

20 PREDICTIONS THAT WILL CHANGE THE WORLD

EC 02481

# OMNI

SEPTEMBER 1991

A woman's face is the central focus, wearing a mask made of a green printed circuit board (PCB). The mask has two eye cutouts showing her blue eyes and a red lip cutout showing her red lips. A hand in a black glove holds a silver probe that touches the top of her forehead. The background is dark with glowing green circuit traces.

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# OMNI

VOL. 13 NO. 12

SEPTEMBER 1991

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Attention, computer scientists! You have ten years to create a real-life Hal by 2001.



"I do not know whether I was then a man dreaming I was a butterfly, or whether I am now a butterfly dreaming I am a man," wrote Chuang-tzu in the fourth century B.C. Now, when consciousness is even more diversified, artist Will Cornier's image inspires a similar statement: "Do I see through the eyes of a butterfly, or through the prefabricated silicon matrix that makes a butterfly's eyes my own?" (Additional art and photo credits, page 59)

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By Doug Stewart  
So's your mother. Name-calling, rude remarks, and obscenities abound in messages sent over computer networks.

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There are no tall, dark, handsome strangers in sight. Instead, these predictions tackle the future of warfare, the environment, and more.

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## Fiction: Life Regarded as a Jigsaw Puzzle of Highly Lustrous Cats

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You've got nothing against cats. You've got nothing for them, either. But you find that they have haunted your life from childhood to marriage to your horrifying job.



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## Games

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## Last Word

By Mich Coleman and Dave Jaffe  
Is your computer a little under the weather? Better consult Dr. Victor Thrake, computer virologist extraordinaire, before your machine goes down—permanently.

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## The Omni-Berkeley Personality Profile

By Keith Harary

Who am I? Why do I act the way I do? Everyone has asked these questions, and they have even given rise to personality tests, including this one developed for OMNI. Responses mailed in to OMNI will contribute to one of the largest personality databases ever.

Hello.

1950.

Dig me,  
Daddy-O.

1958.

Peace,  
baby.

1968.

What's  
your sign?

1971.

Yo!

1978.

Ciao.

1985.

Hello.

1991.

You always come back to the basics:



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# FIRST WORD

## COLD SHOULDER:

Scorned now, fusion may answer our energy problems

By Glenn T. Seaborg

Seaborg,  
corecipient of  
the 1951  
Nobel prize in  
chemistry,  
is professor of  
chemistry  
at the University  
of California,  
Berkeley.



The announcement on March 23, 1989, of the observation of cold fusion, at a press conference in Salt Lake City, electrified the civilized world. Electrochemists B. Stanley Pons of the University of Utah and Martin Fleischmann of the University of Southampton in the United Kingdom claimed they had observed a nuclear fusion reaction (large amounts of heat produced by the fusion of two deuterium nuclei) as a result of passing an electric current through heavy water.

This would be a sensational discovery because the reaction was thought to be occurring at so-called room temperature. Conventional nuclear science suggests that to create this kind of heat, the deuterium nuclei need the kinetic energy created only when the temperature of the nuclei is raised to millions of degrees.

Nuclear fusion of deuterium should produce helium 3, tritium, and neutrons or protons. Pons and Fleischmann claimed to observe neutrons. Neutrons were also seen by physicist Steven E. Jones at neighboring Brigham Young University in Provo, Utah. Many nuclear scientists, however, doubt the validity of these ob-

servations. The level of neutron emission seen was a billion times lower than would correspond to the amount of heat energy that should have occurred, had the energy been due to nuclear fusion mechanisms. Yet the Utah announcement of "cold" fusion provoked visions, among scientists and nonscientists, of a more immediate and less complex approach to nuclear fusion than "hot nuclear fusion," eventually leading to a practical and unlimited supply of electric power.

On April 13, 1989, the day following a symposium on nuclear fusion and electrochemistry at the semiannual meeting of the American Chemical Society, Robert O. Hunter, Jr., director of the Department of Energy's Office of Energy Research, requested I come to Washington, DC, to brief President George Bush and his staff on cold fusion. At the White House I described the Utah experiments and suggested that the discovery must be viewed with skepticism but dispassionately and, thus, probed thoroughly.

At my suggestion, a panel was appointed under the auspices of the Energy Research Advisory Board of the Department of Energy to explore the cold fusion claim. Scores of laboratories around the world entered the fray to prove and produce cold fusion at room temperature, posing a formidable task for the panel. Though the contest is now dying out, Pons and Fleischmann as well as other scientists are still stoutly defending the original premise of substantial cold fusion. The preponderance of negative evidence, however, led the panel to conclude in their final report that cold fusion does not hold promise as a practical source of energy, and there is no convincing evidence to associate the reported anomalous heat with a nuclear

process. Whether there are conditions where a type of cold fusion can lead to the production of neutrons—a billionfold below a level corresponding to practical energy production—may still be an open question.

After careful evaluation, I do not foresee cold fusion as a practical source of energy at any time in the future. However, there would be a fantastic payoff for such an improbable source of energy, and in the spirit of scientific inquiry, the whole process should be better understood. Therefore I agree with the recommendation of the cold fusion panel that modest support should be given for cold fusion research.

The attainment of a practical and economical source of electrical energy through the conventional "hot fusion" process is a formidable task, yet probably an attainable goal. Means must be found, however, to provide, sustain, and confine the reactants at extraordinarily high temperatures and to deal with neutron-induced radioactivity.

In view of the difficulties with this conventional path toward nuclear fusion, some attention is being directed to an imaginative and potentially simpler approach: colliding beams of deuterium and helium 3, leading to the products hydrogen and helium 4 (aneutronic fusion). Because the energy is released in the form of charged particles, it can be converted into electricity with high efficiency.

Nearly a half century of research has been devoted to trying to produce fusion energy in a self-sustaining manner. And it may be another half century before "hot fusion" will be developed as an economical source of electric power. But when this goal is accomplished, the world's oceans will become a source of unlimited energy. ☐

# OMNIBUS

## AMERICAN PSYCHE:

Peering into a crystal globe, our writers embark on a far-reaching soul search

**W**hat does it say about your personality if you are reading this issue while A) on public transportation; B) in the comfort of your own home; C) at your local library and disturbed that some pages are missing? The answer: You are expanding your vast knowledge of science, the future, and yourself by perusing the September issue of *Omnib*.

Reading disparaging reports of tests that don't hold much weight with psychologists, *Omnib* editor at large Pamela Weintraub decided to pioneer a "revolutionary new product" in the field of personality evaluation. The result is "The *Omnib*-Berkeley Personality Profile" (page 48), developed by psychologist Keith Harary in conjunction with researchers at the University of California at Berke-

ley. "I wanted to create a test that would reflect the real-life circumstances and everyday personality of those taking it," Harary says. "And I hope it'll become a new approach to conducting personality tests in the future." Research director of the Institute for Advanced Psychology in San Francisco, Harary is internationally known for his contributions to scientific research on altered states and extended human ability. Harary and Weintraub coauthored *Right Brain Learning in 30 Days and Memory Enhancement in 30 Days*, both published by St. Martin's Press.

Authors Marvin Cetron and Owen Davies ("Crystal Globes," page 42) maintain an objective view of the future in their book *Crystal Globe: The Haves and Have-nots of the New World Order* (St. Martin's Press). President of Forecasting International, Inc., and a lecturer on social, economic, and political issues, Cetron is the author of *American Renaissance* (also coauthored with Davies), *Educational Renaissance*, and *Encounters With the Future*. A former senior editor at *Omnib*, Davies is a freelance writer living in New Hampshire.

The author of *Camping With the Prince and Other Tales of Science in Africa* (Penguin), Thomas Bass (Interview, page 74) flew to Paris for his meeting with Etienne-Emile Baulieu. The scientist behind the controversial RU 486 abortion pill, "Baulieu is quite worldly and politically astute," says Bass, who conducted the interview in French. "As we talked, calls were coming in

from all over the world." Bass has also written for *Smithsonian* and *The New York Times*.

Doug Stewart (*Mind*, page 26) takes a look at "flaming," the tendency of people to become abusive or overly exuberant when sending messages via computer. "The proliferation of smiley faces in electronic mail is worse than the insults I've seen on the networks," Stewart says. The faces, he points out, are always typed sideways as (- - Stewart's articles have appeared in *Smithsonian*, *Health* and *Air & Space*.

Roll over, Van Gogh: Increasing numbers of artists are putting down their palettes in favor of pixels. "Computers have opened new vistas in many creative fields," says *Omnib* associate editor Sandy Fritz (*Pictorial*, page 66). "When properly used, computers open doors that no one could have ever imagined even fifty years ago."

*Omnib* contributing editor Tom Dworetzky (*Political Science*, page 23) tackles the tough issue of just how cozy industry and government should get in an effort to make America competitive in the global marketplace. "The marketplace is like a casino," Dworetzky says. "No one may be able to pick winners every time, but if you don't bet, you're bound to lose."

Nebula award-winner Michael Bishop is the author of numerous science-fiction novels, including *No Enemy but Time*. His novella "Apartheid, Superstrings, and Mordecai Thurbana" was nominated for a 1990 World Fantasy Award. "Life Regarded as a Jigsaw Puzzle of Highly Lustrous Cats" (page 60), dedicated to Jeanne Schmitz, will appear in *You Haven't to Deserve* (Long Street Press), an anthology of stories by Georgia writers. Proceeds from the book will go to Atlanta's Homeless Task Force. **DO**

Clockwise from bottom: Devera Pine, Pamela Weintraub, Keith Harary, and Sandy Fritz.





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SEPTEMBER

# COMMUNICATIONS

## DOLLARS AND SENSE:

Readers react to nuclear power and the economics of crime, nationalism, and 24-hour workdays

### Crime Won't Pay

Author Lamont Wood ["A Pocket Full of Miracles," June 1991] is right on the money with smart cards. Anonymous cash is essential to criminals, who can't rob a bank if there is no money in it. Drug dealers accept only cash, knowing a paper trail would cripple their business. Smart cards might make our future a little more crime-free.

Vito Verga  
 Cash Free America  
 Deer Park, NY

### Thank You for Using ATM

"One World, One Currency" [June 1991] alludes to the elimination of currency in favor of instantaneous electronic transfer of funds. Electronic transfer, however, is a business, not a government, issue. Some American supermarkets already accept automatic teller machine (ATM) cards. Before long I'll be able to use an American ATM card to buy a Big Mac in Europe. But reducing the number of world currencies will be difficult. Governments will see a single global currency as an intrusion on their sovereignty and will continue to have their own currencies if only appearing on some bank computer screen.

Fredric W. Young  
 San Bernardino, CA

### Paint It Green

After reading "The Business of Being Green" [June 1991] and as a project manager on the Audubon Project, I welcome the challenges of environmentally construction. Our company takes great pride in being at the cutting edge of "green office" design. I hope that articles like yours help raise the consciousness of the industrial community to the long-term cost savings offered by environmentally construction.

John J. Phelan  
 AJ Contracting  
 New York City

### Capitalizing on Wonder

When you report on new technology in articles such as "Home Office 2020" [June 1991], you expect readers to be

full of wonder. I am. I wonder. What is the good of having even our current array of telephone options if the person I'm calling isn't available? I wonder, As the new technology brings our work into our cars and homes, will we be able to get away from work and relax with family and friends? I wonder, Why can't engineers create a communications system that would give the people in Bangladesh enough warning to escape cyclones and floods?

Charlotte G. Haldenby  
 Sault Ste. Marie  
 Ontario, Canada

### Nuclear Family

Western computers in the modernization of the Soviet Union's nuclear industry [Artificial Intelligence, June 1991] underscore the increasing globalization of the industry. We have learned that what happens to a reactor on the other side of the world can have profound effects on operations here. Producers of nuclear reactors are entering into agreements with foreign companies, typically the Japanese, to build and market advanced systems. These advanced light water reactors combine the experience we have obtained over 30 years of commercial nuclear power with new approaches that offer simpler, safer, more economical power plants.

Theodore M. Besmann, Ph.D.  
 Oak Ridge National Laboratory  
 Oak Ridge, TN

### Cents of Duty

Jeffrey Sachs [Interview, June 1991] addresses some of my own concerns as a professional military officer. Recently serving in Saudi Arabia made it clear that my job requires me to defend the economic interests of our nation. But that may not be necessary with the advent of a global economy, and with people like Sachs working for it. I would feel an even greater sense of duty in defending the human rights of people around the world.

Vincent D. Hughes  
 Captain (P), U.S. Army  
 Fayetteville, NC DD

# DIGS

## CASKET CASE:

A centuries-old ghost town raises its dead

By Curt Wohleber

**B**y the time George Washington was born, St. Mary's City had largely vanished. Founded by Protestant settlers in 1634, just 14 years after the *Mayflower* landed at Plymouth, Maryland's first city became a ghost town at the end of the seventeenth century after political upheavals moved the seat of government from St. Mary's to nearby Annapolis.

"It was a terrible thing for the city, but a blessing for archaeologists," says Henry Miller, director of research at Historic St. Mary's City.

This fall Miller plans to meet some authentic residents of St.

students found and unsealed lead coffins containing Maryland's first royal governor, Lionel Copley, and his wife. "They opened Governor Copley's coffin and found it was mostly bones and a little hair," says Miller. "But then they opened his wife's coffin and found that she was completely preserved. The students described details of her clothing, hairstyle, even facial features. So that's the range we're looking at: At worst, the coffins we've uncovered could contain only bones. At best, we could be dealing with completely preserved people."

Just hours after Mrs. Copley's coffin had been pried open, how-

ever, you don't want to miss a critical fact."

Right now the plan is to wait until fall, when cooler weather will pose less of a threat to the interior of the coffins. Then the coffins will be removed from their burial vault and placed in a sterile environment. Here they will be subjected to a battery of high-tech imaging techniques such as isotopic sensing, photo-acoustics, and tomography to ascertain, as closely as possible, what's inside without actually opening the box.

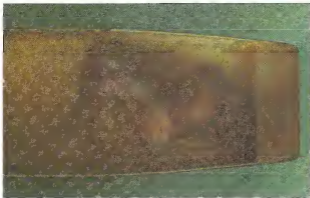
Next, if all goes well, a small hole will be drilled into one or more of the coffins, enabling the scientists to look around inside with fiberoptic probes and perhaps extract samples of seventeenth-century air.

Miller also hopes to extract tissue samples from the coffins' occupants. "We could potentially look at the dried fluids and extract things like antibodies," he says. "That would allow us for the first time to get a real look at the diseases that were present in early America. The period literature notes things like agues and the bloody flux. Who knows what that is?"

Another possibility is DNA analysis of mummified tissues within the coffins. Few could afford to spend eternity entombed in lead, leading Miller to suspect the coffins contain members of the Calvert family, who founded the colony of Maryland. Researchers could conceivably track down their modern-day descendants offering unprecedented glimpses at how genetic data within a family line are transformed over a period of centuries.

But no matter who is inside, Miller looks forward to hearing their silent stories. "I'm very optimistic that we can open up a whole new chapter of life—and death—in early America." **DD**

*Tales from the crypt: WW Americans who died 300 years ago divulge their stories?*



Mary's. These residents are dead, of course.

Miller and field director Tim Riordan discovered them last fall when they used ground-penetrating radar to probe the land where St. Mary's Great Brick Chapel once stood. The find was outstanding because the bodies were housed in lead coffins.

In 1799 some medical stu-

ever, moisture and microbes went to work and the body began to quickly disintegrate. Miller wants to avoid this pitfall, so he recruited a topflight team of experts in such fields as pathology, nondestructive testing, and atmospheric science for their advice and their expertise. "We're trying to figure the best way to proceed," says Miller. "When you



# ARTIFICIAL INTELLIGENCE

## WHERE'S HAL:

Ten years to 2001, and the ultimate computer is nowhere in sight

By Lloyd Chrein

**H**al felt the greatest enthusiasm for the *Discovery* mission. In fact, Hal had a whole range of emotions and thought processes, right down to psychosis. It could simultaneously hold intelligent conversations, maintain radio contact with Earth, beat its crewmates at complex games, and control every circuit aboard the Jupiter-bound spaceship—no small feat for any computer we know.

With A.D. 2001 only ten years away, we don't have anything close to Hal 9000, the silicon vil-

lains using self-replicating neural networks, a breakthrough that led directly to Hal, or heuristically programmed algorithmic computer. Researchers in the Nineties, however, have taken only the first few steps. "Artificial intelligence is good at specific areas of knowledge, at doing one task at a time," says Marvin Minsky, a computer science professor at the Massachusetts Institute of Technology (MIT) and one of the physicists credited in Clarke's book with the breakthrough. An expert system, for example, performs one chore, such as giving medical diagnoses. The closest AI has come to machines with Hal-like abilities are control systems, which can fly, navigate, and land a Boeing 767.

Hal would be able to do multiple chores at the same time. "When you consider what would go into a Hal, you think of knowledge, vision, advanced language, learning—all working together," says Ron Brachman, head of AI principles research at AT&T Bell Labs in New Jersey, who raised the topic at an American Association for Artificial Intelligence meeting earlier this year. "We either have or are working on many of the pieces, but no one has tied them all together."

Yet Hal's prospects aren't all gloomy. For instance, AI may soon possess common sense, "the one single component that has been holding back progress," says Douglas Lenat, principal scientist and director of AI at MCC, a research consortium in Texas.

Six years ago Lenat began programming common sense and reasoning into a knowledge base. "You have to put in information about daily human activities: If you don't drink water for several days you will get thirsty, if you go to work by car, you typically get home by car," he says. "There are

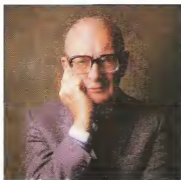
also the subtleties of human language: If I say, 'I saw a bicycle through the window and wanted it,' you'd know it meant the bicycle, not the window."

Lenat expects that his work, which will take several more years of inputting, could lead to a Hal prototype before the deadline. "By the mid-Nineties, natural language systems will be doing well enough that the information will be input verbally or by reading. We will be teaching the computer rather than programming it [a feature of the Hal 9000]." He also hopes his machine will understand emotions. "Computers don't have to have emotions but they can't understand the world unless they know for example, why people get angry."

Another Hal hopeful is the Soar project, started in 1982 by Professor Allen Newell and two graduate students at Carnegie-Mellon University (CMU). "Soar is the first general problem solver that learned as it worked," says John Laird, a CMU graduate and an assistant professor in the University of Michigan AI lab. A similar project, called Prodigy, is advancing under CMU professor Jame Carbonell.

In spite of these advances, Laird doesn't hold out much hope for a Hal for at least 50 years: "We don't understand human intelligence enough to make a complete artificial intelligence." Yet all the researchers believe we will someday have a Hal. Once we do, Clarke hopes it will be more than one small step for man. "You won't see it doing something as mundane as, say, being a bank teller or working in a fast-food restaurant," he says. "Once, after the book came out, David Frost asked me whether they could build a computer to do his job. I said they would not waste a computer on that." □

**What's the matter, Dave? One major stumbling block to researchers' attempts to create a real-life**



**version of Hal 9000 is the need for the computer to have common sense and understand human emotions.**

lain/technological wonder of Arthur C. Clarke's 2001: A Space Odyssey. It's not because we don't need such a machine. "I imagine that the scientific community is looking forward to the first prototypes," says Clarke. According to many scientists, however, there's only a slim chance that we'll make the deadline or even the sequels—although other artificial intelligence experts are considerably more optimistic.

AI has already missed one milestone. In the 1968 book *Eighties* scientists were "growing" artificial

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# SPACE

## 101 USES FOR AN ASTEROID: An untapped mother lode floats aimlessly in space

By Devera Pine

**E**very couple of years someone gains a little publicity by warning that a near-by asteroid could slam into the earth. In fact, at least 170 asteroids regularly cross or graze the earth's orbit. Some scientists say those asteroids should be put to uses other than periodically panicking the public.

The asteroids in question approach Earth's orbit more closely than those in the asteroid belt and thus are relatively easy to reach. In late 1992, for instance, an asteroid known as 1989ML will come within 43 astronomical units of our planet—less than

manned craft to be launched by a Delta 2 rocket, Farquhar says. The ship's main cargo would be advanced instruments like a spectral scanner and a gamma-ray spectrometer to scan the asteroid without actually coming in physical contact with it, although Farquhar prefers to have the craft pick up a sample of asteroid dirt.

Once the initial excursion mission tells scientists the composition of near-Earth asteroids, manned missions—and mining missions—could follow, with the round-trip taking only three years, including a year spent at the asteroid. "The asteroid mis-

modity because it can be separated into liquid hydrogen and liquid oxygen to provide rocket fuel. Having, in effect, an off-planet filling station allows future spacecraft to be lighter and faster because they don't have to carry fuel for the entire trip. Near-Earth asteroids contain 200 times as much water and other volatile materials—compounds of hydrogen, carbon, nitrogen, and oxygen—as the moon, another suggested mining site, according to John Lewis, professor of planetary science at the Lunar and Planetary Laboratory at the University of Arizona and director of science programs at the University of Arizona/NASA Space Engineering Research Center.

Water also provides one of the most effective shields against radiation, so the high water content of near-Earth asteroid dirt makes it an ideal radiation shield for the space station.

Lewis envisions sending a criteon spacecraft, specially designed to mine an asteroid, to bring back 50 or even 100 tons of material.

A near-Earth asteroid's potential usefulness extends to becoming a vehicle for transporting humans to Mars. Simply find an asteroid with an orbit that goes past Mars, hollow it out, and hitch a ride. Following out an asteroid would require little more than shoveling, Lewis says, and "you could use the asteroid as a traveling hotel." ☐

*Forget swinging on a star. How about riding on an asteroid? These spacegoing boulders could prove to be the ideal mode of transportation to the red planet, Mars.*



half the distance from Earth to the sun, and closer than Mars ever gets. "It's a very accessible asteroid," says Robert Farquhar, senior staff engineer for advanced programs at the Applied Physics Laboratory at Johns Hopkins University in Baltimore.

Farquhar and his colleagues have been looking into a low-cost mission—less than \$150 million—to send a U.S. spacecraft to a near-Earth asteroid by 1997. Plans call for a bare-bones, un-

manned mission will also allow us to design and test procedures that we need to get humans to Mars," says Lucy-Ann McFadden, a research physicist at the University of California at San Diego's California Space Institute.

Even though scientists don't know precisely what asteroids are made of, they have a pretty good idea of the main components. For example, they consider asteroids to be as much as one-fifth water, a desirable com-

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# POLITICAL SCIENCE

## FLEA MARKET ECONOMICS:

Where are the industrial-strength solutions to America's ills?

By Tom Dworetzky

*If the U.S. government continues to hedge its bets in the high-stakes technology games, it may bargain away all of our chips.*



I was talking to a former labor organizer, now pastry chef, over dinner. We sampled the October surprise during appetizers, moved to robust discussion of the S&L banking collapse during the entree, and by espresso had settled down to musings about America's industrial policy.

"The country's out of control. Take education, training, long-term investment in R and D and plant upgrades. We're doing none of that," he said, steamed.

Normally I would ignore opinions from so obvious an outsider, but I had been wondering myself about the proper relationship between government and industry that might succeed in fending off the Japanese and defending against the EC '92 initiative in Europe. I was intrigued. So I turned to some experts to find out just what sort of industrial policy our leaders had planned.

The issue has become so sensitive, apparently, that my queries were stonewalled throughout the Bush administration. Finally a source who preferred to remain anonymous clued me in: "This administration does not traffic in industrial policy. It does not pick winners and losers."

Fine. What about the \$100 mil-

lion per year that has gone since 1989 to the chip manufacturing research consortium Sematech—roughly half the organization's budget? Doesn't that make an industrial policy? Sematech's goal isn't broad basic research. It aims to develop a specific manufacturing technology for .35-micron random access memory chips by 1993. Isn't that picking a winner? No, I was told, that's a technology policy because it focuses on precompetitive or generic technologies. Our policy encourages partnerships between government, universities, and firms to develop technologies critical to the whole U.S. economy—not specific products. "Unfortunately, the terms precompetitive and generic are awfully fuzzy," says MIT's Richard K. Lester, executive director of the Made in America Study. "It's really not clear that these words will have much meaning in practice."

Consider the tale of Sematech and a now-defunct second consortium—one aimed at going full-blown into the chip manufacturing business—U.S. Memories. Sanford Kane was one of Sematech's founders and a former IBM VP for industry operations. After successfully bringing together natural competitors, like IBM and AT&T, to form Sematech, the next step was to create a private consortium to manufacture semiconductors in the United States.

Kane went to Washington to argue his case in 1989, as U.S. Memories attempted to raise start-up money. He wanted the President's support, not federal funds—just a mention of U.S. Memories as one of those points of light. Kane says that he was aware that high-level conversations took place in the White House (rumored to have included John Sununu, among others). Nothing ever came of these conversa-

tions. The President never backed U.S. Memories. It disappeared. Along with it, quite possibly, went our best chance of remaining a major player in the global semiconductor business. "These guys have the notion that the worst thing they could do is to pick winners and losers," says Kane. "They don't want to be involved in anything that reeks of industrial policy. Unfortunately, having no industrial policy is still an industrial policy. It's just the worst one."

Even the middle ground is a place that politicians fear to tread, according to Robert Solow, MIT's Nobel laureate in economics. "A nonregulated market does too much of some things, like polluting, or too little of others, like training," he says, "and it's been hard to detect any will or idea on the part of the administration to take action on such issues." Even Congress, he observes, addresses such concerns only occasionally.

I'm not an economist, but I say it's time to take an even greater step. Forget the industrial policy word games and face facts: The free market is all about picking winners and losers, so any cooperative effort between government and industry involves a gamble. Politicians, whose current approach to hedging bets is to make none at all, should bite the bullet and reconsider their aversion to making choices on which technologies—and products—the nation should back.

You win by playing good odds, making enough bets, and managing your stake intelligently. The goal is to win more than you lose, not to never lose or always win. Our foreign competitors are packing the casino right now. Unless we grab a seat at the table, we will end up losers for sure. **DD**

## FLAME THROWERS:

Why the heated bursts on your computer network?

By Doug Stewart

**Y**ou are a thin-skinned reactionary jerk," begins the computer message sent from one highly educated professional to another. "I will tell you this, buster. If you were close enough and you called me that, you'd be picking up your teeth in a heartbeat." There follows an obscene three-word suggestion in screaming capital letters.

The writer of the above message, sent over the Byte Information Exchange, was apparently enraged after a sarcasm he'd sent earlier was misinterpreted as racist. In the argot of computers, his response was a "flame"—a rabid, abusive, or otherwise overexuberant outburst sent via computer. In networking's early days, its advocates promised a wonderful new world of pure mind-to-mind, speed-of-light electronic conversation. What networkers today often find instead are brusque put-downs, off-color puns, and screenfuls of anonymous gripes. The

computer seems to be acting as a collective Rorschach test. In the privacy of their cubicles office workers are firing off spontaneous salvos of overheated prose.

Sara Kiesler, a social psychologist at Carnegie Mellon University, and Lee Sproull, a Boston University sociologist, have observed that networking can make otherwise reasonable people act brash. In studies originally designed to judge the efficiency of computerized decision making, they gave small groups of students a deadline to solve a problem. Groups either talked together in a room or communicated via isolated computer terminals. The face-to-face groups reported no undue friction. The computerized sessions frequently broke down into bickering and name-calling. In one case, invective escalated into physical threats. "We had to stop the experiment and escort the students out of the building separately," Kiesler recalls. Kies-

ler and Sproull documented a tendency toward flaming on corporate electronic-mail systems as well. At one large company, employees cited an average of 33 flames a month over the E-mail system, comparable outbursts in face-to-face meetings occurred about four times a month.

Kiesler and Sproull attribute the phenomenon largely to the absence of cues normally guiding a conversation—a listener's nod or raised eyebrows. "With a computer," Kiesler says, "there's nothing to remind you there are real humans on the other end of the wire." Messages become overemphatic—all caps to signify a shout, "(smile)" or "(-)", a sideways happy face, to mean "I'm kidding." Anonymity makes flaming worse, she says, by creating the electronic equivalent of "a tribe of masked and robed individuals."

In real life, what we say is tempered by when and where we say it. A remark where lights are low and colleagues tippy might not be phrased the same under fluorescent lights on Monday morning. But computerized messages may be read days later and by hundreds or thousands of readers. Flaming's ornery side is only half the picture, says Sproull, who coauthored *Connections: New Ways of Working in the Networked Organization* with Kiesler. "People on networks feel freer to express more enthusiasm and positive excitement as well as socially undesirable behavior," she says. Sproull finds it ironic that computers are viewed as symbols of cool, impersonal efficiency. "What's fascinating is the extent" to which they elicit deeply emotional behaviors. We're not talking about zeros and ones. People reveal their innermost souls or type obscenities about the boss. "What, she asks, could be more human?" □

*If a networker "flamed" in a face-to-face meeting the way he does on his PC, he'd risk being stoned to death by his colleagues.*



# TOOLS

## TOOLS FOR THE TWENTY-FIRST CENTURY: Resources for flying, cleaning, gambling, and patenting

By Sandy Fritz

### KITWORKS

Maxwell Eden, Sterling Publishing Company, 1989 \$14.95

**PLUSES:** Beautiful kites.

**MINUSES:** Tools and manual dexterity required.

**THE VERDICT:** Suitable for the project oriented.

The happy-go-lucky pastime of kite flying gets serious. *Kiteworks* details the history of ancient and modern kites and lavishes attention on the building plans for some of the most outrageous fl-



ers, fighters, and soarers in the world. Although the would-be builder may find some comfort in such precepts as "You may wish to round off fractional numbers to the nearest one-half inch for convenience," some people may be intimidated by the instructions. Here's a typically daunting excerpt from the directions for the ostensibly simple diamond-shaped kite of yesteryear: "The 68.4-inch cross-spar is bowed 10 percent (of AR) and tilted 45 degrees towards the bottom." Protractor not included.

### THE PATENTABLE IDEA

Videotape, Salzman & Levy, 1990, The Press Building, Suite 606, 19 Chenango Street, Binghamton, NY 13901. \$19.95

**PLUSES:** "An idea is a valuable, precious resource..."

**MINUSES:** "Intellectual property can be stolen..."

**THE VERDICT:** Avoids the bottom line.

Brace yourselves, independent inventors. It's damn near impossible to patent something without a lawyer. This video presentation makes it painfully clear why.

Simple questions have complex answers in the patent game, and the rules are shifty. The video presentation, presided over by the esteemed Mark Levy, a patent attorney who is aided by a team of informed "students," shows you the tip of the patent iceberg but sidesteps just one basic question: How much?

### FROGMATS

Frogmat Environmental Protection, Shaftesbury Manor Farm, Shaftesbury, Isle of Wight, UK PO30 4NS

**PLUSES:** A lucid idea.

**MINUSES:** Only one Frogmat-making machine exists.

**THE VERDICT:** If true, double thumbs-up.



Could it be any more simple? Absorb waterborne oil spills with straw. An independent scientific consulting firm verifies this claim and adds to it: Some straws absorb more than 15 times their own weight in oil.

Isle of Wight native Ken Frogbrook adds circular bales of straw to his 42-foot-long Frogmat machine, which grinds the straw and stuffs it into loosely woven mats. The machine spits out 35 feet of mat per minute costing about four dollars a foot. Frogmats float; they lay flat to protect beaches, and, when encompassing an oil spill, they corral the noxious stuff. Oil companies, are you listening?

### THE ENCYCLOPEDIA OF GAMBLING

Carl Sifakis, Facts on File, 1991. \$19.95

**PLUSES:** Finally, the definitive rules for klob.

**MINUSES:** Honey, how about vacationing in Las Vegas this year?

**THE VERDICT:** Hit me.

Omar Sheriff, an early practitioner of card counting, has been advised to stay out of Las Ve-



gas. Employing some of the cunning gambling tricks revealed here could earn you the same privilege. Other priceless details, couched in encyclopedic entries, include how to discern if dice are loaded, how to detect a marked deck, and the rules for virtually every game of chance under the sun. ☞



# CONTINUUM

WHO DISCOVERED AMERICA?

Move over, Columbus; the Vikings are coming to crash the festivities.  
Also: Video courtship and lifesaver's candy

Standing on the deck of a longboat under full sail through the seemingly impenetrable fjords of Norway, one begins to appreciate the Vikings' marauding conquests across Europe, and why they came to be the first settlers of the New World 500 years before Columbus. One look at Norway's snowy, forested, mountainous terrain—with barely 3 percent arable land—will quickly reveal the need to take to water and conquer new lands. Iceland in 860, Greenland circa 930, and finally North America in the year 1000. From Greenland it was an easy 17 days sail to L'Anse au Meadow in Newfoundland.

The introduction to *The Vinland Sagas*, two medieval Icelandic sagas that documented the discoveries, describes how the outlawed Eric the Red fled from Iceland to Greenland and established a colony, how a young merchant called Bjarni Herjólfsson, headed for Greenland, was blown off course across the Atlantic and sighted unknown lands, and how some 15 years later, Leif Ericson, son of Eric the Red, bought Herjólfsson's ship and steered it back to the New World to investigate Herjólfsson's chance sighting. According to the sagas, Ericson and his crew of 35 found "wild grapes in profusion, rolling grasslands, vast stretches of towering timber, an abundance of game of all kinds, rivers teeming with giant salmon, meadows rich with a harvest of wild wheat, and a climate so kind that winter frosts were hardly known." A Norse settlement established at L'Anse au Meadow lasted at least 20 years.

North America's present inhabitants may be forgiven for experiencing something of a *déjà vu*, when, like a dawn raid out of the mists of time, Viking ships will again be sighted offshore this autumn. True to form, those pesky old Vikings have again taken to their longboats in a bid to steal the thunder of next year's elaborate Columbus five-hundredth anniversary celebrations. "Quite simply, the idea was, Bugger Columbus, the Vikings got there first," says Judy Lomax, who together with her husband, former BBC film director David Lomax, is working on a film and book about the voyage. The Lomaxes first thought of the idea of retracing the Viking voyage and then discovered that the celebrated Norwegian seaman Ragner Thorseth was involved in a project to build exact replicas of three original



Viking ships found perfectly preserved under burial mounds. One replica ship, *Gaia*, piloted by Thorseth, departed Bergen in Norway on May 17. Two other replicas, *Osberg* and *Saga Siglar*, were freighted to Halifax, Nova Scotia. The three ships will sail together from there.

Ports of call along the East Coast include Boston (September 11), Newport, Rhode Island (September 20), New York (September 25), and Washington (October 9—Leif Ericson Day). The ships

will remain in each port for several days.

Central to the voyage of *Gaia* is a campaign, first proposed by Iceland's president, Vigdís Finnbogadóttir, to protect the earth's fragile environment. The message has found a strong supporter in shipping tycoon Knut Kloster, who has financed the whole voyage at a cost of \$2.5 million. "Why are we doing this? It's really to show that today we need the spirit of exploration and discovery, the willingness to take risks, to set a new course," Kloster says.

The obvious question: How much did Columbus know about the Viking voyages 500 years before his "discovery"? A lot, perhaps. Some historians speculate that the Viking voyages to the New World were known in certain circles in the fifteenth century. But before the descendants of the Vikings or Columbus grab all the glory for themselves, remember there's a legend that America was discovered in the sixth century by the Irish monk, Saint Brendan the Navigator.

But as one observer notes, "There may have been other people before Columbus, but when Columbus discovered the New World, it stayed discovered."

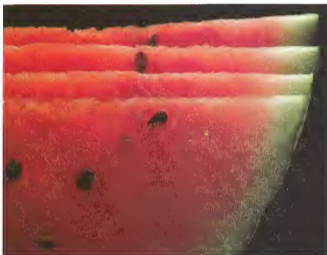
—STEPHEN MILLS AND  
MELANIE MENAGH







## CONTINUUM



The end of childhood watermelon-seed spitting contests may be near, now that researchers have developed a relatively fast and cheap way to grow seedless watermelons.

### THE ENDANGERED WATERMELON

Researchers at the University of Florida may have sealed the fate of the conventional seed-strown watermelon. They have developed a faster, cheaper method of growing seedless watermelons.

Seedless watermelons do indeed exist, but they're scarce because the seeds from which they grow cost up to \$1,200 a pound. By contrast, melon farmers lay out only about \$10 to \$100 a pound for seeds to grow seeded watermelons.

Now developmental biolo-

gist Dennis J. Gray and plant breeder Gary W. Elmsom, working at a 200-acre research farm at the University of Florida's Institute of Food and Agricultural Sciences in Leesburg, think they've solved the watermelon problem. Integrating tissue culture with plant breeding, their approach reduces from around 15 to five years the time it takes to develop a seedless-melon seed. Reducing the time involved also helps to reduce the seed cost to between \$20 and \$100 a pound.

The two scientists liken the breeding process to that of crossing a donkey with a

horse to get a mule, which cannot reproduce. Gray and Elmsom cross a diploid seed, which has two sets of chromosomes, with a tetraploid seed, which has four sets. The match results in a triploid seed, which has three sets of chromosomes, from which sterile, seedless watermelons grow.

But it's not quite that easy. "It can take years of crossing the tetraploid seed with itself to get commercial quantities of seed," says Gray. "So we put it in a tissue culture, clone it, grow the plants to maturity, and use controlled pollination to cross its seeds with diploids." This

method enables scientists to grow thousands of plants from tissue cultures in a relatively short time.

The discovery is good news for the watermelon-growing industry. American consumers buy fewer watermelons these days because they've grown tired of spitting out watermelon seeds, Gray says. Also, today's smaller families hesitate to buy large, seeded melons because they can't finish them before they begin to spoil. They purchase smaller, "boutique" melons instead.

Actually, the new Florida melons aren't entirely seedless. They have edible seeds, easily overlooked like those in cucumbers.

—George Nobbe

*"Time is an illusion  
perpetrated by the  
manufacturers of space"*

—graffiti

*"I am free of all prejudices  
I hate everyone equally."*

—W. C. Fields

### AT LONG LAST, GUM

As most children know, chewing gum loses its flavor after only 20 minutes or so. Now the scientists at Columbia Research Laboratories have invented chewing gum that keeps its flavor for five to ten hours. While this might seem like a development of less than earthshaking importance, it may turn out to have some valuable medical uses.

All commercial gums today include synthetically derived polymers. But instead of mixing polyvinyl

A SHRIMP HAS MORE THAN A HUNDRED PAIRS OF CHROMOSOMES IN EACH CELL NUCLEUS. A HUMAN BEING HAS ONLY TWENTY-THREE.

ASTRONAUTS ORBITING THE EARTH SEE 16 SUNRISES AND 16 SUNSETS IN A 24-HOUR PERIOD.

acostate into the gum base, Columbia scientists Anita Yung Chu and Joseph Robinson adhered a sheet of the polymer to the gum like a layer of Saran Wrap and then rolled it up. Chewing gradually releases the sweeteners and flavors embedded in the polymer. "These chemicals are happier being in the polymer than in saliva," says Robinson, Columbia vice president and professor of pharmacy at the University of Wisconsin. "That's why they come out so slowly."

The new gum's long-lasting nature makes it an ideal method to deliver certain medications. "At the moment, the major uses of gum, except for fun, are for de-

livering pharmaceuticals—nicotine, diet aids, and aspirin," Robinson says. "We're hoping to expand that to treat a variety of mouth conditions such as herpes, canker sores, fungal infections, and gum disease." One stick of gum could provide sustained medication for hours.

One question remains, however. Can anyone chew that long?—Steve Nadis

*"There is hope for us all—if we only get good pitching."*  
—Willard Midgette

*"The truth is beautiful, but the beautiful is not necessarily true."*  
—Timothy Ferris



Lasts longer, tastes great: A new chewing gum holds its flavor for five to ten hours instead of 20 minutes.



### SELF-CLEANING COAL

Coal has good points—its cheapness and abundance—and bad points—the sulfur dioxide gases it emits, which cause acid rain. Outfitting a coal-fired power plant with a "scrubber" to reduce sulfur dioxide emissions can cost up to \$50 million.

Now a company has come up with a process in which the coal cleans itself as it burns, reducing sulfur dioxide emissions by up to 80 percent at a fraction of the cost of conventional scrubbing.

After grinding the coal to a powder and removing impurities, the process, devised by Genesis Re-

search of Carefree, Arizona, requires the coal to be mixed with chemicals—the company won't divulge the exact recipe—and compacted into small nuggets. When the coal is burned, the chemicals react with organic sulfur and trap it in the coal ash, thus preventing its release into the atmosphere. The resulting non-toxic ash could theoretically be used as a fertilizer or a base for cement.

Custom Coals International, the Pittsburgh company marketing the coal, has begun testing the process in California and hopes to have a full-scale power station fueled by self-cleaning coal on line by 1992.—Bill Lawren

### TOXIC SHOCK

Perhaps one of the toughest jobs in the nuclear and chemical waste contamination business is cleaning up soil tainted with toxic materials. Now research scientists at Battelle Memorial Institute's Pacific Northwest Laboratory in Hanford, Washington, have developed what may be an ideal solution: They zap the soil with electricity, transforming it into blocks of glasslike material.

At a test site in Hanford, soil containing radioactive

cesium and strontium was subjected to 615,000 kilowatt-hours of electricity, enough power to light a "medium-size convention hall for a week," says Battelle's James Bueff. During a 12-day period, both soil and contaminants reached a temperature of 3,000°F, turning into a molten mass that will take one year to cool. When they complete their analysis of the test area, researchers expect to find a 900-ton mass of hardened material that is safe to handle.

—George Nobbe



## CONTINUUM

### BLAME IT ON YOUR FATHER

Prospective fathers should avoid alcohol, drugs, and smoking just as scrupulously as pregnant women—even before trying to conceive.

Gladys Friedler of the Boston University School of Medicine gave male mice alcohol or morphine for a week or so, put them on the wagon, and then mated them with testotating females. The resulting babies took longer to open their eyes, made more mistakes while negotiating a maze, or responded less to environmental stressors. The effects of morphine use even trickled down to the original males' grandchildren.

"We can't say for certain the same thing happens in

humans because, of course, you can't do those experiments on people," Friedler says. "But it is clear that fathers, not just mothers, can contribute to all sorts of congenital problems."

Additional studies link birth defects to a man's occupation or habits. Fire fighters, painters, garage workers: even smokers are more likely to father children who are among the 250,000 born in the United States each year with heart problems or childhood cancers.

The growing evidence indicates that more care should be taken to identify and eliminate hazards in the workplace and environment that could affect male reproduction, Friedler says.

—P. J. Skerrett



### IN 1879 A DRUG WAS INTRODUCED TO TREAT MORPHINE ADDICTION. THE DRUG: COCAINE.

THOMAS EDISON AVERAGE ONE PATENT EVERY TWO WEEKS OF HIS ADULT LIFE.

### TANS IN FASHION

Now that doctors have warned us of the dangers of skin cancer, we're not supposed to want tans. But if you still worship the sun, you may soon be able to get that sought-after tan with all your clothes on.

Scientists at defense contractor Innertech Inc. in Richmond, Virginia, have come up with a new material, called Tanex, that permits tanning and prevents sunburn. The polymer blocks harmful ultraviolet B radiation but transmits the mild ultraviolet A rays, which induce melanin to darken and stimulate further synthesis of the pigment. Unlike so-called tan-through swimsuits, which simply let sunlight pass through tiny holes in a conventional knit fabric, Tanex filters specific wavelengths of light, like a sunscreen. As a matter of fact, its SPF rating would be approximately 10.

In film form, Tanex has already been fashioned into beach umbrellas, hats, and bikini boat tops. Designers in New York and Paris have begun experimenting with



Now you can get a great tan—no swimsuit needed.

swathes of woven Tanex fabric that can be made into clothing. "It feels like a thin Lycra with less of a stretch," says Ken Burnstein, president of Innertech, which makes light-altering materials for military and agricultural use. If the designers have their way, sun worshippers may soon be getting tans while commuting, shopping, and eating lunch outside. And those who hate tan lines will finally be able to attain the total tan in the middle of a crowded park—without getting arrested.

—Mark Fischetti

*"The Romans invaded England in 54 B.C. and discovered what every tourist has discovered since: England is an aquarium, not a nation."*

—Rita Mae Brown

*"Science is a wonderful thing if one does not have to earn one's living at it."*

—Albert Einstein

*"Progress robs us of past delights."*

—Sam J. Ervin, Jr.



## CONTINUUM



*They follow the sun. A plant biologist has discovered how leaves move to expose themselves to available light.*

### PLANTS ON THE MOVE

Ever wonder how houseplants bend toward light? Fulton Fisher, a plant biologist at Simon Fraser University, may have discovered the answer.

Light striking a leaf sets several processes in motion, Fisher found. First, lenslike openings above the leaf's veins direct incoming rays to cells that absorb only blue wavelengths; no other type of light sets leaves a-strir, Fisher says. Hormonelike signals then race down the veins into the leafstalk, which joins the leaf to the body of the plant. There, he discovered, the veins of most leaves bunch up into no fewer than three

evenly spaced bundles. Why three or more? Fisher thinks the leafstalk needs data on available light from at least three sources at any given time to make a move.

The arriving signals cause cells around the bundles to expand or shrink, nudging the leaf toward light until all the vein receptors cop an equal dose of rays. When the leaf finds the best position to catch the light, the cell changes stop.

Fisher has built a mechanical leaf to mimic this process, a form of phototropism. Aptly named Phyllus (Latin for leaf), the electronic frond contains three directional photosensors so that when a light source passes above the leaf, it tilts to face

### THE ANCIENT ETRUSCANS INVENTED FALSE TEETH 500 YEARS BEFORE THE BIRTH OF CHRIST. THEY CONSTRUCTED THE CHOPPERS FROM BONE, IVORY, OR OTHER PEOPLE'S TEETH.

the light continuously.

Knowing how leaves lean could have practical uses. "If we can improve a plant's ability to harvest light, we can increase its productivity," Fisher says. "If we can do that in regions where light is limited, we might be able to extend the seasons and the range of arable land."

—Peter Tyson

*"Being in politics is like being a football coach. You have to be smart enough to understand the game and dumb enough to think it's important."*

—Eugene McCarthy

### COUCH SPIDERS

If the medium is indeed the message, it appears to be one with widespread appeal. University of Cincinnati biologists have found that the jumping spider (*Maevia incitemens*) will orient its body to a TV set turned on clear across the room. The spiders react to the screen with more interest than the average couch potato, stalking video images of prey. The aroused arachnids go through mating rituals with video representations of the opposite sex.

The goal of biologists David Clark and George Uetz was not to entertain the spiders but rather to demonstrate a new tech-

nique for behavioral research. Exploiting the creatures' susceptibility to a video version of the arachnid world enables scientists to run experiments that would be virtually impossible to conduct in the field. "We have complete control over the stimulus we want to show," Clark says. "On videotape, we can get a spider to court ad infinitum."

The researchers have shown that jumping spiders are equally attracted to live crickets (their typical prey) and video versions of the same crickets. When confronted with video images of courting males, female spiders display their sexual fervor as they would with live suitors—by tapping their first pair of legs and rotating their bodies. Clark and Uetz also have learned that female jumping spiders choose their mates, like desperate humans, by going for whichever one moves first.—Steve Nadis



*What's a nice spider like you doing on a TV show like this?*

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## CONTINUUM



*Delicious and lifesaving, too. The Canadian Cold Buster chocolate bar helps delay the onset of hypothermia.*

### CHOCOLATE! WE'RE SAVED!

In old-fashioned adventure stories, valiant explorers lost in the icy wilderness are saved by trusty Saint Bernard dogs carrying flasks of brandy around their necks. Now that alcohol has been found to increase hypothermia, rather than fight it, modern stories might have the dogs toting a special chocolate bar.

Unlike regular chocolate, the bar developed by Lawrence Wang, a professor at the University of Alberta in Canada, actually provides physiological protection against the cold. In studies it boosted people's cold tolerance by more than 50 percent. Based on laboratory cold tests, Wang says, a traveler stranded in the cold who ate one of these chocolate bars would have at least twice as much time to find warm shelter before suffering the dire consequences of hypothermia: impaired judgment, confusion, and semiconsciousness.

The new chocolate, unlike the conventional variety,

NEARLY EIGHT OF TEN OF THE NATION'S ELDERLY ARE WOMEN.

A RAT CAN GO WITHOUT WATER LONGER THAN A CAMEL CAN.

contains little fat and lots of protein and complex carbohydrates. It protects against the cold by helping the body metabolize fat more easily a process that helps the body stay warm but becomes increasingly difficult in cold weather. Although the bar doesn't make a person feel warmer, as alcohol does, it "has been found to make people feel less irritable," perhaps reducing the panic that comes with feeling cold and miserable, Wang says.

Dubbed the Canadian Cold Buster for commercial purposes, the chocolate should hit store shelves in the Great White North by this fall.—Cynthia L. Pollock

*"Old age is always fifteen years older than I am."*

—Bernard M. Baruch

### THE NOSE KNOWS

Evolution works in strange and wonderful ways: To compensate for its extraordinarily poor vision, the elephant-nosed mormyrid developed an ability akin to radar to allow it to navigate the murky African waters where it lives. An organ in its tail emits electrical pulses that are relayed to receptors on its body. Besides saving the fish from scraping its long nose on the reeds, this unusual ability also makes the mormyrid an ideal detector of water pollution. The electricity the fish emits fluctuates wildly when it swims through water contaminated by such undesirable chemicals as phenol and cyanide.

John Lewis, a biologist in the Royal Holloway and Bedford New College of the University of London, incorporated the fish's high-tech talent into a system to continuously monitor water quality for Thames Water

Utilities. Lewis placed several elephant-nosed mormyrids in ten-liter aquariums with electrodes on the sides capable of detecting electricity from the fish. A computer monitored and analyzed the amplified sounds and raised an alarm when changes in the electrical pulses indicated the fish had detected polluted water.

"Each fish has a distinct signal of its own that forms a stable pattern until the environment is disturbed," Lewis explains. "Then it will react to even low-level toxic chemical changes in the water."

By year's end, Lewis hopes to submerge tanks containing elephant-nosed mormyrids in river intake protection sites on the Thames, perhaps 30 miles upstream of London. Thus they could provide advance warning of any contaminants headed down the river, which supplies London's drinking water.

—George Nobbe



*By measuring the electrical currents emitted by the elephant-nosed mormyrid, scientists can monitor water pollution.*



Greece and Turkey, Israel and the Arab countries (though we believe they will succeed in settling their differences by the end of the century), and Northern Ireland, which will remain its own worst enemy.

3. *International bodies will take over much of the peacekeeping role the superpowers are now abandoning.* The Warsaw Pact has already disappeared, and the North Atlantic Treaty Organization (NATO) will be radically transformed now that it is no longer needed to defend against a Soviet invasion of Western Europe. Both alliances may be replaced by the Conference on Security and Cooperation in Europe, a group of 33 nations, including the United States and the Soviet Union. NATO is seeking a new reason to exist, however, and may find it serving as an emergency strike force for the United Nations. The UN's peacekeeping forces will intervene to suppress conflicts throughout the world, especially in the Middle East as well as in Southwest Asia.

4. *Look for a new wave of terrorism throughout most of the world's trouble spots:*

- In Northern Ireland, the IRA has stepped up its violence in recent months, sometimes forcing civilians to cooperate in missions such as bombing cars at British checkpoints. This is a clear sign of things to come.

- In the Middle East are three obvious sources of terror:

- Abul Abbas leads one of the extremist PLO factions inflamed by Saddam Hussein's aggression. Muammar Qaddafi, a longtime ally, recently kicked him out of Libya. Some observers believe that Qaddafi may have been trying to curry favor with the West, we suspect that it was just a falling-out among thieves.

- Abu Nidal, who heads another of the PLO's splinter groups, also has ties to Saddam. After Iraq's bloody defeat he's almost surely plotting against the West.

- Finally, Yasir Arafat's Al-Fatah faction may return to terrorism in an effort to reclaim its Palestinian following.

- And in northern Spain, Basque separatists of the ETA are still fighting for autonomy. They will never receive it nor give up the fight in the Nineties. Next year, the five-hundredth anniversary of Columbus's voyage to America, will be particularly bloody, the ETA warns.

5. *Nuclear, biological, and chemical weapons will continue to spread among Third World powers, some of which will be tempted to use them.* Libya, Iraq, and near-



ly two dozen other developing nations have developed either chemical or biological toxins or both, and many have already stockpiled completed weapons. Most of the rest are hurrying to do so.

Inexpensive, easy to make, easily concealed chemical and biological weapons also could become the terrorist threat of the future. Both Action Directe in France and Germany's Red Army Faction have reportedly made chemical weapons, though neither group has used them to date.

#### WORLD ECONOMY

6. *The world economy will grow at a brisk 4.5*

**Cheap, easy to make, easily concealed chemical and biological weapons could become the terrorist threat of the future**

percent annually in the next decade, becoming ever more tightly interlinked. When a car can be made by Chrysler in Mexico with Japanese parts and sold in the United States, it becomes almost impossible to label a product by nation of origin. Already 39 percent of the parts for goods "manufactured" in the United States are imported from other countries. Protective tariffs will therefore become obsolete, and trade will flourish as a result.

All this will do the developing countries little good, however. Between now and 2000, they will fall further behind the industrialized nations, largely because their populations will continue to rise faster than their incomes.

7. *The European Community (EC) is destined to become an even stronger economic power than the United States or Japan.* By 1992 the EC will represent an integrated economy of 325 million people, with a gross domestic product of \$4 trillion. By 1996 the European Free Trade Association (EFTA) countries will join with the EC to create a market of 400 million people with a \$5 trillion GDP. Sweden, Norway, Finland, Yugoslavia, and Switzerland will join the founding 12. By 2000, most of the former East Bloc countries will join the EC.

A new generation of trains is uniting the European continent, making it far easier to do business. By 2015 the 300-mile trip from London to Paris will take less than three hours. Passengers will be able to board a morning train in London and get off in Lisbon, Hanover, Amsterdam, or Marseille later that day.

8. *Western bankers are at last accepting the obvious truth. Many Third World debtors have no hope of ever paying back overdue loans. Creditors will thus write off one third of these debts and in some cases more.* One major reason: the Brady Plan. It swaps Third World debt for





ARTICLE BY KEITH HARARY, PH.D.

## THE OMNI-BERKELEY PERSONALITY PROFILE

A personality test holds the same mysterious allure as an astrological chart. There is something compelling about the notion that the unmarked roads of our innermost nature may be mapped by anyone who properly interprets such tests. But while astrology attempts to explain human behavior by attaching occult significance to the relative positions of the planets and constellations, most personality tests take a scientific approach.

In recent years, moreover, the science of personality analysis has taken a significant leap. The reason: bold new studies that provide deeper insight into the elements that make us who and what we are. In one set of studies, for instance, psychologists have analyzed the words commonly used to describe personality across a variety of cultures. As a result, they have pinpointed five consistent aspects of human personality, ranging from work style to expressive style to the level of emotional intensity that individuals sustain. At the same time, psychologists have published a spate of important new studies examining the way people see themselves and the way they are seen by others. The ability to "see yourself as others see you," the research indicates, is crucial to mental health.

Tapping into these new elements of personality research, I have collaborated with researchers at the University of California at Berkeley to develop the pages to

come. Because the test is based on the latest research in the personality field, it should enable you to understand your own personality in new and revealing ways. In fact, I like to call this new approach "reflective," because it relies not on interpretation by a professional test analyzer, but rather, on the insights of you and your friends.

Like a mirror, the Omni-Berkeley Profile should help you see yourself as others see you, testing your view of reality against the view held by those in your immediate world. Finally, I hope that your responses, mailed back to the magazine, will provide psychologists with perhaps the most extensive personality database ever gathered. Once analyzed by the team at Berkeley, in cooperation with San Francisco's Institute for Advanced Psychology,

your joint responses will push the science of personality testing another step forward.

To understand the test you're about to take, it's important to get a handle on personality tests that have come before. Indeed, the "reflective" approach of the Omni-Berkeley Personality Profile stands in stark contrast to "objective" tests currently in vogue.

Objective tests attempt to measure the common traits of large groups of people; then psychologists assess any one individual's personality by determining the extent to which that individual shares characteristics with various groups.

**THIS  
POWERFUL NEW  
TEST WILL  
BE ABLE TO HELP  
YOU FATHOM  
YOUR INNERMOST  
SELF**

ILLUSTRATIONS BY RAFAL OLBINSKI



In the Minnesota Multiphasic Personality Inventory, or MMPI, for instance, a subject is asked a series of yes/no and true/false questions. (An example of an MMPI question would be, "Sometimes I like to tease animals. True or false?") If the subject answers such questions in much the same way as a group of diagnosed paranoid schizophrenics, a psychologist might suggest that the subject has a tendency toward paranoia in common with this group. If the subject's answers correspond to the answers of well-adjusted people, he or she would be rated normal.

Experts caution that the MMPI may be less than ideal for analyzing relatively normal people, however, because it lacks the flexibility to take ordinary mood fluctuations or extraordinary circumstances into account. In a recent case, for

example, a police officer acted with deadly force in several life-and-death situations; an official review board declared that he had saved his own life and the lives of others in every case. When the officer took the MMPI as a matter of routine departmental procedure, however, his score reflected an elevated level of paranoia compared with the "normal" population. But would his scores have appeared elevated or "abnormal" compared with a population of active inner-city police officers who had recently confronted real-life combat in the streets? A question like that would be impossible to answer without gathering additional samples of completed MMPIs from just such a group.

There are tests, of course, that take a more open-ended approach to personality assessment. These "projective" personality tests consist of a series of sentences to be completed or, more often, various kinds of pictures for the subject to interpret or discuss. In the case of the famous Rorschach inkblot test, a respondent describes his or her personal impressions and free-associates about various blots. But critics argue that although such projective tests are supposed to be scored according to stringent criteria, the opinions of test interpreters ultimately come into play.

Perhaps the real problem is that tests like the MMPI and the Rorschach are used primarily as tools for uncovering evidence of psychological disturbance. As such, they may be of limited value in assessing the personalities of relatively normal folk who, nonetheless, have individual emotional peculiarities and quirks.

Yet even tests designed for well-adjusted people have their limitations. Some, like the Myers-Briggs Type Inventory, or MBTI, attempt to categorize people into a variety of personality "types." The MBTI's 16 types, based on the theories of Swiss psychologist Carl Jung, include a contrast between "introversion" and "extroversion," as well as contrasts between such modes as "thinking" and "feeling," "judging" and "perceiving." This test, widely used to screen prospective employees, can compare various applicants with the personality profiles of those who have succeeded or failed in a given job category. But according to critics, the categorical approach is simplistic and often inaccurate, in the end diminishing our vision of who we are. "Normal human behavior transcends any notion of label or type," says psychological test author and publisher Dennis Coates. "Most people are far more complex and flexible than the type model indicates." In fact, Coates says, Jung intended his theory of types to be applied to the treatment of psychologically imbalanced individuals and referred to the practice of typing normal people as "a childish parlor game."

These criticisms of the major personality tests had been under discussion in the psychology arena for some time when, back in 1989, *Omni* magazine contacted me to see if something better—or, at least, something more suited to *Omni's* readership of psychologically normal adults—could be done. Thus began a two-year odyssey of research and development that has resulted in the *Omni-Berkeley Personality Profile* in the magazine's pages today.

I began my odyssey by surveying the latest research findings in the personality field in close consultation with a number of leading experts: psychologists Auke Tellegen of the University of Minnesota, Douglas Jackson of the University of Western Ontario, Ron Holden of Queen's University, and Robert Hogan of the University of Tulsa, Mike Honaker, deputy chief executive officer of the American Psychological Association, David Saunders, formerly of the Educational Testing Service, and communications researcher Diana Reiss of San Francisco State University.

Perhaps the most important new findings involve studies of dictionaries in a range of languages. Researchers at the

**FLAWS**  
**IN THE MAJOR PERSONALITY**  
**TESTS LED**  
**OMNI MAGAZINE TO COMMISSION**  
**A TEST OF ITS OWN.**



University of Michigan, for instance, went through entries in an entire unabridged English dictionary and initially identified 18,000 words that could be used to describe personality. They eventually had students define about 3,000 key words, coming up with a core psychological vocabulary. Scientists at the University of Groningen in Holland and the University of Bielefeld in Germany did the same with dictionaries in the Dutch and German languages. Other psychologists have done or are doing similar studies with dictionaries in Japanese, Chinese, Italian, Russian, and even Tagalog, a native language in the Philippines.

The upshot is this: No matter what the culture, the terms used to describe personality seem to fall into five categories: expressive style, interpersonal style, work style, emotional intensity, and intellectual style. This may sound like typecasting, but in this case the types are based on everyday language from the real world. In fact, the "Big Five" model actually illuminates crucial dimensions of personality missed by existing tests. According to one recent study, for example, the MBTI does not measure a respondent's overall emotional intensity or stability. The MMPI, on the other hand, includes no direct measures of people's intellectual style and work style.

I also became aware of studies that looked at our perceptions of personality—our own personalities and the personalities of colleagues and friends.

David Funder from the University of California at Riverside, for instance, found that when subjects described their own personality, ratings were often similar to ratings by friends. Even strangers who had watched a subject on videotape for only a few minutes, it turned out, were surprisingly accurate when describing such personality factors as expressive style or emotional intensity. The ideas put forth by Funder and others were particularly useful to me in conceptualizing the reflective approach I designed for *Omni*. I'd long been skeptical of tests evaluated by "experts" unaware of the extenuating or special circumstances in the subject's life. Now research indicated that a more personal type of evaluation might be the most valid of all.

To wrap the basic findings into a test, I consulted with a well-known expert on the Big Five model: psychologist Oliver P. John of the University of California at Berkeley. Working with his team of personality researchers at the university's Institute of Personality Assessment and Research (IPAR), John had reviewed the English, Dutch, and German studies of the Big Five personality dimensions. He identified the 112 adjectives that consistently defined the Big Five across all of these studies. He then asked a group of personality experts to use these 112 adjectives to describe the personalities of several large groups of research subjects. This research resulted in a much smaller set of adjectives that proved to be excellent measures of the Big Five personality dimensions.

Based on this research, the Berkeley group provided me with 35 questions that best measured the Big Five personality traits. The Berkeley researchers were so excited about having their questions used in this massive national personality survey, in fact, that they have volunteered to assess the results themselves. The *Omni-Berkeley Profile*, John and his colleagues believe, will constitute the most extensive personality survey ever done.

The result of our efforts is the *Omni-Berkeley Personality Profile* below. Unlike many other major personality tests, it is based on the Big Five model of personality description. What's more, instead of hinging on a single stranger's interpretation, it compares several different perspectives on your personality with one another. It therefore provides an especially expansive—and flexible—view of your personality.

Indeed, rather than categorize you into an abstract type or group that may not accurately represent your true personality, the *Omni-Berkeley Personality Profile* bases its assessment on real-world judgments of your behavior and uses others who know you well as a standard for comparison. As you interpret your results, you may come to understand not only who you are but also the nature of your relationships in all their multifarious forms.

A word of caution: The *Omni-Berkeley Personality Profile* is not intended as a means of assessing the state of your mental health and does not provide any form of psychotherapy. We urge those who have a history of emotional or other psychological problems to check with qualified professionals before proceeding.

## HOW TO TAKE THE TEST

Begin by cutting out the seven vertical multicolored personality scorecards on the dotted lines. Place scorecard no. 1 alongside the 35 statements in the left-hand column. Mark your responses to the statements in the corresponding spaces on the scorecard, rating as honestly as possible the degree to which you agree or disagree with each statement as a description of your own personality. In each case, marking the number in the far left-hand column on your scorecard would mean that you strongly disagree with a particular statement, marking the number in the far right-hand column would mean that you strongly agree. You may, of course, also mark any number in between these two poles, indicating varying degrees of agreement or disagreement with a particular statement. Mark only one number per item on the scorecard. Take a 15-minute break and then use scorecard no. 2 to respond as honestly as possible to the 35 statements according to the way in which you believe others see you. Fill in your responses to the 35 items without referring to the answers on card no. 1. Once you have filled out these first two scorecards, put them both aside.

Now give scorecard no. 3, along with the list of 35 statements, to the person to whom you feel the closest: your best friend, a sibling, or your spouse. Then give scorecards no. 4 and no. 5, along with the list of 35 statements, to two personal friends. Give scorecards no. 6 and no. 7 to two co-workers or colleagues. Some people feel more comfortable asking a parent, rather than a co-worker, to rate their personality. If you prefer, therefore, you may give scorecards no. 6 and no. 7 to your parents, or you may give one to a parent and one to a colleague or co-worker. You may also elect to give one of these scorecards to a surrogate parent—someone who has known you as long and as well as a parent would. Ask each of the individuals you select to fill out the scorecards honestly, responding to the 35 statements without consulting anyone else. When you have collected all of your completed scorecards, you may analyze the results with the help of the scoring guide on page 55.

By taking the test and mailing in your completed scorecards and the survey form that follows, you can also participate in the *Omni-Berkeley National Personality Survey*, one of the most extensive attempts ever undertaken to survey the personalities of adults throughout the United States.





"If God had meant us to fly he would have given us tickets"

**Self-Rating.** Beginning with the Self-Rating (Inner) scorecard, add together the numbers marked by an X across all the orange-colored responses and enter the total in the corresponding space provided for Orange items below.

Do the same for the blue, yellow, red, and green responses on your Self-Rating (Inner) scorecard. Next add together and enter the numbers marked on your Self-Rating (Outer) scorecard, exactly as you did for the Inner scorecard.

Enter the totals of the two Self-Ratings for each of the five color categories, then divide each of those totals by two and enter those in the spaces provided. These are your Self-Image Ratings.

SCORECARD	Add the Orange items:	Add the Green items:	Add the Yellow items:	Add the Red items:	Add the Blue items:
	Expressive Style	Interpersonal Style	Work Style	Emotional Style	Intellectual Style
Self-Rating (Inner) =					
Self-Rating (Outer) =					
Add together these two Self-Ratings =					
Divide the above number by two. These are your Self-Image Ratings =					

**Other Ratings.** Now, for each of the scorecards completed by one of the "others," add together and enter the numbers for each of the colored responses, just as you did for the Self-Rating scorecards. Then add together and enter the totals for each of the five color categories. Divide the totals for each of the color categories by five. (If only four "others" completed scorecards, you would divide the totals by four.) The results represent your Outside Impression Ratings.

Person to whom you feel closest =					
Friend #1 =					
Friend #2 or parent =					
Co-worker #1 =					
Co-worker #2 =					
Add together these five Other Ratings =					
Divide the above number by five. These are your Outside Impression Ratings =					

**Figuring Your Individual Category and Total Test Scores.** In the spaces provided, copy the numbers previously entered for your Self-Image Ratings and find the difference between those and your Outside Impression Ratings for each color category. These results are your Individual Category Scores.

Copy the Self-Image Ratings computed above here =					
Now compute the absolute difference between the Self-Image Ratings and the Outside Impression Ratings above. These are your Individual Category Scores =		+	+	+	+
Now add together all five Individual Category Scores. The total is your final Total Test Score.					=

# THE NATIONAL PERSONALITY SURVEY

Omniv would like to include the results of your personality test in our National Personality Survey. Results will be analyzed by psychologist Oliver P. John of the University of California at Berkeley, in cooperation with psychologist and test designer Keith Harary of the Institute for Advanced Psychology in San Francisco, and reported in a future issue of Omniv. Please return all seven complete scorecards, along with the survey information requested below, to Omniv National Personality Survey, 1965 Broadway, New York, NY 10023.

Date of birth (month/year) \_\_\_\_/\_\_\_\_ Gender  Male  Female

Mental status and history (check all that apply):

- Never married  Married (date: \_\_\_\_\_)  Widowed (date: \_\_\_\_\_)  
 Living w/partner  Divorced (date: \_\_\_\_\_)  Remarried (date: \_\_\_\_\_)

Number of your children \_\_\_\_\_ Age of each child \_\_\_\_\_

Employment status:  Full-time  Part-time  Not currently employed  Retired

Your occupation/job \_\_\_\_\_

Annual family income \$ \_\_\_\_\_ Registered to vote?  Yes  No

Highest educational level:  High school  Some college  Bachelor's  Master's  Doctorate

Ethnic background:  African-American  Hispanic/Latino  Native American  
 Asian-American  Caucasian/White  Other: \_\_\_\_\_

Are you left-handed?  Yes  No

How frequently do you:	Never	Occasionally	Frequently
Drink coffee	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drink alcohol	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eat sweets, desserts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smoke tobacco	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exercise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Get colds, flus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have aches, pains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Take sleeping pills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Worry about your health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Health Questions:

1. Have you ever had heart disease?

No  Yes: What type, when

2. Have you ever had a cancer?

No  Yes: What type, when

If you wish to participate in further studies or receive more information on how your scores compare with those of other readers, include your name and address below. Responses will be kept confidential.

Name (optional) \_\_\_\_\_

Address (optional) \_\_\_\_\_

PLEASE REMEMBER TO ENCLOSE YOUR SEVEN SCORECARDS WITH THIS FORM



## INTERPRETING YOUR RESULTS

**Interpreting Your Individual Category Scores** Each color represents one of the Big Five personality categories, orange for expressive style, green for interpersonal style, yellow for work style, red for emotional intensity, and blue for intellectual style. (These colors were chosen on the basis of a survey of people's intuitions about the associations between color and personality traits.) To determine your individual category score, add up your points for each color. Then refer to the guidelines:

- 4 points or less: Your description of this dimension of your personality is highly related to the way in which others describe you.
- 5 to 11 points: Your description of this dimension of your personality is somewhat related to the way others describe you.
- 12 to 20 points: Your description of this dimension of your personality is not closely related to the way others describe you.
- 20 points or more: Your description of this dimension of your personality is very different from the way others describe you.

You should notice whether your overall score in any single personality category

is particularly high, according to the scale given above. This might indicate an aspect of your personality of which you may not be fully aware, though it is clearly evident to others. It might also indicate an aspect of your personality that you may find difficult to express to yourself or to other people.

In addition, you may want to consider the following points on a category-by-category basis:

- If your self-image score on expressive style (orange items) is much higher than the score you receive from the five others who rated your personality, you think of yourself as more outgoing and expressive than you come across to others. If you accept this as a correct interpretation, you might want to work on expressing yourself better to other people. If, on the other hand, your self-image score is lower than that given by the others, you are probably more outgoing and expressive than you realize. Of course, it's obvious that if you and others give you similarly high scores for expressiveness, you are most likely an outgoing and expressive person; if, on the other hand, your scores in this area are generally low, your personality type is probably quiet and relatively unexpressive.
- If your self-image score on interper-

sonal style (green items) is much higher than the score you received from those who rated your personality, you think of yourself as a more cooperative and considerate person than you come across to others. If, on the other hand, your score is lower than that given to you by the others, you are probably a lot more cooperative and considerate than you realize. A low score across the board indicates that you are not, in fact, cooperative and considerate, while a high score in this area shows that you are.

- If your self-image score on work style (yellow items) differs greatly from the scores you received from others, you might want to reconsider your notion of how you truly tackle tasks and behave in work settings. Generally high scores here mean that you are most likely organized and efficient. Low scores indicate a more casual approach to work.

- If your self-image score on emotional intensity (red items) is higher than the score you received from the others, you are probably not revealing the full range of your feelings to the outside world. If, on the other hand, your own score is lower than the score received from others, you come across as more emotionally intense and anxious than you realize. In either case, you might want to examine how you express your feelings. If your scores are high for all seven scorecards in this area, you are probably the sort of person who gets upset and worries more than necessary. Low scores for this category indicate that you are relatively laid-back and steady in your emotions.

- If your self-image score on intellectual style (blue items) is much higher than the score you received from the five others who rated your personality, you think of yourself as more inventive and sophisticated than you come across. If your self-image score is lower than the score given to you by the others, then you come across as being more inventive and sophisticated than you think you are. In either case, you might want to examine how you express your ideas to other people.

**Interpreting Your Total Score.** When you add together all the points from all the colors, you will get what we term a total score, representing your overall ability to see yourself as others see you.

- 19 points or less: Your overall description of your personality is highly related to the way others describe you.
- 20 to 49 points: Your overall description of your personality is somewhat related to the way others describe you.
- 50 to 90 points: Your overall description of your personality is not closely related to the way others describe you.



• 90 points or more: Your overall description of your personality is very different from the way others describe you.

If your overall description of your personality is highly or somewhat related to the way others describe you, you probably have a generally realistic sense of the way in which you come across. Of course, there may still be hidden aspects of your personality that you have not yet discovered or exposed to other people. These aspects may include, for example, the way in which you would behave in certain crisis situations.

You should also pay special attention to any striking differences in the way various people describe you. Such differences may explain more about the nature of your relationship with a particular individual than about your personality as a whole. Examining your relationship with such an individual may lead to insights into relatively subtle or repressed aspects of your inner self.

In another approach, you may wish to examine any difference in the way that people from various aspects of your everyday life describe you. Such differences may indicate your tendency to express different sides of your personality in different social settings.

You may also want to compare your own ratings of your innermost personality with your ratings of the self you believe you present to the world. Such an analysis may be useful in helping you bring some subtle or repressed aspects of your personality to the surface in an effort to be more true to yourself. On the other hand, you may prefer to expose certain aspects of your personality only with those to whom you feel close.

Finally, you might consider sharing this test with others. By filling out the test for them as they have done for you, you may notice that you sometimes relate to others in a habitual way. This realization might provide you with deeper insights into the ways in which you perceive, and are perceived by, those around you. ☐

#### CREDITS

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LIFE REGARDED AS  
A JIGSAW PUZZLE OF  
HIGHLY LUSTROUS

# CATS

FICTION BY MICHAEL BISHOP

Your father-in-law, who insists that you call him Howie, even though you prefer Mr. Bragg, likes jigsaw puzzles. If they prove harder than he has the skill or the patience for, he knows a sneaky way around the problem.

During the third Christmas season after your marriage to Marti, you find Howie at a card table wearing a parka, a blue watch cap with a crown of burgundy leather, and fur-lined shoes. (December through February, it is freezing in the Braggs' Tudor-style house outside Spartanburg.) He is assembling a huge jigsaw puzzle, for the Braggs give him one every Christmas. His challenge is to put it together, unaided by drop-in company or any other family member, before the Sugar Bowl kickoff on New Year's Day.

This year, the puzzle is of cats.

ILLUSTRATIONS BY CLAYTON ANDERSON





WHEN  
THEY ZAP YOUR  
ELECTRODES,  
YOUR CAT-RELATED  
MEMORIES  
PARACHUTE INTO  
YOUR  
MIND'S EYE.

The ESB procedure being administered to you by the Zoo Cop and his associates is keyed to cats. When they zap your implanted electrodes, cat-related memories parachute into your mind's eye, opening out like fireworks.

The lid from the puzzle's box is Mr. Bragg's—Howe's—blueprint, and it depicts a population explosion of stylized cats. They are both mysterious beasts and whimsical cartoons. The puzzle lacks any background, it's so full of cats. They run, stalk, lap milk, tussle, tongue-file their fur, snooze, etc., etc. There are no puzzle areas where a single color dominates, a serious obstacle to quick assembly.

Howe has a solution: When only a handful of pieces remain in the box, he uses a razor blade to shave any piece that refuses to fit where he wants it to. This is cheating, as even Howe readily acknowledges, but on New Year's Eve, with Dick Clark standing in Times Square and the Sugar Bowl game only hours away, a man can't afford to screw around.

"Looking good," you say as the crowd on TV starts its rowdy countdown to midnight. "You're almost there."

Howe confesses—complains?—that this puzzle has been a "real mind bender." He appreciates the challenge of a thousand-plus pieces and a crazy-making dearth of internal clues, but why this particular puzzle? He usually receives a photographic landscape or a Western painting by Remington.

"I'm not a cat fancier," he tells you. "Most of 'em're sneaky little bastards, don't you think?"

Marti likes cats, but when you get canned at Piedmont Freight in Atlanta, she moves back to Spartanburg with your son, Jacob, who may be allergic to cats. Marti leaves in your keeping two calico mongrels that duck out of sight whenever you try to feed or catch them. You catch them eventually, of

course, and drive them to the pound in a plastic animal carrier that Marl bought from Delta, or Eastern, or some other airline out at Hartsfield.

Penfield, a.k.a. the Zoo Cop, wants to know how you lost your job. He gives you a multiple-choice quiz: A) companywide layoff; B) neglect of duty and/or unacceptable job performance; C) personality conflict with a supervisor; D) suspicion of disloyalty; E) all, or none, of the above.

You tell him that there was an incident of (alleged) sexual harassment involving a female secretary whose name, even under the impetus of electrical stimulation of the brain (ESB), you cannot now recall. All you can recall is every cat, real or imaginary, ever to etch its image into your consciousness.

After your firing, you take the cats, Springer and Ossie (short for Ocolot), to the pound. When you look back from the shelter's doorway, a teenage attendant is giving you, no doubt about it, the evil eye. Springer and Ossie are doomed. No one in the big, busy city wants a mixed-breed female. The fate awaiting nine-year-old Jacob's cats—never mind their complicity in his frightening asthma—is the gas chamber, but today, you are as indifferent to the cats' fate as a latter-day Eichmann. You are numb from the molecular level upward.

"We did have them spayed," you defend yourself. "Couldn't you use that to pitch them to some nice family?"

You begin to laugh.

Is this another instance of Inappropriate Affect? Except for the laughing gas given you to sink the electrodes, you've now been off all medication for... you don't know how long.

On the street only three years after your dismissal, you wept at hoboes' bawdy jokes, got up and danced if the obituaries you'd been sleeping under reported an old friend's death.

Once, you giggled when a black girl bummed a cigarette in the parking lot of Trinity United Methodist: "I got AIDS, man. Ain't no smoke gonna kill me. Ain't time enough for the old lung cee to kick in, too."

Now that Penfield's taken you off antipsychotics, is Ye Old Inappropriate Affect kicking in again? Or is this fallout from the ESB? After all, one gets entirely different responses (rage and affection, fear and bravado) from zapping hypothalamic points less than two hundredths of an inch from each other.

Spill it, Adolf, Penfield says. What's so funny?

Cat juggling, you tell him. (Your

name has never been Adolf.)

What?

Steve Martin in *The Jerk*. An illegal Mexican sport. A joke, you know. Cat juggling.

You surrender to jerky laughter. It hurts, but your glee isn't inappropriate. The movie was a comedy. People were supposed to laugh. Forget that when you close your eyes, you see yourself as the outlaw juggler. Forget that the cats in their calcewauling orbits include Springer, Ossie, Thai Thai, Romeo, and an anonymous albino kitten from your dead grandparents' grain crib on their farm outside Montgomery.

As a boy in Hapeville, the cat you like best is Thai Thai, a male Siamese that your mama and you inherit from the family moving out. His name isn't Thai Thai before your mama starts calling him that, though. It's something fake Chi-

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◊ Thing  
is, you prefer dogs.  
As a  
kid, you bring  
home  
flea-bitten strays  
and  
beg to keep them. ◊

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ness, like Lung Cee or Mouser Tung. The folks moving out don't want to take him with them, their daddy's got a job with Otero Steel in Pueblo, Colorado. Besides, Mouser Tung's not likely to appreciate the ice and snow out there. He's a Deep South cat, Dixie born and bred.

"You are who you are," Mama tells the Siamese while he rubs her laddered nylons, "but from here on out your name is Thai Thai."

"Why're you calling him that?" you ask her.

"Because it fits a cracker Siamese," she says.

It's several years later before you realize that Thailand is Siam's current name and that there's a gnai-plagued town southeast of Albany called, yeah, Ty Ty. Your mama's a smart gal, with an agile mind and a quirky sense of humor. How Daddy ever got it into his head that she wasn't good enough for him is a mystery.

It's her agile mind and her quirky

sense of humor that did her in, the Zoo Cop says, pinching back your eyelid.

Anyway, Daddy ran off to a Florida dog-track town with a chunky bottle-blond ex-hairdresser who dropped a few pounds and started a mail-order weight-loss-ionic business. He's been gone nine weeks and four days.

Thai Thai, when you notice him, is pretty decent company. He sheathes his claws when he's in your lap. He purrs at a bearable register. He eats leftover vegetables—peas, lima beans, spinach—as readily as he does bacon rinds or chicken scraps. A doll, Mama calls him. A gentleman.

This ESB business distorts stuff. It flips events, attitudes, preferences upside down. The last shall be first, the first shall be last. This focus on cats, for example, is a major distortion, a misleading reenvisioning of the life that you lived before getting trapped by Rockdale Biological Supply Company.

Can't Penfield see this? Uh-uh, no way. He's too hot to screw Rockdale Biological's bigwigs. The guy may have right on his side, but to him—for the moment, anyway—you're just another human oven cake. If you crumble when the heat's turned up, great, zip-a-dee-Zoo Cop, pop me a cold one, justice is served. Thing is, you prefer dogs. Even as a kid, you like them more. You bring home flea-bitten strays and beg to keep them. When you live in Alabama, you covet the fiony chow, Simba, that waits every afternoon in the Notasulga schoolyard for Wesley Duplantier Dogs, not cats. Until Mouser Tung—Thai Thai—all the cats you know prowl on the edges of your attention. Even Thai Thai comes to you and Mama, over here in Georgia, as a kind of offhand housewarming gift. Dogs, Mister Zoo Cop, not cats.

Actually, Penfield says, I'm getting the idea that what was in the *forefront* of your attention, Adolf, was women.

After puberty, your attention never has a forefront. You are de-bombed by stimuli. Girls' faces are billboards. Their bodies are bigger billboards. Jigsawed ad signs. A piece here. A piece there. It isn't just girls. It's everything. Cars, buildings, TV talking heads, mosquito swarms, jet contrails, interchangeable male callers at supertime, battle scenes on the six o'clock news, rock idols infinitely glitterized, the whole schmeer fragmenting as it feeds into you, Mr. Teenage Black Hole of the Spirit. Except when romancing a sweet young gal, your head's a magnet for all the flak generated by the media-

CONTINUED ON PAGE 88



Technology with a human face chisels a stunning new profile for a neglected art

## LEGENDS ON THE SCREEN

Revolutions are rarely one-person affairs. Nonetheless, Lillian Schwartz sparked a fire that continues to burn. "I was the painter who started computer art in 1968," says Schwartz. By now, using the computer as an artistic tool has become second nature to her. "When I'm using it, I don't think of it as a computer," she says. "When I have a mouse in my hand it's just as comfortable as a paintbrush."

The images here, the newest from the New Jersey-based artist and featured in her upcoming book *The Computer Artist's Handbook* represent a bold undertaking: an attempt to retrieve portrait art from the clutches of photography. "Portrait painting went out when photography came in," Schwartz says. "With the computer, I'm looking for a way to redefine the portrait."

Electronic elasticity has helped Schwartz with her creations. She began by scanning pictures of herself into the computer. Images from dif-



ferent time periods followed. Schwartz then blended elements from her own face to established images, adding elements, subtracting them, or drawing free-hand. "It's actually painting," the artist says. "I take portions of my face and incorporate them with other portions. With the computer, I can shrink things, enlarge them, age them ... It's a

wonderful tool for portrait work."

Proficiency with this tool has helped the artist's creativity bloom in a new way. "One day I wondered what I would be like, say, as Sarah Bernhardt," Schwartz says. "So I began to work these images together in the computer." Realism is not necessarily required or even desired.

"There's no hint of Sarah Bernhardt in the piece I titled *Sarah Bernhardt*, but I wanted to get the form and essence of the person. And I do. People look at my work and say, 'Oh, yeah, that is Sarah Bernhardt. You captured a hint of her soul.'"

COMPUTER ILLUSTRATIONS BY  
LILLIAN SCHWARTZ



◆◆  
ONE DAY I WONDERED  
WHAT I WOULD BE LIKE AS SARAH BERNHARDT.  
SO I BEGAN TO WORK...  
◆◆

Yet Schwartz makes no conscious attempts to direct her portraits during the act of composition. They seem to rise from a collusion between the artist and the image itself. "Some of these images are purely symbolic," Schwartz says. "Some are made up. As I step back and watch, I blend with my subjects. During the journey I re-create myself as famous people. In the end, the face isn't me anymore. It becomes a different face. Only when the works are finished do the names come to me. Still, a part of me is in every picture."

Preceding page: Amelia Earhart. Left: Margaret Thatcher. Below: The Madonna, Alice B Toklas, Nefertiti, Sarah Bernhardt. Overleaf: Above, Martha Graham, right, Ella Fitzgerald





As modern artists ponder the creative process, they frequently define themselves as creators, inspiring a flurry of self-portraits. Some may call this urge egomaniacal. Schwartz thinks this notion is poppycock. "I love saying, Well, they've done that; I don't need to do that," says the artist of masterpieces of the past. "I don't feel the need to repeat things. I'll always search and study the masters and look for the fruses. But I'm really pushing the tools to their limit to create new kinds of imagery."

As the potential of computer-based art expands, Schwartz finds new areas to explore. "Virtual reality is amazing," she says. "I can actually see images in 3-D or feel as though I'm walking through space." She has already toyed with this emerging art form, creating sculpture within the computer.

Schwartz still takes up her watercolors and sketches with pencils from time to time. But electronic realities engage her most. "My needs of expression are complete with the computer," she says.—Sandy Fritiz **DO**



I'M REALLY PUSHING THE  
TOOLS TO THEIR  
LIMIT TO CREATE NEW KINDS OF  
COMPUTER IMAGERY.





# Crystal Globe

CONTINUED FROM PAGE 46

million barrels daily.

If oil production outside the OPEC nations has not yet peaked, it will come soon. By 2000, or soon after, both America's Prudhoe Bay and Britain's North Sea oil fields will run dry.

15. Oil prices will not rise, instead, by 2000 they will plummet to between seven and nine dollars per barrel. Even those prices offer huge profits to the producers. It costs only \$1.38 per barrel to lift Saudi oil out of the ground. OPEC just is not very good at throttling back production to keep prices up when their market is glutted. They will not get any better at it in the Nineties.

And the market will be glutted. The most industrialized nations have a three-month supply of oil in tankers and storage facilities. Most have a similar amount in "strategic reserves."

Finally, if the price of oil starts to rise, new methods for recovering oil from old wells will become cost-effective. Techniques already developed could add nearly 50 percent to the world's recoverable oil supply, and cheaper methods are likely to appear by 2000.

16. Growing competition from other energy sources will also help to limit the price of oil. Natural gas burns cleanly, and there is enough of it available to supply the world's entire energy needs for the next 200 years. Nuclear plants will supply 12 percent of the energy in Eastern Europe and the Soviet Union by the end of the century. Even the United States appears to be sidling up to the recognition that modern, well-run power plants like Canada's CANDU technology can be safer and less polluting than coal- and oil-fired generators.

Solar, geothermal, wind, and wave energy will ease power problems where they are available. But they will contribute only a small fraction of the world's energy in the foreseeable future.

Nuclear fusion, the energy produced when small atoms are combined to form larger ones, probably will not supply practical power before 2020. A pollution-free hydrogen economy will not become practical until later in the next century and will remain costly.

## SEPARATISM

17. Nations are forming loose confederations, either by breaking up the most centralized countries along ethnic and religious lines or by uniting independent states in international alli-

ances. This is the world's most important political trend.

• Eastern Europe: Yugoslavia will soon split into a loose confederation, based on the region's three dominant religions: Greek Orthodoxy, Roman Catholicism, and Islam. Czechoslovakia is already loosening the ties between its Czech and Slovak regions. And, following a brief, unsuccessful attempt at a new repression by the right wing of the Communist Party, the Soviet Union will reorganize itself into a confederation of 12 largely independent states. The Baltic nations—Latvia, Lithuania, and Estonia—will regain their independence.

• European Community: The Continent will form an effective confederation of 12 states in 1992, 17 by 1996. Eastern European states will become associate members by 2000.

• North America: After Quebec secedes from Canada, probably in 1996, the

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● Not long after the turn of the century, the first antiaging treatments will extend the human life span to more than a century of good health. ●

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four Eastern provinces will join the United States by 2004, the Western provinces by 2010. In a recent poll, 60 percent of French Canadians opted for separation. The provinces of Manitoba and New Brunswick have already contacted the U.S. State Department for information about how to become part of the United States.

• Asia: The leases are about to run out on Hong Kong and Macao, the British and Portuguese colonies will regain mainland China no later than 1997. If Beijing lives up to its promise to preserve their capitalist life-styles, Taiwan will seek to join the People's Republic shortly after that. Eighty percent of the Taiwanese asked in one recent poll said they wish to rejoin the mainland. Even the two Koreas will reunite before 2000.

• Middle East: Saddam Hussein inadvertently gave Israel and its Arab neighbors their best chance for peace in 40 years—and they seem to be throwing it away. Fortunately, leaders on both sides recognize the blunder, even if they cannot prevent it. Hostilities will es-

calate there again, but this time Israel will trade its captured lands for peace. By 2000, economic and political ties will start to bind the region into a prosperous and tranquil community.

## POPULATION

18. In the industrial countries, the "birth dearth" has cut growth almost to nothing; in the developing world, the population bomb is still exploding. The primary cause is economic, not medical. Throughout the industrialized world, workers can look forward to national retirement programs or social security. In the developing lands, those too old to work rely on their children to support them, so they have as many children as they can. Yet, thanks to better health care, children have a better chance to survive into adulthood. This contributes to population growth.


19. The AIDS epidemic will slaughter the defenseless by the millions. According to the World Health Organization, the AIDS-causing human immunodeficiency virus (HIV) will infect up to 40 million people by 2000.

In 1990 some 5 million people in sub-Saharan Africa already carried the disease, twice as many as just three years earlier. By 2000, 90 percent of the individuals in sub-Saharan Africa will test positive for the HIV virus.

In the long run, medicine will provide ways to prevent AIDS and even to cure it. They will come much too late for today's victims, and it will be many years longer before adequate supplies reach the Third World.

20. A host of new medical technologies will make life longer and more comfortable in the industrialized world. Many years will pass, before they spread to the developing countries. Experimental brain-cell transplants will aid victims of retardation and head trauma by 2001. Surgeons will repair sick hearts by grafting in healthy muscle from other parts of the body. In many operations, laboratory-grown bone, skin, muscle, and blood cells will replace donor tissues.

Not long after the turn of the century, the first antiaging treatments will extend the human life span to more than a century of vigorous health, though it will be decades later before we can be certain that they work as well in humans as in lab animals. Best bet: melatonin, the natural hormone that regulates the body's "clocks." Our bodies produce less of it as we age. Supplements prevent many of the effects of aging in animals and, in fact, extend their life spans by 20 percent, without causing adverse side effects. ●●



DORTOIR A  
INFIRMERIE

"I've not dedicated my life to abortion," declares the French physician, endocrinologist, and the discoverer of the contraceptive pill. "But two hundred thousand women die in bungled abortions. And RU 486 can save them"

## INTERVIEW

# ETIENNE-EMILE BAULIEU

"I saw a lot of botched abortions when I was an intern. Abortion was illegal in France until 1966, but if a woman was in danger of bleeding to death, she could be brought to the hospital for a surgical scrape. I have horrible memories of those days." French M.D. and biochemist Etienne-Emile Baulieu sat on the medical committee that recommended legalization of abortion in France. More important, he is the discoverer of RU 486, the abortion pill. Today, more than a third of France's abortions are done chemically with RU 486. When this safe and inexpensive antihormone reaches the world market, it will make abortion available to millions of women who today have no access to family planning.

A pioneer in research on hormone receptors and brain function, Baulieu struggled for 20 years to develop an abortion pill. When drug manufacturers were too frightened to inves-

tigate the idea, Baulieu used his position as a consultant to Roussel-Uclaf, a \$1.7 billion-a-year French pharmaceutical company, to nurture promising leads. When RU 486 was synthesized and its abortifacient properties accidentally discovered by Roussel chemists in 1980, Baulieu mounted an even fiercer campaign to get the drug onto the market. He succeeded in 1985. The strings Baulieu pulled in maneuvering RU 486 through the top levels of French government provide a plot worthy of Inspector Maigret. The cast of characters ranges from Sophia Loren, Baulieu's longtime friend and former mistress, to heads of the world's largest drug companies. Baulieu is plotting a similar coup for introducing RU 486 into the United States. "I love competition," he says, "and I like to keep score."

Baulieu claims he didn't even know what birth control was

PHOTOGRAPHS BY NICK CLARK

until Gregory Pincus, father of the contraceptive pill, recruited him in the early Sixties as a likely successor. Pincus spotted in Baulieu the traits that had made his own career so successful: the intellectual agility of a first-rate researcher plus a political flair. Still in his twenties, Baulieu had already isolated a water-soluble steroid from the adrenal glands of patients suffering from adrenal cancer. This surprising discovery cast a new light on how hormones are transformed and transmitted in the body. Appointed professor of chemistry at the University of Reims in 1956, Baulieu still kept his lab in Paris. The research there led to his 1970 isolation of the uterine progesterone receptor. Secrated by the corpus luteum, the outer lining of the ovulated egg, progesterone prepares the uterine wall for implantation should an egg be fertilized. Without continued progesterone secretion, the uterus cannot carry a pregnancy to term. Once the progesterone receptor was discovered, the next step in fertility control was to engineer an antiprogesterone that blocks the uterine response to progesterone.

Roussel chemist Georges Teutsch synthesized Roussel-Uclaf 38486—RU 486—in 1980 while looking for new ways to make analogues of cortisone. Baulieu snatched, "Eureka!" while Roussel's Catholic executives looked on in dismay. Baulieu went through years of arduous lab testing

and intense political jousting. But just before the French government approved RU 486 and it was on the verge of production, Baulieu was dumbfounded to learn that Roussel had abruptly yanked the drug off the assembly line. Roussel is controlled by the German pharmaceutical company Hoechst A.G., and Hoechst's predecessor company was I. G. Farben, manufacturer of gas used in Nazi concentration camps. When anti-abortionists started comparing RU 486 to Farben's death-camp gas, the firm's president halted production.

Shortly after hearing the news, Baulieu flew to Rio de Janeiro, where the World Congress of Gynecology and Obstetrics was meeting. Waving a petition signed by 1,000 doctors, he denounced Roussel's decision as "morally scandalous." The French government owns about a third of Roussel, and by law it can withdraw a patent from a company refusing to use it in the public interest. Two days after Baulieu's press conference, the minister of health, calling RU 486 "the moral property of women, not just the property of the drug company," ordered Roussel to put it back on the market. Roussel's policy since has been to release RU 486 to countries whose ministries of health request it, and Baulieu is confident the pill will soon be widely available not only in abortion clinics but also in doctors' offices, where abortion will be a decision be-

tween a woman and her physician.

Baulieu lives with the style of an artist, although a friend says it most nearly resembles that of P. T. Barnum. Induction into the French Academy of Sciences usually involves the ceremonial presentation of a sword. Instead, Baulieu's friends Jean Tinguley and Nikki de Saint-Phalle handed him a sculpture made by welding Baulieu's academic sword onto a chicken rosette. Baulieu works at a long table overflowing with papers, puppets, and masks. The walls are lined with art and bookshelves including the works of Pasteur and the 35 volumes of his bound publications. These papers document the invention of molecular endocrinology, a field Baulieu helped create in the Fifties when he started making his discoveries.

Thomas Bass interviewed Baulieu at his lab at Bicetre Hospital. This former midhouse and prison outside Paris is somber with espaliered trees and four centuries of ghosts. His office overlooks the hospital's family planning clinic, and as Bass discovered from an informal survey, most of the women threading their way through the courtyard were on their way to RU 486-induced abortions—now safer and more private thanks to Baulieu's championship of women's rights.

**Omnif:** Why do you call the birth control pill "the most important invention of the twentieth century?"

**NAME:**

Etienne-Ernie Baulieu

**AGE:**

Sixty-five

**PLACES OF WORK:**

Director of lab at INSERM, a French institute for medical research; adviser to Roussel-Uclaf, a French pharmaceutical firm

**OFFSPRING:**

Three children, seven grandchildren

**MOST NOTED ACHIEVEMENT:**

Isolated the uterine progesterone receptor, leading to synthesis of RU 486, the "abortion pill"

**DRUG'S EFFECTIVENESS:**

96 percent, the same rate as that of surgical abortion

**NUMBER OF FRENCH WOMEN USING RU 486 BY 1991:**

65,000

**OTHER POTENTIAL USES FOR RU 486:**

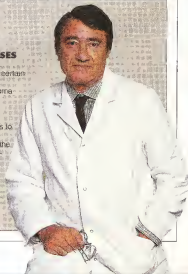
Treatment of endometriosis, certain breast and uterine cancers, Cushing's syndrome, glaucoma

**HOPE FOR RU 486 IN THE U.S.:**

Deprived of specific indications to attack and symbols on which its propaganda thrives, the American anti-abortion movement should collapse

**BOOK RECENTLY WRITTEN:**

*Génération Pilule (Pill Generation)*, published by Odile Jacob (Paris)



**Baulieu:** By divorcing sexuality from reproduction, the Pill has revolutionized human behavior. For the first time in history it's possible to have sexual relations without worrying about pregnancy. The Pill also demonstrated the ability of science to transform our lives. It's the forerunner to other chemicals, good or bad, that will alter brain function and behavior. The Pill has been elevated to mythic status. Among many thousands of drugs, it alone is called "the Pill." But I'm astonished to see the same thing happening with RU 486.

People ascribe to it either too much good or too much evil. It's either the work of angels or the devil. In truth, science has finally developed a drug for ending pregnancy, something that women have yearned for for thousands of years. I was on Italian television recently when the interview was interrupted with news of a Sicilian woman who had died from drinking an infusion of parsley, which is toxic in high doses; she was trying to induce an abortion. Even in Europe, there are still cases like this.

At last we have a safe way to interrupt gestation. But radical feminists are mistaken if they think they can take the pill under any circumstances without supervision of doctors or nurses. "Women are free at last!" they say. But this

isn't true. I'm a supporter of women's liberation, and I think RU 486 is going to aid the cause. But I'm also a doctor concerned about the health of my patients. Five out of a thousand women have extrauterine (ectopic) pregnancies. RU 486 will not abort these pregnancies, which, if left untreated, are fatal. To demedicalize abortion by removing doctors from the process—it's insane! This is not a miracle pill, it's merely an instance of medical progress.

**Omni:** You've said the birth control pill "failed." What do you mean?

**Baulieu:** Out of the almost one billion women in the world of child-bearing age, fifty million, a mere five percent, take the Pill. The Pill has failed in the sense that something that is so effective and generally so well tolerated is used by such a small percentage of women. People grow tired of taking it month after month. Perhaps the minor side effects are one reason why women start and stop.

**Omni:** Is RU 486 going to be less of a "failure" than the Pill?

**Baulieu:** Because the Pill, condom, diaphragm, and every other means of contraception are imperfect, RU 486, unfortunately, will be widely used. I oppose sterilization because it's generally irreversible. I support reproductive free-

dom to the end of one's reproductive life. So RU 486 will remain the pill of the occasion.

**Omni:** Your father's family was Jewish. Have you suffered anti-Semitism?

**Baulieu:** In school, when I still used the family name of Blum, I was called "dirty Jew" and things like that. As a young Communist, I saw anti-Semitism in the Party. Between school and the Party came the anti-Semitism of Hitler's Germany. When my mother, who raised us without religion, moved us to Grenoble during the war, we changed our name to Baulieu and managed to survive. The bourgeoisie in France, especially the upper echelons of the medical profession, has always had a strong vein of anti-Semitism. Whenever I confront these people, I call myself a Jew, even though I'm not, just to annoy them.

**Omni:** Does having Jewish roots have anything to do with your discovery of RU 486?

**Baulieu:** Nothing to do with it. Fundamentalist Jews are indistinguishable from right-wing Protestants, Catholics, or Moslems. They're all fanatic moralists bent on limiting people's freedoms. It's easier to work on abortion and contraception if one is part of the political left, where liberty and freedom of choice have always been important issues. My early interest in women's rights, other than my mother's influence, probably developed in the auberges de jeunesse, the leftist youth groups that were among the precursors to the revolution of May '68. But I didn't start researching fertility control until I'd already had three children.

**Omni:** How were you involved in the Resistance?

**Baulieu:** In 1942 after I'd changed my name and gotten in trouble with the Gestapo for breaking windows in the militia, I joined the Francs-Tireurs et Partisans Français, which were the irregular forces controlled by the Communists. But I wasn't a Communist then, just a fifteen-year-old kid. We got weapons from parachute drops. After the liberation of Annecy in 1944, I joined a battalion sent to the Alpine front. It was there I decided to become a doctor. Still wearing my uniform and the blue beret of a mountain infantryman, I came back on leave to take medical school exams.

**Omni:** Was the birth control movement active in France?

**Baulieu:** All forms of contraception had been outlawed in 1920, when the country was desperate to repopulate itself after the war. There was the famous case of a woman in Vichy who had her head chopped off for performing abortions: Diaphragms, spermicides, the



Pill—all were illegal, except for condoms, which were tolerated only as a way of preventing prostitutes from spreading venereal disease. Everybody ignored these laws. But no one in France was sociologically prepared for contraception until Mitterand, the presidential challenger, made it an election issue in 1965.

I'd been presenting my ideas on androstrenones to the high research and development committee at Roussel. In a Catholic, rather conservative company, the directors had been opposed to working on sex hormones. But chemists down below were doing their own work, and they came up with eleven substituted molecules, just the type of structures I had suggested on the basis of our work with other androstrenones (such as antiestrogens).

**Omnar:** Why did you have trouble coming to the United States?

**Baulieu:** I wanted to visit Seymour Lieberman's lab at Columbia University. He was doing first-class work on steroid hormones. But the U.S. government denied me a visa to visit him because I'd been a Communist. It didn't matter that I'd broken with the Party after the Hungarian uprising in 1956. You have to remember, too, the strict morality of the French Communist Party, which was like a religion. The PCF was absolutely opposed to contraception and abortion. They held an internal trial to drum out of their ranks a very good gynecologist, Jean Daisace, who'd introduced the diaphragm into France.

But after Kennedy was elected President, I got a visa right away. I went to work with Lieberman and met Gregory Pincus. I'd actually shaken his hand once before but was put off by his royal air. It was like shaking hands with God. I was initially disappointed that Pincus, although a very good scientist, was doing more politics than science. I didn't realize then that he was making a revolution. When he invited me to give a talk at his endocrinological lab, I didn't go because of the Pill, which I knew little about. I went because he was famous and might be able to help my career. He flew me down to Puerto Rico to visit the laboratory where the Pill was being developed. It was not reproductive biology but the mechanism of hormone activity that interested me. I wanted to look at sex steroids from the biochemical viewpoint.

**Omnar:** How did he convince you to work on contraceptives?

**Baulieu:** I was a thirty-five-year-old lab scientist, and you can't be a practicing physician while you're trying to do research at the highest level. But research on contraception wasn't only mol-

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ecules and cells: It was applicable to people's lives. Very few scientists engaged in this kind of work in a serious way. Everyone has an ideological position on contraception, but reproductive biology is still largely unexplored terrain. I was also influenced by the problem—then taken seriously in the U.S.—of overpopulation in developing countries. Pincus also arranged for me to sit on a World Health Organization committee. As a result, I met demographers, gynecologists, social scientists, and others who would enlarge my vision and make me more inclined to contribute to fertility control. And he was right. I became a defender of the cause.

**Omn:** Do you think overpopulation is a serious threat?

**Baulieu:** The world's population will double sometime in the twenty-first century—from five to ten billion people. There will be twice as many Moslems, while the populations of Europe and North America will remain the same. RU 486 and other methods of birth control will be essential for maintaining a stable population. Without birth control, there will be no social or technological progress. It is also a woman's right to decide how many children she wants.

**Omn:** Did Pincus help your career in other ways?

**Baulieu:** I was seduced by Pincus's way of thinking. Work on sex steroids would involve me in an interesting social activity, which I lost when I left the Communist Party. It was a way for me as a research scientist to get back in touch, indirectly, with medicine. Thanks to him and Lieberman I was invited to give a presentation on estrogen receptors in the rat endometrium at the Ford Foundation in 1965. The Ford people were stupefied. I was expanding work done earlier by University of Chicago chemist Elwood Jensen, who discovered the estrogen receptor. To me it was obvious that Jensen's approach was the way of the future. Hormones travel through the blood to cells that respond to them—uterine, pituitary cells, whatever. The receptor is the specific locus where the hormone hits the cell and tells it what to do. This is the likely place to intervene. I was applying to hormone research what pharmacologists had been saying—but not doing—for fifty years.

I told the Ford Foundation I'd work on sex hormones and their receptors but didn't promise to discover a new pill. They were nice and clever enough to give me money enough to last for ten years. And so we discovered the progesterone receptor in the uterus and

the androgen receptor in the prostate. We introduced the concept that endocrinology involves changes both in hormones and receptor concentrations. For example, At the beginning of a woman's cycle she secretes mostly estrogen; in the second part, progesterone as well. Estrogen triggers ovulation, but it also induces the synthesis of the progesterone receptor—"primes" it. This is an important finding from my lab.

We also showed that progesterone deactivates, or "down regulates," its own receptor before the onset of menstruation. These mechanisms apply to all hormones.

**Omn:** Could understanding these mechanisms lead to the development of a new form of birth control?

**Baulieu:** A steroid that binds to the progesterone receptor could provoke this down regulation, or deactivation of the receptor. Theoretically a very good contraceptive, it would have to be given to a woman exactly at mid-cycle. What is mid-cycle? Even regular cycles are always to some extent irregular. Nonetheless, some people in England and Stockholm are experimenting with RU 486 as a mid-cycle contraceptive. One would take antiprogesterone very early, just after ovulation, so that the endometrium is unable to implant a fertilized egg.

**Omn:** What happened after you discovered the progesterone receptor?

**Baulieu:** Roussel and other drug companies pulled out all the molecules in their drawers to look for antagonists to progesterone. But we hit a dead end, so I played some more with the idea of receptor regulation. [Arpad Istvan] Cesapo's work in St. Louis was the first to prove progesterone is indispensable in women.

That work made me confident that an antiprogesterone would be effective in blocking pregnancy. And it's very important in science to be confident.

**Omn:** What happened after Georges Teutsch synthesized RU 486?

**Baulieu:** Teutsch and his group had originally been looking for cortisol analogs, which earn drug companies much more money than sex hormone drugs. Work on progestins was not officially programmed, so RU 486 was tested first as an antiglucoocorticosteroid and only secondarily as an antiprogesterone. I was really keen on having a drug that induced menses, as well as an abortifacient. So the next step was to test it in animals and then humans.

It was sent out for toxicological studies in monkeys, who were given a hundred milligrams per kilo every day for a month. An enormous dose. Three monkeys got sick and had to be killed. The toxicological people at Roussel who re-





## LAUNCH SOMETHING SPECIAL

ceived the report told me nothing. But one day at a committee meeting, somebody said to me, "By the way, your compound is dead." Which meant it was too toxic for human use.

I looked at the studies and found RU 486 doing exactly what an antiprogesterone drug should do: blocking cortisone activity and inducing extreme weakness, hypotension, metabolic disorders. "This is beautiful," I said. "The compound is working in vivo!" So I rescued RU 486 from oblivion. The first human tests were performed in Geneva. People were initially afraid that what happened to the monkeys would happen to the women. They didn't understand that one small dose given for the regulation of progesterone is completely different from using the drug as an antiprogesterone for many successive days at high doses. My overall strategy has been to work in the public eye. If the facts are good, people buy them. The studies done are convincing for any scientist of good faith anywhere. More than sixty-five thousand women in France have taken the abortion pill. We're up to one thousand a week, and each week there are more than before. One third of the abortions in France are now done with RU 486, and we're still on the curve.

**Omn:** Will all abortions ultimately be done with RU 486?

**Baulieu:** I don't think so. Some women won't like it. With a surgical abortion, you close your eyes and put yourself in the hands of the doctor. RU 486 involves a more active approach. You take the pill yourself, and the process lasts longer, since you have to wait 48 hours before the bleeding starts [the pill is followed by a small dose of synthetic prostaglandin].

**Omn:** Will the drug be used differently in different cultures?

**Baulieu:** The best way to use RU 486 anywhere is to have women who've missed their periods go as soon as possible to a specialized center for the induction of menses, contraception, or whatever you want to call it. Many women who miss their periods wait another month before doing anything. But they shouldn't. French law says you have to have an abortion within the first three months. I think that's a good time to fix the limit.

**Omn:** Will there be more abortions because of RU 486?

**Baulieu:** Not more but simpler, safer, more private abortions. When it comes to fertility control, I've always said, "The earlier, the better." Suspension of ovulation and contraceptives are better than treating the problem later. But even in an ideal world, you'll still have abortions. RU 486 will never become the method replacing contraceptives, although this is a theoretical possibility. Without birth control a woman with a normal sexual life will be pregnant two or three times a year. She sees her period is late, oops, she takes RU 486. This is not what I'm recommending now. Maybe in twenty years.

**Omn:** If it's safe, why not use it two or three times a year?

**Baulieu:** Women want real freedom, not just words. To tell them, "Don't bother with precautions. You can do anything you want. If you have an accident, RU 486 is here, so it's all right"—this is playing with people. We don't know the long-term effects of repeated interruption with RU 486. I want the knowledge brought by progressive experiences. There are certain cases where RU 486 might become the sole method of contraception. Take the forty-year-old woman living alone who doesn't use birth control pills because they're bad for her health, or a young woman who doesn't have a sex life except occasionally, and then something happens. In these cases RU 486 could be very useful. Out of the 1.6 million abortions performed every year in the U.S., more than a quarter are teenagers.

**Omn:** Could RU 486 be used as a once-a-month or postcoital birth control pill?

**Baulieu:** It could be used once or several days a month as a contraceptive in the classical sense of the word, that is, to block ovulation during the first part of the cycle. It would be an estrogen-free contraceptive functioning like the Pill. It might function better than the Pill, because estrogen is what gives the Pill its harmful side effects. But who's going to develop this new method? It's easier and less costly for drug companies to play with what they already know about. But RU 486 is active as a contraceptive in monkeys, we've suspended ovulation for six months with a single injection.

It could also be used occasionally—not each month—as a postcoital contraceptive, a day-after pill. In case of sexual exposure at midcycle, it can be taken late in the luteal [second] phase to induce abortion. It works ninety-six percent of the time. But that's not efficient enough to use each month.

**Omn:** After your big fight with Roussel, are you still working with the company?

**Baulieu:** Edouard Sakiz has been a friend of mine for 30 years. I introduced him to Jean-Claude Roussel in 1965, who hired him as head of a lab, a position relatively low down the line. Sakiz climbed up to become president, and we are still real friends, which is quite an achievement. We had broken-

CONTINUED ON PAGE 96



ARE PEOPLE  
TREATING YOU  
LIKE AN ALIEN?



# ANTIMATTER

HELP WANTED:

Amateur psychologist, meteorologist, and Renaissance person to hunt down UFOs

So you want to be a UFO investigator. You'll need a compass, tape recorder, and Geiger counter. A pair of tweezers would help as well. This is the gospel according to the *MUFON Field Investigator's Manual*, published by the Mutual UFO Network in Seguin, Texas. Still interested?

Dan Wright, deputy director for investigations at MUFON, says he's looking for a few good volunteers with science, engineering, and aviation backgrounds, although anyone with enthusiasm and common sense is welcome. Wright, who has an M.A. in political science, runs the investigator network from Michigan. He reviews all completed case reports—about 15 a month—and evaluates the quality of research. Then he provides critical feedback to the investigator, his local supervisor, called the state director, and to Walt Andrus, who heads MUFON from Seguin.

Wright says a UFOlogist needs to be a Renaissance person. He or she should know something about weather, conventional aircraft, the celestial sky, and "the psychology of people during an interview." The novice UFOlogist doesn't just go out and dig into cases, though. First his local supervisor will put him through a training course using the investigator's manual. It contains chapters on equipment, commonly reported phenomena, assessment of testimony, and other fricks of the trade. The trainee studies, participates in classes, and eventually takes a 100-question exam. "It shows the person's strong and weak areas," says Wright. Then he is ready to go out on cases with an experienced



UFOlogist. After his apprenticeship, he graduates from trainee to full investigator. The training varies in quality from state to state, admits Wright, "but to one extent or another they all conduct formal sessions."

Of course, the UFOlogists' activities have become more specialized since MUFON opened its doors in 1969 with a handful of investigators in a few Midwestern states. Now MUFON has more than 3,000 members worldwide, 800

investigators in the United States, about 150 Ph.D. consultants, and another 150 research specialists with master's degrees. The analysis of photos and the computerization of UFO case reports, for instance, are activities that qualified volunteers may pursue.

Philip Klass, aerospace technical journalist and longtime UFO skeptic, favors investigator training but argues that you can't teach skepticism from a handbook, "unless that handbook gives great emphasis to skepticism." He feels the wrong incentive system is built into UFOlogy. Investigators become famous and get awards not for finding prosaic explanations for cases, he says, but for failing to find an explanation. They are sincere but often don't try hard enough because they are looking for "the Rosetta stone that will unlock the UFO mystery," he says.

Even so, Andrus is busy rewriting the fourth edition of the investigator's manual, which will run about 200 pages and contain a generous portion on abductions. Of course, he also needs people who can use a compass and tweezers. "There's a lot to do," says Andrus, "and it's all important."—PAUL MCCARTHY





# ANTIMATTER



## TANZANIAN WITCH-HUNT

The days of murdering women accused of witchcraft didn't end with the seventeenth-century Salem witch trials, according to Lutheran World Information. The Geneva, Switzerland-based news service claims that hundreds of women have been slaughtered in recent years in Tanzania's northwestern Mwanza and Shinyanga provinces—often just because their

neighbors thought they looked like witches.

The Lutheran World report contends that most of the killings have taken place in rural areas where poverty-stricken elderly women use smoky wood fuel that irritates their eyes. Believing red eyes to be a sure sign of a witch, village security groups called Sungusungu have supposedly seized and killed old women with bloodshot eyes. Several hundred women threatened with

death have reportedly escaped to the cities, the report says, where belief in witchcraft is minimal.

But the press officer at the Tanzanian embassy in Washington, DC, denies the reports. The officer, who does not want his name used, insists that hundreds of Tanzanian women have not been killed as witches in modern times. "There might have been an incident," he admits, "but this story has been enormously sensationalized."

Jan Due, an American agricultural economist who travels frequently to Tanzania, also doubts the witch-hunt story. "I have never heard any reference to this happening at all, and I travel a lot in the rural areas and talk to the people," she notes. "I did hear reports last year of children in West Africa being killed for body parts for witch doctors, but that could have been rumor. I certainly hope that story didn't really happen either."—Sherry Baker

A REPORT SUGGESTS THAT HUNDREDS OF ELDERLY WOMEN WITH BLOODSHOT EYES HAVE BEEN BRANDED AS WITCHES AND KILLED IN RURAL TANZANIA.

## THE PLAGUE OF BATS

Chris Farkis was walking down Main Street in Fort Worth, Texas, one day when something brushed by his left ear. "I wasn't paying a lot of attention to my surroundings, but that made me look up," says Farkis. "I saw a couple of hundred bats flying five to ten feet above the street and hundreds more crawling the street and flopping around on the sidewalk." Pedestrians dodged the onslaught of plummeting bats until local health department workers arrived and removed the dead and dying creatures.

What caused normally night-flying bats to drop from the daylight-sky in hordes? "At first people theorized that the animals were sick or overcome by heat," says Pat Morton, education director of Austin-based Bat Conservation International. "But it always sounded to us like they had been poisoned."

According to reporter Julie Gilbert of the Fort Worth Telegram, a reliable source who did not want to be named told her newspaper that the local Hyatt Regency hotel had hired an exterminator to kill the Mexican free-tailed bats. Hotel manager Hans Strohmer, however, says that while he "asked to

have the bats removed, he did not ask to have them killed."

Morton says it's not unusual for bats to be poisoned. "Most people think they are doing the world a favor by killing them—they believe bats spread rabies, when, in fact, in the past forty years of record keeping only eighteen people have died of bat rabies," Morton says. "More people die annually from being bitten by their own dogs. And bats are important to the balance of nature. They are major predators of night-flying insects and in Central America some bat species help maintain the rain forests. Bats are declining at an alarming rate worldwide," adds Morton, "and their number one enemy is human ignorance."

—Sherry Baker

## NOTES FROM MAGIC MOUNTAIN

Psychic investigator Alexander Imich was so struck by the vivid descriptions of seances in Thomas Mann's classic novel, *The Magic Mountain*, that he began a long-term study of the author's account of encounters with the "otherworld." Now Imich has released a letter he received from Mann in 1945. The letter's message, the fictionalized descriptions in *The Magic Mountain* were, in fact, based on Mann's personal experiences

in prewar Munich.

The letter refers to a seance at which Mann wrote that he witnessed "small phenomena." Imich subsequently searched the author's papers and discovered descriptions of a ball that levitated "floating in a globe, flashing with luminous points of rays" and a "table, with its typing by itself."

Mann's biographer, Ilya Erezgailis, confirms the authenticity of Imich's investigations. "The overall experience," she says, "was definitely there."

—Imich hopes that



Mann's adventures may help validate the phenomenon. "After all," says Imich, "Thomas Mann was a Nobel prize-winner and a son of his time."

—Jeff Gribbery

## PSYCHIC WOUNDS

Penny Pellito didn't see the accident coming or she and her husband never would have gone

shopping at the Home Depot Store in Hollywood, Florida. While Pellito was viewing the merchandise, three 8-foot planks dropped on her head. Flinging suit against the store, Pellito claimed that the wood had caused physical injuries and had eliminated her "psychic ability" to block out pain.

During a trial last March, Pellito was asked why, if she is psychic, she didn't see the accident coming. Despite her abilities, she said, she "can't see everything."

In what began as a highly convincing case, Pellito's attorneys called several medical experts to testify about her ability to

turn off pain. Dr. Sheldon Willens, for instance, recalled how Pellito refused anesthesia for an operation in which he removed an enlarged bone from one of her toes. The case turned, however, when testimony revealed that just two weeks after the accident, Pellito had another operation—again without anesthesia.

In the end, the Pellitos were awarded \$6,000 for physical pain and suffering, but even that sum was reduced when the jury decided she was 80 percent at cause for the accident. A new trial was denied but the Pellitos have appealed.

—A.J.S. Rayl



crazed twentieth century.

"You're tomcatting, aren't you?" Mama says. "You're tomcatting just like Webb did. God."

It's a way to stay focused. With their faces and bodies under you, they cease to be billboards. You're a human being again, not a radio receiver or a gravity funnel. The act imposes a fleeting order on the ricocheting chaos working every instant to turn you, the mind cementing it all together, into a flimsy cardboard box of mismatched pieces.

Is that tomcatting? Resisting, by a tender union of bodies, the consequences of dumping a jigsaw puzzle of cats into a box of pieces that, assembled, would depict, say, a unit of embattled Itak gunners on Corregidor?

Christ, the Zoo Cop says, a more high-falutin excuse for chasing tail I've never heard.

Your high school is crawling with cats. Cool cats, punk cats, stray cats, dead cats. Some are human, some aren't. You dissect a cat in biology lab. On a

plaster-of-Paris base, guyed upright by wires, stands the bleached skeleton of a quadruped that Mr. Osteen—he's also the track and girls' softball coach—swears was a member of *Felis catus*, the common house cat.

With its underlying gauntness exposed and its skull gleaming brittle and grotesque, this skeleton resembles that of something prehistoric. Pamela van Rhyn and two or three other girls want to know where the cats in the lab came from.

"A scientific supply house," Coach Osteen says. "Same place we get our bullfrogs, our microscope slides, the insects in that there display case." He nods at it.

"Where does the supply house get them?" Pamela says.

"I don't know, Pamme. Maybe they raise 'em. Maybe they round up strays. You missing a kitty?"

In fact, rumor holds that Mr. Osteen found the living source of his skeleton behind the track field's south bleachers, chloroformed it, carried it home, and boiled the fur off it in a pot on an old stove in his basement. Because of the smell, his wife spent a week in Augusta with her mother. Rumor holds that cat lovers hereabouts would be wise to keep their pets indoors.

Slicing into the chest cavity of the specimen provided by the supply house, you find yourself losing it. You are the only boy in Coach Osteen's lab to contract nausea and an overwhelming uprush of self-disgust, the only boy, clammy palmed and light-headed, to have to leave the room. The ostensible shame of your departure is lost on Pamela, who agrees, in Nurse Mayhew's office, to rendezvous with you later that afternoon at the Huddle House.

"This is the heart," you can still hear Osteen saying. "Looks like a wet rubber strawberry, don't it?"

As a seven-year-old, you wander into the grain crib of the barn on the Powell farm. A one-eyed mongrel queen named Sky has dropped a litter on the deer hides, today stiff and ratchet, that Gramby Powell stowed there twenty or more years ago. Sky one eyes you with real suspicion, all set to bolt or hiss, as you lean over a rail to study the blind quintet of her kitting.

They're not much, mere lumps. "Turds with fur," Gramby called them last night, to Meemaw Anita's scandalized dismay and the keen amusement of your daddy. They hardly move.

One kitten gleams white on the stiff hide, in a nervous curl of Sky's furry belly. You spit at Sky, as another cat would spit, but louder—*ssssphh! sssphh!*—so that eventually, intimidated, she gets up, kittens falling from her like bombs from the open bay of a B-52, and stinks to the far wall of the crib.

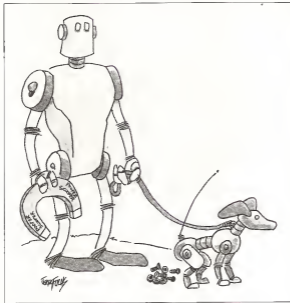
You climb over the rail and pick up the white kitten, the Maybe Albino as Meemaw Anita dubbed it. "Won't know for sure," she said, "til its eyes're open."

You turn the kitten in your hands. Which end is which? It's sort of hard to say. Okay here's the starchy white potato print of its smashed-in pug of a face: eyes shut, ears a pair of napkin folds, mouth a miniature crimson gap.

You rub the helpless critter on your cheek. Cat smells. Hay smells. Hide smells. It's hard not to sneeze.

It occurs to you that you could throw this Maybe Albino like a baseball. You could wind up like Denny McLain and fling it at the far wall of the grain crib. If you aim just right, you may be able to hit the wall so that the kitten rebounds and lands on Sky. You could sing a funny song. "Sky's being fallen on, / Oh, Sky's being fallen on, / Whatcha think 'bout that?" And nobody'll ever know if poor little Maybe Albino has pink eyes or not.

This sudden impulse horrifies you, even as a kid, especially as a kid. You can see the white kitten dead. Trem-



# The Artist

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Hold it!  
Nothing is  
so bad it  
can't get  
worse.



Mind if I  
use your name  
in my  
therapy class?

Hey,  
that's what  
friends  
are for.



bling, you set the kitten back down on the cardboard deer hide, climb back over the crib rail, and stand away from the naked litter while Sky tries to decide what to do next.

Unmanfully, you start to cry. "S-sorry, k-kitty S-s-sorry, Sk-sky. I'm r-really s-sorry." You almost want Gramby or Meemaw Anita to stumble in on you, in the churchly gloom and itch of their grain crib, to see you doing this heartfelt penance for a foul deed imagined but never carried out. It's okay to cry a bit in front of your mama's folks.

I'm touched, Penfield says. But speak up. Stop mumbling.

For several months after your senior year, you reside in the Adolescent Wing of the Quiet Harbor Psychiatric Center in a suburb of Atlanta. You're there to neutralize the disorienting stimuli—flak, you call it—burning out your emotional wiring, flying at you from everywhere. You're there to reclaim how to live with no despairing recourse to disguises, sex, drugs.

Bad drugs, the doctors mean. At QHPC they give you good drugs. This is actually the case, not sarcastic bullshit. Kim Vaughan, one of the psychotherapists in the so-called Wild Child Wing, assures you that this is so, that antipsychotics aren't addictive. You get twenty milligrams a day of haloperidol. You take it in liquid form in paper cups shaped like dollhouse-sized coffee filters.

"You're not an addict," Kim says. (Everyone at QHPC calls her Kim.) "Think of yourself as a diabetic, of Haldol as insulin. You don't hold a diabetic off insulin, that'd be criminal."

Not only do you get Haldol, you get talk therapy, recreational therapy, family therapy, crafts therapy. Some of the residents of the Wild Child Wing are druggies and sexual-abuse victims as young as twelve. They get these same therapies, along with pet therapy. The pets brought in on Wednesdays often include cats.

At last, Penfield tells an associate that last jolt wasn't a mishit, after all.

The idea is that hostile, fearful, or withdrawn kids who don't interact well with other people will do better with animals. Usually they do. Kittens under a year, tumbling with one another, batting at yarn balls, exploring the pet room with their tails up like the radio antennas on cars, seem to be effective four-legged therapists.

One teenage girl, a manic-depressive who calls herself Eagle Rose,

goes gaga over them. "Oh," she says, holding up a squirming, smoke-colored male and nodding at two kittens wrestling in an empty carton of Extra Large Tide, "they're so soft, so neat, so . . . so highly lustrous."

Despite Kim Vaughan's many attempts to involve you, you stand aloof from everyone. It's Eagle Rose who focuses your attention, not the kittens, and E. R. is an untouchable. Every patient here is an untouchable, that way. It would be a terrible betrayal to think anything else. So, mostly, you don't.

The year before you marry, Marti is renting a house on North Highland Avenue. A whole house. It's not a big house, but she has plenty of room. She uses one bedroom as a studio. In this room, on the floor, lies a large canvas on which she has been painting, exclusively in shades of blue, the magnified heart of a magnolia. She calls the painting—too explicitly, you think—*Magnolia Heart in Blue*. She's worked on it all quarter, often appraising it from a stepladder to determine how best to continue. Every weekend you sleep with Marti in the bedroom next to the studio. Her mattress rests on the floor, without box springs or bedstead. You sometimes feel that you're lying in the middle of a painting in progress, a strange but gratifying sensation that you may or may not carry into your next week of classes at GSU.

One balmy Sunday you awake to find Marti's body stenciled with primitive blue flowers, a blossom on her neck, more on her breasts, an indigo bouquet on the milky plane of her abdomen. You gaze at her in groggy wonderment. The woman you plan to marry has become, overnight, an arabesque of disturbing floral bruises.

Then you see the cat, Romeo, a neighbor's gray Persian, propped in the corner, belly exposed, so much like a hairy little man in a recliner that you laugh. Marti sits. Romeo preens. Clearly, he entered through a studio window, walked all over *Magnolia Heart in Blue*, then came in here and violated Marti.

My wife-to-be as a strip of *fin de siècle* wallpaper, you muse, kissing her chastely on one of the paw-print flowers.

You sleep on the streets. You wear the same stinking clothes for days on end. You haven't been on haloperidol for months. The city could be Lima, or Istanbul, or Bombay, as easily as Atlanta. Hell, it could be a boulder-littered crater on the moon. You drag from one place to another like a zombie, and the people you hit up for hamburgers,

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change, MARTA tokens, old newspapers, have no more substance to you than you do to them, they could all be holograms or ghosts. They could be androids programmed to keep you dirty and hungry by dictating your behavior with remote-control devices that look like wristwatches and key rings.

Cats mean more to you than people do. (The people may not be people.) Cats are fellow survivors, able to sniff out nitrogenous substances from blocks away Food.

You follow a trio of scrawny felines down Ponce de Leon to the rear door of a catfish restaurant where the dumpster overflows with greasy paper and other high refuse. The cats strut around on the mounded topography of this debris while you balance on an upturned trash barrel, mindlessly picking and choosing.

Seven rooms away from Coach Osteen's lab, Mr. Petty is teaching advanced junior English Poetry. He stalks around the room like an actor doing Hamlet, even when the poem's something dumb by Ogden Nash, or something Beat and surface sacrilegious by Relfingheth, or something short and puzzling by Carlos Williams.

The Williams piece is about a cat that climbs over a cabinet—a "jamcloset"—and steps into a flowerpot. Actually, Mr. Petty says, it's about the image created by Williams's purposely simple diction. Everyone argues that it isn't a poem at all. It's even less a poem, lacking metaphors, than that Carl Sandburg thing about the fog coming on little, for Christ's sake, cat's feet.

You like it, though. You can see the cat stepping cautiously into the flowerpot. The next time you're in Coach Osteen's class, trying to redeem yourself at the dissection table, you recite the poem for Pamela van Rhyn, Jessie Faye Culver, Kathy Margenau, and Cynthia Spivy. Coach Osteen, shaking his head, makes you repeat the lines so that he can say them, too. Amazing.

"Cats are digitigrade critters," he tells the lab. "That means they walk on their toes. Digitigrade."

Cynthia Spivy catches your eye. Well, I'll be a pussy willow, she silently mouths. Who'd've thunk it?

"Unlike the dog or the horse," Coach Osteen goes on, "the cat walks by moving the front and back legs on one side of its body and then the front and back legs on the other. The only other animals to move that way are the camel and the giraffe."

And naked crazy folks rutting on all fours, you think, studying Cynthia's lips and wondering if there was ever a

feral child raised by snow leopards or jaguars. . . .

Thai Thai develops a urinary tract infection. Whenever he has to pee, he looks for Mama pulling weeds or hanging out clothes in the backyard and squats to show her that he's not getting the job done. It takes Mama two or three days to realize what's going on. Then you and she carry Thai to the vet.

Mama waits tables at a Denny's near the expressway. She hasn't really got the money for the operation that Thai needs to clear up the blockage, a common problem in male Samese. She tells you that you can either forfeit movie money for the next few months or help her pay to make Thai well. You hug Mama, wordlessly agreeing that the only thing to do is to help your cat. The operation goes okay, but the vet telephones a day later to report that Thai

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“Cats  
mean more to you  
than  
people do. (The  
people  
may not be people.)  
Cats  
are fellow survivors.”

---

took a bad turn overnight and died near morning.

Thai's chocolate and silver body has a bandage cinched around his middle, like a wraparound saddle.

You're the one who buries Thai because Mama can't bring herself to. You put him in a Samese-sized cardboard box, dig a hole under the holly in the backyard, and lay him to rest with a spank of the shovel blade and a prayer consisting of grief-stricken repetitions of the word please.

Two or three months later, you come home from school to find a pack of dogs in the backyard. They've dug Thai Thai up. You chase the dogs away, screaming from an irate crouch. Thai's corpse is nothing but matted fur and protruding bones. Its most conspicuous feature is the bandage holding the maggotty skeleton together at its cinched-in waist.

This isn't Thai, you tell yourself. I buried Thai a long, long time ago, and this isn't him.

You carry the remains, jacketed in

the editorial section of the Atlanta Constitution, to a trash can and dump them with an abrupt, indifferent thunk. Pickup is tomorrow.

One Sunday afternoon in March, you're standing with two hundred other homeless people at the entrance to Trinity United Methodist's soup kitchen, near the state capitol. It's drizzling. A thin but gritty-looking young woman in jeans and sweatshirt, her hair lying in dark strands against her forehead, is passing out hand-numbered tickets to every person who wants to get into the basement. At the head of the outside basement steps is a man in pleated slacks and a plaid shirt. He won't let anyone down the steps until they have a number in the group of ten currently being admitted. He has to get an okay from the soup-kitchen staff downstairs before he'll allow a new group of ten to pass. Your number, on a green slip of paper already crumpled-dampened, is 126. The last group down held numbers 96 to 105. You think: Hard to tell with all the shoving, cursing, and bantering on the line. One angry black man up front doesn't belong there. He waves his ticket every time a new group of ten is called, hoping, even though his number is 182, to squeeze past the man set there to keep order.

"How many carehs yo ring?" he asks. "I sick. Mon n iamm sah lo I fall out. Damn disere rain."

When the dude holding number 109 doesn't show, the stair guard lets number 182 pass, a good-natured sort of charity. You shuffle up with the next two groups. How many of these people are robots, human machines drawn to the soup kitchen, as you may have been, on invisible tractor beams? The stair guard isn't wearing a watch or shaking a key ring. It's probably his wedding band that's the remote-control device.

"My God," he cries when he sees you. "Is that really you? It is, isn't it?"

The stair guy's name is Dirk Healy. He says he went to school with you in Hapeville. Remember Pamela van Rhyn? Remember Cynthia What's-her-name? When you go down into the basement and get your two white-bread sandwiches and a Styrofoam cup of vegetable soup, Dirk convinces another volunteer to take over his job and sits down next to you at one of the nickety folding tables where your fellow street folk are single-mindedly eating. Dirk—who, as far as you're concerned, could be the man on the moon—doesn't ask you how you got in this fix, doesn't accuse, doesn't exhort.

"You're off your medication, aren't

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you?" Your hackles lift. "Hey," he soothes, "I visited you at Quiet Harbor. The thing to do is get you back on it."

You eat, taking violent snatches of the sandwiches, quick sips of the soup. You one-eye Dirk over the steam the way that, years ago, Sky one-eyed you from her grain-crib nest.

"I may have a job for you," Dirk says confidentially. "Ever hear of Rockdale Biological?"

One summer, for reasons you don't understand, Mama sends you to visit your father and his ex-hairdresser floozy—whose name is Carol Grace—in the Florida town where they live off the proceeds of her mail-order business and sometimes bet the dogs at the local greyhound track.

Carol Grace may bet the greyhounds at the track, but, at home, she's a cat person. She owns seven: a marmalade-colored tom, a piebald tom, three Incoo or females, an orange Angora of ambiguous gender, and a Manx mix with a tail four or five inches long, as if someone shortened it with a cleaver.

"If Stub was pure Manx," Carol Grace says, "he wouldn't have no tail. Musta been an alley tom in his mama's Kitty Litter."

Stroking Stub, she chortles happily. She and your mother look a little alike. They have a similar feistiness, too, although it seems coarser in Carol Grace, whom your balking father—she calls him Webby, for Pete's sake—unabashedly dates on.

A few days into your visit, Carol Grace and you find one of her females, Hedy Lannar, lying crumpled under a pecan tree shading the two-story house's south side. The cat is dead. You kneel to touch her. Carol Grace kneels beside you.

"Musta fell," she says. "Lotsa people think cats are too jack-be-nimble to fall, but they can slip up, too. Guess my Hedy didn't remember that, pretty thing. Now look."

You are grateful that, today, Carol Grace does the burying and the prayer saying. Her prayer includes the melancholy observation that anyone can fall. Anyone.

Enough of this crap, Penfield says. Tell me what you did, and for whom, and why, at Rockdale Biological.

Givin' what I can, you mumble, working to turn your head into the uncompromising rigidity of the clamps.

Adolf, Penfield says, what you're giving me is cat juggling.

Alone in the crafts room with Kim Yaughan while the other kids in Blue

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Group (QHPC's Wild Child Wing has two sections, Blue and Gold) go on a field trip, you daub acrylics at a crude portrayal of a cat walking upside down on a ceiling. Under the cat, a woman and a teenage boy point and make hateful faces.

"Are they angry at the cat or at each other?" Kim asks.

"You give her a look. What a stupid question."

Kim comes over, stands at your shoulder. If she were honest, she'd tell you that you're no artist at all. The painting may be psychologically revealing, but it refutes the notion that you have any talent as a draftsman or a colorist.

"Ever hear of British artist Louis Wain?" Kim says. "He lived with three unmarried sisters and a pack of cats. His schizophrenia didn't show up until he was almost sixty. That's late."

"Lucky," you say. "He didn't have so long to be crazy."

"Listen, now Wain painted only cats. He must've really liked them. At first, he did smarmy, realistic kitties for calendars and postcards. Popular crap. Later, thinking jealous competitors were zapping him with X rays or something, the cats in his paintings got weird, really hostile and menacing."

"Weirder than mine?" You jab your brush at it.

"Ah, that's a mere puddy-tat." Then, "In the fifteen years he was institutionalized, Wain painted scads of big-eyed, spiky-haired cats. He put bright neon auras and electrical fields around them. His backgrounds got geometrically rad. Today, you might think they were computer generated. Anyhow, Wain's crazy stuff was better—fancier, stronger—than the crap he'd done sane."

"Meaning I'm a total loss unless I get crazier?" you say.

"No. What I'm trying to tell you is that the triangles, stars, rainbows, and repeating arabesques that Wain put into his paintings grew from a desperate effort to . . . well, to impose order on the chaos inside him. It's touching, really touching. Wain was trying to confront and reverse, the only way he could, the disintegration of his adult personality. See?"

But you don't. Not exactly.

Kim taps your acrylic cat with a burgundy fingernail. "You're not going to be the new Picasso, but you aren't doomed to suffer as terrifying a schizophrenia as Wain suffered, either. The bizarre thing in your painting is the cat on the ceiling. The colors, and the composition itself, are reassuringly conventional. A good sign for your mental health. Another thing is, Wain's doctors

couldn't give him antipsychotic drugs. We can."

"Cheers." You pantomime knocking back a little cup of Haldol.

Kim smiles. "So why'd you paint the cat upside down?"

"Because I'm upside down," you say. Kim gives you a peck on the cheek.

"You're not responsible for a gone-awry brain chemistry or an unbalanced metabolism, hon. Go easy on yourself, okay?" Dropping your brush, you pull Kim to you and try to nuzzle her under the jaw. Effortlessly, she bends back your hand and pushes you away. "But that," she says, "you're going to have to control. Friends, not lovers. Sorry if I gave you the wrong idea. Really."

"If the pieces toward the end don't fit," Howie tells you, "you can always use a razor blade." He holds one up.

You try to take it. Double-edged, it slic-

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◀The cats are no longer moving. They're no longer highly lustrous. They're floppy, anonymous, and dead.▶

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es your thumb. Some of your blood splatters on the cat puzzle.

A guy in a truck drives up to the specimen-prep platform and loading dock behind Rockdale Biological Medical Supply. It's an unmarked panel truck with no windows behind the cab. The guys who drive the truck change, it seems, almost every week, but you're a two-month fixture on the concrete platform with the slide cages and the euthanasia cabinet. Back here you're Dirk Healy's main man, especially now that he's off on a business trip somewhere.

Your job is both mindless and strength sapping. The brick wall around the rear of the RBMS complex, and the maple trees shielding the loading dock, help you keep your head together. Healy has you on a lower dosage of haloperidol than you took while you and Marb were still married. Says you were, ha-ha, "an apathetic drug slave."

He should know. He's been a hotshot

in national medical supply for years. "We'll have you up in the front office in no time," he assured you. "The platform job's a kind of trial."

The guy in the truck backs up and starts unloading. Dozens of cats in slide cages. You wear elbow-length leather gloves, and a heavy apron, and feel a bit like an old-timey Western blacksmith. The cats are pieces of scrap iron to be worked in the forge. You slide the door end of each cage into the connector between the open platform and the euthanasia cabinet, then poke the cats in the butt or the flank with a long metal rod until they duck into the cabinet to escape your prodding. When the cabinet's full, you drop the safety door, check the gauges, turn on the gas. It hisses louder than the cats climbing over one another, louder than their yowling and tumbling, which noises gradually subside and finally stop.

By hand, you unload the dead cats from the chamber, slinging them out by their tails or their legs. You cease feeling like a blacksmith. You imagine yourself as a nineteenth-century trapper, stacking fox, beaver, rabbit, wolf, and muskrat pelts on a travois for a trip to the trading post. The pelts are pretty, though many are blemished by wild skin diseases and a thick black dandruff of gassed fleas. How much could they be worth?

"Nine fifty a cat," Dirk Healy has said. That seems unlikely. They're no longer moving. They're no longer—if they ever were—highly lustrous. They're floppy, anonymous, and dead, their fur contaminated by a lethal gas.

A heavy-duty wheelbarrow rests beside the pile of cats on the platform. You unwind a hose and fill the barrow with water. Dirk has ordered you to submerge the gassed cats to make certain they're dead. Smart. Some of the cats are plucky boogers. They'll mew at you or swim feebly in the cat pile even before you pick them up and sling them into the wheelbarrow. The water in the wheelbarrow ends it. Indisputably. It also washes away fleas and the worst aspects of feline scabies. You pull a folding chair over and sort through the cats for the ones with flea collars, ID collars, rabies tags. You take these things off. You do it with your gloves on, a sodden cat corpse hammocked in your apron. It's not easy, given your wet glove fingers.

If it's sunny, you take the dead cats to the bright part of the platform and lay them out in neat rows to dry.

Can't you get him to stop mumbling? Penfield asks someone in the room. His testimony's almost unintelligible.



He's replaying the experience inwardly, an indistinct figure says. But he's starting to go autistic on us.

Look, Penfield says. We've got to get him to verbalize clearly—or we've wasted our time.

Two months after the divorce, you drive to Spartanburg, to the Braggs' house, to see Jacob. Mr. Bragg—Howie—intercepts you at the front gate, as if apprised of your arrival by surveillance equipment.

"I'm sorry," he says, "but Marti doesn't want to see you, and she doesn't want you to see Jake. If you don't leave, I'll have to call the police to, uh, you know, remove you."

You don't contest this. You walk across the road to your car. From there, you can see that atop the brick post on either side of Mr. Bragg's ornate gate reposes a roaring granite lion. You can't remember seeing these lions before, but the crazed and reticulated state of the granite suggests they've been there awhile. It's a puzzle.

As you lay out the dead cats, you assign them names. The names you assign are always Mehitabel, Felix, Sylvester, Tom, Heathcliff, Garfield, and Bill. These seven names must serve for all the cats on the platform. Consequently, you add Roman numerals to the names when you run out of names before you do cats: Mehitabel II, Felix II, Sylvester II, Tom II, and so on. It's a neat, workable system. Once, you cycled all the way to Sylvester VII before running out of specimens.

As a fifth grader in Notasuga, you sit and watch a film about the American space program.

An old film clip shows a cat—really more a kitten than a cat—suspended from a low ceiling by its feet. It's a metal ceiling, and the scientist who devised the experiment (which has something to do with studying the kitten's reactions to upside-downness, then applying these findings to astronauts aboard a space station) has fastened magnets to the cat's feet so that they will adhere to the metal surface.

The scientist has also rigged up a pair of mice in the same odd way, to see if they will distract, entice, or frighten the hanging kitten. They don't. The kitten is terrified not of the mice (who seem to be torpid and unimaginative representatives of their kind), but of the alien condition in which it finds itself. Insofar as it is able, the kitten lurches against the magnets, its ears back, its mouth wide open in a silent cry. On the

soundtrack, a male voice explains the import and usefulness of this experiment. No one can hear him, though, because most of the other kids in Miss Beischer's class are laughing uproariously at the kitten. You look around in a kind of sick stupefaction.

Milly Heckler, Agnes Lee Terrance, and a few other girls appear to be as appalled as you, but the scene doesn't last long—it's probably shorter than your slow-motion memory of it—and it seems for a moment that you are that kitten, that everything in the world has been wrenchingly upended.

"I know it seemed to you that evil people were trying to invade and control your thoughts," Dr. Hall, the director of Quiet Harbor, tells you. He pets a neutered male just back from a visit to the Gerontological Wing. "But that was just a symptom of the scrambled con-

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●The  
Zoo Cop isn't a  
real  
cop. He hates you  
because  
what you've been  
doing  
for Healy is evil. ●

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dition of your brain chemistry. The truth is . . .

Fatigued, you slouch out the rear gate of Rockdale Biological. Your apartment—the three-roomer that Healy provided—is only a short distance away. A late-model luxury town car pulls alongside you as you walk the weed-grown sidewalk. The tinted window on the front-seat passenger's side powers down, and you catch your first glimpse of the raw-complexioned man who introduces himself as David Penfield. An alias? Why do you think so?

"If you like," he says, "think of me as the Zoo Cop."

It's a permission you don't really want. Why would you choose to think of a well-dressed, ordinary-featured man with visible acne scarring as something as déclassé as, Jesus, the Zoo Cop? Is he a detective of some sort? What does he want?

The next thing you know you're in the car with Penfield and two other tight-lipped men.

The next thing you know you're on the expressway and one of the Zoo Cop's associates—goons?—has locked the suction-cup feet of one of those comfy Garfield toys on his tinted window as a kind of—what?—mockery? rebuke? warning?

The next thing you know, you're in a basement that clearly isn't the soup kitchen of Trinity United Methodist. The next thing you know, you're flat on your back on a table. The next thing you know, you don't know anything.

Marti's body is stenciled with primitive blue flowers, a blossom on her neck, more on her breasts, an indigo bouquet on the milky plane of her abdomen. You gaze at her in groggy wonderment. The woman you one day marry has become, overnight, an arabesque of disturbing floral bruises.

"Marti," you whisper. "Marti, don't leave me. Marti, don't take my son away."

Penfield, a.k.a. the Zoo Cop (you realize during your descent into the puzzle box), isn't a real cop. He hates you because what you've been doing for Healy is vile, contemptible, evil. So it is, so it is. He wants to get Healy, who hasn't been around this last week at all, who's maybe skipped off to Barbados or the Yucatan or Saint-Tropez.

Penfield is an animal-rights eco-terrorist, well financed and determined, and the ESB zappings to which he and his associates are subjecting you are designed to incriminate, pinpoint, and doom old Dirk and his associates, who obviously deserve it. You, too. You deserve it, too. No argument there. None.

Christ, Penfield says, unhook the son of a bitch and carry him upstairs. Dump him somewhere remote.

You visit the pound for a replacement for Springer and Ossie, gassed three or four years ago. The attendant tells you there are plenty of potential adoptees at the shelter. You go down the rows of cages to select one. The kittens in the fouled sawdust tumble, paw, and mew, putting on a disgruntled show.

"This one," you finally say.  
"Cute." The attendant approves. Well, they'd fire her if she didn't. The idea is to adopt these creatures out, not to let them lapse into expendability.

"It's for Jake, my son," you tell her. "His asthma isn't that bad. I think he may be growing out of it."

"Look at my puzzle," Howie says, yanking the razor blade away from you. "You've bled all over it." ●●

# INTERVIEW

CONTINUED FROM PAGE 61

fast together yesterday in the Roussel dining room. I'm still consulting for the company. RU 486 is ultimately going to be released around the world, but yesterday morning we discussed the U.S. strategy, which we agree on. First, we're going to make a study—political, social, economic—which will probably conclude the wind is blowing in our favor. Scientists are clearly for RU 486, and even the Republican Party is going to change its mind. The women's movement is even stronger since the Webster decision from the Supreme Court. Secondly, Sekiz has decided that Roussel will not hide behind its finger, as we say in French. Roussel will go ahead in America by itself. This will be difficult, since Hoechst, the parent company, is not ready to do it, nor does Hoechst have expertise in the field of obstetrics. So Roussel has to find partners. These can be other companies, but I predict big companies won't touch it. So that leaves smaller ones. Another possibility is venture capital. We've had at least ten serious offers to create new companies, and a couple are extremely interesting. The third possibility is to

ally ourselves with nonprofit groups who already have a network of centers that could deliver the pill. I am suggesting that Roussel, venture capitalists, and Planned Parenthood form a coalition to create a single-product company.

**Omn:** What other hormones are you currently investigating?

**Baulieu:** One discovery concerns the interaction of steroid receptors with something called heat shock protein. If you heat up cells, they shut down most functions but synthesize specific heat-resistant proteins. These molecules are conserved over evolutionary history. You find them in every organism from bacteria to humans. We've cloned such a protein and are studying its involvement in steroid receptors.

We're working on other steroid interactions at the gene level. These hormones stop or start the synthesis of many proteins, so there are many systems to study. We've also discovered that the brain makes neurosteroids that affect some neurotransmitter function. We're studying the effects of hormones on aggressive behavior. We're also looking at aging of the brain, multiple sclerosis, and other degenerative diseases.

This research is at a very primitive stage, but I hope to develop general

systems that apply across species.

**Omn:** You once said your character was predestined by your genes. Why?

**Baulieu:** My father, who died when I was three, was a scientist and doctor in Strasbourg who specialized in diabetes. He was the first in Europe to treat patients with insulin. This cross between science and medicine is a hybrid: One is neither a pure researcher nor a typical physician. I put them together naturally, like my father, which is why I say in jest that my choice of careers was genetically determined. My mother wanted me to become a Polytechnician, with a beautiful uniform [the Ecole Polytechnique is France's military engineering school]. There was nothing pushing me in that direction. My mother was an exceptional woman, strong willed, beautiful. She was an international lawyer before giving up her career to marry my father at age thirty-two. She was a very good pianist and had a degree in English from the Sorbonne. She adored England and admired the early British feminists.

**Omn:** Are you a feminist?

**Baulieu:** Yes. As the poet Louis Aragon said, "Woman is the future of man." I'm for absolute equality before the law, but I love difference, and the simplest difference we know is between men and women. Women's reproductive capacity gives them a lot of special problems. Their brains are different; everything about them is different. But the rights of men and women should be the same. Women's liberation will go forward, but we have to keep pushing. We're going to see more women doctors, scientists, heads of state. But I don't think women will ever play tennis better than men.

**Omn:** What is the significance of the rise of religious fanaticism and right-wing pressure groups?

**Baulieu:** Obviously these endanger the movement. But I have tremendous confidence in the power of women. Women will always win in the end because they make the children. The careers at the beginning of life is a determinant factor. Men will never overcome the bond between mother and child.

**Omn:** Are you ambitious?

**Baulieu:** To be a scientist is to be ambitious, otherwise one doesn't do it. But I'm talking about ambition in the American sense. I want to make discoveries, advance the field. In France, to be ambitious is to yearn for power and money. You have to be an idiot if you think science will reward this kind of ambition. It may be contradictory to the practice of science, but nonetheless, scientists, like painters, writers, and politicians, succumb to the desire for fame



We still want to be known for what we have done.

A serious problem of modern civilization is people's ignorance of science. They don't understand it and are afraid of it. Nobody cares about the lives of scientists. The scientific enterprise is depersonalized. Science is the science of nobody. It's the science of robots, computers, and men in white coats. It produces miracles, but no one understands how. You can read a newspaper and read about Dr. Smith's discovery of a new drug for treating AIDS. And what will you remember? Not the name of Dr. Smith. It's exactly the opposite for an artist like Andy Warhol. You can easily forget the subject of his paintings, but you won't forget his name.

**Omni:** Aren't you more famous than most scientists?

**Baulieu:** I was a scientist like all the others, known among my peers for a few small discoveries, until some accidental circumstances led me into an area where science and society encounter each other. The same thing happened to my colleague, Luc Montagnier, the discoverer of the AIDS virus. All of a sudden, a man in a white coat was mixed up with sex and drugs and homosexuals. But this rarely happens, and even without the direct bearing on social problems, I would still like scientists to be better known—even if I can't personally complain.

I'm not a nineteenth century moralist, saying that science works only for the good of humankind. But I do believe science is the most important element in the evolution of modern life. When I descended into the grottoes at Lascaux to see the prehistoric cave paintings, I had a revelation. These superb images felt entirely modern, and to my amazement I realized that over the centuries man hasn't changed at all artistically. But scientifically, thanks to the interaction of our brains with nature, we've changed a great deal.

**Omni:** We hear you've finished a book. Is it going to be like James Watson's *Double Helix*?

**Baulieu:** I'm not as talented as Watson. My book includes a pedestrian explanation of how RU 486 works, the nature of its discovery, and a little bit about my life. I want it to be sold in supermarkets and bought by women out doing their shopping. One chapter will be a kind of user's manual.

**Omni:** Have you ever thought about writing a novel?

**Baulieu:** It's an idiotic dream. In that domain I'd be too ambitious. It's Fleubert or nothing. It'd be better for me to try to make one or two small discoveries in biology. **DO**

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# COMPUTER GAMES

## NEEDED:

A diplomatic, synergistic wizard of the id who can fit a square peg in a round hole

While most software companies tend to jump on the bandwagons of traditionally popular games, a few more adventurous companies take chances on unconventional, sometimes off-the-wall ideas. Three titles in particular stand out as perfect examples of computer games that don't always get the attention or the success they deserve, yet often set trends that everyone else follows.

Originally packaged by Mindscape, *Captain Blood* may be one of the most original and misunderstood science-fiction games ever produced for the personal computer. With alien landscapes and creatures that really are alien, the design scheme recalls the art of H. R. Giger, whose work filled the screen in the film *Alien* and its sequel *Aliens*. The unusual graphics and surprisingly effective wireframe animation sequences are impressive—in spite of the purple/blue CGA coloring.

*Captain Blood's* lund name and the unorthodox game play tend to confuse as many people as the game attracts. But perhaps most confusing is the fact that violence is not a requisite player option. The means and the methods are available, of course, but the keys to success—and survival—are communication and diplomacy, not conquest and destruction. In fact, if you give in to aggressive impulses, you will almost certainly fail. The object of the game is to assimilate five nasty clones that are draining your life-force. To accomplish this, you must locate and establish contact with 14 alien life forms scattered throughout a galaxy of more than 32,000 planets.

In a universe inhabited by creatures like Croolis-Ulv and the Tubular Brain, no one speaks your language or even possesses a common frame of reference. Communication is possible only through a unique icon-based language that uses symbols instead of words. It's sometimes frus-



trating but always fascinating. Try, for example, to explain the term clone to a three-headed plant creature who thinks the symbol for duplicate stands for reproduction. This can lend new meaning to the word challenge.

Freud would have loved Microplay's *Weird Dreams*, but like the rest of us, he would probably have gone crazy trying to figure it out. *Weird Dreams* hits you with graphics and settings that resemble a cross between Salvador Dalí and René Magritte. In this celebration of the subconscious mind, bizarre dreamscapes guarantee that your worst nightmares have nightmares. There are no roles to play, no worlds to conquer, no guns, spaceships, or popular cartoon characters. Instead, you encounter giant wasps, carnivorous rosebushes, a psychotic lawn mower, and other artifacts of a very sick mind. The objective: Interpret 17 wildly different dream sequences, solving the weird puzzles and visual riddles that each one presents. How, for example, can a sky full of flying fish help you get past hopping totem poles? What's the secret of the cute little girl with a huge soccer ball?

Easy to play, but difficult to master, *Accolade's Harmony* is the ultimate nongame. Instead of blowing things up, you must restore balance and create synergy. Playing alone or with a partner, you bump, pull, or coax like-colored spheres in and around various geometric obstacles until they make contact and vanish. Once all the spheres are united, the configuration is "harmonized" and you move on to the next screen. You can play against time or opt for Mantra Mode, in which a calm, unharmed effort is its own reward. Either way, game play is underscored by melodious music and gentle sound effects. And the threat of synaptic nerve damage is nonexistent.

This could take some adjustment.—JAY KEE **CG**

# GAMES

## HOLEY CHIP:

This three-dimensional maze will boggle your mind

By Scot Morris

Paul Heusinkveld was always good at solving mazes. As a child, penciling a path to take Farmer Brown from the barn to the chicken coop, he developed a keen sense of spatial awareness. He mastered newspaper mazes, quickly completing them in ink, and then dreamed of greater challenges—labyrinths in which paths went over and under each other and disappeared from view as they coiled around each other and behind a solid surface.

sometimes lie hidden behind the structure.

Now a Navy commander stationed in Arlington, Virginia, Heusinkveld designs intricate computer interface systems that have, in turn, inspired yet another type of maze. In these three-dimensional mazes the paths run like ribbons around solid objects.

On his three-dimensional cube you must find your way from start to finish,

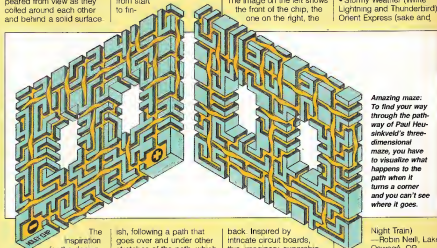
Together, the two images provide a view of all six sides. To solve Heusinkveld's maze quickly, you must visualize the entire cube and determine where the path goes when it turns a corner and disappears before reappearing on the other side.

Asked to create an even more challenging maze, Heusinkveld came up with his Holey Chip, shown here. The image on the left shows the front of the chip, the one on the right, the

## ANOTHER ROUND

Last month we announced the grand prize-winner and runners-up in Competition #52: Mixed-up Drinks. We didn't have room for all the entries that deserved honorable mention. But they were too good not to offer the following second round.

- Holy Cow (root beer, ice cream, and holy water)
- Joe Vecchio, San Diego
- Stormy Weather (White Lightning and Thunderbird), Orient Express (sake and



**Amazing maze:** To find your way through the pathway of Paul Heusinkveld's three-dimensional maze, you have to visualize what happens to the path when it turns a corner and you can't see where it goes.

The inspiration for the design of such mazes came after Heusinkveld joined the U.S. Navy as a mechanical engineer. He began creating tubular mazes that resemble a ship's web of pipes and ducts. In the surrealistic results, which we featured in May 1969, you must follow pathways that

ish, following a path that goes over and under other stretches of the path, which covers all six sides of the cube. Heusinkveld offers two views of the maze: One image shows a perspective of the top as viewed from one corner, the second image provides a perspective from the opposite corner, from the back and the bottom of the cube

back. Inspired by intricate circuit boards, this imaginary superchip has two holes in it. The path travels around each side of the chip, as well as through the holes. The challenge is to get from + to — and complete the circuit. If you can do it in less than ten minutes, you've got a great 3-D sense. The answer will appear next month.

**Night Train**  
—Robin Neill, Lake Oswego, OR

- Chuck Yeager (ground beef and Jagermeister)—Nick Liberski, West Allis, WI
- Bloody Sundae (vodka, tomato juice, and ice cream)—Joseph L. Siewski, Cleveland
- Eli Whitney (gin and cottonseed oil)—G. A. Mueller, Seattle **CC**

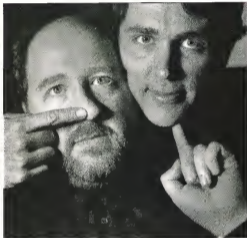
# LAST WORD

## DOS HOSPITAL;

When the chips are down, the physician is in

By Mitch Coleman and Dave Jaffe

Mitch Coleman and Dave Jaffe are Chicago freelancers whose word processor has been placed in quarantine.



"What do you think, Doc?" the man cried. "Can you save her?" The doctor pried the man's fingers from their death grip on his lapels and looked into his eyes with practiced compassion.

"I'm sorry," he said. "I'm afraid your terminal is terminal."

Meet Dr. Victor Thrake, computer virologist, one of the world's most sought-after authorities on computer viruses. Along with his staff of experts, he has identified and treated more than 200 common computer viruses in the last five years.

"Sometimes treatment is as simple as a hot oil bath and a 'Call me in the morning,'" Thrake told us as we accompanied him on afternoon rounds. "But occasionally we run across a really nasty bug. You wouldn't believe what some of those laptops pick up."

As he spoke, Thrake moved down a row of "beds," each con-

taining an ailing PC. Apples, Compaqs, Tandys, IBMs—no computer is turned away. He stopped briefly at each bedside, dispensing a kind word here, a few twists of a screwdriver there.

"Here's a real hard luck story," he said, patting an ailing IBM. "It worked twenty years at the same job. Then, just two days after retirement, it got an infection in its system file that brought on a massive keystroke. Now it's paralyzed from L through Z."

Thrake's compassion for his unfortunate charges is apparent in every word and gesture. "Many years ago, I took a vow," Thrake explained. "A vow to end suffering and injustice, to bring hope where there was none, to seek out evildoers wherever they may dwell and drag them out—no, wait a second. That wasn't me. That was *The Green Hornet*."

"Well, anyway, I took a vow

And I can't rest until these viruses are whipped once and for all." Facilities around the country are duplicating Thrake's work in virus detection and treatment. But the psychological counseling he offers to computers who've come down with a bug makes his clinic unique.

"It's a real trauma for some of these machines. They feel... dirty. We try to tell them that they're not alone. We aim to rebuild their self-esteem."

Thrake led us into a darkened room from which we could look through a one-way glass at a counseling session in progress. Several PCs sat in a circle as one of them printed out the words, "HI, MY BOB AND I HAD A VIRUS."

The other PCs responded.

"HEY, BOB!"

"LOOKIN' GOOD!"

"BOB, HOW YA DOIN'?"

"At times like these, they really need to be among their own," Thrake said.

Before we could ask him some questions, a sharp, insistent beeping came over the office intercom. Throughout the facility, iron doors slammed down, trapping everyone and everything inside.

"Contamination," Thrake said calmly. "Our sensors have picked up a stray virus. Nothing goes in or out until we nail down the source."

He adjusted a knob on his desktop control panel.

"It seems to be very close by, in fact..." His eyes came to rest on our laptop.

"I think I've found it," he said, grabbing the word processor.

"I hope this won't keep you from finishing your article," he said as he pried the back off the infected machine.

"Don't worry," we assured him. "We'll finish it somehow." **OO**