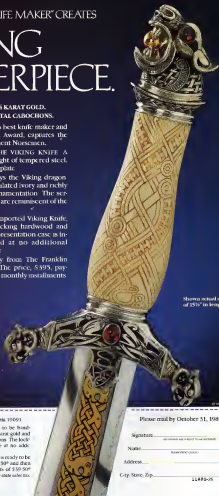
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box—From "The Wonderful World of Quantum Physics," a seminar presented at the ICQP Annual Meeting by A. Fields, Ph.D., University of Nebraska at Wahoo.

I completely forgot to warn Darlene about Tiffany, the model-slash-actress.

"What do you mean you're trying to avoid David?" she had asked me at least three times. "Why would you do a stupid thing like that?"

Because in St. Louis I ended up on a overboat in the moonlight and didn't make it back until the conference was over.

"Because, I want to attend the programming," I said the third time around. "not a wax museum. I am a middle-aged woman."

"And David is a middle-aged man who, I might add, is absolutely charming. In fact, he may be the last charming man left in the universe."

"Charming is for quarks," I said and hung up, feeling smug until I remembered I hadn't told her about Tiffany. I went back to the front desk, thinking maybe Dr. Onofrio's success signaled a change. Tiffany asked "May I help you?" and left me standing there.

After a while I gave up and went back to the red and gold advice.

"David was here again," Dr. Takumi said. "He said to tell you he was going to the wax museum."

"There are no wax museums in Reno," Abbey said.

"What's the programming for tonight?" I said, taking Abbey's program from him.

"There's a mixer at six-thirty and the opening ceremonies in the ballroom and then some seminars."

I read the descriptions of the seminars. There was one on the Josephson junction. Electrons were able to somehow tunnel through an insulated barrier even though they didn't have the required energy. Maybe I could somehow get a room without checking in.

"I was in Racine," Abbey said, looking at his watch. "we'd already be checked in and on our way to dinner."

Dr. Onofrio emerged from the elevator still carrying his bags. He came over and sank down on the sofa next to Abbey.

"Did they give you a room with a semi-naked woman in it?" Dr. Wheelbee asked.

"I don't know," Dr. Onofrio said. "I couldn't find it." He looked sadly at the key. "They gave me 1282, but the room numbers only go up to 75."

"I think I'll attend the seminar on chaos," I said.

The most serious difficulty quantum theory faces today is not the inherent limitation of measurement capability or the EPR paradox. It is the lack of a paradigm. Quantum theory has no working model,

no metaphor that properly defines it.—Excerpt from Dr. Godankon's keynote address.

I got to my room at six, after a brief skirmish with the bellboy-slash-actor who couldn't remember where he'd stored my suitcase and unpacked.

My clothes, which had been permanent-press all the way from MIT, underwent a complete wave-function collapse the moment that I opened my suitcase, and came out looking like Schrödinger's almost dead cat.

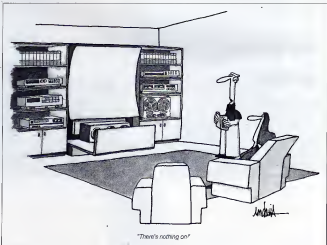
By the time I had called housekeeping for an iron, taken a bath, given up on the iron, and steamed a dress in the shower, I had missed the "Mixer with Munchies" and was half an hour late for Dr. Onofrio's opening remarks.

I opened the door to the ballroom as quietly as I could and slid inside. I had hoped they would be late getting started, but a man I didn't recognize was already introducing the speaker. —and an in-spection to all of us in the field.

I dived for the nearest chair and sat down.

"Hi," David said. "I've been looking all over for you. Where were you?"

Not at the wax museum, I whispered. "You should have been," he whispered back. "It was great. They had John Wayne, Elvis, and Tiffany the model-slash-



actress, with the brain of a pea-slash-smoke!"

"Shh!" I said.

"—the person we've all been waiting to hear, Dr. Ringgit Dinar."

"What happened to Dr. Onofro?" I asked.

"Shh," David said.

Dr. Dinar looked a lot like Dr. Onofro. She was short, spindish, and mustached and was wearing a rainbow-striped collan. "I will be your guide this evening into a strange new world," she said, "a world where all that you thought you knew, all common sense, all accepted wisdom, must be discarded. A world where all the rules have changed and it sometimes seems there are no rules at all."

She sounded just like Dr. Onofro, too. He had given this same speech two years ago in Cincinnati. I wondered if he had undergone some strange transformation during his search for room 1282 and was now a woman.

"Before I go on," Dr. Dinar said, "how many of you have already charmed?"

Newtonian physics had as its model the machine. The metaphor of the machine, with its interrelated parts, its gears and wheels, its causes and effects, was what made it possible to think about Newtonian physics—Excerpt from Dr. Gedanken's keynote address

"You know we were in the wrong place!" I hissed at David when we made it out to the lobby.

When we stood up to leave, Dr. Dinar had extended her pudgy hand in its rainbow-striped sleeve and called out in a voice a lot like Charlton Heston's: "O unbelievers! Leave not, for here only is reality!"

"Actually, charming would explain a lot," David said, grinning.

"If the opening remarks aren't in the ballpark, where are they?"

"Beats me," he said. "Want to go see the Capitol Records Building? It's striped like a stack of records."

"I want to go to the opening remarks."

"The beacon on top blinks out Hollywood in Morse code."

I went over to the front desk.

"Can I help you?" the clerk behind the desk said. "My name is Nakale, and I'm an actress—"

"Where is the IQCP meeting this evening?" I said.

"They're in the ballroom."

"I bet you didn't have any dinner," David said. "I'll buy you an ice cream cone. There's the great place that has the ice cream cone Ryan O'Neal bought for Tatum in *Paper Moon*."

"A charmer's in the ballroom," I told Nakale. "I'm looking for the IQCP."

She fiddled with the computer. "I'm

sorry, I don't show a reservation for them."

"How about Grauman's Chinese?" David said. "You want really? You want Charlton Heston? You want to see quantum theory in action?"

He grabbed my hands. "Come with me," he said seriously.

In St. Louis I had suffered a wave-function collapse a lot like what had happened to my clothes when I opened the suitcase. I had ended up on a merboat highway to New Orleans that time. It happened again, and the next thing I knew I was walking around the courtyard of Sid Grauman's Chinese Theatre, eating an ice cream cone and trying to fill my feet in Myrna Loy's footprints.

She must have been a midgit or had her foot bound as a child. So, apparently, had Debbie Reynolds, Dorothy Lamour, and Wallace Booby.

The only footprints I came close to fitting were Donald Duck's.

"I see this as a map of the microcosm," David said, sweeping his hand over the slightly irregular pavement of printed and signed cement squares.

"See, there are all these tracks. We know somethings been here, and the prints are pretty much the same, only every once in a while you've got this"—he knelt down and pointed to the print of John Wayne's clenched fist—and over here"—he walked toward the box office

CONTINUED ON PAGE 142





# THE SHAPING OF THINGS TO COME

DESIGNS BY NORMAN BEL GEDDES



**T**he exclusive glimpses of cars, boats, trains, airplanes, freeways, restaurants, and cities—conceived mostly during the impoverished years from 1929 to 1939—pays tribute to a man who clearly lived beyond his era. Every sprawling Sunbelt city laced together by 12-lane freeways confirms his predictions. Each elevated expressway and loop bypass skirting an urban center bears out his vision.

PHOTOGRAPHS BY STEVEN PIERSON

## THE SHAPING OF THINGS TO COME



THE DESIGN FOR THE WHALELIKE, 1,808-FOOT-LONG OCEAN LINER (ABOVE) ALLOWED FOR THE LOWEST RESISTANCE TO AIR AND WATER. BEL GEDDES



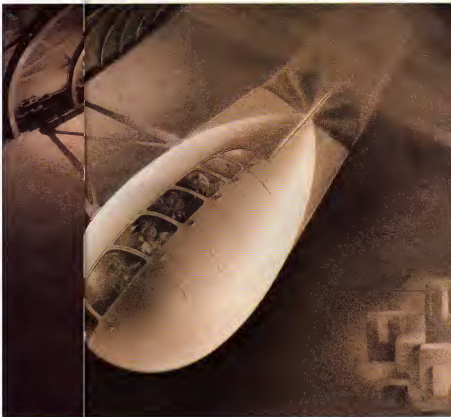
ENVISIONED AIRCRAFT LIKE THE JET PROPULSION PLANE (ABOVE RIGHT) AS WELL AS



THE ROADABLE FLYING SEDAN (ABOVE LEFT), FEATURING RETRACTABLE WINGS. RIGHT: AN AMUSEMENT PARK RIDE



REFLECTS FUTURISTIC FLAIR.



## THE SHAPING OF THINGS TO COME



Streamlined cars as well as today's sleek and foreboding Stealth bomber bear a striking resemblance to the work done by this extraordinary designer half a century ago.

The prophetic vision of an energetic young designer named Norman Bel Geddes during the darkest period of the Great Depression. While most of the industrialized world was paralyzed in the present, he imagined a revolutionary new society dominated by mobility, efficiency

and independence. Bursting with boundless ideas, he leaped into a future we have only now begun to realize.

The most cohesive assembly of Bel Geddes' ambitious ideas was his Futurama exhibit for the 1939 New York World's Fair. (This model for Futurama is shown above with World's Fair workers.) With its theme, "The World of Tomorrow," the fair offered the perfect stage for Bel Geddes' utopian drama. Spending \$7 million (busting the \$2 million budget that his sponsor Gen-

eral Motors had projected) the intense, wild-haired inventor created the fair's most popular attraction, which consisted of a 15-minute "ride" through the largest animated scale model of the future ever built. The three-quarter-acre expanse of miniature cities, highways, towns, and countryside contained half a million individually designed buildings, 50,000 tiny cars and buses (10,000 of which moved), and 1 million miniature trees.

Futurama embodied an independent, society liberalized

by labor-saving machines and accessible modes of transportation. The decentralized cities were strictly zoned, demonstrating how motorways—with remote-controlled traffic bridges, safety curbs, and multiple lanes to accommodate high speeds—would link the metropolis to its surrounding areas. Pollution, atomic energy, traffic congestion, and urban parking were all addressed here on an inevitable problems created by a progressive future.

Much of Futurama's vision,

AMERICAN CULTURE OVER THE LAST 50 YEARS HAS IGNORED MANY OF BEL GEDDES'S IDEAS.



HAVEN'T WE COME UP WITH SAFE, AUTOMATED FREEWAYS FOR THE 100-MILE-PER-HOUR SPEEDS THAT BEL GEDDES'S FUTURAMA EXHIBIT ENVISIONED?



WHY DO OUR CARS SEEM SO CONSERVATIVE COMPARED TO HIS DYNAMIC DESIGNS? WHY



as well as the Geddes's other work, found its way into everyday life exactly as its designer hoped. Over the span of his 45-year career, Bel Geddes designed an incredible panoply of objects, ranging from boats and refrigerators to skyscrapers, indoor stadiums, and freeway flyovers. Such smaller objects as an IBM typewriter and the gas range oven, which he designed for the Standard Gas Equipment Corporation, became fixtures in the American office and home of the Forties.



AS WITH HIS CARS AND BOATS, THE BOOMERANG SHAPE OF THE TRANSOCEANIC AIRLINER (ABOVE AND LEFT) IGNORED CONVENTION IN



FAVOR OF INNOVATION. MANY OF BEL GEDDES'S IDEAS FOR THE OCEAN LINER WERE IN-



CORPORATED INTO PLANS FOR THE 231-FOOT WENNER-GREN YACHT (LEFT). FAR

LEFT: A 1929 DESIGN FOR THE TOLEDO SCALE FACTORY.



# THE SHAPING OF THINGS TO COME



and Pikes. His larger projects, however, were not constructed until decades later. His aerial restaurant design for the 1933-34 International Exposition in Chicago depicted a steel, aluminum, and glass structure—25 stories high—which would rotate slowly, providing patrons with a changing panorama of Chicago. The first aerial restaurant was actually built for the Century 21 Exposition in Seattle in 1962.

More than any other futurist of his era, Bel Geddes fore-

saw the impact of advances in transportation. "Speed is the cry of our era, and greater speed is one of the goals of tomorrow," wrote Bel Geddes in his 1932 book *Horizons*. For him, the automobile demanded forms radically different from those that dominated the designs of the time. His teardrop-shaped aerodynamic cars of the early Thirties (seen above with his aerodynamic designed buses) had engines in the rear, bulging windshields to provide full visibility, retractable safety

bumpers, wheels fully enclosed in the body superstructure, headlights that turned with the wheels, and air-conditioned interiors.

Bel Geddes followed his own stringent policies with the designs for his *Ocean Liner* and the *Werner-Gren* yacht. The huge, whalelike, 1,800-foot-long *Ocean Liner* would accommodate 2,000 passengers and a crew of 900. In addition to grandiose lounges, a nightclub, cinema pool, and gymnasium, there was a large, sun-exposed beach and four

tennis courts under a smooth glass shed. The skin of the ship was designed with a glass-and-metal slipcover to enclose the vessel during rough weather. Much of the design was incorporated into Bel Geddes's plans for a private 231-foot yacht commissioned for Axel Werner-Gren. Neither ship was ever built.

Anticipating that airplanes would eventually replace ocean liners, Bel Geddes, along with German aeronautical engineer Otto A. Kuhse, designed an alternative fu-

ture vehicle—the V-winged Transoceanic Avliner. The six-motored, nine-story-high hybrid of ocean liner and airplane would have accommodated more than 600 people, with staterooms, suites, and a two-story-high dining room as well as a dance floor, tennis court, library, and barber and beauty shops.

As with the cars and boats, Bel Geddes was reinventing air transportation from scratch. His "Helicopter Community Bus," for example, combined road, water, and air transport

And for such a vehicle, he imagined a Rotary Airport in New York City harbor. The floating airport would be connected to Manhattan by an 800-foot tunnel equipped with a moving sidewalk.

This year on the 50th anniversary of Bel Geddes's remarkable masterpiece for the 1939 New York World's Fair, a feeling of buoyant optimism resonates from the pages of his archives. His challenging and provocative views still belong to the future.

—Lawrence W. Speck

ALTHOUGH THE REVOLVING AERIAL RESTAURANT (RIGHT) WAS DESIGNED

IN 1929, THE FIRST ONE WASN'T BUILT UNTIL 1962, FOR THE CENTURY 21



EXPOSITION HELD IN SEATTLE. LEFT: 1931 DESIGN FOR A TRAIN. ADVANCES

IN TRANSPORTATION DEMANDED CARS WITH FORMS RADICALLY DIFFERENT FROM COMMON DESIGNS OF THE ERA.



in other ways remain experimental. At the Fred Hutchinson Cancer Research Center in Seattle, E. Donnal Thomas's team has tried purifying human stem cells, the unspecialized bone marrow cells that produce all other types of red and white blood cells. Stem cells exist in such small numbers—constituting just 0.01 percent of all bone marrow cells—that their potential importance has thus far been overshadowed by their elusiveness. Last year, however, a team of scientists, led by Irving Weissman at Stanford University, succeeded in isolating and transplanting stem cells in mice. Their startling results—in some recipients, as few as 30 cells were sufficient to repopulate whole blood and marrow systems—could eventually enable BMT teams to perform human transplants with little more than a pinhead's worth of material.

Because stem cells appear to be unaffected by leukemias and other marrow-damaging diseases, it may also be possible to avoid GvHD by harvesting, purifying, and reimplanting a patient's own stem cells. Doctors at the Hutchinson Center and Sloan-Kettering are already experimenting with autologous, or self-to-self, transplants, in which a cancer patient's own marrow is removed, stored during an aggressive round of chemotherapy, and reimplanted once treatment is completed. Recently Sloan-Kettering investigators tried the technique on 14 lymphoma patients, with exciting results: 76 percent were still in remission two years after their transplants, compared with an expected survival rate of only 20 percent with conventional treatment.

By using purified stem cells, doctors may be able to widen the application of self-to-self transplants. MarrowTech, an Elmford, New York, company, is working on growing marrow cultures in the lab by maximizing stem cell populations. Ultimately MarrowTech plans to license this technology to a company that would store individual's marrow for a nominal fee. Nuclear power plant workers and others at risk of exposure to high levels of radiation or toxic chemicals could then bank their own marrow while they're still healthy and withdraw it should they ever need a bone marrow transplant.

Elegant as the advances in BMT technique appear, they won't increase the number of procedures performed until the ranks of donors swell. Because bone marrow, unlike other organs, is typed along strict racial and ethnic lines, typing centers frequently fail to locate suitable donors. Doctors now do BMTs on less than half of the 11,000 patients who might benefit from them each year. To find more donors, the Department of the Navy provided \$3.5 million in 1987 to establish a computerized National Bone Marrow

Registry. Registry officials say they hope to increase their current donor pool of 33,000 to 100,000 within the next year—enough to provide BMTs for an additional 3,000 patients each year.

In the future, O'Reilly says, typing centers may select donors under a system that identifies resistance to leukemia, as well as appropriate tissue matches. "The sorts of questions we're asking now concern whether approved marrow donors may have a built-in resistance to various leukemias and whether this resistance can be harnessed," O'Reilly's team has observed that the relapse rate for leukemia patients who receive tissue-typed marrow transplants is lower than the rate for patients who receive transplants from an identical twin. The donor marrow may be contributing something that prevents the leukemia from recurring. "Ultimately," he says, "we may find out why these people got leukemia in the first place."

## BECOMING A DONOR

"Becoming a bone marrow donor is a fairly risk-free way to be a hero. But it's not without discomfort or inconvenience," says Pamela Wenberg, the National Bone Marrow Registry's operations director. Prospective donors must be healthy adults under fifty-five, with no history of serum hepatitis, malaria, AIDS, or intravenous drug use. Some of the 50 national donor centers equipped to do the initial tissue typing from a blood sample require prospective donors to contribute to the typing cost (about \$50, though it's tax deductible), while others do not.

If the donor turns out to be a good match for someone awaiting a transplant, all costs of collecting the marrow are covered by the recipient's insurance. The procedure takes place in a hospital under local or spinal anesthesia. The surgeon makes a tiny incision above the donor's hip, then uses a syringe to withdraw about a liter of marrow. Because a certain amount of blood comes out with the marrow, donors typically store one or two units of their own blood before the procedure. It is restored to them while they are still under anesthesia. The donor's body replenishes the lost marrow in about two weeks. No stitches are required, but the incision leaves a minute scar and the collection causes a moderately aching bruise that many compare to a fall on ice. About half of all donors go home the same day, while the rest stay in the hospital overnight. The risks to the donor are slight. (Out of 100,000 healthy people, one can be expected to have a serious reaction to the anesthesia, while an even smaller proportion develop an infection at the site of the removal or experience additional blood loss.) Donor readers who want to find out more about donating marrow or want help locating the nearest typing center should write to: National Marrow Project, Box CM, 100 South Roberts Street, St. Paul, MN 55107.

finished his first year as President, Congress had set for the first time, and the Supreme Court had heard its first cases.

In the Old World a single event was shaping the entire century to come: the French Revolution. As the decade began, Napoleon was a student in military school, when it ended he had carved out his campaigns against Italy and Egypt and been named first consul. By 1814 he had been replaced by the Bourbon monarchy which the revolution had been intended to overthrow. Yet when the revolution began France was still a largely feudal state. When it was over the bourgeois were clearly the dominant power in society. The Code Napoleon had introduced the concept of social justice to Europe, and the modern sense of nationalism had begun to appear.

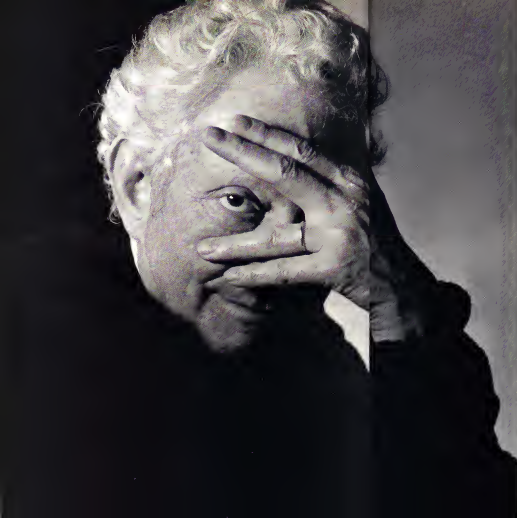
At last we come to the 1890's, the "Gay Nineties." In the United States it was a time of world's fairs, particularly in Chicago, that presaged the use of technology, science and modern architecture in the twentieth century. The 1890's were also an era of flamboyant wealth: of Diamond Jim Brady and Gentleman Jim Corbett, of Andrew Carnegie and J. Pierpont Morgan.

For science it was the time when modern physics was born. Wilhelm Röntgen discovered X rays in 1895. Before the decade was out William Ramsay discovered helium, xenon, krypton, and neon; Ernest Rutherford found that electricity and magnetism were one; J. J. Thomson discovered the electron, and Rutherford elucidated radioactive decay. In 1900 Max Planck proposed his quantum theory, which still governs our understanding of the universe. And Einstein was hard at work on the theory of relativity.

We do not really mean to give the entire of the century effect credit for the works of Shakespeare and Beethoven or even for the French Revolution. Genius appears in its own time and, if genuine, will find some way to express itself, and so vast a purging as the French Revolution seems more the work of history itself than of the individuals who set it in motion.

Yet perhaps the daughter of the Bourbons makes the point. There are times when the atmosphere is thick with the potential for change, and works of genius or of madness have their best chance for a friendly reception. A disproportionate number have occurred when an aged century was about to give way to a new one—a powerful spur to the accomplishment of tasks long neglected.

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*Looking for unbroken symmetry in the awesome energy of the super collider, physicists may find something else, says this Nobel laureate, something that could shake the underlying structure of physical reality*

## INTERVIEW

# LEON LEDERMAN

**A**t the entrance to the Fermi National Accelerator Laboratory (Fermilab) in Batavia, Illinois, stands a giant red and black steel sculpture: Broken Symmetry, created by Robert R. Wilson, the lab's builder and first director, consists of three arches looping upward to join one another but not quite, about 50 feet in the air. The three arms are slightly offset; in fact, from almost every angle, the sculpture is asymmetrical. If, however, you abandon your car at the lab's

entrance, lie down directly beneath Broken Symmetry, and look straight up, you will discover two things: one, that you have created a traffic jam of physicists trying to get to work and, two, that you have found the only view from which the sculpture is symmetrical.

That's essentially the order of business at this odd place on the prairie, home of the world's most powerful atom smasher. Here scientists look for a hidden symmetry in a very asymmetrical world. Variety may be the spice of

PHOTOGRAPHS BY DENNIS MANARCHY



**“A few years ago, when I campaigned for the six billion dollars for the superconducting super collider, I suggested that Brazil pay for it. The Brazilians already owed eighty-nine billion dollars. So why not make it ninety-five?”**

life, but to a high-energy physicist it is an effort to a principle that's been with us since the Greeks: Simplicity is truth. These physicists are looking for that one view that will reveal the simple symmetrical essence of matter.

Their search is filled with collisions and heat. The machine at Fermilab is the hottest place in the known universe. Beneath the prairie runs a four-mile ring where antiprotons race at near-light-speed velocities to their happy annihilation in face-to-face collisions with their brethren protons. These confrontations generate temperatures higher than those at the core of the sun or in the furious explosion of a supernova. Fermilab physicists are time travelers more legitimate than any you'll find in a late-night *Star Trek* episode. The last time such temperatures were created—about 10,000 trillion degrees Fahrenheit—was a fraction of a second after the Big Bang, the birth of the universe.

Lord over this bizarre machine, and all the time travelers who work with it, is Leon Lederman, sixty-seven, experimentalist extraordinaire, number one spokesman for high-energy physics and big-garage atom smashers. The son of Russian-Jewish immigrant storekeepers, Lederman grew up in the Bronx watching an older brother play with chemicals. “I’d do all the chores in the house if I could watch his experiments.” After reading a *New York Times* article about the discovery of positrons (antielectrons), the ten-year-old vowed to go into science. “It was a fascinating article about a guy, Carl Anderson, who carried a cloud chamber to the top of a mountain in Colorado and found this particle,” he recalls. Around the same age, Lederman came down with the measles, and his father bought him a book with big print called *The Story of Relativity* by Albert Einstein and Leopold Infeld. “I’ll never forget the beginning,” Lederman says. “It talked about detective stories, about how every detective story has a mystery, clues, and a detective. The detective tries to solve the mystery by using the clues. That’s what science is all about. The trouble with science books today is that they don’t have big print. And so they lose two important audiences: children and old men.” Lederman’s brother now owns a novelty business that markets T-shirts with catchy sayings, and it’s Leon Lederman’s ambition to reduce all of physics to one simple equation that will fit on the front of a T-shirt.

Educated at City College in New York in the Forties, Lederman took off three years to serve in World War II before returning to New York and Columbia University, where he received his Ph.D. in physics in 1951. There he stayed for the next 23 years, teaching, experimenting, and eventually serving as director of the university’s Nobel Laboratories. In 1979 he got the call from Fermilab, the top job in high-energy experimental physics.

In such physics, new power is the name of the game, and Fermilab was about to be supplanted as the world’s top accelerator by CERN in Geneva, Switzerland-based friendly collaborator. So rather than build a bigger ring for a new accelerator, Lederman proposed adding 1,000 superconducting magnets to make a new ring in the existing tunnel, boosting the energy. In an era when superconductivity was still an arcane concept, Fermilab staffers designed and built magnets themselves. It was not only new physics but new technology and engineering. The accelerator now accelerates protons to the enormous energy of one TeV (trillion electron volts). Imagine a trillion flashlight batteries. That’s one TeV. CERN, by comparison, operates at 400 GeV (billion electron volts), less than half as much. At Fermilab antiprotons are also circulated in the opposite direction, then smashed into protons to double the energy. That’s why the vanity license plates on Lederman’s Toyota read, TWO-TEV.

Lederman’s stature as director of Fermilab can cause one to overlook his achievements as a pure physicist. The Nobel committee didn’t make this mistake. In 1988 he shared the prize for physics with Jack Steinberger and Melvin Schwartz for a seminal 1960–62 experiment demonstrating the existence of a second type of neutrino. They were also the first to create a beam of neutrinos in the laboratory. The consensus was that Lederman’s prize was long overdue. Roy Schwitters, director of the new superconducting super collider, says, “I don’t understand why it took so long. It was one of the top half dozen experiments in the last thirty years. As for Lederman, he was grateful to get his family off his back. ‘My children often asked me why I never received a Nobel prize,’ he says. ‘I used to tell them it was because the committee couldn’t make up its mind which of my accomplishments to recognize.’”

Lederman, Steinberger, and Schwartz had used the Brookhaven, Long Island, accelerator to hurl swarms of protons at a beryllium target. The beryllium atoms were torn asunder into a menagerie of particles that were filtered through a 40-foot-thick steel wall. The process screened out all but the neutrinos, creating the first artificially produced neutrino beam. Until then these artful dodgers had eluded meaningful capture. Having no electric charge and no mass, a neutrino, according to Lederman, can pass through 100 million miles of solid lead with only a 50 percent chance of being detected. He and his colleagues corralled them and herded them into a useful beam. And beams of neutrinos opened the way to the study of the fundamental force that induces radioactive nuclear decay.

Perhaps more important, the trio discovered a second type of neutrino—the muon neutrino. The meat that leptons—

portlike particles such as electrons and neutrinos—react in pairs. Electrons are paired with electron neutrinos, muons are paired with muon neutrinos, and so on. It was a giant step in the development of the "standard model," the cornerstone of modern physics. Today the standard model consists of 12 particles—six quarks and six leptons—paired up in three categories of matter.

The standard model consolidates everything learned since the first "particles" were hurled from the first accelerator. Galileo's dropping the two spheres from the Leaning Tower of Pisa. Besides the basic building blocks of matter, the model also includes the W, Z, gamma, and gluon particles, which are manifestations of three of the four forces of the universe. The gamma represents the electromagnetic force, the W and Z, the weak nuclear force, and the gluons are manifestations of the strong nuclear force. No one has yet propounded a good theory for how the fourth force, gravity, fits into this portrait.

There you have it: thousands of years of a science all squeezed into a neat grid of 12 basic particles and three forces. Physicists, however, would like something even simpler—like one basic particle and one force. Unbroken symmetry. That's where Lederman comes in again. He knew that even the two TeV power of

Fermilab wasn't enough to reduce the standard model to its ultimate beauty (ingo), he helped spearhead the campaign for the super collider. "Leon was the public spokesman for the super collider," says Roy Schwitters. "He said we might all have to eventually give up our little accelerators to make the giant one a reality." As a result, the 53-mile-circumference, \$6 billion super collider made it through the Reagan administration. Construction is expected to begin in Ellis County, Texas, in spring 1990. The super collider will accelerate protons to 20 TeV in countervailing rings for a final collision energy of 40 TeV. Lederman and his cohorts have a good reason for wanting this awesome energy.

It's called Higgs, and it's the demon that confounds physics. The theoretical Higgs field saturates space like an ether. All known particles except the massless ones bind to it. It's responsible for the so-called "symmetry breaking." When the universe cooled down after the Big Bang, Higgs took hold. Think of a nanopore, billions of tiny drops of water, all uniform. Then a cold front moves in: the rain turns to snow, and every flake is different. That's what Higgs does to matter. Examining a universe with Higgs is like seeing through a glass darkly. Lederman wants to see it face-to-face. That means "blowing away the Higgs," as he puts it, or enough of it

to see the infamous Higgs boson, though which the field does its dirty work. That's the main job of the super collider. If the super collider finds the theoretical particle, the standard model will undoubtedly be simplified. If it doesn't, then the standard model will have to go.

Although Lederman gave the standard model its first boost, he could do stray it even before the super collider tests its test proton. Fermilab is currently looking for one unconfirmed quark, the massive top quark. Disconcertingly heavy for an elemental particle, it is at least 60 to 70 times heavier than the proton, according to Schwitters. That's heavier than most molecules. Fermilab has enough power to prove the top quark really exists or—even more difficult—disprove its existence. Should Fermilab succeed in ruling out the top quark, the standard model will crumble and physics will suffer a massive crisis. For there is at present no viable alternative to the standard model.

If that happens, Lederman will probably hold a press conference, make a few jokes, and explain why it's the best possible thing for physics. Lederman stories are legion—and often apocryphal. One rumor has it that he wrote a description of the super collider that any high-school student could understand, then rewrote it so that even then-President Reagan could understand it. It was just that. A ru-



not. The New York Times reported that Lederman fashioned the 40-foot steel bannier for his neutrino experiment out of the battleship Missouri. Again, not true.

Lederman will do anything to support science, including a 1979 appearance on the Phil Donahue show. Challenged by a housewife on the \$100 million per year operating cost of Fermilab, he replied, "A hundred million dollars doesn't pay for a fraction of the chewing gum we chew. Why don't we all stop chewing gum and then I could make an even bigger accelerator?" (Donahue seemed pained. Lederman recalls, "How did I know the commercial was 'Double Your Pressure'?). Lederman didn't even mind a question about Fermilab's herd of buffalo, which graze west of the main ring. "Dr. Lederman makes the accelerator seem relatively harmless, a call-in complained. "It is why do they have all those buffalo? We all know they're extremely sensitive to radioactive material." She thought the buffalo were like cattle in a mine shaft. Lederman calmly reassured her that the buffalo were just buffalo and that a Geiger counter works better as a radiation detector. He does, however, appear somewhat uncomfortable fielding questions on whether a day set the Big Bang in motion. That question, he once replied, "is beyond my salary scale."

I interviewed Lederman at Fermilab, a never-never land where the buffalo roam and the atoms and nuclei decay. Lederman and his colleagues live in an abstract world where facts are inferences upon inferences upon inferences. The accelerator has been compared to a microscope, but no object is ever observed directly. Two particles collide and spew debris and new matter inside the accelerator. Fermilab physicists infer the existence of new particles from the fact that they collide with other particles, which leave electromagnetic tracks in a \$60 million detector. Think of a bus that drives by your house every day. One afternoon while you're at work the bus collides with a Subaru. The bumper line of the Subaru and his your

mailbox, which is hurled through your window. When you come home, you look at the pattern of shattered glass and say, "Hmmm, a Subaru." That's not unlike what high-energy physicists do for a living. And as the energy gets higher, things get weirder. As Schweitters explains,

"When two cars collide at sixty-five miles per hour, the crash may produce a kind of steaming wheel, or a few tires. If the cars were proton beams colliding head-on at the speed of light, the crash might produce a Mack truck, a tractor-trailer rig, forty cars, a giraffe, or a zebra."

Lederman gave up his search for subatomic particles in July of this year. Resigning as head of Fermilab, he will be

There was lots of laughter during the interview. When was he serious and when was he just pulling our lepton? As usual, Lederman came out firing and got in the first word.—Dick Tawes

Lederman: If this goes true to practice, you're going to talk about Brazilian debt, short skirts, and Social Security.

Orin: What are your feelings about the Brazilian national debt?

Lederman: A few years ago, when I campaigned for the six billion dollars needed for the superconducting super collider, I suggested that Brazil pay for it. The Brazilians already owed eighty-nine billion dollars. Why not make it ninety-five?

Orin: Is it true that you took apart the battleship Missouri in order to build your neutrino detector back in 1960?

Lederman: Except it wasn't the Missouri. Somebody recently told me the Missouri is still out there somewhere. We've forgotten the name, but we certainly did cut up a battleship for scraps.

Orin: According to Robert Croese and Charles Mann who wrote *The Second Creation*, a history of modern physics, you told them that war broke out and you had to give up your detector so the Navy could have its battleship back. Lederman: Noooo. I said that? Well, I was probably joking. We were worried that if there was a new war,

we'd have to tow the ship back together. We got a lot of surplus naval stuff in those days. My best story on that is the cannon. We got one of those twelve-inch-diameter cannons. It had a beautiful hole and thick walls. It was fifty feet long, a wonderful device for aiming a particle beam. We wanted to fill it up with beryllium as a floor. The trouble was that it had deep rifling grooves. So I sent a student inside the cannon to stuff steel wool into the grooves. He spent about an hour in there and crawled out hot, sweaty and embated and said, "I quit!" So I said to him, "You can't quit. Where will I find another student of your caliber?" That clearly made me famous.

Orin: But seriously, Dr. Lederman, you



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come a professor again, this time at the University of Chicago, where he'll teach a course entitled Quantum Mechanics for Poets. Lederman is a born teacher, and it's tough to keep him away from the blackboard that dominates the wall in his office. He can't talk without sketching, and because we needed him to stay near the tape recorder, he scribbled all over his desk calendar during the interview. Also in his office is a two-foot-tall stuffed doll of Einstein and what appears to be a large, fluffy dunce cap that bears the tag "No, no, no." "It's a thinking cap an artist gave me," he explains, picking the hat up to reveal little multishaped pieces of fabric dangling from strings inside. "See, he said, 'it's full of ideas'."

Lederman at Fermilab, a never-never land where the buffalo roam and the atoms and nuclei decay. Lederman and his colleagues live in an abstract world where facts are inferences upon inferences upon inferences. The accelerator has been compared to a microscope, but no object is ever observed directly. Two particles collide and spew debris and new matter inside the accelerator. Fermilab physicists infer the existence of new particles from the fact that they collide with other particles, which leave electromagnetic tracks in a \$60 million detector. Think of a bus that drives by your house every day. One afternoon while you're at work the bus collides with a Subaru. The bumper line of the Subaru and his your

said the super collider will cost six billion dollars, and another three hundred million a year to operate. Will this finally be enough to shake a quark free?

**Lederman:** We doubt it will make two quarks; we shouldn't shake one free. That would embarrass the theorists. Their cover is that quarks always come in at least pairs, and it's like a string that has two ends. There is no way I can take one and home.

**Omer:** Isn't it unsettling that your model of reality is based on the quark, and despite spending billions of dollars on atom smashers, you still can't find the object on which your science is based?

**Lederman:** Well, it's a living.

**Omer:** Seriously, isn't it a problem that you never see your quarry?

**Lederman:** No, no, that you can handle. Did you ever see Ronald Reagan when he was president?

**Omer:** I saw an image of him.

**Lederman:** What do you mean, an image? You saw an electron beam. Look at the back of a TV set. You saw glass, filament, wires. You saw Reagan? My evidence for the quark is just as good.

**Omer:** So everything is mindsets? That chairs, rocks, quarks, and presidents are just abstract ideas with no independent existence in the physical world because we can't perceive them directly?

**Lederman:** Oh, no. There's a real world. Let me explain it like I do for kids. You

have a human eyeball. You can see a tree. What's the tree? Well, it's photons from the sun reflecting from the tree. Now the eyeball has wires that go to a processor. The processor looks at the data, a train of photons, and a central processor says "Oh, my God, a tree!" Then you put on glasses or peer through a telescope. Now the photon is being distorted by a lens. Or you replace all this by a camera film or a magnetic tape and digitizer. Little by little you make the informational tube more abstract. So now I have a piece of magnetic tape with zeros and ones on it. Those zeros and ones can tell me there's a tree over there, or they can tell me that the bottom quark has a lifetime of ten to the minus thirteen seconds. Both are encoded as zeros and ones. Put this way they are equally abstract. You're wearing glasses, for instance. You're already modifying the "real world."

**Omer:** But wearing glasses is less abstract than blasting protons apart in an accelerator.

**Lederman:** Let me tell you a story about Galileo. He built thousands of telescopes. And he did tens of thousands of experiments to learn to trust the telescope. Now, I have this little picture. Here's Galileo with all his graduate students. He's looking out the window with his telescope, describing what he sees, and they're all scribbling it down. "Here's a tree. It's got a branch this way and a

leaf that way." Then they all get on their horses or wagons and go across the field and look at the tree close up, comparing it to Galileo's description. You calibrate an instrument by doing that ten thousand times. But a critic of Galileo, in describing the meticulous nature of the testing, says "If I follow these experiments on terrestrial objects, the telescope is superb. I trust it even though it interposes something between the God-given eye and the God-given object. Nevertheless, it does not fool you. On the other hand, if you look up at the sky, there's a star. And if you look through the telescope, there are two stars. It's totally cracked!"

**Omer:** Quarks are as real as stars?

**Lederman:** We believe in quarks because we see them in incredibly different ways. First, you do an experiment in Geneva and you do one in California. Or you get properties of the quark from looking at, as we do here, lepton pairs coming off the proton collision. Totally different kinds of experiments, but the results agree numerically. There must be some kind of objective reality. But we have to be especially meticulous in experimenting with quarks because we can't get them free.

**Omer:** Don't you ever wake up sweating in the middle of the night, worrying that maybe physics took the wrong turn a couple of decades back?

**Lederman:** I wake up with sweats in the middle of the night all right, but only when something may not work. Is the equipment going to break down? Is Oscar going to screw up? A lot of problems give me cold sweats, but not the route. The route is the route is the route. There's a hazard here, a cliff there, a mountain here but it's the road. Sometimes there are bifurcations and a split somewhere. You're not sure it's exactly the right road but the Golden Fleece is there. It's in sight. It's obscured by some clouds, so you don't know exactly where it is, but you know where you're going. Newton was on it. Galileo was on it. Maxwell was on it. All those guys followed the road. It's very simple. They had one question: How does the universe work? And they did whatever it took to find out.

**Omer:** Whatever the road is, you get there by following?

**Lederman:** Yeah, you get there by collisions. It's a clear road. The game plan is the same. The guiding rule was given to us by the Greeks twenty-five hundred years ago. It's got to be simple. The world is explicable by ordinary rules. There is some sort of overarching principle that encourages synthesis. We got gravitation as a universal law that explains an incredible range of phenomena: the bulge in the center of the earth, the tides. All sorts of things you thought wouldn't be connected became connected: the falling of the apple, the orbits of the planets, satellites. And that kept on. Electricity unified electricity and magnetism, and that culminated later in Maxwell's equations.



"We've achieved cold fusion in a sock. Should we tell anyone?"

But the underlying themes go all the way back to the Greeks and Democritus. There was a strategy. How do you make a complex world understandable? Mr. Democritus announced that atoms were the smallest objects, so small you can't cut them apart. That's what atom means: not able to be cut. Are these primordial objects that have no radius? The radius of a quark is zero, we say. Maybe we're wrong, but our hope is to find the basic particles. They have mass, charge, and spin. They have all these quantum numbers. But we have to understand the nature of their forces: how these things go with energy. The most exciting thing now is the so-called "symmetry breaking" and the fact that maybe the world is as complex as it is because it's cold.

**Omer:** Cold?

**Lederman:** We want to build a super collider to heat it up a bit. I mean locally. The collisions we make at Fermilab are hot, 10 to the 16th degrees above absolute zero. We see in those collisions promises of simplicity. So our current notion is that in the beginning the world was very simple and very hot and that at these high temperatures there was a unified force, one kind of particle—a simple Greek concept. But then as the world expanded and cooled, Mr. Higgs [the Higgs field] came in breaking symmetry and making things complicated. As you cool things down, you introduce complexity.

There are lots of metaphors for this. A thin glass sphere filled with water vapor at very high temperature has perfect symmetry: perfect simplicity. But cool it. Soon you find a liquid pool of water at the bottom, an ice cube floating in the pool, and water vapor above it. No symmetry anymore. If you get high enough energy and understand the Higgs phenomenon, the hidden symmetry, then you'll get an answer that you can write on a T-shirt.

**Omer:** Right now we're not close enough to the Greek ideal. You have six quarks, three different forms of matter, four different forces.

**Lederman:** The standard model, with its six quarks and six leptons mediated by forces, is like the periodic table of the elements that hangs in every high-school chemistry classroom. It was written down in orderly form. All the columns had similar chemical properties. Nobody understood why they were that way, but you could show it to the kids, explain it to them. This is the lightest, that's the heaviest one. Little by little we realized that these were complicated atoms with shell structures, and we began to know about quantum mechanics. We began to understand why the regularities were there. Physicists haven't gotten harder than it was, say, 150 or a hundred years ago.

**Omer:** It's not what you'd call simple.

**Lederman:** There are some oscillations in the search for simplicity. Thales of Mile-

lus announced that the world could be explained without ghosts and angels. He guessed water was the only element. Not a bad guess. Heat up a piece of metal and water comes out. Everything is made of water, Thales said. But eventually the Greeks didn't like that and came up with the air-earth-fire-water theory. Then came ninety elements, a disaster, but soon that simplified to nuclei and electrons. That theory looked very good, but little by little it got worse. The nucleus was a mess. In the 1930s we had a hundred and thirty particles. It was chaos and degradation. Where was all this promise of simplicity?

Then came the quarks! First there were just three. When we looked at those hundreds of particles, we found they were all made up of only three quarks. Okay, so now there are six, and we're not sure there are only six yet. People are saying, "Well, that's complicated." Maybe there are things made of quarks called protons. On the other hand, six isn't all that bad. Here [Lederman grabs his desk calendar and begins sketching the standard model]. I can write down on one of these squares the up and down quark, the charm and the strange, the top and bottom. Those are the six quarks. The six leptons are electrons and electron neutrinos, muons and muon neutrinos, tau and tau neutrinos. Then on the force side there's the photon, the Z, the W, and the gluons. That picture explains all the data that have come out of all the accelerators since the Leaning Tower of Pisa.

**Omer:** About twenty-four particles.

**Lederman:** Yeah. Well, we have one problem: I've omitted gravity, and in the force picture I have a deep inconsistency in that two of these particles, the W and Z, are heavy and one of these, the photon, is massless. I can't explain that, because the mathematics of forces says they should all have zero mass. That's where the Higgs comes in. This picture isn't perfect by a long shot, otherwise word quit. But still, even with its inconsistencies [it's a pretty neat summary of billions and billions [he imitates Carl Sagan] of experiments carried out by people who stayed up late at night].

**Omer:** Why will the new super collider be fifty-three miles around? Why not fifty-four or sixty?

**Lederman:** It correlates again to this question of the Higgs field. The Z and W particles were predicted by the theorists—including their masses. When they were found at CERN in 1983 and 1984, they were found exactly as predicted. The theory that predicted them, put forth by Steven Weinberg, Abdus Salam, and Sheldon Glashow, made the bizarre assumption that there's a field. Never mind why they called it the Higgs field; there's a genius named Higgs around somewhere. Anyway, these Z's and W's break symmetry because they're very heavy. These are gauge particles. They carry the forces, and they really should have zero





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seen from

**Q:** Why are the accelerators so beautiful? Even the wiring is beautiful. Are built-

[illegible]

**Grant** me a short story for *Grimm*!

**Lederman:** And you rejected it. You said I needed to add some monsters made out of meat loaf or at least a couple of *Worms*.

**Grant:** I wasn't the fiction editor! Wasn't it about a physicist whose mulling over a new theory that will set the scientific world on its ear? Then he realizes he's missed something. His theory is wrong. He thought he was a genius, but he never mentioned the idea to anyone.

**Lederman:** Physicists get lots of ideas. Most of them turn out not to be right. And the trick—one that I use myself as do most scientists—is to ask yourself, "What if?" So you think about it, you probably finish it, you're good, and then you won't have it anymore. But if you postpone thinking about it for as long as possible, it's possible you're right.

**Grant:** I thought your protagonist, a Nobel prize-winner goes to a party attended by another Nobel laureate, and your hero is tickled intimidated by the guy even though he himself has also received a Nobel.

**Lederman:** That's the true part I modified: the charismatic physicist after Lederman! The protagonist is a character I call Alberto Stark, who was the Nobel for measurement of the strong interaction. I would actually be a student of Alberto's. Everybody could call Alberto Stark.

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It didn't matter what he said; you were just raptured. Stark was a guy who did a good experiment. I remember sitting on the floor chatting with Stark at a party when Rabi walked in. Everyone rushed to surround Rabi, and Stark said to me in a moment of frankness: "Every time I see that son of a bitch, I say to myself, 'Stark, you also have a Nobel prize. Stark, you also have a Nobel prize. Stark, you also have a Nobel prize.'"

**Orin:** Is this insecurity at the core of all scientists?

**Lederman:** I'm not sure it's at the core. I think the valid part of the story is that scientists have an intrinsic awe of certain peers. There are a few gods. Fermi was a god. He was above the battle and widely venerated. Feynman [the late Richard Feynman, Caltech Nobelist] was a god. I could easily see how someone with a Nobel prize sitting next to Feynman could still feel that he didn't really belong in his class. If Feynman were still alive and sitting over there, I'd think, *My God, that's Feynman! I wonder if he'll talk to me.* Feynman was very special. Some Nobel prize-winners are unpleasant. You wouldn't want to talk to them. But Feynman's enthusiasm for physics was always childlike, and that gave you pleasure in talking to him. He was also a fundamentally compassionate and humane guy. He would reinterpret every-

thing you said so that you wouldn't embarrass yourself or say anything stupid.

**Orin:** Ten years ago, when you were first appointed director of Fermilab, you invited Orin to a huge gathering of physicists who came here for a celebration in honor of your predecessor, Robert R. Wilson. Through all the lectures and speeches, I noticed, physicists freely and knowledgeably quoted poetry and drafts and related their work to art and music. Do you think physicists tend to be Renaissance people?

**Lederman:** Yeah. I think that physicists listen to Bach and read Shakespeare. The trouble oft stated is that Shakespearean professors don't know the second law of thermodynamics. I don't want to list that war, because scientists need the humanistic aspect. I want to start a series of workshops in which we come to an agreement as to what an educated person should know. I grew up at Columbus University, where some of the great men of the day taught, including Jacques Barzun and Lionel Trilling. I think they were so antiscience because they were cut out of what they knew was a very primary intellectual activity. For an intelligent guy that's an anguish. And sometimes that anguish is reflected in blaming the scientist for example, focusing on obscure language and not communicating. I don't think that's fair. We're communicating as

hard as we can. There were three science books on the best-seller list last year—by Richard Feynman, Stephen Hawking, and Timothy Ferris. Scratch a physicist, and if he isn't a member of a quonit, doing pottery, or part of a literary group, I'd be surprised. Physicists are exceptionally closely connected to music. I don't know how many of my friends have been tortured by the quandary "Should I go into music or physics?" So they keep the music with them all their lives. They all made the wrong decision. They went into physics.

**Orin:** What's the worst thing going on in the country, in terms of science?

**Lederman:** The narrow vision, the drive for short-range goals. When I was a kid there were twenty industrial labs doing research on a very high level. Now there are two that I can think of: IBM and Bell Labs. The other companies can't afford basic research because the profits don't show up for years and years. And they have to show a profit now. Yet we have grandchildren; the twenty-first century is chugging along, and we're going to need a passport to get admitted to it. It takes a long time for basic research to pay off. Maybe fifty years. I had a professor years ago, Isidor Rabi, who was interested in magnetism in the nucleus. The nucleus has electrical charges; why not magnetism? He thought it would be nice to

CONTINUED ON PAGE 114





ARTICLE

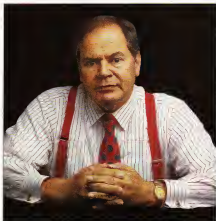
## **FUTURE TRENDS**

BY MARVIN  
CETRON AND OWEN  
DAVIES

*Need-to-know  
information for life in the  
twenty-first century*

PHOTOGRAPH BY DAN  
WARKENTHIEN

• Coming attractions, medical miracles, a shorter workweek, compulsory national service, and a greater emphasis on the family.



The approach of the year 2000 can hardly go unnoticed, for certainly it will be a time of change. For some people the turn of the century represents hope: an end of current troubles, a time of reconciliation with nations and with nature. For others it's a time that evokes fear: a climax to the world's present course of destruction, a time to face the inevitable consequences of our actions. And still others view the coming century scientifically—as a logical extension of today's world.

Futurist Marvin Calton, who foresaw the Arab oil embargo, Solidarity in Poland and the fundamentalist revolution in Iran, has calculated what direction tomorrow may take. Along with former *Omni* senior editor Owen Davies, Calton has compiled predictions for the year 2000. These trends, which focus primarily on the United States and range from technological advances to a shift in values, will help you prepare for and control your future.

Copyright © by Marvin Calton and Owen Davies. From the book *American Renaissance: Our Life at the Turn of the 21st Century*. Recorded through special arrangement with St. Martin's Press, New York. To be published on October 1992.

#### LONG-TERM SOCIETAL TRENDS

Life in the fast lane. Expect frequent moves in career and home, with super-fast transportation for longer commutes.

- There may be a recession in 1990, but this will be only a perturbation. Our long-range forecast for the economy is good.
- Part of society's affluence rests on credit-card use or overuse; extension of excessive credit could result in government-imposed limitations.
- About half of all service workers (43 percent of the labor force by 2000) will be involved in collecting, analyzing, synthesizing, structuring, storing or retrieving information as a basis of knowledge.
- Half of these people will opt for "flex-time" "flexplace" arrangements, which allow them to work at home, communicating with the office via computers.
- By 2001, nearly all college textbooks and many high-school and junior-high books will come with computer disks to aid in learning.
- Computers will provide access to all the card catalogs of all the libraries in the world by the late Nineties.
- Videodisks will enhance books by providing visual and audio information and

even recordings of smells and tastes.

- Fewer very poor and very wealthy [well-off] in our society.
- Fewer loopholes mean the wealthy will pay more tax.
- The Social Security system will be reformed. Some of the reforms will be means testing, taxation of benefits, and ceilings (although all workers will still have to contribute).
- Greatest development in suburbs (rather than cities). Land is cheaper and road systems provide good accessibility. Suburban life is being urbanized as satellite cities grow outside the major metropolitan areas. Suburban "downtowns" are being created with the construction of office parks, shopping centers and entertainment districts.
- Creation of "perurbia," as population expands beyond the suburbs into outlying towns and rural areas.
- "Superurbia" will connect cities in the South and West, where most of the population growth over the next decade is expected to occur.
- Modular plastic housing will allow people to move more easily and frequently.
- High-speed, magnetically levitated trains will allow commutes of 500 miles.
- Occupational mobility occurs as people increasingly refrain from new careers.
- Job mobility—i.e. changing location or firm but doing the same work—will increase. People will get more used to the idea of changing jobs several times in their lifetimes.

#### THE TECHNOLOGY TRENDS

Building a better future. Interactive magazines, robots, and memory-enhancing drugs are readily accessible.

- Personal robots in the home will appear by 2000. Mundane commercial and service jobs, environmentally dangerous jobs, and repairs of space station components in orbit will be done by robots.
- Computers will become part of our environment rather than just tools we use for specific tasks. Portable computers will give us wireless access to data wherever we go inside our computer network.
- Superconductors operating at room temperature will be in use by 2001, resulting in supercomputers the size of three-pound coffee cans, electric motors 75 percent smaller and lighter than those today, practical hydrogen-fusion plants, electrical storage facilities with no heat loss, analyzers that chart the interaction of brain cells and 200 mph maglev trains that float on magnetic cushions.
- There will be much growth in the en-

# THE FASTEST-GROWING JOBS, 1985-95

JOB TITLE	% GROWTH 1985-95 (PERCENT)	NUMBER NEEDED (IN THOUSANDS)	1995 STARTING SALARY (IN THOUSANDS)	2005 MEDIAN SALARY (IN THOUSANDS)
Accountant or auditor	35	1047	17	25
Correctional institution official	35	105	12	25
Mechanical engineer	34	237	20	28
Registered nurse	33	1302	14	20
Public relations	32	131	12	32
Computerized-tool programmer	32	200	12	20
Occupational therapist	31	—	16	22
Medical records technician	31	20	12	23

Data from the Bureau of Labor Statistics and Forecasting International

engineering, technology, and health industries, many new biotechnology jobs will open up.

- **High technological turnover rate.** All the technological knowledge we work with today will represent only 1 percent of the knowledge that will be available in 2050.

- **Magazines in the year 2001 will be on floppy disks that allow the reader to interact, play with, and manipulate the information on his or her PC.**

- **Mass media will be more personalized as consumers use pay-per-view television to select movies and entertainment. Viewers will download their choices from a "teledelivery" service, paying for the program when they see it.**

- **A computer system will create a personalized newspaper by logging onto news-service databases at night, selecting stories, laying them out, setting the headlines in sizes that reflect their importance to the individual reader, and adding pictures.**

- **Major medical advances: \$100 billion spent in genetic engineering by 2000 will result in:**

- artificial blood (which could replace the nation's blood banks)
- human growth hormones
- memory recall drugs
- newborns with particular disease immunities.

- **Now, computer-based diagnostic tools will be providing doctors with unprocessed cross-sectional images of soft and hard tissues inside the body, thus eliminating much exploratory surgery.**

- **Brain cell and tissue transplants will be in the experimental phase by 2001 to aid victims of retardation and head trauma. Laboratory grown bone, muscle, and blood cells will be used in transplants.**

## TRENDS IN LABOR FORCE AND WORK

**On the home front:** More women will enter the workforce, increasing demands for job sharing and child care programs, personal computers become common household appliances, allowing more employees to work from home.

- There will be 125 million farmers in the United States in 2000, 900,000 fewer than today.

- By 2001 the percentage of labor force in manufacturing will be 9.7, down from 18 percent in 1967. Productivity, however, will have increased 500 percent in those industries that have become more automated, added robotics, and remained flexible in their production.

- By 2000 we predict that 85 percent of the labor force will be working in the service sector. Of that 85 percent, 43 percent will be working in the information industry, 22 percent of which will be working at home.

- Seventy percent of U.S. homes will have computers in 2001, compared with 75 percent now, more than three-fourths will be equipped to permit communication with the public switched network.

- Personal computers will be used for voting, filing income tax returns, applying for auto licenses plates, and taking tests such as college entrance exams and professional accreditations.

- Five of the ten fastest-growing careers between now and 2001 will be computer related, with the demand for programmers and systems analysts growing by 70 percent.

- More women enter the labor force.
- Increasing volume of work can be done at home, expanding child-care facilities/ services and the economic need to have income from both spouses.

- Expect new demands for child care as approximately 63 percent of new entrants into the labor force between 1985 and 2000 are women.

- Businesses will seek to fill labor shortages with stay-at-home mothers by offering child-care programs and job-sharing.

- The decline in the birth rate in the Sixties and early Seventies means a smaller number of young people entering the job market today. The number of jobs is increasing, creating entry-level labor shortages expected to increase in the Nineties, especially in the service sector.
- This may translate into more entry-level

job opportunities for high-school graduates as companies train them on the job.

- The Army and Navy has seen the education levels of recruits drop as competition from the private sector intensifies.
- Restaurants may turn to more self-serve items. Hotels, restaurants, fast food places, convenience stores, retailers, and businesses needing beginning computer and clerical skills will be especially hard hit by this labor shortage.

## MANAGEMENT TRENDS

**Be your own boss.** Middle management will be phased out in favor of highly trained personnel. Corporate ladders become stepping-stones to new careers.

- More and more midcareer professionals will become entrepreneurs as they are squeezed out of the narrowing pyramid in large companies. This is because in 2001 only one person for every 50 will be promoted, whereas in 1987 it was one person for every 20.

- More women are starting up small businesses. In a mass "homecoming," they are leaving traditional jobs to go home, open up businesses, and have children.

- By the year 2000 85 percent of the labor force will be working for firms employing fewer than 200 people.

## EDUCATIONAL TRENDS

**Back to school!** Formal learning will continue throughout life out of necessity, with new technologies and techniques changing the way we learn.

- Half life of an engineer's knowledge today is five years; in ten years 90 percent of what he knows will be on the computer.

- Because of fundamental changes in the economy, there will be fewer, well-paying jobs not requiring advanced training. Close to 6 million jobs will open up in the next decade in the highly skilled occupations—executive, professional, and technical.

- Up to 4 percent of the labor force will be in job-retraining programs by the Nineties to upgrade skills and knowledge and keep pace with changing technologies and changing demands of the workplace.

- Schools will train both children and adults around the clock. The academic day will be lengthened to seven hours for children; adults will be working a 32-hour workweek and preparing for their next job in the remaining hours.

- Job simulation stations (modules that combine computers, videodiscs, and instrumentation to duplicate job-work environments) will be used in training.

- Education becomes more individualized as new media (interactive computer/videodisc) permit students to learn according to their needs and abilities.

- Lackluster performance of U.S. students on standardized tests will prompt inevitable reforms.

- In the midst of this reform, there will be a severe shortage of qualified teachers.

An estimated 1 million new teachers will be needed between 1989 and 1993.

- Future possibilities to alleviate the overburdened U.S. school system include lengthening the school day and year to 210 seven-hour days a year and cutting average class size down from 17.8 to 10 students.

- By 2001 there will not be enough adolescents to sustain the current number of colleges and universities. Colleges will close their doors, merge with other schools in a federation, reduce faculty size and class offerings, and seek more adult students.

- More and more businesses will conduct research.

#### TRENDS IN VALUES AND CONCERNS

Great expectations: demands for quality medical and social care for individuals, and individuals caring for society and environment.

- General shift in societal values: "Me" ethic—"we" ethic—family ethic.

Family issues in the Nineties: long-term health care, day care, early childhood education, antidrug campaigns.

Companies will be required to grant "family leave" for mothers and fathers of newborns and newly adopted children, and to care for their elderly or ill family members.

- Middle age will be "in" by 2000: the "youth culture" will be "out."

- Narrow, extremist views of either the left or the right will be unpopular. Moderate Republicans and conservative Democrats will lead their respective parties.

- General expectations of high level of medical care.

- Medical knowledge is doubling every eight years.

- By 2000 85 percent of doctors will be salaried.

- There will be more nurses available for community-based health care—salaries for nurses will rise.

- Medical costs will rise more slowly by 2000. Drug costs will decrease, 53 percent of drugs will be generic.

- There will be a surplus of 100,000 physicians by 2001. The result: Doctors will pay closer attention to individual patient care; office hours will be extended to evenings and weekends. Prescriptions will be written, transmitted, and filled via computer.

- General expectations of a high level of social service.

- Adequate Social Security income if retirement age goes to seventy.

- More services/accommodations for the deaf, blind, disabled, poor, infirm, and the aged.

- Compulsory national service (two years: male and female) is likely by 2000, with three options: military service, VISTA-type work with the disadvantaged, or the Peace Corps.

- Increasing concern for environmental issues, but a real environmental push may not come.

not occur until the Democrats return to the White House in 1992.

- Zoos will serve as "Noah's archives," as the extinction rate of animals increases.

- Fusion reactors will appear after 2000, by 2020 they will be a major source of power.

- Power plants using only the energy of the oceans will produce both electricity and fresh water for island communities, more islands will be inhabited as a result.

- Concern for the indoor environment will increase. The quality of indoor air, the effects of building materials, asbestos, and radon gas will be controlled.

#### INSTITUTIONAL TRENDS

Checks and balances: watching out for the small businesses, watching over the big conglomerates, and watching the middleman disappear.

- Growing demand for accountability in the expenditure of public resources.

- Computers permit transaction information (i.e., audit trails) to be kept, facilitating accountability.

- Companies will be judged on how they treat the environment.

- Government intervention will supplant deregulation in the airline industry (safety and services), financial services industry (instability and costs), electric utility industry (nuclear problems), and the chemical industry (toxic wastes).

- With 5 percent of the world's population and 86 percent of the lawyers on the planet, U.S. citizens will not hesitate to litigate if their demands are not met.

- Ten domestic air carriers today control 80 percent of the market, leaving the smaller domestic carriers with only 20 percent. By 2001 there will be only three major domestic carriers.

- Currently there are 20 major automakers around the world, with market shares ranging from 18.1 percent (GM) to 1.0 percent (BMW). By 2001 there will be only five giant automobile firms: production and assembly will be centered in Korea, Italy and Latin America.

- By 2000 there will be three major corporations making up the computer hardware industry: IBM, Digital, and Apple.

- A phenomenon of bimodal distribution of institutions is emerging. The big get bigger, the small survive, and the middle-sized are squeezed out.

- Today the manufacturer often sells directly to the dealer, skipping the wholesaler or distributor.

- The above trend extends to

hospitals—growth in hospital corporations and at the opposite end, walk-in medical centers.

agriculture—the farmer making more than \$500,000 is flourishing; the farmer who makes less than \$100,000 is surviving; the middle-income farmer is going bankrupt.

- The above trend leads us to believe that AT&T may be reconsolidated in the mid-Nineties. □

## INTELLIGENCE

CONTINUED FROM PAGE 30

in place at the Johnson Space Center. For instance, computers play a vital role in the launch and tracking of the space shuttle. Computers also monitor the pumping of liquid oxygen into the space shuttles external fuel tank and keep a watch for surprises such as a failure of any of the life-support systems in the shuttle during countdown.

This year's shuttle launches have been the most highly automated to date. Personnel at Johnson get assistance from four smart consoles analyzing data from the shuttles' main engines and other mechanical systems.

At Kennedy, the Remote Maintenance Monitoring System (RMMS) gives the novice engineer an opportunity to examine and analyze information from the shuttle on a monitor. The older computers are fed the same information on printouts ("The size of a New York telephone book," says Loughheed). Engineers then sift through the data to ensure the safety of the launch.

"These new systems speed things up and add confidence," says Loughheed. Tom Davis, manager of artificial intelligence at Kennedy Space Center, agrees.

"The capabilities of these machines are more extensive than the older systems," says software that enhances decision making," Davis says. "The smart machines resemble human thought processes." But it will be many more years, Davis cautions, before machines replace humans. "We're getting closer, but the Hal computer from 2001 is a long way off."

And today NASA is a long way from that horrible January morning when the Challenger exploded. "After the accident we were faulted for not looking ahead," says John Murkowski, a flight director at Johnson. "We took tremendous hits about our long-term planning. Our critics want to know where we're going. We are working on the quality of both our decision making and shuttle flights. We will use these machines to maintain the quality of our work."

Chris Craft, former director of the Johnson Space Center and six director of flight operations from the Mercury project through the Apollo era, cautions against using artificial intelligence as a cure-all for the agency's woes. "Computers are only as good as the people who program them," Craft says. "But there are other things hampering NASA that won't be remedied by artificial intelligence." Craft believes people no longer view space exploration as a high priority. "What they don't realize," he says, "is that NASA is a driver of this country's economy and technology. Space is not a luxury; it isn't a fantasy. People don't understand that the work will pay dividends in the future. It's the Method of America's economy and technology." □

•Are mysterious waves of UFO sightings triggered by general public hysteria or by bona fide UFOs?•

## ANTI MATTER

What do 1898, 1947, 1952 and 1973 have in common? All were years when the world witnessed mysterious UFO "waves."

When UFOlogists refer to waves, they mean repeated UFO reports in a specific region or regions over a precise period of time. For example, throughout 1933 and 1934 many mysterious ghost fires were seen over the Scandinavian countries. In 1973 thousands of sightings were reported across the breadth of the eastern seaboard of the United States. And most recently hundreds of people around the globe have reported close encounters in which they say they've been abducted by tiny, six-mouthed aliens with bulging eyes.

But now Indiana folklorist Thomas E. Bullard has given new meaning to the term UFO wave. Studying every significant UFO wave from 1936 to the present, Bullard has divided them into several groups. For instance, he notes, some UFO waves focus on a small geographic area. While others are worldwide. Some waves last for weeks and some for months or years.

As far as UFOlogists are concerned, however, Bullard's data are especially important because they suggest that many waves emerge not from social hysteria, as skeptics contend, but from bona fide UFOs. Indeed, to prove this point, Bullard has analyzed two radically different wave patterns. In the first, "explosive wave" pattern, Bullard says, a spectacular sighting receives a lot of publicity. The sighting is quickly followed by many others for weeks or months, until the wave slowly dies. In the second, "gradual wave" pattern,



large numbers of UFO reports accumulate without gaining much publicity at all. While explosive waves may be related to social factors or even hoaxes, Bullard concedes, gradual UFO waves are not. Even when these waves are freely publicized, he adds, there's no discernible increase in UFO reports.

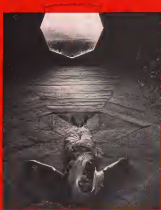
To make his point, Bullard recalls the great UFO wave of 1952. Even when publicity was generated because of reports of UFOs near Washington's National Airport, he says, sightings continued to emerge steadily, without increasing.

Some sociologists find Bullard's theories implausible, to say the least. Sociologist Marcello Truzzi of Eastern Michigan University in Ypsilanti, for instance, says that "several social factors may contribute to why people think they see UFOs and report them, and for why the media publicizes them. The social factors that contribute to UFO waves are probably extremely complex and interactive. So to summarize dismisses social factors in any type of UFO wave is naive."

Truzzi does believe, however, that Bullard's work is important. "It shows that simple social factors cannot explain these waves," he says. "Though when you're dealing with mass behavior, life is ever simple."

Bullard himself concedes that Truzzi may be correct. "But at least I've shown," he says, "that publicity does not always trigger UFO reports with the knee-jerk suddenness that skeptics suggest." In fact, he adds, "I believe people are sighting something to get excited about when they report UFOs. I'm just not sure exactly what." —D. SCOTT ROGO





#### YOGA & BODILY MEDICINE

Yoga is often touted as a means of quieting the mind and achieving a state of well-being and enlightenment. But could the practice also increase a person's ability to tolerate cold?

To find out, Dr. W. Selve-murthy and his colleagues at the Defense Institute of Physiology and Allied Sciences in New Delhi, India, put a group of 15 soldiers on a daily yoga regimen for a period of six months. A control group of 15 soldiers spent the same amount of time on a daily regimen of ordinary physical exercise. The yoga group played

performed yoga postures, did breathing exercises, and meditated. The exercisers ran, stretched, did pull-ups, and played games. At the end of six months, both unexposed groups were exposed to two hours of 50° F. cold.

Surprisingly, the yoga-trained subjects showed significantly less drop in oral temperature, less increase in oxygen consumption, and shivered later and less intensely than their traditionally exercised counterparts. They were quite simply better at tolerating the cold.

Does this make scientific sense? Yes, says Dr. Herbert Benson of Harvard Medical School, who is also president

of the Mind/Body Medical Institute at Boston's New England Deaconess Hospital. "We have found that yoga exercises elicit the same physiological changes in people as meditation," he says. "And during meditation there is a redistribution of blood from the gut to the skin." This phenomenon could explain Selve-murthy's results.

Though Benson emphasizes the need for more work on cold acclimatization, he himself has turned up some corroborating evidence. In one of his studies, he observed meditating monks wrapped in wet sheets in a 40° F. room. These individuals, he found, were able to raise their skin temperatures enough to dry the sheets in just 45 minutes.

Paul McCarthy

*'The Essence of Existence' is 'Buddhahood'*

—Jack Kerouac

*'I think I could stare for ten minutes without blinking'*

—Andy Warhol

#### YOGA NEWS & MEDICINE

John F. Kennedy's years in the White House were he quently dubbed Camelot by journalists who saw romantic links between the young, visionary president and the legendary King Arthur. Now comes word from London-based Burke's Peerage, the world's top authority on royal lineage, that Kennedy may have been related to the real King Arthur.

According to Burke's Peerage publisher Harold Brooke-Baker, the publication has discovered that the fourteenth-century castle of Gwent was "almost certainly" the site of Camelot. Beneath the eaves of the castle sits an Iron Age fort that matches "almost exactly" descriptions of a fort in Arthurian legend. Brooke-Baker says. What's more, the castle had been owned by the Scottish Kennedy clan since antiquity.

If you accept the fact that Arthur's Camelot was located at the Gwenton Castle,



says Brooks Baker. "There's the possibility of a connection between Arthur and the Kennedys of Scotland." Although there are today literally dozens of Kennedy clans, Brooks-Baker adds, it's generally thought that 600 years ago those groups were all related. There's evidence of continual intermarriage between the Irish Kennedys and Scottish Kennedys in the sixteenth and seventeenth centuries, he notes, establishing a blood connection between those groups and the Armenians Kennedys of today.

Brooks Baker admits that not everyone agrees that Camelot was in Scotland—or that it ever existed at all. But he says, "I'm convinced that King Arthur was a real person who ruled this island. Our discovery should entwine his name and that of President Kennedy for all time!"—Sherry Baker



## WITCHES' TRAIL

You can't go anywhere in Salem, Massachusetts, without being reminded that the town was the site of the witch trials of 1692. The newspaper's logo features a witch. Police cars are emblazoned with a witch's silhouette. Even the high-school football team is dubbed the Witches. Now there's a movement to erect a statue commemorating the men and women persecuted at the infamous witch trials. But that memorial has pitted descendants of the accused against the minister of the First Church in Salem, the same church, ironically,

that housed the witchcraft hysteria nearly 300 years ago.

"A lot of people in Salem think cartoon images of witches are harmless. But they don't want a reticent memorial because it would bring up that their town was involved in torturing and killing innocent people," says Howard Hay of Boston, president of the Sons and Daughters of the Victims of Colonial Witch Trials. Hay's group, which has more than 100 members, supports a memorial designed by Salem sculptor Yanna Stefanakis. Set on a pedestal, the eight-foot tall statue depicts Mary Esty and Rebecca Nurse, both hanged as witches, and

their sister Sarah Cloyce who survived. Cloyce is shown with her hand pointing at her accusers as her sisters face their death.

"I want the statue to make people think about the reality of the human tragedy that has occurred here. These were innocent people who were caught up in hysteria," Stefanakis comments.

Before the statue can be erected, however, city officials must provide a site for it. And that has yet to occur. The reason, claims Hay, is local opposition from descendants of those who participated in the witch trials. "They think that our ancestors got what they deserved."

But the Harvard John Fiske of the First Church in Salem denies that charge. "As a Unitarian, I'm for religious tolerance. I'm not opposed to witches at all," he insists. "I'm not opposed to an appropriate monument. I'm just opposed to Stefanakis' proposal because he tried to ramrod it through city council without input from historians, other artists, and citizens."

Sherry Baker

"In Goya's greatest scenes we learn to see the people of the world exactly at the moment when they first attained the idea of 'suffering humanity'."

—Lawrence Sanders

## DEATH AND THE AFTERLIFE

A man dreamed he was opening a checking account when two armed robbers burst into the bank. The dream was so vivid the man felt compelled to tell a friend about it the next morning. Later that same day, the man was opening a checking account when the bank was robbed, just as it had been in his dream.

Atlanta psychologist David Ryback thinks stories like this one show that people may be particularly open to psychic experiences in their dreams. Surveying 433 college students, Ryback concluded that 1 in 12 had in fact experienced paranormal dreams, more than half of these dreams, he says, were precognitive.

In *Dreams That Come True* (Dolphin Doubleday), Ryback recounts a series of such dreams reported to him. One woman, for example, woke up terrified and told her husband she had dreamed of being struck by a train. A few weeks later she was killed while trying to save her daughter, who had wandered in front of a train. Another woman, while away from home, dreamed her house had been robbed. She soon learned that her home had been broken into and that the objects she dreamed had been stolen were the ones taken.

Ryback believes that the ability to have psychic dreams can be encouraged. "People should write down their dreams and consider the possibility that what they dream might come

true," he says. "If the dream seems to be a warning, they should do whatever they think they should to prevent it from happening."

But University of California at Santa Cruz psychologist G. Willem Domhoff says many of these dreams are not psychic at all. Most of them, he notes, "are coincidences. And others are vividly insightful, but not psychic. You can see an old friend and think she doesn't look well. You repress that thought. Then you dream she's dying. When you learn two weeks later that she has cancer, you can think you had a psychic dream. But what you did was pick up on the fact that something was wrong." —Sherry Baker

## THE AFTERLIFE

If you've ever had a near-death experience or think you've seen a ghost, you may want to mark October 14 on your calendar. That Saturday has been declared Life After Death Day by the Extension of Life Foundation, a group founded by Georgia psychic Patricia Hayes. According to psychic Joan Meddledich, who works with Hayes, people around the world will gather in parks at three p.m. local time to show their support for the existence of life after death.

Meddledich claims she has not only received messages from spirits "on the other side," but has even seen her grandmother's ghost. L.

was thirteen and my baby had just died. I was in the hospital and unable to go to the funeral because I had had a cesarean section," she recalls. "I looked across the room and saw my grandmother, who had died when I was twelve. She appeared sad and she said in her cockney accent, 'Now what are you crying for? Everything will be all right. I promise. After blowing me a kiss, she disappeared.' Meddledich, who insists she was not under the influence of any medication when the incident occurred, did not tell anyone about it until six years later when her sister came to her with a similar story.

Life After Death Day will feature similar testimonies. "But our primary goal is to get people who have had near-death experiences to realize that they are not alone," she comments. "If more and more people speak out about these experiences, then more people will accept the reality of life after death, even though it can't be validated through scientific analysis."

York University psychologist James Alcock says, however, no matter how many people participate in Life After Death Day, it won't prove anything. "It will not provide evidence of life after death just because people meet in groups and have magical beliefs," he notes, "doesn't make those beliefs true."

For information on participating in Life After Death Day, call the Patricia Hayes School of Inner Sense Development at (804) 482-2772.

—Sherry Baker



have tried to make amends in my latest, thirteenth novel, *Any Old Iron*. Manchester's talents—at drama, music, and fiction—migrated south: London in spite of the immense differences in civic temperament, has always found it easy to absorb the best of Manchester but only when that best has already been proved. What Manchester thinks today, London will think tomorrow.

My native city, then, is not what it was. Napoleon was defeated by the lessons he taught other armies and Manchester, teaching the cotton technology to nations without trade unions, ceased to be Cottonopolis. Manchester used to be European before the concept of a united Europe existed; now while all England prepares to join Europe by a land road, Manchester has become Asiatic. But this northwestern Asia speaks with a Manchester accent. If I regret the disappearance of the shabby tiger I used to know, I am proving myself stupidly resistant to the current of history. But memory preserves reality, and my own memory will not permit that greater Manchester to die.

As for the future, we must accept a kind of homogeneity that makes one English town very like another. London is the great exception, but London is not a town but a country. England, with Manchester and Birmingham in the forefront, led the world into the Industrial Age, but that age of great smoking chimneys is over. England delivers "ironcast," whatever they are, and is curiously interested in tourism. Industry has become industrial archaeology, cleaned-up, dried, apt for the photography of foreign visitors. The towns grant evidence mostly of small commercial retail shopping malls and plants in tubs, reasonable restaurants whose chefs are young and have been trained to produce an adequate ratatouille. Manchester is bland, and the old industrial life and style have been transmuted into epidemic gang warfare and the mugging of old-age pensioners. This is the pattern of the European future.

At the turn of the millennium, when you will be able to drive from Shoredrop to Manchester without even an awareness of the famed Channel—granted that you should want to drive to Manchester at all—the homogeneity of England, close to that of Europe, will be taken for granted. But despite the centring forces of radio, film, and television, there will still be a Manchester temperament, expressed in Manchester speech that will have resisted the bland leveling. The vowels will be close to Shakespeare's and epithets like greedily and champion will express cautious approval. Old men will still say "Do's gotten chip pan on," instead of, "My wifes cooking the dinner," and if your feet are wet, you will be wether. You will go to

Manchester to meet Mancunians, the fiercest, fiercest foreigners in the world—Anthony Burgess

#### THE PRESENT

**Hong Kong.** It is the greatest place in the world for tourists, a kind of megamall for American shoppers, as well as for Malays, Filipinos, and people from all the great nations of the Pacific. The gateway to China, Hong Kong is safe, well policed, well organized—a buccannering place. You go there to make money; that's the purpose of the place, an emporium for everything.

The world is looking toward what it sees as the imminent meeting or clash between the Communist East and the capitalistic West when China reclaims Hong Kong in 1997. But it isn't an imminent meeting. It's been going on for a long time. Any ruling power in China has always reached the throne with bloody hands. Hong Kong is ready for anything.

Manchester  
used to be European before  
the concept of  
a united Europe existed;  
now, while all  
England prepares to join Europe,  
Manchester has  
decided to become Asiatic.

Buildings are enormous now, but they tear down a building and put up a larger one. The horses from the Jockey Club exercise on the roof, schoolchildren do as well, to save space. A building is razed every three years, period.

The way of life in Hong Kong will not be threatened in any substantial way either by technology or by the passing of time. Technological inventions come and go, items come and go, perceptions and policies please expedience, but Hong Kong residents never put their trust in them. The only thing the people trust is the family. If you are part of a family, you are immortal.

I've already reserved my place at the Mandarin Hotel for July 1, 1997. The whole place is nearly booked up for that year.

—James Clavell

**Tokyo.** Today the young people of Tokyo are very different from my generation. There are more single people, more people marry later and have fewer children. These people belong to the new era that is not national but international. They belong to the real global age. An end space

technology, telecommunications, and computer technology travel and transportation innovation have opened the gate of a new era.

For the first time in the long history of the earth and the long history of human beings, we face the problem of urban civilization. A human being who wants to live a full life as a human should live in an urban area, not in the wild. The most humanistic life is realized in urban areas: with electricity, water supplies, apartments, security, education, health care—all the opportunities to live a meaningful life.—Sakyo Komatsu

**Lagos.** At present the city of Lagos is grossly inefficient, congested with traffic, and very overcrowded. People sit on top of one another. People build in places without access roads or any utilities. Yet they choose to come to Lagos because life in the rural areas is drudgery. The trend is clear. People congregate in cities, and it's happening all over the world. In order to make urban life as civilized as possible, we must become wiser.

Ideally there should be a constant coming and going between city and village, to be able to live well in a city such as New York and still return to a village and take a bath from a bucket. This flexibility will moderate some of the harshness of life in the city. If more people were aware of this life, appreciated it, and lived it, then relationships in the city would improve. We should be adaptable enough without having to climb mountains as a kind of sport to be able to live on a daily basis if need be: the way the "other half" lives, without any special training or skill, without feeling self-conscious.

Already there has been some recognition that pressure must be taken off Lagos so that it might become livable again. Recently the federal capital was moved out of Lagos to Abuja, a more central position in Nigeria. This was an attempt to simply reduce the high concentration of things in one small corner of the country. But Lagos is very greedy. It sucks in everything. The future nightmare of Lagos is the stopping of all movement. We virtually came to that point at the height of the so-called oil boom. There were so many cars on the road that nothing helped to restore movement. There was a demand that cars with even-number and odd-number registrations should ply the roads on different days. People simply bought two cars. Friends of mine woke up at four o'clock in the morning to be in the office at eight. They're trapped in the heat and traffic. It's something beyond most people, and it turns us into very strange beings. That's no life.

We must get back to a city where traffic moves; where people can even walk. People cannot walk in Lagos. You'd be a madman to try walking anywhere in Lagos. So we must create a city that is a human place. These are not extravagant,

romantic dreams; they are the basic things that the village takes for granted.  
—Chris Achille

**Moscow** I returned to Moscow in the spring of 1988 for the first time in nearly 14 years. There was a tremendous psychological and political change among the intelligentsia. Friends of mine in journalism, in music, in art, in the theater, in the cinema industry were bubbling over with a new sense of freedom. The air was intoxicating. It was as if they were breathing ozone for the first time in their lives. But very little had changed physically in 14 years. The architecture and the feel of the city was very much the same: hokey, low, Khrushchev-style five- and nine-story—five and nine were his two favorite numbers, I don't know why—apartment buildings.

When I walked into the Intourist Hotel, the first impression I had was Proustian. I was clobbered by the smell of the disinfectant—an acidic, stinging-salts odor, exactly the same smell I remembered 14 years ago. I went upstairs to find the same small room, a bathtub about half the size of a normal bathtub, a bath towel about the size of a hand towel, and a bar of soap about the size of a silver dollar.

In the grocery and meat stores in the old Arbat, there was the standard fare: potatoes, cabbages, cucumbers, a few carrots, some grungy green oranges, a couple kinds of salmon and bologna. Very discouraging. Materially, it looked as though life had slid backward in 14 years, at best they were standing still. The country, I thought, hasn't changed at all. It's exactly the same because Soviet society is an extraordinarily conservative society and does not welcome change, despite the fact that they have an ideology that preaches change.

There isn't any question, however, that modernization is what perestroika is all about; it's not about falling further behind. Gorbachev's primary focus is to tap modern technology so the Soviets can compete on the world market. And if Gorbachev isn't toppled, we're going to see an inflexion in the arts list. It's already beginning to happen, particularly in new documentary films, which portray prostitution, the problems of Afghan veterans coming home, and maverick kids who are persecuted by the collective. Some people are beginning to question the value and the supremacy of the collective against the individual.

—Hedrick Smith

**Venice** Let Venice sink. It is just too fragile an idea or image to survive the pressures of a modern world, especially of modern tourism. Millions and millions of people are pouring in over the causeways to destroy the very fragile beauty that they have come to see. Venice is an object lesson to us all to resist the unending pressures of tourism, a tourism so

thoughtlessly encouraged both by states and by the financial community. The world is not equipped, really, to have such places as Venice in its charge. Let it sink. It's a God-given cry. I think God made the city and God should take it away.

Venice has been very successful in showing itself off over so many centuries, until now. What remains, and is still unbelievably beautiful, is the essence of the city—distinct from the art and architecture. It is partly a matter of the city's design, partly a matter of light. Venice has always been a translucent city, a place of swishing sunbeams and incandescent mornings. The atmosphere is remarkable for its clarity, which can confuse one's sense of distance and proportion. It is partly a matter of texture. Venice is a place of voluptuous materials: marbles, porphyries, and alabaster, velvets, damasks, and silks. It is partly a matter of movement. The gondola is a vehicle of beautiful locomotion; if only you have a chance to

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●Paris's biggest  
commitment is to change.  
After all, the  
very nature of fashion is  
that it is always  
changing, and French taste  
is formed around  
fashion, change, or fate.●

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see it, if only you can find the moment of relative stillness that will enable you to see it. Perhaps the answer will be to see it at nighttime or dawn.

By today's standards of technological problems, Venice's problems are relatively simple: the rising water and the air pollution, which have damaged the monuments. I'm sure the environmental problems will be solved, but that is a far less difficult problem to deal with than the one of giving the place a purpose and protecting it simply from its own popularity. With popularity comes degradation, which is already creeping in. Venice feels cheaper than it used to. It's more ridiculous, more vulgar, more crowded.

A symbolic moment of change came recently when the four horses, the golden horses of St. Mark's, were removed and replaced by model ones, sham ones. They don't look bad, but once you know they aren't the real thing, you realize a moment of change has occurred; the city is no longer real. It had given up trying to be real and has decided just to keep itself in good order to show itself off to the tourists. Poor old Venice.—Jan Morris

**Paris** Today there are two Parises: the traditional Paris of the French and a Paris composed of three large groups of immigrants: blacks from the Antilles or from Africa, Arabs from North Africa, and people from Vietnam and China. This vibrant immigrant culture is changing the face of Paris. You hear the drums beating when you walk down the street, you see whole areas where all the signs are written in Arabic or Chinese.

Everything works in Paris: the Metro, the post office, the telephone. Citizens who have a telephone have a home computer and they use them to order dinner, bank, make travel arrangements, cruise each other. In the haute couture houses, right along with beautifully handmade little buttons, fabrics are cut by lasers. The streets are cleaned every morning. The city sparkles. It's really a beautiful city, though a regimented one. Police are on every corner. There's a very low crime rate.

The Spanish architect Ricardo Bofill designs buildings that may represent the future of Parisian architecture. He uses the classical vocabulary in a playful manner: a triumphal arch in which people live, an aqueduct flung out across an artificial lake, but instead of being an aqueduct that bears water, it's actually apartments hanging over the water; an amphitheater composed of underground garages and aboveground residential quarters. The approach to classical vocabulary fits in with the way the French view the world, at once innovative and conservative.—Edmund White

**London** Our nightmare is overpopulation. Perhaps Prince Charles will one day move out of Buckingham Palace, and of London to tell people it is too large. Already a sharp critic of much that came from La Courbière, Charles rejects the idea of stuffing human beings into huge high-rise buildings, just like ant heaps. Now the high-rise idea is ridiculed, architects and planners favor garden cities. People must learn to enjoy living in these. More political power, more artistic centers, galleries, and concert halls need to move into provincial cities like Bristol and Manchester so people don't feel obliged to go to London to see new exhibitions and the latest entertainment.

The English temperament changes slowly. There is a sloughing off of many old Puritan character traits like obsession with work and the ancient hatred, profound hatred, of pleasure. This unflinching of character is not without drawbacks. The British are now the driest, most litter-scattering nation in the world. But intelligent people are more aware of both town and country. They must be made able to live in both places; to travel more easily between them. City dwellers, who once turned their backs on their poets and artists, begin to be dimly aware that turning their backs on the farm

on nature, on trees and the countryside will cost them a dreadful price. Like sheep that go into great pens, they cannot see the outside world anymore. The world suffers with people: decentering and returning in part to nature are the only answers. Men and women used to think the good life was where the most people were. It's obvious nowadays that that is the worst life.—John Powles

**New York:** In the age of chutzpah and Donald Trump, New York is the capital city of greed. It is very hard for anything idealistic to happen there. The city is always on the verge of being torn down and rebuilt in connection with the latest real estate entrepreneurial trend. It has nothing to do with what authors or artists or philosophers would hope for New York.

As telecommunications enables people to work wherever they choose, more and more New Yorkers will choose to work outside the city because of traffic congestion and revolting taxis. New Yorkers are taxed three times on the same income for the pleasure of fighting their way through a crime- and disease-ridden city where you can't even get a taxi.

If I were mayor—a job I don't want—or cultural affairs commissioner—a job I don't want—it would be understood that the lifeblood of New York, both commercially and creatively as artistic. It is the arts that have brought people into New York, that have brought business to New York, that have brought the real estate boom to New York.

While New York is a great city for deal-making—it's a city full of static and charge and electricity—it's also the worst place in the world to do contemplative work. Less literature will be written in New York and about New York, because it is becoming such a very difficult city for a writer to live in. You know, Hemingway described literary New York as a jar of tapeworms leeching on each other. I don't think anyone has improved on that definition. You could spend every day and every night of your life in New York going from one fund-raiser to another where you would be lunch or dinner, but the space to create the next work is not respected. That's not the case in other places. You can live in London and write a novel. You can live in Venice and write a novel.

New York's creative juices are being squeezed out by the lack of affordable space for artists. Real estate greed has driven out the very people who have made New York what it is. If we want to keep the vitality of New York, we have to make it an artists' center in the future. And I don't see how it would hurt us to devote certain areas of the city to places where artists could live and work.—Ence Jong

**New York:** New York is a city of tall buildings and very low culture in which dress designers and interior decorators are the social superstars of the people they work

for. There is no society here in the old sense; there are only people with money. They're the newly rich, and what they seem to enjoy most is going to parties for which the guest lists are given out in advance to the gossip columnists and at which no statement of any set or intelligence is ever reported. And the reigning celebrities in that high society are those interior decorators and the fashion designers. The couples appear to have nothing more worthwhile to do with themselves than engage in lopsided philanthropies of no real benefit to anyone but the fund-raisers. An outsider reading *The New York Times* would conclude that what New Yorkers are most interested in reading about is food, fashion, and money.

Economically New York City must continue to degenerate and become more and more of a slum, with certain clusters of high rises in which people live fairly cramped, hurried, and antiseptic lives. There are too many poor and not much that can

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be done for them, as there is very little of any kind of sense of community. The tension in the city will increase, the squalor will increase, the crime will increase, the amount of drug use will increase. There are already too many criminals to arrest, too many court cases, not enough policemen, not enough courts, not enough prisons. It will make no difference who is mayor or governor. Politically, New York City has always been a cesspool. The place is now ungovernable.

What might be done cannot be done in a free society, and we are talking about a New York that will exist in the free society that is democratic America. I do not think a democracy normally contains the means to arrest its own decline. A society cannot remain democratic and at the same time become totalitarian in expelling its poor or dictating to the rich.

If I were my city, I would eliminate poverty, improve education for the young. I would want families to have a good diet and enough hope to perceive that they have a future in which their lives could become better—and I would not know how to begin. Everything takes money

but the money is not there, and it won't be there as the number of the impoverished proliferates. In New York, as everywhere else in the country there is a horrifying absence of compassion. And I think these two things—the proliferating poor emerging into public visibility and the lack of compassion—are going to make for continuing social disaster.

What is still true is that if I had to choose a city to live in again, Manhattan would be my first choice. Manhattan will continue to draw the majority of the most creative, ambitious, and intelligent young people. The city is one of the handful of places in the world that are most worth going to. It is a large city; it is a city of opportunity. There are more bright, witty, intelligent, ambitious people in Manhattan, I think, than one can find anywhere, except possibly in certain districts of London. And I think all of that will last for some time. I don't know why it should, but it will. Still, I cannot imagine any other American city making it.—Joseph Heller

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**Chicago:** "Fifty hands wanted." Hands is an old-time word for working people. In its origin and base, Chicago is a city of hands, a blue-collar town, not a city of paper like New York, San Francisco, or New Orleans—the "story" cities. They are supposed to have a certain sense of grace that Chicago lacks. Chicago has never been characterized as gracious. Think of Sandberg's poem, *coony* though it may be: "Hog butcher for the world/ Tool maker, stacker of wheat/ Player with railroads and the nation's freight handler/ Stormy, husky bawling/ City of the big shoulders." Today the steel mills have closed, the packing town has shifted to other communities nearer to the feedlots, and we all know what has happened to farms, the demand for farm equipment, railroads, and passenger trains.

Chicago will be a starting point, a focal point, for the great upheavals of the future, when our economy is no longer industrially based, and, somewhat later, when the limits of a high technological society are recognized. Will these realities make for a disaster in the future? Will there be violence? Will there be a depression? Sure. I don't see how we can avoid it if we keep going as we are. Chicago could start off the chain reaction. It's a key city, a typical American city. It's a microcosm of Americans' problems: racism, class struggle, suburban flight, political and social alienation between suburb and city. Chicago has been the site of numerous civil upheavals, scandals, disasters, including bitter labor disputes, gangster wars, the 1968 Democratic convention. Perhaps most of all Chicago is more theatrical than other cities, the Big Daddy of corrupt cities, the creation of Warner Bros., of Jimmy Cagney and Edward G. Robinson. Because Chicago is typical yet more theatrical, it could be the center of activity or attention

for many of the problems facing cities throughout the country.

There's a surrealism to life right now that cannot last forever. The discrepancy in Chicago between the haves and the have-nots will become more acute because it is a city of hands, not a city of paper. The landmarks are disappearing from a city known as the architectural Athens, what with Louis Sullivan, Frank Lloyd Wright, and Mies van der Rohe. The city's plan and skyline is threatened by new horrendous, completely uninspired buildings. The elevated train, of course, is going. They'll put it in a spaceplane or bullet train.—Suds Terkel

**Los Angeles:** William Iwen Thompson wrote that California is not so much a state of the Union as it is an imagination that seceded from our reality a long time ago. In the transition from industrial to post-industrial society, California is leading the way. It became the first state to shift from coal to oil, from steel to plastic, from hardware to software, from materialism to symbolism, from reality to fantasy. California first discovered that it was fantasy that led reality, not the other way around. But as we head toward the twenty-first century, the Pacific century when LA will be the last city of America, a kind of stifling bureaucracy will take over.

Los Angeles no longer regards itself as the second city in this country. The claim of Los Angeles to be coequal with New York could have been depressed as innegociable except for one factor: Los Angeles had Hollywood. There have been two aspects of American culture: the print culture, located in the East, and the image culture—the movies—in LA. Eastern interpreters indicated the Hollywood scene: the movie moguls. But the battle lines were drawn: the opinion media of the East versus the Western image media of movies and TV. The spoils went the hearts and minds of America. America now defines itself by the image culture, and that culture will remain in LA.

Physically, the city the basin city, the part of the city that people think of as Los Angeles, has no room to expand. There are no open spaces, but the city grows and will continue to grow. Like other cities, Los Angeles is becoming high rise to death, which is sad. It's not going to stop. Downtown LA is a hodgepodge of mediocrity full of box buildings.

Los Angeles is not like New York, and that is largely because of the climate. Life in cities, I think, is always dictated by the climate. People from the East complain the California doesn't have seasons. But it has two seasons, and they're two apocalyptic seasons: the late season and the rainy season. In the fall, ice comes down the hills, through the canyons, fast, like a runaway freight train, burning whatever object is in its path. In the spring the rains come and the mountains fall down. And earthquakes. There's the ever-pres-

ent possibility of a cataclysmic tremor that can destroy half the city. Psychologically knowing you sit on top of a bowl of Jell-O does not make for a great sense of permanence. It gives you more of a sense of mortality, of this catastrophic mortality over which you've got no control. That kind of attention to the elemental forces of nature is unusual for a city to possess.

—John Gregory Dunne

**Los Angeles:** Los Angeles won't exist by the middle of the next century. It's doomed, and I'm sorry to say that, because it was beautiful country, rather like Kenya, with rolling hills and Mount Baldy always with a little snow on it, in the background. And very pure air.

Unfortunately, there's really nothing to do. It's no longer matters how much pollution from automobile exhaust is controlled. The geographical inversion, like a leakup, is placed upside down over LA. The smog really is frightening—gray.

---

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mustard-colored, brownish gray, which just settles in and doesn't move. Children never run. It's terrible. Every person, every automobile adds to it. There is nothing to do. It's too late, much too late. Too many people and not enough air to breathe. Los Angeles is not a city; it's not an entity; it's an occasion, a great confusion.

Before its end, whether it comes via the Big One—what we all look forward to on this coast—or otherwise, people are trying to survive. They are moving up or down the coast to escape the smog, but the smog rolls in. An electric trolley now runs between San Diego and Tijuana—an experiment to see if people will travel by train instead of using buses or automobiles. It won't be successful, because everything is controlled by Standard Oil.

Artists and intellectuals arrive in great numbers and intellectual and cultural life is very good. In fact, culturally Los Angeles is more like Paris, a place of great creative incentive, not like San Francisco, where life is too good and too charming and too wonderful, a dreamworld. And when people dream, they don't create. In LA people are driven to do something.

People live on their wits, on their own resources. There's a looseness, a daring, a "Western" quality about Los Angeles. More and more people live off of the electronic revolution, especially the kids. It's become apparent that it's silly for older people to understand young people. They don't want to understand older people and older people don't want to understand them either. It's silly for us to think we can reach young people except by empathy and love. Fortunately, human love is here to stay, but it expresses itself in different ways. And human love may be about the only lasting thing in the world. Sounds a bit mawkish, but I do mean it.—MFK Fisher

**Mexico City:** I Speak of the City [for Eliot Weinberger]

I speak of the city built by the dead, inhabited by their stern ghosts, ruled by their despotic memory.

The city I talk to when I talk to nobody, the city that dictates these insomniac words.

I speak of towers, bridges, tunnels, hangars, wonders and disasters, the abstract State and its concrete police, the schoolteachers, jokers, preachers.

The shops that have everything, where we spend everything, and it all turns to smoke.

The markets with their pyramids of fruit, the turn of the seasons, the sides of beef hanging from the hooks, the hills of spices and the towers of bottles and preserves.

All of the flavors and colors of the smells and all the stuff, the tide of voices—water, metal, wood, clay—the bustle, the haggling and conniving as old as time.

I speak of the buildings of stone and marble, of cement, glass and steel, of the people in the lobbies and doorways, of the elevators that rise and fall like the mercury in thermometers.

Of the banks and their boards of directors, of factories and their managers, of the workers and their incoherent machines.

I speak of the timeless parade of prostitution through streets long as desire and boredom.

Of the coming and going of cars, mirrors of our anxieties, business, passions (why? toward what? for what?).

Of the hospitals that are always full and where we always die alone.

I speak of the half-light of certain churches and the flickering candles at the altars.

The loud voices with which the cloistered talk to saints and virgins in a passionate, failing language.

I speak of dinner under a squaring light at a limping table with chipped plates of innocent tribes that camp in the empty lots with their women and children, their animals and their ghosts.

Of the rats in the sewers and the brave sparrows that nest in the wires, in the

comicos and the martyred innoc  
of the contemplative cats and their lib  
erine novels in the light of the moon, cruel  
godless of the rooftops

of the stray dogs that are our Francis  
cans and thievers, the dogs that scratch  
up the bones of the sun,

I speak of the anarchists and the liber  
tarian brotherhood, of the secret plots of  
law enforcers and of bands of thieves,

of the conspiracies of lawless and the  
Society of Friends of Crime, of the Su  
icide Club, and of Jack the Ripper

of the Friend of the People, shipwre  
cker of the guillotine, of Caesar, Delight of Hu  
mankind,

I speak of the paralytic slum, the  
cracked wall, the dry fountain, the gra  
ffited statue

I speak of garbage heaps the size of  
mountains, and of melancholy sunlight  
filtered by the smog,

of broken glass and the desert of scrap  
iron, of last night's crime, and of the ban  
quet of the immortal Tiresias,

of the moon in the television antennas,  
and a butterfly on a tizzy jet,

I speak of dawn like a flight of herons  
on the lake, and the sun of transparent  
wings that lands on the rock foliage of the  
churches, and the twittering of light on  
the glass stalks of the palaces,

I speak of certain afternoons in early  
fall, waterfalls of immaterial gold, the  
transformation of this world, when every  
thing loses its body, everything is held in  
suspense,

and the light thinks, and each one of  
us feels himself thought by that reflective  
light, and for one long moment time dis  
solves, we are air once more,

I speak of the summer, of the slow night  
that grows on the horizon like a mountain  
of smoke, and lit by bit it crumbles, fall  
ing over us like a wave,

the elements are reconciled, night has  
stretched out, and its body is a powerful  
river of sudden sleep, we rock in the  
waves of its breathing, this hour is limi  
table, we can touch it like a fruit,

they have lit the lights, and the ave  
nues burn with the brilliancy of desire, in  
the parks electric light breaks through the  
branches and falls over us like a green  
and phosphorescent mist that illuminates  
but does not wet us, the trees murmur,  
they tell us something,

there are streets in the half-light that  
are a smiling intimation, we don't know  
where they lead, perhaps to the ferry for  
the lost islands,

I speak of the stars over the high ten  
nices and the indecipherable sentences  
they write on the stone of the sky,

I speak of the sudden downpour that  
lashes the windowpanes and bends the  
trees, that lasted twenty-five minutes and  
now, up above, there are blue slits and  
streams of light, steam rises from the as  
phalt, the cars gleam, there are puddles  
where ships of reflections sail,

I speak of nomadic clouds, and of a

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# The Artist

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How can I be  
like you?

Simple - To be a winner  
you have to  
look like one



Any questions?



Which way  
to the  
pawmshop?



Simple  
may not  
be the  
right  
word





# BRAINSTORMS

CONTINUED FROM PAGE 74

access to information from other parts of the world. The improved access will have some drawbacks. The threat of cultural "Western" homogenization may trigger a retreat to traditional ways of thinking and even religious fundamentalisms, such as the Islamic revival that swept Iran. New communications technology may also have disconcerting effects in the world's poorest nations, as people contrast the life-styles they see on television with their own.—*Francisco Sagasti, GRADE, World Bank*

**UNITED STATES** By the end of the century the United States will have completed an "informational superhighway" of fiberoptic cables from coast to coast. The digitized system will carry voice and digital data, enabling users to talk, send television pictures, and communicate with computers on the same line. One result will be high-quality western telephones; another will be a system whereby cable TV viewers send as well as receive information, thus ordering from hundreds of movies the one they wish to see.

Advances in telecommunications will accelerate a trend toward "anticipatory democracy" in which people become more involved in government decisions. Citizens will use home-based computers to research the issues. Then they will vote via computer. The referendum initially will serve advisory functions; later they will become binding. Political parties will decline as the influence of such polling increases.—*Robert Olson, Institute for Alternative Futures, Leland Johnson, The Rand Corporation, Santa Monica, CA*

**EUROPE** Computer consoles will be attached to the telephone in every home. Users will have access to a continent-wide database providing information on everything from train schedules to shopping services and offering instantaneous public opinion polls.—*FAST, European Economic Community, Forecasting and Assessment in Science and Technology, Brussels, Belgium*

**SOUTH AMERICA** Farmers isolated in rural areas will use information gathered from telecommunications systems to direct their crops to countries willing to pay the most. They will thus avoid corrupt middlemen and find the highest market.—*GRADE, Lima, Peru*

"We are drowning in the wealth of the information age. We have the information but no way to organize it."—*James Benart, Foresight Institute*

## THE HEALING ARTS

"Dave, call your doctor!" It wouldn't stop. Even now the nagging continued.

"Quiet!" he hissed. He knew it wouldn't help. The sensors in the arms of his La-Z-Boy rocker had already detected his

quickening pulse, his systolic and diastolic pressures. The impulses went directly to a medical computer programmed with everything from his particular genetic sequence to the details of his personal nutrition. In general it helped. At fifty Dave still looked thirty-five. But today he didn't want help. It had been only two months since the divorce. Today he wanted privacy.

"Dave, your blood pressure is way up," said a voice within the chair. "Your pulse is too fast."

"Clement!" said Dave. He didn't need the furniture to tell him about stress. He got off the chair and went to the bathroom. A display flashed over the toilet: UNBALANCED BALANCE OF STRESS-RELATED HORMONES.

He went to the refrigerator and punched the button for a beer. Nothing happened. "Given your current stressful state, alcohol ingestion is not recommended," the fridge said.

Monitoring technology will be embedded in the home. The toilet will analyze urine; a favorite chair will take blood pressure and feed it to a computer filled with medical expertise.

"All right already. I give up!" He stomped to the telephone and called his doctor's number.

"I'd like to make an appointment with Dr. Frank," he told the secretary.

"He knows," said the secretary. Dave's vital statistics had long since been transmitted to Dr. Frank's computer. "We've been expecting your call."

**UNITED STATES** Advances in biotechnology will make Homo sapiens the first species capable of controlling its own evolution. The current project to decode the human genome will eventually produce a genetic road map of specific human characteristics. With this map it may be possible to manipulate the genes, thus stimulating the production of specific hormones and enzymes before a child is even born. Using this technique, parents and doctors may be able to eliminate genetic disease, select for blue eyes, or engineer athletic ability in the unborn.—*Stuart Kaufman, J. M. Smmons, Santa Fe Institute, Santa Fe, NM*

By 2010 home health-care monitoring systems will diagnose disease recom-

mend treatment, and communicate with physicians' and pharmacists' computers. Monitoring technology will be embedded in the home. The toilet will analyze urine; a favorite chair will take blood pressure and feed it to a computer filled with medical intelligence; if the patient's blood pressure has increased since the last reading, the system will recommend a course of action. Patients' genetic sequences will be on file at the pharmacy, enabling the pharmacist to tailor medications to each individual's genetic makeup. Tiny computers will be implanted at nerve cells to stimulate artificial limbs, enhance memory, and improve the ability to taste, smell, see and hear.—*Clement Bezold, Institute for Alternative Futures*

Nanotechnology will bring medical care to the molecular level. Doctors will inject tiny antennalike machines capable of attacking bacteria and viruses. Some will travel the bloodstream, destroying foreign bacteria. Others will fight viral infections. They will enter a cell, unwind the DNA helix, proofread the genetic material, edit out any viral material, and then repackage the cell with all the proteins back in place. Eventually people may choose to walk around with nanomachines inside as an integral part of their immune systems.—*Jonathan Peck, Institute for Alternative Futures; K. Eric Drexler, Foresight Institute*

**SOVIET UNION** Medical care, widely considered catastrophic in the USSR, will lag behind the West's well into the twenty-first century.—*Andrei Piontovsky, Institute for Systems Studies, USSR Academy of Sciences, Moscow*

**EUROPE** Life expectancy will inch toward age ninety and beyond. As a result, treatment of senility will become a growing concern, and the aging population will place a heavier toll on public health-care systems. In the end society will object to heroic life-saving measures for the very old.—*FAST, European Economic Community, Forecasting and Assessment in Science and Technology*

**PACIFIC RIM** As traditional Chinese medicine such as acupuncture and qigong gains increased stature in the West, more Americans and Europeans will travel to China to search out cures for cancer, AIDS, and other life-threatening diseases. Special clinics just for foreign patients will emerge as a staple of the Chinese medical establishment.—*Lin Hoshang, associate director of the Qichong Research Institute, Shanghai Academy of Sciences, Shanghai*

Artificial hearts, kidneys and muscles will become commonplace. Protein engineering will make it possible for doctors to create artificial organs with materials that are virtually identical to human tissue but that resist rejection by the recipient's immune system. People will die not from disease but from the natural breakdown of body tissues.

For the Japanese, average life span may reach as high as one hundred in the next century. But it is doubtful that much further progress will be made, because of the basic instructions that are programmed into the body's DNA.—Dr. Takemochi Isha, professor of medicine at Tokyo University, Tokyo

**MIDDLE EAST:** Building on its current medical infrastructure, Israel will become a regional center for medical treatment and training, specializing in services to the Third World, Arab countries, and southern Europe.—Jon Bisk, Foundation for Israel in the Twenty-First Century, Kfar Sava, Israel

**SOUTH AMERICA:** The region's main health problems will remain the "poverty diseases," including intestinal and respiratory disease, malnutrition and infectious disease that can be prevented through vaccination. Pollution-borne disease will increase. Periodic epidemics will arise as First World pharmaceutical companies dump stocks of expired medicines or of medicines not approved by the Food and Drug Administration. Such epidemics will fall into two categories: diseases such as diphtheria and polio, which spread due to expired vaccines and because people do not get vaccinated, and deformities from inadequately tested medications such as thalidomide.

The well off will travel to hospitals elsewhere for modern treatments.—CELATIS Latin American Center for Social Work, Lima, Peru

**AFRICA:** AIDS will spread across southern Africa along transportation and migration routes. A number of AIDS-like epidemics may emerge as the HIV virus continues to change.—William B. Johnson, The Hudson Institute, Peter Speis, Institute for Futures Research, University of Stellenbosch, Bellville, South Africa

"Nanotechnology will make us look back at surgery with scalpels the same way we look at the use of leeches today."

—Jonathan Peck, Institute for Alternative Futures

## ENERGY

International Herald-Tribune, November 21, 2005

**STEVEK YAMAM DEAD AT 85: MADE FOR TIME AND LOST IT IN OIL, HOLLAND.** Saudi Arabian sheikh Ihab Yamani, who made a fortune in oil sales and then lost it when the market for local fuels collapsed, died of heart failure yesterday in his home in St. Moritz, Switzerland. He was eighty-five. For decades the sheikh was one of the world's richest men. He lost that position during the Arabian oil embargo of 1996, which he helped precipitate in order to drive up oil prices. Nations had been using so much solar, nuclear and

proliferative Middle East Peace Initiative "Once you have solved the resource problem, people will talk peace."

The sheikh's last major project involved building a 20-square-mile array of photovoltaic cells in the Arabian Desert. That project is scheduled to begin sending electricity to Europe next year.

**WORLD:** Fusion energy, which will probably become commercially available by the mid twenty-first century. As energy prices rise, more and more nations will turn to alternative energy sources like solar power and conservation. Photovoltaic cells, which directly convert sunlight to energy, will become economical enough to supplement power plants during peak power needs. In nuclear technology a second generation of power plants—smaller, less expensive, and safer than today's—will emerge.

The Soviet Union will become the primary energy source for Europe as the completed trans-Siberian pipelines supply the continent with natural gas.

The world's deserts, with their abundance of sunlight, will serve as enormous sources of solar electricity. With current transmission technology many deserts are too remote to supply useful electricity, too much is lost as leakage along wires. The development of superconductivity will eliminate that

leakage and make it feasible to transmit vast amounts of power from deserts to urban centers. Enormous wastelands like the Sahara will become the sites of enormous photovoltaic arrays.

In much of South America, Asia, and Africa the use of charcoal and fuelwood will continue to destroy forests.—Joel Darmstadter, Resources for the Future, Washington, DC; International Institute for Applied Systems Analysis, Banská Bystrica, Center for Technological Analysis and Forecasting, Tel Aviv University, Tel Aviv, Economic Commission for Africa

"Garbage will be one of the great resources of the future."—Joseph Coates, J. F. Coates, Inc.

Some guys know.

English Leather or nothing at all.

recycled energy by then that the withholding of oil had little effect. Oil prices dropped after that and never recovered.

Sheikh Yamani funded several projects that became important energy sources in the once-troubled Middle East. He provided seed money for Arab-Israeli energy exchanges, which included the construction of a natural gas pipeline from Egypt to Israel. He also funded a hydroelectric canal linking the Mediterranean Sea and the Dead Sea, the lowest point on Earth. Water cascading down the canal spins turbines that provide electricity to Israel and Palestine.

"Ours is a region of scarce resources," he said last May at a conference celebrating the tenth anniversary of the Com-

## MONEY AND POWER

MANNED MARS MISSION SCORES TOUCHDOWN  
By Maxine Peterson

December 22, 2031 (AP) A manned spacecraft touched down on Mars today the culmination of a 30-year joint effort by the United States and the Soviet Union.

"This step I take it is for all humankind said astronaut Arkady Lipmanov, echoing the words of Neil Armstrong, the first human to set foot on the moon. Lipmanov stepped into the red dust of Mars after a year's flight from the mission's launch from the Soviet base Kosmogrod #14 on the moon. The nuclear-powered spaceship left its launching pad last December 15.

A crew of four took part in the 48-million mile journey. The American John Powell, gained fame six years ago by becoming the first man to walk the circumference of the moon. The other crew members included engineer Ana Lopez from Mexico and chemist Kagei Yamashita from Japan.

The mission was initially financed by NASA and the USSR Academy of Sciences but went into private hands when the agencies ran out of money. The bulk of the \$1 billion cost was supplied by the American firm Orbital Industries and the Soviet-based Glasnost, Inc., a private company specializing in high-risk venture capital. The companies hope to ex-

plor the titanium reserves that probes have detected on Mars.

"Regardless of who paid for it, this mission is a cause for all members of the Earth family to be proud," said Hsuan-Y Chin, the American President. "By this I mean Earth dwellers and moon colonists alike." Chin's statement was notable for its mention of moon colonists, who in recent years have been agitating for independent nationhood. Observers say that by including them in his statement the President was attempting to dampen the separatist feeling that has been growing in the mining colonies.

**WORLD:** The world will move toward a multipolarity in which the United States, Japan, and Europe share power with emerging business powers of Korea, Taiwan, India, Hong Kong, and Singapore. Space efforts will also become multipolar. By 2030 the United States and Soviet Union may pool their efforts in a mission to Mars. The project will cost too much for either nation alone. Europe and Japan, which lag in rocket technology, will participate in joint missions with the two great space powers. Together these nations will establish traveling space cities—self-contained mining communities that can rocket from asteroid to asteroid, searching for ores.

The internationalization of space will

lead to a reduction in the importance of statehood on Earth: haggling chances for long-term peace. At the same time, international tensions may increase over the allocation of geostationary orbits—the prime orbits for communications satellites that float above the equator. Developing countries, especially, will begin to protest as orbits of high value are unjustly delegated to industrialized countries.

—Merton Davies, The Rand Corporation, American Institute of Aeronautics and Astronautics, Washington, DC; Hajimu Hori, Economic Planning Agency, Tokyo; FAST, European Economic Community Forecasting and Assessment in Science and Technology; Banuh Raz, Center for Technological Analysis and Forecasting, Tel Aviv University; Andrei Pionkovsky, Institute for Systems Studies, USSR Academy of Sciences.

**UNITED STATES:** The most promising jobs in the twenty-first century will involve biotechnology, lasers, robotics, telecommunications, medical technology, aerospace, and superconductivity. Manufacturing jobs will drop from 28 percent of the total workforce in 1981 to 11 percent in 2000 and 3 percent in 2030. The information industry, which represents 55 percent of today's workforce, will constitute 60 percent by 2000—S. Norman Finkeloff, National Counsel and Consulting Services, Washington, DC.

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**SOVIET UNION:** The USSR will move towards a market-based economy in the next couple of decades. The government will cut expenditures in heavy industry and the military, while instituting market-based wages and private farms. Such economic and political reforms will double the nation's economic output by early in the twenty-first century.—Viktor Gokhsan, *Institute for Systems Studies, USSR Academy of Sciences*

**EUROPE:** Europe, stretching from the Atlantic to the Ural Mountains, will unite politically and economically by the mid-twenty-first century. More people will produce nonmaterial items that exist only as electronic impulses, software, computer-assisted designs, film, video, DNA patterns. Fewer people will touch what they produce.—Hugues de Jouvanel, *Association Internationale Futuribles, Or Economie Mieux, president, World Future Studies Federation, Rome*

**PACIFIC RIM:** In Japan most factories will be run by robots, with no human labor past the product design stage. These factories will run with unprecedented flexibility taking custom orders for consumer products. For example, a customer will be able to order a refrigerator and choose the size, color and specific features. With a few computer commands, the factory will custom-produce it quickly at low cost.—Dr. Shigeru Watanabe, *Tokyo Science and Technology College, Shoho Kurita, Artificial Intelligence Center, Japan Information Processing Development Center, Tokyo*

**MIDDLE EAST:** The Arab-Israeli conflict will end as Palestinian and Jewish political entities come to coexist. Egypt and Israel will undertake several joint economic projects, such as fertilizer and cement plants and textile manufacturing. Israel and Palestine will grow codependent as the century progresses. Eventually, Israel will offer Palestine military protection while Palestinians act as middlemen in Israel's business dealings with the Arab world.—Ira Berk, *Foundation for Assisted Twenty-First Century, The Armand Hammer Fund for Economic Cooperation in the Middle East, Tel Aviv University, Tel Aviv, Ahmad Qudus, Committee of Egypt, Cairo*

**AFRICA:** Hobbled by a lack of technological know-how, Africa may eventually become excluded from the world economy.—The Club of Rome, Rome

*"Turbulence, dissension, social agitation and shortages swirl around!"—Satish Seth, Department of Science and Technology, New Delhi, India*

#### OH, THE HUMANITY!

Le Front National, Marseille, France  
29 May 2003  
A MANIFESTO

WHEREAS the world's poorest nations have failed to control their expanding populations

WHEREAS said populations are becoming younger and more violent

WHEREAS these nations have done nothing to industrialize, economize, or provide employment for their young

WHEREAS these nations have done nothing in anyway to improve their lot

WHEREAS the spawn of these nations have continually coveted the wealth of our fair lady France

WHEREAS the inhabitants of these nations maintain a barbarous appearance despite what we taught them

WHEREAS they are already swamping our factories and social services

BE IT RESOLVED THAT All true sons of France declare war on the invading hordes. We vow to keep them off our lovely shores, to stem their tide, and to hold back their brutish numbers. We vow to protect our culture, our children, our church, and sacred land.  
LIBERTÉ, ÉGALITÉ, FRATERNITÉ  
VIVE LA FRANCE!

**Rapid urbanization will lead to the growth of apocalyptic megalopolises—immense cities. The rich will live in heavily guarded compounds surrounded by belts of misery.**

**WORLD:** The world's population will grow to 10 billion or 11 billion by 2075, twice that of today. Most of the growth will occur in the Third World. The population of Mexico City, the world's largest metropolis, will rise from today's 15 million people to more than 30 million people by the year 2000. São Paulo will have 26 million people, Shanghai 23 million, Bombay and Calcutta 18 million people each.—Carl Haub, *Population Reference Bureau, Washington DC; Ben J. Wattenberg, American Enterprise Institute for Public Policy Research, Washington DC; Francisco Sagasti, World Bank, Washington DC*

A hierarchy of have and have-not nations will develop with respect to computers in education. Individual nations will develop their own elites of the technologically literate. Because these elites will follow previously existing socioeconomic trends, social inequities will grow.—Baruch Riaz, *Center for Technological Analysis and Forecasting, Tel Aviv University*

**SOVIET UNION:** Straddling the continents of Europe and Asia, the population of the Soviet Union will age in European

regions. Younger people will live predominantly in Asia.—Andrei Piontovsky, *Institute for Systems Studies, USSR Academy of Sciences*

**EUROPE:** By the year 2065 every fourth European could be sixty-five years or older. At the same time the legal retirement will drop to fifty-five. The result: a minority of Europeans working full-time. People in their twenties and thirties will monopolize high-performance jobs.

—Hugues de Jouvanel, *Association Internationale Futuribles, FAST European Economic Community, Forecasting and Assessment in Science and Technology*

**JAPAN:** Crowded Tokyo will become even more populated and congested. The government will establish tax incentives and telecommunication links to disperse the population. Most Japanese salarymen will resist, however, preferring to be near the centers of power. As overcrowding worsens, Japan will build cities on water, creating islands of landfill for office and apartment towers.—Rachi Ohta, *National Institute for Research Advancement, Tokyo, Japan Economic Planning Agency, Tokyo*

**SOUTH AMERICA:** Rapid urbanization will lead to the growth of "apocalyptic megalopolises"—immense, densely populated cities. The rich in such cities will live in heavily guarded homes. Around them will be enormous cantons of misery, or "belts of misery." Such areas, like today's favelas of Brazil, will house the majority of South American urban populations. The people will live in tin and mud huts and run clandestine wires to steal electricity. They'll cook with kerosene or over open fires and get water from a community well.

Facial matter will be disposed of in open sewers or in fields. Disease will be rampant; pests will abound. Pollution will reach untenable levels. In some cases a more benign pattern of "poor urbanism" will emerge in the form of small, self-governing groups. Using small government grants, these groups will build up their neighborhoods with available materials such as brick and adobe. While aesthetically unappealing, such zones will provide important basic services to the poor.—Institute for Urbanism, Central University of Venezuela, Caracas

**AFRICA:** Growing unemployment will lead to increased poverty and crime, straining social services and hospitals. Underemployment will affect more than 70 percent of the rural labor force, or 303 million workers. By early in the twenty-first century 72 African cities will have average populations of 1 million or more. Like their South American counterparts, most city dwellers will live in squatter.—Economic Commission for Africa

*"By 2020 the combined population of the four largest countries in Europe—England, Italy, France, West Germany—will be less than that of Bangladesh."—Ben*

## CRIME

It was years since Carles had held a gun, months since he'd had his hands on plastic explosives. Now the only plastic his fingers touched were the keys of his personal computer. His recent training had all been nonviolent. Four years at London Polytechnic, three years in the European Community's Center for Transportation Control in Brussels. Now from his fourth-story walk-up in the Trastevere section of Rome, he would put his years of training to work.

He tapped out a phone number, waited for a prompt, and then typed an entry code. Hundreds of numbers filled the screen. He moved his cursor onto some digits and changed them. He left his desk and smoked a Cuban cigar. When he returned, a notice flashed on his computer display. *Daddy done*, he thought. And so much cleaner than machine guns and bombs.

Five hundred miles away the screams rose above what would later be recorded as the most disastrous train wreck in European history. The *Mistral*, on its maiden run from Paris to Moscow, was traveling at the speed of sound when it was shunted onto an unused track near Karlsruhe. No one would ever learn why

its guidance system failed. More than 1,000 people died by the time Carles had finished his cigar.

**UNITED STATES** Scientists will discover physiological links to problem behavior in children, leading to earlier intervention and treatment. As the percentage of adolescent males in the population declines, so will violent street crime. But white-collar crime involving information and economic manipulation will rise. Americans will begin to give up certain individual rights in return for societal safety and protection.

Opposition to drug testing will wane; eventually drug use will taper off. Fewer prisoners will serve time behind bars. Electronic bracelets will provide cheaper, more effective means of incarceration. Linked to central monitoring systems, the bracelets will enable prisoners to move about in certain parts of the community. If the prisoner goes beyond a restricted zone, the bracelet will alert a supervisor and stop the prisoner with a shock.—Barbara Williams, The Rand Corporation; Harry Harry, The Urban Institute, Washington, DC; Hubert Williams, The Police Foundation, Washington, DC.

**EUROPE** Terrorists will use increasingly advanced weapons such as ultra-rapid-fire machine pistols or hand-held guided missiles. The danger of nuclear

terrorism will increase through the theft of dangerous components. Computer hacking will become a preferred method of terrorism. The terrorist will hack into systems as diverse as banking or mass transit, siphoning bank accounts and causing trains to collide.—Research Foundation for the Study of Terrorism, Aberdeen, Scotland; Institute for the Study of Terrorism, London.

**SOUTH AMERICA** Crime will continue to rise throughout South America, along with the number of disaffected, unemployed youths. Narcotics will continue to be an important cause of crime, especially as legal sources of income decline. Alliances between drug-growing peasants and revolutionary guerrillas may spread.—Institute for Peace and Studies, Rius Gonzalez, DESCO (Center for Studies, Promotion, and Development), Lima, Peru.

*'The open space prison is the wave of the future.'—Hubert Williams, The Police Foundation.*

Contributors: Amy McDonald/New York; Brendan Murphy/Rome; Connie Schmidt/Lima; Al Ruseh/Tokyo and Boston; Harzada Feki/Cairo; He Shajun/Beijing; Shohel Kunta/Tokyo; Asako Hatai/Tokyo; David Gumpert/Tokyo; Sarah Glazer/Boston. **DO**



# AT THE RIALTO

CONTINUED FROM PAGE 24

and pointed to the print of Betty Grables leg—"and we can figure out the signatures, but what is the reference to 'Sid' on all these squares? And what does this mean?" He pointed at Red Skelton's square. It said, THANKS TO WE DOOO IT.

"You keep thinking you've found a pattern," David said, "crossing over to the other side." But Van Johnson's square is kind of sandwiched in here at an angle between Esther Williams and Cantelinas, and who the hell is May Robson? And why are all these squares empty?"

He had managed to maneuver me over behind the display of Academy Award winners. It was an accordion-like wrought-iron screen. I was in the fold between 1944 and 1945.

"And as if that isn't enough, you suddenly realize you're standing in the courtyard. You're not even in the theater."

"And that's what you think is happening in quantum theory?" I said weakly. I was backed up into Bing Crosby, who had won for Best Actor in Going My Way. "You think you're not in the theater yet?"

"I think we know as much about quantum theory as we can figure out about May Robson from her footprints," he said, putting his hand up to Ingrid Bergman's cheek (Best Actress, Gaslight) and blocking my escape. "I don't think we understand anything about quantum theory, not turning, not complementarity." He leaned toward me. "Not passion."

The Best Movie of 1945 was *The Lost Weekend*. "Dr. Gadankin understands it," I said, disentangling myself from the Academy Award winners and David. "Did you know he's putting together a new research team for a big project on understanding quantum theory?"

"Yes," David said. "Want to see a movie?"

"There's a seminar on chaos at nine," I said, stepping over the Marx Brothers. "I have to get back."

"It's chaos you want; you should stay right here," he said, stepping to look at Irene Dunne's handprints. "We could see the movie and then go have dinner. There's this place near Hollywood and Vine that has the mashed potatoes Richard Dreyfuss made into *Devils Tower* in *Glass Encounters*."

"I want to meet Dr. Gadankin," I said, making it safely to the sidewalk. I looked back at David.

He had gone back to the other side of the courtyard and was looking at Roy Rogers's signature.

"Are you kidding? He doesn't understand it any better than we do."

"Well, at least he's trying."

"So am I. The problem is how can one neutron possibly interfere with itself, and why are there only two of Trigger's footprints here?"

"It's eight fifty-five," I said. "I am going to the chaos seminar."

"If you can find it," he said, getting down on one knee to look at the signature.

"I'll find it," I said grimly.

He stood up and grinned at me, his hands in his pockets. "It's a great move," he said.

It was happening again. I turned and practically ran across the street.

"Bang! It's showing," he shouted after me. "He accidentally exchanges bodies with a Samseese cat."

Thursday, 9-10 pm. "The Science of Chaos." I. Dutch enlander, Leipzig. A seminar on the structure of chaos. Principles of chaos will be discussed, including the butterfly effect, fractals, and insolid following. Clara Bow Room.

I couldn't find the chaos seminar. The Clara Bow Room, where it was supposed to be, was empty. A meeting of

✿ I read  
the breakfast entrées. They  
all seemed to  
have cilantro or lemongrass  
in their names. I  
wondered whether radiochio  
could possibly  
be Californian for donut. ✿

vegetarians was next door in the Fifty Arkbudds Room, and all the other conference rooms were locked. The channeler was still in the ballroom. "Come!" she commanded when I opened the door. "Understanding awaits!"

I went upstairs to bed.

I had forgotten to call Darlene. She would have left for Denver already, but I called her answering machine and told it the room number in case she picked up her messages. In the morning I would have to tell the front desk to give her a key. I went to bed.

I didn't sleep well. The air conditioner went off during the night, which meant I didn't have to steam my suit when I got up the next morning. I got dressed and went downstairs.

The programming started at nine o'clock with Abby Field's "Wonderful World" workshop in the Mary Pickford Room, a breakfast buffet in the ballroom, and a slide presentation on "Delayed Choice Experiments" in Cecil B. DeMille A on the mezzanine level.

The breakfast buffet sounded wonderful, even though it always turns out to be

urn coffee and donuts. I hadn't had anything but an ice cream cone since noon the day before, but if David was around, he would be somewhere close to the food, and I wanted to steer clear of him. Last night it had been Grauman's Chinese. Today I was likely to end up at Knott's Berry Farm. I wasn't going to let that happen even if he was charming.

It was pitch-dark inside Cecil B. DeMille A. Even the slide on the screen up front appeared to be black. "As you can see," Dr. Lvov said, "the laser pulse is already in motion before the experimenter sets up the wave or particle detector."

He clicked to the next slide, which was dark gray. "We used a Mach-Zehnder interferometer with two mirrors and a particle detector. For the first series of trials we allowed the experimenter to decide which apparatus he would use by whatever method he wished. For the second series, we used that most primitive of randomizers—"

He clicked again, to a white slide with black polka dots that gave off enough light for me to be able to spot an empty chair on the slide in rows up. I hurried to get to it before the slide changed, and sat down.

"—a pair of dice. Alley's experiments had shown us that when the particle detector was in place, the light was deflected as a particle; and when the wave detector was in place, the light showed wavelike behavior, no matter when the choice of apparatus was made."

"Hi," David said. "You've missed five black slides: two gray ones, and a white with black polka dots."

"Shh!" I said.

"In our two series, we hoped to ascertain whether the consciousness of the decision affected the outcome." Dr. Lvov clicked to another black slide. "As you can see, the graph shows no effective difference between the trials in which the experimenter chose the detection apparatus and those in which the apparatus was randomly chosen."

"You want to go get some breakfast?" David whispered.

"I already ate," I whispered back, and waited for my stomach to growl and give me away. It did.

"There's a great place down near Hollywood and Vine that has the waffles Katherine Hepburn made for Spencer Tracy in *Woman of the Year*."

"Shh!" I said.

"And after breakfast, we could go to Frederick's of Hollywood and see the tire museum."

"Will you please be quiet? I can't hear."

"Or see," he said, but he subdued more or less for the remaining ninety-two black, gray, and polka-dotted slides.

Dr. Lvov turned on the lights and blinked smilingly at the audience. Consciousness had no discernible effect on the results of the experiment. As one of my lab assistants put it, The little devil



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knows what you're going to do before you know it, yourself.

"This was apparently supposed to be a joke, but I didn't think it was very funny. I opened my program and tried to find something to go to that David wouldn't be caught dead at."

"Are you two going to breakfast?" Dr. Thibodeaux asked.

"Yes," David said.

"No," I said.

"Dr. Hotard and I wished to eat somewhere that is vibrant Hollywood."

"David knows just the place," I said. "He's been telling me about this great place where they have the greatest James Cagney showed in Mae Clarke's face in Public Enemy."

Dr. Hotard turned up, carrying a camera and four guidebooks. And then perhaps you would show us Gnueman's Chinatown Theatre?" he asked David.

"Of course he will," I said. "I'm sorry I can't go with you, but I promised Dr. Verlovsky I'd be at his lecture on Boolean logic. And after Gnueman's Chinese David can take you to the bus museum at Frederick's of Hollywood."

"And the Brown Derby?" Thibodeaux asked. "I have heard it is shaped like a chapeau." They dragged him off. I watched till they were safely out of the lobby and then ducked upstairs and into Dr. Whedbee's lecture on information theory. Dr. Whedbee wasn't there.

"He went to find an overhead projector," Dr. Takumi said. She had half a donut on a plate in one hand and a Styrofoam cup in the other.

"Did you get that at the breakfast buffet?" I asked.

"Yes. It was the last one. And they ran out of coffee right after I got there. You weren't at Abby Field's thing, were you? She set the coffee cup down and took a bite of the donut."

"No," I said, wondering if I should try to take her by surprise or just wrestle the donut away from her.

"You didn't miss anything. He saved the whole time about how we should have had this meeting in Racine. She popped the last piece of donut in her mouth. 'Have you seen David yet?'"

Friday 9-10 pm The Eureka Experiment: A Sade Presentation. J. Lovis, Eureka College. Descriptions, results, and conclusions of Lovis's delayed consciousness/randomized choice experiments. Cool B. DeMille A.

Dr. Whedbee eventually came in carrying an overhead projector, the card trailing behind him. He plugged it in. The light didn't go on.

"Here," Dr. Takumi said, handing me her plate and cup. "I have one of these at Catech. It needs its fractal beam boundaries adjusted."

She wheeled the side of the projector. There wasn't even any crumbs left of the donut. There was about a millimeter of coffee in the bottom of the cup. I was about to stoop to new depths when she hit the projector again. The light came on. I learned that in the chaos seminar last night," she said, grabbing the cup away from me and drinking it. "You should have been there. The Clara Bow Room was packed."

"I believe I'm ready to begin," Dr. Whedbee said. Dr. Takumi and I sat down. Information is the transmission of meaning," Dr. Whedbee said. He wrote several or possibly even more on the screen with a green Magic Marker.

"When information is randomized, meaning cannot be transmitted, and we have a state of entropy." He wrote it under several with a red Magic Marker. His handwriting appeared to be completely legible.

States of entropy vary from low entropy, such as the mild static on your car radio, to high entropy, a state of complete disorder of randomness and confusion, in which no information at all is being communicated."

Oh, my God, I thought. I forgot to tell the hotel about Darlene.

The next time Dr. Whedbee bent over to inscribe heroglyphics on the screen, I sneaked out and went down to the desk hoping Tiffany hadn't come on duty yet. She had.

"May I help you?" she asked.

"I'm in room 663," I said. "I'm sharing a room with Dr. Darlene Mendocia. She's coming in this morning, and she'll be needing a key."

"For what?" Tiffany said.

"To get into the room. I may be in one of the lectures when she gets here."

"Why doesn't she have a key?"

"Because she isn't here yet."

"I thought you said she was sharing a room with you."

"She will be sharing a room with me. Her name is Darlene Mendocia."

"And your name?" she asked, hands poised over the computer.

"Ruth Baringer."

"We don't show a reservation for you."

We have made impressive advances in quantum physics in the ninety years since Planck's constant, but they have by and large been advances in technology, not theory. We can only make advances in theory when we have a model we can visualize. —Excerpt from Dr. Gerdanken's keynote address.

I high-entropied with Tiffany for a while on the subjects of my not having a reservation and the air-conditioning and then switched back suddenly to the problem of Darlene's key in the hope of catching her off guard. It worked about as well as Abby's delayed-choice experiments.

In the middle of my attempting to ex-

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plan that Darlene was not the air-conditioning repairman. Abby Fields carried up.

"Have you seen Dr. Goddard?"

I shook my head.

"I was sure he'd come to my Wonderful World workshop, but he didn't, and the hotel says they can't find his reservation," he said, scanning the lobby. "I found out what his new project is, incidentally, and I'd be perfect for it. He's going to find a paradigm for quantum theory. Is that him?" he said, pointing at an elderly man getting in the elevator.

I think that's Dr. Whodunnit. I said, but he had already sprinted across the lobby to the elevator.

He nearly made it. The elevator slid to a close just as he got there.

He pushed the elevator button several times to make the door open again, and when that didn't work, tried to readjust its fractal basin boundaries. I turned back to the desk.

"May I help you?" Tiffany said.

"You may," I said. "My roommate, Darlene Mendoza, will be arriving sometime this morning. She's a producer. She's here to cast the female lead in a new movie starring Robert Redford and Harrison Ford. When she gets here, give her her key. And fix the air conditioning."

"Yes, ma'am," she said.

The Josephson junction is designed so that electrons must obtain additional energy to surmount the energy barrier. It has been found, however, that some electrons simply tunnel, as Heisenberg put it, "right through the wall."—From *The Wonderful World of Quantum Physics* by A. Fields, UNW.

Abby had stopped banging on the elevator button and was trying to pry the elevator doors apart.

I went out the side door and up to Hollywood Boulevard. David's restaurant was near Hollywood and Vine. I turned the other direction, toward Grauman's Chinese Theatre, and ducked into the first restaurant I saw.

"I'm Stephanie," the waitress said. "How many are there in your party?"

There was no one remotely in my vicinity. "Are you an actress-alish-model?" I asked her.

"Yes. I'm working here part time to pay for my horrible hairstyling lessons."

"There's one of me," I said, holding up my forefinger to make it perfectly clear. "I want a table away from the window."

She led me to a table in front of the window. I handed her a menu the size of the macrocosm, and put another one down across from me.

"Our breakfast specials today are pa-paya stuffed with salmonberries and resturium/iodochio, saled with a balsamic integrities. I'll take your order when your off or party arrives."

I stood the extra menu up so it had me from the window, opened the other one,

and read the breakfast prices. They all seemed to have olivants or lemongrass in their names.

I wondered if *iodochio* could possibly be Califorman for donut.

"Hi," David said, grabbing the standing-up menu and sitting down. The sea urchin plate looks good.

"I was actually glad to see him. 'How did you get here?' I asked."

"Turning," he said. "What exactly is extra-vegan olive oil?"

"I wanted a donut," I said pitifully.

He took my menu away from me, laid it on the table, and stood up. "There's a great place next door that's got the donut. Clark Gable taught Claudette Colbert how to dunk in it. It happened *One Night*."

The great place was probably out in Long Beach someplace, but I was too weak with hunger to resist him. I stood up. Stephanie hurried over.

"Will there be anything else?" she asked.

"We're leaving," David said.

"Okay, then," she said, tearing a check off her pad and slapping it on the table. "I hope you enjoyed your breakfast."

Finding such a paradigm is difficult, if not impossible. Due to Planck's constant the world we see is largely dominated by Newtonian mechanics. Particles are particles, waves are waves, and objects do not suddenly vanish through walls and reappear on the other side; it is only on the subatomic level that quantum effects dominate.—Excerpt from Dr. Goddard's keynote address.

The restaurant was next door to Grauman's Chinese, which made me a little nervous, but it had eggs and bacon and toast and orange juice and coffee. And donuts. "I thought you were having breakfast with Dr. Thibodeaux and Dr. Holard," I said, dunking one in my coffee. "What happened to them?"

"They went to Forest Lawn," Dr. Holard wanted to see the church where Ronald Reagan got married.

"He got married at Forest Lawn?"

He took a bite of my donut. "In the Woo Kik of the Heister. Did you know Forest Lawn is the World's Largest Oil Painting Incorporating a Religious Theme?"

"So why didn't you go with them?"

"And miss the movie?" He grabbed both my hands across the table. "There's a matinee at two o'clock. Come with me."

I could feel things starting to collapse. "I have to get back," I said, trying to disentangle my hands. "There's a panel on the EPR paradox at two o'clock."

"There's another showing at five. And one at eight."

"Dr. Goddard's giving the keynote address at eight."

"You know what the problem is?" he said, still holding on to my hands. "It's not really Grauman's Chinese Theatre. It's Mamma. So did I even around to ask."



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Like, why do some pairs like Joanne Woodward and Paul Newman share the same square and other pairs don't? Like Ginger Rogers and Fred Astaire?

"You know what the problem is?" I said, wrenching my hands free. "The problem is you don't take anything seriously. This is a conference, but you don't care anything about the programming or hearing Dr. Gedanken speak or trying to understand quantum theory!" I kumblied in my purse for some money for the check.

"I thought that was what we were talking about," David said, scolding surprised. "The problem is, where do those ion statues that guard the door fit in? And what about all those empty spaces?"

Friday 2-3 pm Panel Discussion on the EPR Paradox: I. Takumi, moderator, R.

Iverson, L. S. Ping. A discussion of the latest research in single-state correlations, including nonlocal influences, the Cokoske proposal, and passion Keynote Kaps Room

I went up to my room as soon as I got back to the Rialto to see if Darlene was there yet. She wasn't, and when I tried to call the desk, the phone wouldn't work. I went back down to the registration desk. There was no one there. I waited fifteen minutes and then went into the panel on the EPR paradox.

"The Einstein-Podolsky-Rosen paradox cannot be reconciled with quantum theory," Dr. Takumi was saying. "I don't care what the experiments seem to indicate. Two electrons at opposite ends of the universe can't affect each other si-

multaneously without destroying the entire theory of the space-time continuum."

She was right. Even if it were possible to find a model of quantum theory what about the EPR paradox? If an experimenter measured one of a pair of electrons that had originally coincided, it changed the co-representation of the other instantaneously, even if the electrons were light-years apart.

It was as if they were eternally linked by that one collision, sharing the same square forever, even if they were on opposite sides of the universe.

"If the electrons communicated instantaneously I'd agree with you," Dr. Iverson said, "but they don't, they simply influence each other. Dr. Shimony defined this influence in his paper on passion, and my experiment clearly—"

I thought of David leaning over me between the Best Pictures of 1944 and 1945, saying, "I think we know as much about quantum theory as we do about May Robison from her footprints."

"You can't explain it away by inventing new terms," Dr. Takumi said.

"I completely disagree," Dr. Ping said. "Passion at a distance is not just an invented term. It's a demonstrated phenomenon." It certainly is, I thought, thinking about David taking the macrocosmic menu out of the window and saying, "The sea urchin plate looks good."

It didn't matter where the electron went after the collision. Even if it went in the opposite direction from Hollywood and Vine, even if it stood a menu in the window to hide it, the other electron would still come and rescue it from the radio-cho and buy it a donut.

A demonstrated phenomenon! Dr. Takumi said, "Ha!" She begged her moderator a gavel for emphasis.

Are you saying passion doesn't exist? Dr. Ping said, getting very red in the face.

"I'm saying one measly experiment is hardly a demonstrated phenomenon."

"One measly experiment? I spent five years on this project!" Dr. Iverson said, shaking his hat at her. "I'll show you passion at a distance!"

"Try it, and I'll adjust your fractal beam boundaries!" Dr. Takumi said, and hit him over the head with the gavel.

Yet finding a paradigm is not impossible. Newtonian physics is not a machine. It simply shares some of the attributes of a machine. We must find a model somewhere in the visible world that shares the often bizarre attributes of quantum physics. Such a model, unlikely as it sounds, surely exists somewhere, and it is up to us to find it—Excerpt from Dr. Gedanken's keynote address.

I went up to my room before the police came. Darlene still wasn't there, and the phone and air-conditioning still weren't working. I was really beginning to get

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**Life Sign**

worried. I walked up to Grauman's Chinese to look for David, but he wasn't there. Dr. Wheedbee and Dr. Sleeth were behind the Academy Award winners folding screen.

"You haven't seen David, have you?" I asked them.

Dr. Wheedbee removed his hand from Norma Shearer's cheek.

"He left," Dr. Sleeth said, disentangling himself from the Best Movie of 1929—30.

"He said he was going out to Forest Lawn," Dr. Wheedbee said, trying to smooth down his bushy white hair.

"Have you seen Dr. Mendoc? She was supposed to get in this morning."

They hadn't seen her and neither had Dis. Horard and Thibodeaux, who stopped me in the lobby and showed me a postcard of Arnette Semple McPherson's tomb. Tiffany had gone off duty. Neelie couldn't find my reservation. I went back up to the room to wait, thinking Darlene might call.

The air-conditioning still wasn't fixed. I fanned myself with a Hollywood brochure and then opened it up and read it. There was a map of the countryside of Grauman's Chinese on the back cover. Deborah Kerr and Yul Brynner didn't have a square together either, and Katharine Hepburn and Spencer Tracy weren't even on the map. She had made him wait in *Woman of the Year* and they hadn't even given them a square.

I wondered if Tiffany the model-slash-actress had been in charge of assigning the cement. I could see her looking blankly at Spencer Tracy and saying, "I don't show a reservation for you."

What exactly was a model-slash-actress? Did it mean she was a model or an actress or a model and an actress? She certainly wasn't a hotel clerk.

Maybe electrons were actually the Tiffanys of the microcosm and that explained their wave-slash-particle duality. Maybe they weren't really electrons at all. Maybe they were just waiting part time at being electrons to pay for their single-state lessons.

Darlene said hadn't called by seven o'clock. I stopped fanning myself and tried to open a window. It wouldn't budge. The problem was, nobody knew anything about quantum theory. All we had to go on were a few colliding electrons that nobody could see and that couldn't be measured properly because of the Heisenberg uncertainty principle. And there was chaos to consider, and entropy, and all those empty spaces. We didn't even know who May Robson was.

At seven-thirty the phone rang. It was Darlene. "What happened?" I said.

"Where are you?"

"At the Beverly Wilshire."

"In Beverly Hills?"

"Yes. It's a long story. When I got to the Rialto, the hotel clerk—I think her name

was Tiffany—told me you weren't there. She said they were booked solid with some science thing and had had to send the overflow to other hotels. She said you were at the Beverly Wilshire in Room 1027. How's David?"

"Impossible," I said. "He's spent the whole conference looking at Deanna Durbin's footprints at Grauman's Chinese Theatre and trying to talk me into going to the movies."

"And are you going?"

"I can't. Dr. Gadenker's giving the keynote address in half an hour."

"He is?" Darlene said, sounding surprised. "Just a minute." There was a silence, and then she came back on and said, "I think you should go to the movies. David's one of the last two charming men in the universe."

"But he doesn't take quantum theory seriously. Dr. Gadenker is hiring a research team to design a paradigm, and David keeps talking about the beacon on top of the Capitol Records Building."

"You know he may be on to something there. I mean, scientists was all right for Newtonian physics, but maybe quantum theory needs a different approach. Sid says—"

"Sid?"

"This guy who's taking me to the movies tonight. It's a long story. Tiffany gave me the wrong room number and I walked in on this guy in his underwear. He's a quantum physicist. He was supposed to be staying at the Rialto, but Tiffany couldn't find his reservation."

The major implication of wave/particle duality is that an electron has no precise location. It exists in a superposition of probable locations. Only when the experimenter observes the electron does it "collapse" into a location.

"The Wonderful World of Quantum Physics," A. Fields, UNW.

Forest Lawn closed at five o'clock. I looked it up in the Hollywood brochure and Darlene hung up.

There was no telling where he might have gone: the Brown Derby or the La Brea Tar Pits or some great place near Hollywood and Vine that had the initials sprouts John Hunt side right before his chest exploded in Allen.

At least I knew where Dr. Gadenker was. I changed my clothes and got in the elevator, thinking about wave/particle duality and fractals and high-entropy states and delayed-choice experiments. The problem was: where could you find a paradigm that would make it possible to visualize quantum theory when you had to include Josephson junctions and pairson and all those empty spaces? It wasn't possible. You had to have more to work with than a few footprints and the impression of Betty Grable's leg.

The elevator door opened, and Abby Fields pounced on me.



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"I've been looking all over for you," he said. "You haven't seen Dr. Gedanken, have you?"

"I've been in the bathroom."

"No," he said. "He's already fifteen minutes late and nobody's seen him. You have to sign this," he said, showing a clipboard at me.

What is it?

"It's a petition." He grabbed it back from me. "We've undersigned demand that annual meetings of the International Congress of Quantum Physicists henceforth be held in appropriate locations. Like Raone," he added, showing the clipboard at me again. "Unlike Hollywood."

"Are you aware it took the average ICGP delegate two hours and thirty-six minutes to check in? They even sent some of the delegates to a hotel in Glendale."

"And Beverly Hills," I said absently. Hollywood. Big museums and the Marx Brothers and gangs that would kill you if you wore red or blue and Tiffany/Stephane and the World's Largest Oil Painting Incorporating a Religious Theme.

"Beverly Hills," Abby muttered, pulling an automatic pencil out of his pocket protector and writing a note to himself. "I'm presenting the petition during Dr. Gedanken's speech. Well, go on, sign it." He said, handing me the pencil. "Unless you want the annual meeting to be here at the Rialto next year."

I handed the clipboard back to him. "I think from now on the annual meeting might be here every year," I said, and took off running for Gaudin's Chinese.

When we have that paradigm, one that embraces both the logical and the non-logical aspects of quantum theory, we will be able to look past the colliding oceans and the mathematics and see the microcosm in all its astonishing beauty.—Excerpt from Dr. Gedanken's keynote address

"I want a ticket to Berg IX." I told the girl at the box office. Her name tag said WELCOME TO HOLLYWOOD. MY NAME IS KIM-BERRY.

"Which theater?" she said. "Graumann's Chinese." I said, thinking. This is no time for a high-entropy state.

"Which theater?"

I looked up at the marquee. Berg IX was showing in all three theaters: the huge main theater and the two smaller ones on either side.

"They're doing audience reaction surveys," Kimberly said. "Each theater has a different ending."

"Which ones in the main theater?"

"I don't know. I just work here part time to pay for my organic breathing lessons."

"Do you have any clips?" I asked, and then realized I was going about this all wrong. This was quantum theory not Newtonian. It didn't matter which theater I chose or which seat I sat down in. This

was a delayed choice experiment and David was already in flight.

"The one with the happy ending," I said. Center theater, she said.

I walked past the stone lions and into the lobby. Rhonda Fleming and some Chinese wax figures were sitting inside a glass case next to the door to the rest rooms. There was a huge painted screen behind the concession stand.

I bought a box of Raisinets, a tub of popcorn, and a box of jujubes and went inside the theater.

It was bigger than I had imagined. Rows and rows of empty red chairs curved between the huge pillars and up to the red curtains where the screen must be. The walls were covered with intricate drawings. I stood there, holding my jujubes and Raisinets and popcorn, staring at the chandelier overhead. It was an elaborate gold sunburst surrounded by silver dragons. I had never imagined it was anything like this.

The lights went down and the red curtains opened, revealing an inner curtain like a veil across the screen.

I went down the dark aisle and sat in one of the seats. "Hi," I said, and handed the Raisinets to David.

"Where have you been?" he said. "The movies about to start."

"I know," I said. I leaned across him and handed Darlene her popcorn and Dr. Gedanken his jujubes. "I was working on the paradigm for quantum theory."

"And?" Dr. Gedanken said, opening his jujubes.

"And you're both wrong," I said. "It isn't Graumann's Chinese. It isn't movies either. Dr. Gedanken."

"Said," Dr. Gedanken said. "I were all going to be on the same research team. I think we should use first names."

"If it isn't Graumann's Chinese or the movies, what is it?" Darlene asked, eating popcorn.

"It's Hollywood," Dr. Gedanken said thoughtfully.

"Hollywood," I said. "Stars in the sidewalk and buildings that look like stacks of records and hats, and radio-cops and audience surveys and big museums. And the movies. And Graumann's Chinese."

"And the Rialto," David said.

"Especially the Rialto."

"And the ICGP," Dr. Gedanken said. I thought about Dr. Lovis' black and gray slides and the disappearing chase seminar and Dr. Whedbee writing means or possibly wrongness on the overhead projector. "And the ICGP," I said.

"Did Dr. Takum really hit Dr. Newton over the head with a glass?" Darlene asked.

"Shh," David said. "I think the movie's starting." He took hold of my hand. Darlene settled back with her popcorn, and Dr. Gedanken put his feet up on the chair in front of him. The inner curtain opened, and the screen lit up. **OO**

# EXPLORATIONS

CONTINUED FROM PAGE 32

said it was a leopard's cave and I saw big tracks, like those of a giant cat. Dad said, light the flashlight. We must explore everything. I started shaking. What if the leopard comes back and attacks us? Dad said, just be cool. I'm here.

It was like entering a cemetery. It was the first time I had entered the home of a leopard and witnessed the remains of so many kills. I was so scared [my hand holding] the flashlight was trembling. I said, it's scary. I'm giving up. May I wait outside? And Dad said, no way. If the leopard returns, he will find you in his way and kill you. Stay with me.

I asked, Dad, why do you need to explore? What if we just pretend that we have explored everything? Why risk our lives just to find some bones? And Dad said, we are looking for evidence of prehistoric animals. But it's too much for you, tomorrow you can stay at the farm and I will go alone. I wanted him to be proud of me. So I stopped shaking. But each time he heard something and pointed the gun. I lost my breath.

AUGUST 7 Jim Kosa says that Dad and I will hunt for food for the expedition. I didn't want to kill any animals, but Dad explained, we are not hunting for trophies. It is my duty to feed everyone.

We went to a water hole and hid, wait-

ing for some game to come. After half an hour, I saw a warthog with four babies. Then other small animals. Then an oryx appeared and Dad shot it. The oryx jumped and took two small steps and fell. He was still moving and I was begging Dad to kill him, yelling, even starting to cry. Then Dad took the handgun and shot directly into the animal's heart.

I hate hunting!

AUGUST 10 Jim searched one side of a kopje while I went with Dad to explore other parts of the range. We ran into some baboons. Big, powerful monkeys. They made an awful scream and bared their teeth, prepared to protect their territory.

I'm starting to get used to it. When Dad couldn't go any deeper into the cave [because the space became too small], I told him to give me the gun and let me go. I carried the handgun in one hand and the flashlight in the other. But as soon as I left his side, he started to panic. When I came out carrying some bones, Dad was white. He said, what if something happened to you? And I said, we are exploring, right? AUGUST 15 Today we all explored a kopje. I carried the water, a big machine. Dad's still camera, and the flashlight. I was loaded like a donkey, carrying more than the men!

When we all finally met at the top of the kopje, Jim, the professor, and Dad put something in a box. Dad said, it's a bone that maybe will change history, but I can't

talk to you about it now. Later, when we're safe. I was excited.

[Editor's note: The team believes the relic being analyzed at the University of Chicago may, in fact, be only a few years old and certainly no more than 70.] AUGUST 17 I fell in three, three times. I've had enough. I've had enough of mountains and exploring, enough of leopards and fear, enough of baboons that are always screaming. I feel like crying. I will never be an explorer like Dad. Why risk your life for nothing? This is not for me. AUGUST 18 I am improving my hunting skills—choosing to kill and learning to observe, recognizing which animals may be shot and which ones should be saved, which is a cow and which is a bull, which is young and which is old. I am becoming more aware of the animals' emotions and I feel deeply connected to them.

While we were at the water hole [waiting to shoot more game], Dad explained the difficulties he has living in Africa and trying to fund his expeditions. It makes me sad. But he said, you know, Marcus, right now while we are talking, millions of people are sick and dying and silently screaming because they discovered that life is always too short. They would give anything they have for one last expedition. My duty is to live for all the people who can't. And that helps me.

AUGUST 25 A baboon attacked me. The monkeys were on a cliff. One jumped down and rushed toward me. I was scared. The only thing that came to my mind was that this monkey would destroy my life. With his power, his teeth, his hands, he could break me into pieces. I don't remember if I screamed. Dad didn't even have time to reach for his rifle. He took the .357 Magnum from his holster and, without aiming, just shot. The baboon fell ten feet from me. AUGUST 27 Dad will stay two weeks longer, but I must go home and return to school. I feel like everything has just started. But even if Miami told the teachers, my daughter is late because she is looking for dinosaurs. They will still expect me. AUGUST 31 I am fat. I am depressed. I now see that life in the city is so superficial. Many times in the savannah we thought we would die and I now know the value of just being alive. To be happy, I will need to go on an expedition once a year and restore the intimate connection I have felt with nature. I know I must deeply live every second because it is only later that you realize you're experiencing exceptional moments in your life. I can't wait to find out when Dad is going back.

In a letter she left in Namibia for her father, Marcus wrote, "You told me that sometimes you have had enough and are ready to give up and become like everyone else, someone who receives a paycheck at the end of the week. Dad, grant me one wish. Never gave up your dreams. More than anything, I need them." ☐



# SPACE

CONTINUED FROM PAGE 28

sponsor activities that will aid them in that objective. And they don't spread patronage indiscriminately. In the United States such sponsorship has few strings attached to it. In Japan there are definitely strings attached. "You have to go back and work for the company," says John Harbison of the aerospace department of the consulting firm of Booz, Allen & Hamilton. Harbison warns U.S. aerospace companies that the Japanese are poised to become a major power in the international aerospace business. This corporate influence extends to the astrocamps.

American space camps function much like ordinary specialty camps. Tuition is high (up to \$400 or \$500 for a one week session), and costs can reach \$1,000 with airfare. Anyone who pays can attend, whether or not he has studied space science. Many kids go more for fun than for the learning experience.

To enter a Japanese space camp one must usually be a member of a YAC and be personally sponsored by a member of the patron corporation. The participants also complete a rigorous preparatory curriculum and take a more educational approach to the simulations than Americans do.

The U.S. Space Camp at Huntsville runs

thousands through its program—13,000 last year alone. Classes are large—between 50 and 60 kids per instructor—so each child gets little time on each simulator and there is no individualized instruction. The CosmoSphere in Hutchinson accepts only about 30 kids per week, with one instructor for two to three kids, lots of individual attention, and more time on the simulators. The Japanese chose to adopt this model. But the CosmoSphere program runs only five days; the Japanese camps run for two weeks. They also run year-round, processing kids through training often more than once. Most American camps are open only during the summer. And the Japanese YACs always send a full contingent of members to international space camp sessions held in other member countries such as the Soviet Union and Canada.

At both the CosmoSphere and Japanese camps a typical training day begins early. First students digest a 400-page manual on zero-gravity survival, which includes the handling of space equipment. Their reaction times and alertness are tested, and they learn about the hazards of using toilet facilities in space, how to eat in weightlessness, and exercises they will need to do to stay fit in zero-gravity.

On later days they learn about rocket propulsion and spaceflight and take physical stress and mobility tests wearing space suits. The students take a test

flight in a simulator and practice emergency escapes in which five team members must coordinate moving everyone one at a time from one stricken spacecraft to another inside three-floored rescue bolls with huge zippers.

The teams study rocket propulsion using actual rocket engines and make computer-simulated test flights of their own simulated shuttle flight, which will culminate the course. They fly a shuttle simulator to prepare for that mission.

The stress simulator may be what best shows their fervor. The device is pitch-dark inside except for banks of button switches and red and green lights. The student must push the button next to any red light that flashes but ignore all green lights. As the cabin pitches around, the lights blink faster and faster. A computer scores speed and accuracy. The emergencies eventually come faster than the student can respond, and he must voluntarily abort the mission or "die" as the spacecraft explodes. Japanese astro camps usually blow up with their ships.

"Our students are taught never to quit, so they never hit the abort button," says Soichi Tomoshima, manager of the international division for YAC Japan. "It's only after we explained that they lose points for dying that the students started to think safety first."

The astrocamps also launch model rockets they have built that carry aloft scientific payloads. Eventually the students make a mock rendezvous with a damaged satellite using a simulator for the shuttle's manned maneuvering unit. As the course progresses the campers study their shuttle mission with each practicing his assigned mission-specialist role in the simulator.

On the last day the crew carries out two complete simulated shuttle flights with satellite launches, simulated emergencies, and scientific experiments. Afterward there is a complete debriefing.

Is the growth of these YACs and space camps a sign the Japanese will make a bid to become number one in commercial space technology, as they did with automobiles and consumer electronics? "I think so," says Butler. "I think we have our heads in the sand if we think we can maintain our preeminence in space just because we went to the moon or built the space shuttle."

They have the rockets and the electronics. But the most important thing is preparing the young people. That's the future. The key is having large numbers of young people prepared to move into space technology. This is where the Japanese YACs and camps are important. It's no secret that that's what they are doing with my program. It's like the VCR. We invent it, they take it, make it better and cheaper, and sell it back to us.

And that's not all, he says. "Korea is about to do the same thing. They are about two years behind Japan." □





# INTERVIEW

CONTINUED FROM PAGE 10

measure that. He took on the problem studied it, and looked how to measure the magnetism of nuclei. Students of his and their colleagues developed the technique much further, and now it's a half a billion dollar industry called nuclear magnetic imaging.

**Omn:** Have you tried getting TV to benefit its science coverage?

**Lederman:** I attended a weekend meeting for TV news producers and scientists. The producers said, "Why do you want us to do more science?" And we said, "Science is important." And they said, "It sounds like you want us to be social engineers, and we're news broadcasters." So I made up this story. Two flashes come over the AP wire. Friday discovers electricity and Napoleon's armies are on the march. What makes the second flash news? Napoleon? Friday won't even get mentioned. But Friday will have a bigger impact on the evolution of humanity by far. Ultimately, it came down to a confession by these producers that they were uncomfortable with science. What bothers me are the people who are uncomfortable with science who should be. Like thirteen presidential candidates in the last election.

**Omn:** Getting back to particles. I understand you're making antimatter—the labeled substance of science-fiction stories—right here at Fermilab.

**Lederman:** Oh, we got hot and cold running antiprotons here. And we can store them. [He checks a TV screen.] Right now we have four hundred and seventy billion antiprotons circulating in our stacks, waiting to be used.

**Omn:** What form does it take?

**Lederman:** Group clusters of antiprotons running round and round in the vacuum of a magnetic storage ring. They're moving at the speed of light, or close to it. That's how you store them.

**Omn:** What could antimatter do?

**Lederman:** Well, with these numbers not much. I think antimatter if it ever has any practical use will be as an energy storage device. One antiproton stores an enormous amount of energy by virtue of the fact it can be annihilated. The estimate I've seen is that a milligram of antimatter could put a rocket into orbit. Now that's compared to I don't know how many tons of liquid oxygen, kerosene, or whatever fuel they use. The energy-storage-to-weight ratio of antimatter is fantastically better. On the other hand, a milligram of antiprotons would take us—well, let's figure it out. [He does some quick and dirty calculations on his calculator.] It would come to ten thousand years of production at Fermilab at high cost to give us a milligram. To make it practical—say make it take one year—you have to improve it by another factor of ten thou-

sand. Maybe some kid now in public school will figure out how to do that.

**Omn:** How many antiprotons would make up a milligram, then?

**Lederman:** [He calculates.] About a billion trillion, or ten to the twenty-first.

**Omn:** Why are you making antimatter?

**Lederman:** We have this four-mile ring, right? We stick in protons. They go in this direction and around. We stick in antiprotons and they go in the opposite direction. Then we make head-on collisions of protons and antiprotons in the same ring. Head-on collisions are incredibly more effective than the usual thing, where you take the beam of particles out of the ring and hit a target. Of course there's no free lunch. The penalty is that if the particle has a target to hit, it's going to hit it. With head-on collisions it's like machine gun bullets colliding in mid-air. There are lots of misses. So improving the number of collisions per second becomes the art of the collider. With a target you can have ten million collisions per second, whereas here we're making fifty thousand collisions per second. Sometimes I say when protons and antiprotons collide at Fermilab, we replicate what happened just after the Big Bang. Temperatures are so high that they don't exist anywhere in nature until ten to the minus fourteen seconds after the Big Bang, and someone will say, "Is it safe?" The answer is that we're only doing it for a piddling number of particles. The total energy released is less than a sneeze. But in each collision, it's fantastic.

**Omn:** Will they make antimatter in the super collider?

**Lederman:** No. If the super collider is to find the Higgs, it needs maybe a hundred times the collisions per second. For that, there may not be enough antiprotons. Antiprotons don't grow on trees. **Omn:** If the super collider does find some new physics at the twenty-Tev level, does that mean a lot of physicists will have to give back their Nobel prizes?

**Lederman:** What? Oh, I don't think so. The Nobel has had a very good record. The biggest "mistake" was Fermi. They gave him the prize for what was thought to be transuranic elements when he had really discovered fission. But that's the kind of mistake you like to make, right? [Fermi bombarded uranium with neutrons and many thought he had created new, heavier elements; in reality he had unknowingly split the uranium atom, creating fission, the secret of the atom bomb.] There have been some mistakes, but not in physics. Oh, there have been some curious choices, like the guy who got the prize for inventing the lighthouse some kind of reflector.

**Omn:** And on the physiology side, you have Egas Moniz, who won the prize for the lobotomy.

**Lederman:** Well, physiology is clearly a lot harder to judge. That may be why Nobel put physics last. **DO**

# MIND

CONTINUED FROM PAGE 34

the lever pressing behavior at the time of the lower press and just before food delivery. The food would, presumably, activate the reward system, giving the target cells a shower of dopamine or endorphin. Balazsically," he adds, "only the cells involved in the correct behavior consistently would have been recently active. Only recently active cells are responsive to the reinforcing transmitter, so over many trials there would be selective reinforcement of correct response cells."

"I like to call those cells 'smart cells,'" he continues, "because they learn from the consequences of their action." The more smart cells, the more behavioral variations and flexibility intelligence—the ability to behave adaptively—may depend in part on the number of smart cells. Maybe, he says in what he admits is "weak and raw" speculation, "the general IQ factor can be quantified by counting up how many smart cells you have."

Stein's next step is to determine where these smart cells cluster. In addition, research everyone is looking for a place in the brain where the drugs exert a high. "The loss of the bed is that the nucleus accumbens [a prominent area of the limbic system] as the main candidate. I don't have any problem with the nucleus accumbens, it is an important projection of the dopamine system." But, Stein adds, the reward-seeking cells probably reside in the diverse areas of the brain where many different types of learning occur. Perhaps nature's way of endowing these centers with learning ability is by putting these smart cells in them.

Some scientists are reserved about smart cells. It's a giant, albeit interesting, leap, comments Thomas H. Brown, a Yale psychologist studying the mechanisms of learning. "But there are a lot of missing steps between understanding the brain's systems of rewards and reinforcement, and the idea of global intelligence." Adds Andrew G. Barto, a computer scientist at the University of Massachusetts-Amherst, "Neurons are probably more sophisticated machines than we currently believe. But how can you get these cells to interact as an aggregate unit to solve complex problems?" Artificial intelligence theorists like Barto would like to answer that question.

If Stein's assertion about smart cells and intelligence proves a key piece of that puzzle, will we arrive at a biotechnology to augment intelligence? Will we be able to improve our IQs by using drugs that enhance the activity or development of smart cells? These gains have been hard won over the last thirty years. "Stein says, 'It'll be quite a while before we unravel the biological bases of intelligence. But this research may give us an interesting place to start.' **DO**



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## GAMES

CONTINUED FROM PAGE 109

locked the bag, kept the keys, and mailed the package to Weber. Two days later I got the bag back in the mail. It was still locked, but the lock had been removed. When I opened the bag I found a message that read: "Dear Scott—Where do you want to follow me first?"

Obviously we disapprove of telling magic secrets to the general public, but clearly Weber's trick isn't ordinary. The secret has serious implications. It can be used to "comm" (communicate) bank hosts, corporate espionage, or mail fraud. It is a secret that should be known by banks and others who use bags with locks similar to the one shown on page 105. These bags are not secure, as you can't tell when they've been tampered with after opening.

Because of the seriousness of the trick, Weber has given me permission to reveal the secret for the first time to the general public. The solution will appear in this column next month, along with an update from the Internal Revenue Service regarding its bag changes.

In the meantime, think about the principle. Keep in mind that it is so simple it can be described over the phone or revealed in a single illustration. Now that you know locked zipper bags can be opened, perhaps you'll come up with Weber's "Aha!" insight yourself.

### ELEVEN QUIZ ANSWERS

1. The first manned landing on the moon: Apollo 11
  2. Eleven possible number combinations can be thrown with a pair of dice.
  3. The USSR has 11 time zones—more than any other country.
  4. There were a total of 11 states in the Confederacy.
  5. The armistice to end World War I was signed on 11/11/1918. For many years thereafter it was customary to ring bells, blow factory whistles, and so forth at 11:11 A.M. each November 11.
  6. Ocean's Eleven (1960) and 11 Herowhouse (1974).
  7. Soccer and cricket (Extra credit answers: speedball, a soccer variant that permits the ball to be caught and thrown with the hands, and bandy, a Scandinavian hockey game.)
  8. The Bible. In the parable of the vineyard, workers hired at the "eleventh hour" are paid the same as those hired earlier in the day (Matthew 20:1-6).
  9. Erase the letters one to get eleven. Rearrange these letters to spell twelve.
  10. The Spanish for eleven is once.
  11. Flour, monosodium glutamate (MSG), salt, and pepper.
- Thanks to Dan Shine of Cincinnati and Martin Gardner of Hendersonville, North Carolina, for their help in the preparation of this quiz. **DD**

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# STAR TECH

## ACCESSING THE FUTURE



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Satellite-based anti-theft system (above) triggers a pager when a car is stolen. Owner can trigger a siren,

lights, and painful sound generator by phone. Price: \$350 to \$550. Contact: NASA-PSI, 400 East 74th Street, New York, NY (212) 517-0064.

### PICKUP ARTIST

The Sonosonar (right) uses microwaves to detect transmitters, diodes, and integrated circuits. It detects hidden tape recorders, transmitters, and microphones. Price: \$17,000. Contact: Information Security Associates, 350 Fairfield Avenue, Stamford, CT (203) 357-8051.



### LIGHT LISTENING

Infrared-transmitting bug escapes conventional detection by using light, instead of radio frequencies, to send its signals. Receiver (left) translates the beams from a postage-stamp-size transmitter (not shown for reasons of national security) into sound. Line of sight is required between the devices. For sale only to accredited members of agencies of Western governments. Price: not available. Contact: none.

## SONIC BOOM

Electronic stethoscope (right) listens through walls or doors or to suspicious ticking inside packages. The unit works best on solid doors and walls and amplifies sound about 30 times. Price: \$299. Contact: International Logistics Systems, Box 25, 72 Ralph Street, Belleville, NJ; (201) 750-0007.



## CRIES AND WHISPERS

You can't buy this transmitter on a heard (below) unless you're the law. But the tiny nite is legal. It picks

up a whisper from 30 feet. Price: \$360 for mike; about \$200 for transmitter. Contact: International Logistics Systems, Box 25, 72 Ralph Street, Belleville, NJ; (201) 750-0007.



## PHOTOCOP

Standard car antennas house sophisticated pinhole video camera (right). Excellent for stealthy sleuthing and undercover surveillance. Optical fibers transmit the image from video camera to monitor. It's also easy to hide the camera inside hollow plastic plants for discreet video observation indoors. Cost: \$12,000 with monitor. Contact: Personal Protection Products, 405 Park Avenue, New York, NY; (212) 431-4757.



The eleventh anniversary quiz and  
the eleventh hour for bank security bags

# GAMES

By Scott Morris

In honor of our eleventh anniversary, I dug up some interesting facts about that number.

Eleven is a prime (divisible only by itself) and a palindrome (numerically, it reads the same backward and forward). It is the only palindromic prime with an even number of digits. Eleven is also the first number whose square (121) is a palindrome.

If you want to tell whether a given number is divisible by 11 (without doing long division), add the digits in the odd positions, then add the digits in the even positions, and subtract the smaller sum from the larger. If the difference is zero or a multiple of 11, then the original number is divisible by 11.

For example, number the alphabet: A = 1, B = 2, C = 3, and so forth. Using this method, the letters in Omea are 15, 13, 14, and 9: Is the number 1513149 divisible by 11? Yes, because the difference between the odd- and even-placed digits equals zero:  $12 - 12 = 0$ .

If you take any long list of people's names, such as a city telephone directory and turn to the center pages, what will you find? The names listed will begin with the seventh letter of the alphabet: K, not the middle of the alphabet as would be expected. Sunspots follow 11-year cycles from one peak to the next. The last maximum occurred the year after Omea was launched; the next one will be in 1990.



Put on your thinking caps for our quiz on the number 11

## ELEVENS QUIZ

What is the connection between each item listed below and the number 11? (Answers appear on page 161.)

1. A twentieth anniversary that was celebrated in Omea three months ago
2. The roll of two dice
3. Soviet time
4. The side that lost in the Civil War
5. The end of World War I
6. Two robbery-caper films, one starring Frank Sinatra and the Flat Pack, the other starring Charles Grodin
7. Candice Bergen, James Mason, and Sir John Gielgud
8. There are 11 members

per side in American football and in what two other major team sports?

8. The "eleventh hour" means the last possible moment before a deadline. In what book did this phrase first appear?

9. Eleven-two. Starting with this word combination can you "prove" that  $11 + 2 - 1 = 12$ ?

10. The teacher asked "Can you spell the Spanish word for eleven once?" The student replied, "Yes, you can." Why?

11. Colonel Sanders, bossed of the "eleven secret herbs and spices" in his Kentucky Fried Chicken (KFC). William Poundstone, for his 1983

book *Big Secrets*, commissioned a chemical analysis of the promised seasoning that is sent to KFC franchisees. Poundstone found only four ingredients, none of which were herbs. What were they?

## OPEN AND SHUT CASE

In May 1985 I introduced Omea readers to Michael Weber, the magician who created the Boomerang Band—a marvelous stunt of firing a rubber band off your fingers so that when it hits the floor it rolls back to where it was launched.

Weber first showed me the Boomerang Band at a magicians' convention in 1984. A more impressive trick by far was one he performed that involved a locked coin purse. In this trick Weber takes a volunteer's ring, places it under a handkerchief, and hands it to a third person to hold. He then reaches inside his jacket, pulls out a locked zipper purse like the one shown at right, and hands it to the volunteer. When the third person looks under the handkerchief, the ring has been mysteriously replaced with a key that just happens to unlock the purse. The volunteer opens it and, surprise, inside the bag is the ring.

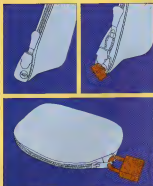
At the convention Weber was selling the trick, which included a small coin purse, a tiny padlock and key, and a sheet of instructions. (This was a closed trade audience, so the secret was safe.) I bought one. When I read the "method" paragraph and

looked at the single accompanying illustration, my jaw dropped! The technique was so simple, so obvious that I assumed it couldn't be new.

As Weber recalls, "I came up with the idea in a dream in 1975. I had a little zippered purse with a lock, and in the dream I saw a hand open the case in a strange way and drop a ring inside. When I awoke I tried it and it worked. I wondered where that vision came from. Was it something I had read, was it a principle that other people already knew, or was it truly original?" Weber showed the trick to some top magic performers and historians, including Dai Vernon, Charlie Miller and Ricky Jay. None had seen it before.

With Weber's permission, I shared the secret with some experts: Martin Gardner, James Randi, Jerry Andrus, and others. The unanimous opinion: "It's new to me!" We were now convinced that this trick was original.

Early on, Weber realized that his trick applied to bank bags. To test his theory, he went to the California First Bank in Long Beach. "When I saw the night deposit bag, I knew it would work," he says. Weber asked the teller to put something of hers inside the bag, lock it, and hand it to him. She put her watch on top of it. He held it under the counter and opened it in less than a minute. Weber dropped the bag on the counter with



Bank bag clasp shown locked and unlocked. Below: coin purse

her watch on top of it. Says Weber, "I'll never forget the look on her face. She suddenly realized that these bags, which people had been trusting for years, weren't secure."

Weber wrote to the company that makes the bags used in his local bank and told them everything. He let them know how their bags could be opened without detection, and he suggested two ways that the bags could be redesigned to solve the problem. "I got a letter from them saying, in effect, 'Thanks for your interesting letter' but nothing more. A year later I noticed that the bags circulating at my bank had

been redesigned using the second solution I had proposed." Apparently someone had taken his letter seriously.

In 1983 Weber did his trick at a magicians' convention in Perris, California. In the audience was Larry Wright, public affairs officer for the Northern California District of the Internal Revenue Service (IRS). Impressed by the zipper purse trick and its exploit, Wright went back to his office and examined the bags that the IRS used to transmit sensitive and confidential documents. He immediately realized that some of them could be opened with Weber's de-

visely simple method.

Wright tells his story: "I asked our security chief if she knew that transmittal bags could be compromised. She said no, she was sure the bags were secure. I opened one in front of her and she was aghast at how quickly I'd broken into it. She decided to tell the division chief. He left me a locked bag and walked down the hall to his office. He was only there for a few seconds when I telephoned him and told him what was inside. He hung up the phone and ran back to my office. The bag was still locked, and the slip inside. He was shocked of course, and I told him how I did it."

Wright acted on his new information. "We changed the design of the transmittal bags we use in this office, and now most of the bags used by the IRS throughout the country have been changed so they are impervious to Weber's technique of opening them."

In addition, many banks have changed their night-deposit bags in recent years, making them secure against Weber's trick.

There are still bags in circulation, however, that can be broken into using Weber's method. A few months ago I obtained a bank bag, and the lock (shown at left) looked secure to me. Inside the bag I put a copy of *The New Book of Odds* Games in-scribed to Michael Weber. "Okay, miracle-worker, get this book out and I'll follow you anywhere!" I

## VIDEO SCANS

# GAMES

Circa 2050. Renegade computer hackers sizzle their synapses by wiring their gray matter into the vast cyberspace of a multinational computer network. The ultimate computer interface is a consciousness-expanding mindlink between man and machine, far beyond the hallucinogenic of the twentieth century. But someone is killing the hackers, flat-lining their brain waves and charming their cerebellums with direct-connect electrodes.

Welcome to the world of science-fiction novelist William Gibson's novel *Neuromancer* (Ace).

A grand-slam winner of the Nebula, Hugo, and Philip K. Dick awards, *Neuromancer* immerses readers in Gibson's literary vision. The author time warps elements of criminal subcultures and counter-cultures into the Information Age, creating the cyberpunk world with its hard-boiled squalor and alcohol-based psychedelia. Computer owners can now grab a piece of cyberspace for themselves with Interplay Productions' interactive *Neuromancer* game, distributed by Megadisc for Apple II, Commodore 64, and Amiga computers.

When Interplay was translating *Neuromancer* into computer entertainment, sales guru Timothy Leary was an enthusiastic cheerleader. "As a friend, I urged [Interplay president] Brian Fargo to capture the language and flavor of Gibson," Leary says. "Many of the phrases names



and poetry in the game come directly from the novel. The literary level of *Neuromancer* is a high point in computer games. And the great thing is that you are a hacker playing it. That is the key to the whole game."

In the *Neuromancer* game, you assume the character of Doc's Flatline using a keyboard or joystick to control his on-screen movements. It's a Lucasfilm Games' Zak McKracken and the Alien Mindbenders (Games, February 1989). To uncover the hacker killer who turns renegade and ride the wide network, encountering monolithic security programs through the grid of cyberspace. You can use hard-earned virus programs to counter security and break into top secret databases.

A real *Neuromancer* game, however, would probably kill or maim you or maybe give you a mild shock if you lost. Gibson

quips: "It amuses me that *Neuromancer* is now a product that you can actually play." Gibson, however, doesn't play computer games. In fact, when he wrote the novel he didn't even own a personal computer. "Maybe that's why I was able to bring a sense of wonder to computing," he says.

Technolimits aside, the *Neuromancer* game suggests, and often captures, Gibson's evocative atmosphere and intrigue. And it offers players many hours of provocative science-fiction entertainment. But it is just one of the many role-playing computer and video games now available. Rooted in the board game world of TSR's *Hobbies*, *Dungeons and Dragons* role-playing games (RPGs) splice the human participant into the personality of an electronic alter ego. The character survives by painstakingly exploring strange worlds, slouting

puzzles, and betting against progressive foes. And typically, RPGs require 30 to 100 hours to complete.

Among the most popular RPGs are *The Legend of Zelda* and *The Adventure of Link*, two sword and sorcery epics for the Nintendo Entertainment System (NES), and the futuristic cattle-war scenario of Electronic Arts' *Savanna* (Worlds, Future Magic) (MS-DOS, Apple IIpp). An intricately plotted drama for multiple players, *Masterplay's Star Siege One* (Macintosh, Apple II, Commodore 64) combines board- and computer game techniques. And Origin Systems' *Ultima* series is a quartet of games in the *Dungeons and Dragons* mold for the NES and for computers.

Though the graphics and interaction of today's RPGs are relatively crude, future role-playing will be as real as *Me* itself. Experiments are under way to perfect interactive, three-dimensional imaging. Players will wear goggles that display and alter their field of vision in response to movement, just as your perspective changes when you turn your head. And in a few years similar hardware will allow you to experience, for example, the feeling of walking on the moon or beheading a dungeon-roaming dragon. The brain-zapping fantasies of *Neuromancer's* cyberspace may not be as fictional or as distant as they seem.

—Bob Lindstrom







## LAST WORD

By Sean Kennedy

●*Think of the results we could achieve if we attached every exercise bicycle in the United States to a power generator. Then we could convert every track to a treadmill and watch as calories turn into kilowatts.* ●

You've fueled the claims: solar, wind, geothermal, unlimited power from seawater and an ever-ready battery. Well, almost. The rest of the scientific community has yet to replicate the fusion work of professors Martin Fleischmann and B. Stanley Pons of the University of Utah. (Perhaps this region can take place only in Utah.) While the jury's still out, I offer my own new sources of energy:

**BABY POWER** Anyone who hits ever taken an extended plane, train, or automobile ride with children has experienced firsthand the boundless energy of youth. Some people make frequent pit stops to cope, others hold a cache of toys, candy, and comics to placate their offspring. I suggest a third alternative: a baby changer that captures all the movement, noise, and mayhem of its youthful passengers. Infants would "sit" in a special soundproof containment area, which would transform all of their energy into a force driving the vehicle.

Once the ban of weaned listeners, children would now become indispensable. Instead of snappers, bottle-fed parents, kids would greet grateful, well-rested people at train and airport exits. There would also be environmental and financial benefits. Snugg would lift around Disneyland and other family vacation spots, and a 14-ounce box of Cocoa Puffs could fuel a trip from Chicago to St. Paul.

**TURNTILES** Think of how many people push their way through turnstiles each day: subway riders, sports enthusiasts, concertgoers. The winds may be unpredictable, but rush-hour crowds and U2 fans are not. Turnstiles will spin as long as man wishes to charge admission to his fellow man.

Introducing the windmill of the twenty-first century. A miniature turbine implanted in each turnstile holds mass power. Minimally, this powers lighting and sound systems. (In fact, this may already be the case, according to the daily of announcements over subway speakers.) On a really good day, patrons might receive door prizes of a freshly charged C or D cell battery for some use.

**ON SALE!** Been to any good sales "booty"? The hordes who hoard at department stores and big boxes (and power) when bent on saving 25 percent and beyond. My mother once struggled for ten minutes with another shopper over a pair of plaid bell-bottoms for my sister Meg's sixteenth birthday. When Meg discovered the pants had only one leg (apparently the other customer had gone home with a leg under her arm) my mom was undaunted. "Still," she murmured, "they were a bargain."

Why let such potential fall by the wayside? Picture a store equipped to

reap the benefits of cheap transient folks. Sale items are strategically located at the end of an energy-harvesting obstacle course: Potter's wheels, hand pumps, and treadmills like the above. At the very least a store's escalators and cash registers could run on customers' labors. And savings in these areas could be passed on to consumers in the form of even greater sales, thus creating a type of perpetual energy machine.

**EXERCISE** The resurgence of spas and gyms across the country offers all kinds of potential energy. At present the exertion of millions is being washed down locker-room drains. But with a few minor adjustments, Americans could stop exercising and begin energizing. Think of the results of attaching every exercise bicycle in the United States to a power generator (these could be converted so easily that I suspect their owners foresee the difficulties of present resources). Now convert every track to a treadmill and watch calories become kilowatts.

The last goal is Nautilus machines would supply the pumping power for the waterworks of an entire neighborhood. Teams of swimmers would tow torpedoes across harbors, and a modified contest of tug-of-war would lift elevator passengers to their desired floor. Additionally, donors would be encouraged not to let their energy go to waste, while athletes would be challenged to go for the gold.

**STESIA** This suggestion is, perhaps, the easiest for people to try. It relies on their most basic sense: cloth.

Though some may never climb a treadmill or test drive their children, almost no one would refuse a midday nap. Skillet, long recognized as a necessity in the heat of Mexico, could benefit the United States in two ways. First, while people sleep they use almost no outside energy. This would aid in energy conservation (i.e., a daily saving street). Second, it followed by a monotonous and absolute "doze to," a four- to five-hour period allowing no opportunity for activity, people would avoid like-cooled springs, tiring to climb a treadmill, ride a bicycle, or take a relaxing drive with the kids.

In closing I'd like to pose a question: Remember the Department of Energy? Began in 1977 by erstwhile president Jimmy Carter, DOE was all but obliterated by elsewhere president Ronald Reagan. One of the original functions of DOE was to develop and research new sources of energy. Despite the Reagan era's denial of problems with existing sources of energy, they still exist, haven't it time to resuscitate the DOE, before it's pronounced DOA? ☐

Sean Kennedy is a singer in a now-closed chocolate shop finding himself in Jamaica.