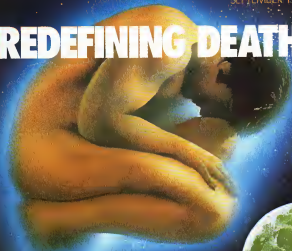


ONNI

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# REDEFINING DEATH



## SUPERSCIENTISTS

### SIX MINDS THAT COULD SAVE THE WORLD



# OMNI®

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Imagine an existence without consciousness, lacking all sensory awareness. Conjure up a sense of the twilight area between life and death, totally dependent on medical technology: it's a world artist Tim White has contemplated for our cover.

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## FIRST WORD

By Alan M. Dershowitz

● *It will take a broad-based commitment to liberty to weather the approaching constitutional storm. We will survive these challenges only if we stick together as a nation proud of our legacy.* ●

We the people are now celebrating the two hundredth anniversary of our Constitution. At this historic time it is necessary to balance the pros and cons of days gone by and approach the coming years with a clearer understanding of America's role in the world. We must also lay a course for the future that will continue to uphold the basic premises of our Constitution—liberty and justice for all.

Many newspapers throughout history have attempted to sabotage the future of our great nation by warning against the fragility of her basic doctrine. The Constitution, however, has successfully survived these false predictions of doom.

Our Constitution has also met strong opposition from a number of more realistic assaults. These attacks threatened our ability to hold to the fundamental design established by our Founding Fathers. For instance, during the Civil War President Lincoln tried to suspend the writ of *habeas corpus*—the primary legal vehicle for enforcing many of the protections contained in the body of the Constitution. During World War II, 110,000 Japanese-Americans were stripped of their most basic right of freedom when they were rounded up and confined in concentration camps. McCarthyism, which swayed our freedoms of speech and association for nearly a decade, was yet another danger to our constitutional liberties.

But I'm afraid that the Constitution will face some of its most bitter legs in the years to come. Even though the body of our Constitution is celebrating its bicentennial, I'm skeptical it will survive these challenges wholly intact to celebrate the two hundredth anniversary of the Bill of Rights—the first ten amendments to the Constitution, enacted in 1791. Although they are called amendments, the Bill of Rights is an organic part of the original document. Without them the Constitution would not have been called. By itself the Constitution created a structure for centralized power without sufficient assurances of liberty. The Bill of Rights gave us a strong government without the power to censor newspapers or otherwise curtail the rights of its citizens.

This very moment our Constitution and its Bill of Rights may be threatened by the most serious danger they have ever confronted. The menace is not religious zealous or repressive politicians. It is not human beings or a group of human beings. It is the AIDS virus and the fear it has generated. The perils posed against our liberty are much greater than they were during some of our past crises which were perpetrated by fear alone and whipped up by opportunistic politicians. In the case of AIDS, however, both the virus and the fear are real, and fear-based upon legitimate threats are a far greater risk to our survival.

The fear of AIDS contains all the elements necessary for a genuine civil-liberties disaster. At present the perceived

'talents' are gay men and intravenous drug users. And the bridge between the homosexual and heterosexual communities is prostitutes, particularly those from minority backgrounds who are IV drug users. When these elements are combined, we have a prescription for political scapegoating of the worst kind.

I have little confidence in most of our leaders when it comes to deescalating an issue as emotionally laden as AIDS. I have somewhat more confidence in the decency of the American public. But their decency will be sorely tested if AIDS spreads more pervasively through the heterosexual non-drug-using community. AIDS will test the coverage of the insurance policy we call our Constitution.

I also suspect that in the next decade we will encounter other technological, biological, and ecological dilemmas that the framers of our Constitution could never have anticipated. Consider, for instance, governmental intrusion on the privacy of individuals. The framers were deeply concerned about this issue and manifested that concern in the Fourth Amendment, which guarantees that the "right of the people to be secure in their persons, houses, papers, and effects" shall not be unreasonably restricted. They had experienced intrusive governmental searches, eavesdropping, and spying, so they wrote a constitutional amendment capable of dealing not only with these specific evils but also with as-yet-unanticipated violations of the rights to privacy. Although the framers could not imagine the current state-of-the-art intrusions—widespread miniaturized bugs, satellite interceptions, and computerized files—it is clear that they did not intend the Constitution to become obsolete with every change in technology. They endowed us with constitutional policies and language sufficient to adapt to the inevitable changes of the future.

Even today we cannot begin to predict each of the scientific discoveries that await us in the third century of our constitutional history. The ever-changing lines between the human and the nonhuman and even the possibility of alien life will pose inscapable challenges to our Constitution. The world we live in barely resembles the one in which our Founding Fathers resided, and the world (or worlds) our grandchildren will inhabit may bear little resemblance to our own. Yet our Constitution must be capable of adapting to and governing all these worlds.

It will take a broad-based commitment to liberty to weather the approaching constitutional storm. We will survive these challenges only if we stick together as a nation proud of our legacy. If we make it to 1991 with our Constitution intact, we will truly have something to celebrate. □

Alan M. Dershowitz, one of the nation's leading authorities on constitutional law, is a professor at Harvard Law School.

# CONTRIBUTORS

## OMNIBUS



SCIENTISTS MAY SAVE THE WORLD



BRANDON



DECH



SPLOSHMUSH



LAST RIGHTS



TECH

**T**he dogmas of the quiet past are inadequate to the stormy present." Abraham Lincoln said in 1862. Today, as technology reshapes our society, we must wrestle with ethical questions and issues that will affect life in the twenty-first century. The future after all may offer exciting possibilities, but it also entails even greater responsibility.

One such ethical dilemma, reports *Omniv* staff writer Kathleen Sloan in "Last Rights" (page 56), is the matter of death and dying. As bioethicists, philosophers and physicians attempt to redefine death, however, they are confronting the basic question of what it means to be alive. Even doctors find it emotionally difficult coming to terms with the finality of death. "I can say, 'I remember my father coming home after a patient had died on the operating table. For him, as for others, it represented a personal defeat.'"

Most people are confused about the twilight area between life and death—the vegetative state and coma, for example. Many people thought Karen Ann Quinlan—lying in her bed in a fetal position and seemingly asleep—was brain dead. She wasn't. She was in a persistent vegetative state and lacked all sensory awareness. Was she alive? Some argue that such patients should be declared legally dead. Others vehemently oppose that idea. Their debates raises questions that must be considered and resolved: Will there be a proliferation of organ harvesting and the creation of a death industry? Given the

economic incentive, people might sell their organs to be transplanted at the time of their own death. How would that affect their later medical care? And will only the rich benefit?

Scientists are also looking at the challenge technology poses to life on Earth, and they are taking action they consider necessary to protect our planet. In "Six Scientists Who May Save the World" (page 56), contributor Bill Lawren profiles dedicated crusaders who represent the legions of scientists trying to ensure there is, indeed, a future. Plant biologist Virginia Welton, for example, may have paved the way for the creation of a genetic library of custom-designed superplants to feed the world. Biomechanic Rosale Bertoli is campaigning against toxic waste. And botanist Peter Raven concentrates on preserving the great equatorial forests that comprise a third of Earth's plants and animals. "These leaders account responsible progress," Lawren says.

In other areas, scientists are trying to enhance human physical performance. For 30 years Bruce Ogilvie has worked with Olympic competitors, football quarter backs, and other athletes, helping them to achieve their personal bests. In an interview with the founder of sports psychology (page 80), *Omniv* senior editor Pamela Weintraub and Mark Tech, former senior editor at *Health* magazine, explore the mental requirements for success. Ogilvie passionately describes

ancient techniques for concentration, the body-awareness methods developed by sex therapists, and behavioral modification through self-talk and attention focusing. Weintraub and Tech first discovered Ogilvie's work while researching their upcoming book on sports science, *The Hot-Wired Athlete: A Journey to the Frontiers of Human Performance* (Doubleday, 1988).

In this month's fiction, writer Lucius Shepard returns to the setting of a future Central America that has characterized much of his highly praised work. A narrative poem, "Pictures Made of Stones" (page 68) is his first story to appear in *Omniv*. The Science Fiction Writers of America recently awarded Shepard a Nebula for his novella *R & R*, included in *Jaguar Hunter*, a collection of his short stories (Arkham House). And author Thomas M. Disch conjures up a light, metaphysical tale in "Plainsdrome" (page 42). He wrote *The Brave Little Toaster* (Doubleday) which will soon be released as a full-length feature cartoon and *Annexes* (Ballantine Arts), a computer-interactive novel.

Disch also provides the fictional account of off-world convicts ("Brigadoon," page 74) accompanying the fantastical art of Pierre LaCombe. And *Omniv* Games editor Scott Morris bursts some bubble myths in the pictorial "Splash" (page 48). With a little applied physics, he notes, scientists have demystified the fragile, spherical objects, revealing the wonderful economy of nature. **DD**



# BACK TALK

## FORUM

**G**o back in time about six months, to the day in February when you received or purchased our issue on "Science and Censorship." Do you remember? Ray Badbury, Norman Leor, Stephen King, Hilaria Elson—among others—spoke out against scientific illiteracy and censorious books. Kathleen Stein wrote a feature ("Censoring Science"), describing the court battles in the South between creationists and evolutionists. Do you recall the postcard we asked you to sign objecting to censorship in any form? Odds are, if you're recalling the issue, your blood pressure's on the rise, and you've wondered why we've been so silent in the ensuing months.

September 1987 marks the two hundredth anniversary of the signing of the Constitution, the great document that protects our civil liberties. The recent battles between creationists and evolutionists have landed in the courts, to be adjudicated by the standards that guide our democracy. September's Forum reminds us that we are free to believe and worship as we choose and free to speak our minds without reprisal.

But not everyone is convinced. Possibly the worst thing you can do is send the President a ready-made list of names and addresses with which to assemble a McCarthy-esque file for some future use, one reader noted. He was not the only skeptic. "How naive are you?" asked one reader. "Do you really believe sending postcards to the White House protesting censorship will make any difference?"

Apparently he was a lone voice in the wilderness—37,000 people signed and sent back their cards. A fraction of respondents—100—were so pleased and returned cards shredded, burned around the edges, or heavily edited with notes in the margins: *NO WAY! EVIDENCE DOES NOT PREVAIL. GOD MADE US. WE ARE NOT APES. STICK TO SCIENCE. POLITICS DOES NOT BELONG TO YOU!* "Although I have nothing to do with the creationists, I think your card is ridiculous, elitist, biased, and extremist!" said one reader.

Many people sent their cards in sealed envelopes. As you can see, the postage

stamp was torn off my postcard and then returned to me," said one reader. "I can't believe people in my local area feel so strongly about this issue." Another wrote "I may be experiencing a case of temporary paranoia—in a free country—but I feel safer sending you a signed card inside an envelope."

Some readers didn't receive cards in their magazines. "Why didn't I get a card to sign? Someone removed mine. The stub from the card was still between pages 46 and 49." A Canadian reader wrote, "My card was obviously taken and not just left out, as the staples in the magazine were bent out and torn back."

Cards arrived signed by two, three, or five people and from families and small groups, including a club at one college. Readers called or wrote requesting more cards to pass along to their friends. "I felt so moved that I actually went to the printer and had ten more cards printed up to pass along to friends," wrote one woman. Another man asked for 40 cards to pass out.

But people didn't send just cards. More

than 450 readers wrote us: notes, letters, op-eds, and long dissertations, including a 14-page paper complete with footnotes and bibliography. Pamphlets and Christian comic strips arrived with titles such as: "What to Do in Case You Miss the Rapture!" The "Bible Thumper" sent a triad—entitled "Big Daddy?"—with a picture of an ape eating a banana. Theories on how to reconcile science and religion were propounded with extensive portions of the Bible photocopied or carefully written out by hand.

For weeks the bulging mailbags kept coming in, with letters from England, Scotland, Norway, Italy, New Zealand, Holland, Australia, Canada, and all over the United States. All ages and all professions were represented: grammar school children, high-school kids, college students, lawyers, housewives, librarians, teachers, engineers, doctors, scientists, and ministers from mainline denominations and independent churches: Jew, Catholic, Protestant—all had something to say.

And the "sayin'" was "hot"—right out of Archie Bunker's mouth, vehemently opposing or endorsing creation science. Both sides suggested sending proponents of the other side on a free trip to the USSR. Contributors were highly praised or severely condemned. Subscribers canceled with *André* please. Some requests were made not so kindly. One man wrote, "God created science when He created the universe. Cancel my subscription." Another, "Cancel my subscription. The magazine is disgusting." Try Romans 10:9-10. "Accusations abound! 'Communists,' 'Satanists,' 'Leftists.' Please was plentiful. Bravo! Hallelujah!"

The following letters represent some of your responses.



Censorship: Our readers couldn't be silenced.

The "Science and Censorship" issue is considerably controversial. Let me get the ball rolling. Until I see religion given equal time in your magazine, I shall never open another page of your mag. You're about as credible as MAD magazine. I am both a scientist and a Christian, coexisting in both worlds without any problems.

—Gary Zimmerman, Oklahoma City

COVER: DAVID COLEMAN '76

# THE BIG LINK

## ARTIFICIAL INTELLIGENCE

By Steve Diffee

**L**ike the English poet Samuel Taylor Coleridge, who couldn't remember his romantic dream of Xanadu, Ted Nelson suffers from memory lapses. But unlike Coleridge, he's living in an age when he can do something about them.

For more than 25 years Nelson has been developing a computer system that most people have a hard time even imagining. He's designing a universal electronic publishing network—to be stored on orbiting satellites—that will provide computer users with instantaneous access to the world's books, magazines, movies, music, and all published documents. Even more amazing, Nelson's project, called (you guessed it) Xanadu, will allow individual users to pop off into a universe of automated footnotes, providing them with an electronic magic wand that will take them down the information path of their choosing.

Not surprisingly, Nelson's grand scheme has been little more than a pipe dream for years. Indeed, up until last year Nelson's

idea was belittled by AI gurus and hackers alike. But then CD-ROM (compact disk-read-only memory) came along, with its incredible electronic storage capacity for text, sound, and images. Suddenly Nelson's ivory tower seemed approachable. This year the first prototype of Nelson's system was put online on the powerful Sun Computer workstation in California. Its only text for the moment is Nelson's own 13-year-old classic, *Computer Lib/Dream Machines*, "the first out book of the computer generation into World," a computer industry magazine called Nelson's futuristic book "a manifesto for the computer revolution—the Common Sense of a letter-day Tom Paine. It's only fitting, then, that *Computer Lib/Dream Machines* is the first publication to prove that Nelson's vision of Xanadu can indeed be realized.

Essentially, Xanadu is a storage medium that can grow to any size. It's also the best medium for Nelson's sophisticated software package known as hypertext. Hypertext operates on the theory that if

you can tag each piece of information—be it sound, text, or an image—with an identifying number, you can then organize those numbers into a system, like (although Nelson hates this analogy) the Dewey decimal system in a library. Once a piece of information has been labeled and stored, any user can access the information from the pod. For example, if you have called up a book on Dwight Eisenhower and see a reference to a jacket he wore, Xanadu could allow you to punch a key and read about that style of jacket, punch another key and you can relieve the history of jackets.

Or, say you've accessed a *Los Angeles Times* story about a man who plans to have his pet dog cloned before it dies. After you've read the story, you can punch a button to find out more about the process and potential of cloning, or you can head off in an entirely different direction and call up stories about the man's particular breed of dog. The only catch is that the writer who has put the story in Xanadu must also create the necessary links to the other information. Users cannot make those links themselves. Still, Xanadu's ability to allow these sorts of detours or bridges from one piece of information to another is what makes the program so revolutionary. It's also what promises to make Nelson a famous man.

Sitting in his San Antonio apartment crowded with stacks of papers and magazines, the boyish-looking Nelson seems an unlikely candidate for computer visionary. The son of actress Celeste Holm and film director Ralph Nelson, he grew up a mid-show biz and bohemianism in New York's Greenwich Village. He wanted to write novels and screenplays and stumbled on to computers in an attempt to speed up the process of preparing his projects. "I wanted a word-processing program that would let you link and compare different versions of a document," he explains, "but nobody was talking about such things then."

While earning a philosophy degree at Harvard in 1960, he decided to develop the program himself. Hypertext was born. I

CONTINUED ON PAGE 39



Ted Nelson's futuristic Hypertext may put all the information in the world at your fingertips.

# LOST ULYSSES

## SPACE

By Doug Stewart

**A**mong those who witnessed the space shuttle *Challenger*'s explosion at Cape Canaveral last year was a small team of scientists on hand to ready a device for its next flight four months later. Once in Earth orbit, the device—an unmanned, instrument-laden spacecraft called *Ulysses*—would launch itself by booster rocket on a voyage over the top of the sun.

Today the shell of *Ulysses* sits earth-bound and immobile in a climate-controlled storeroom in Germany. Most of its nine scientific instruments have been removed and placed in tightly sealed boxes and tanks here and abroad. The project, in NASA parlance, is in "test mode," waiting for a liftoff. Many see *Ulysses* as a grim symbol of what has—or has not—happened to U.S. space science since the *Challenger* accident.

"Every year we have to put another ten million dollars in," says NASA's Dave Bohlin, *Ulysses* program scientist. The money helps hold together skeleton teams of scientists and engineers who monitor this exotic piece of equipment and retest

the various instruments every few months, looking for gummed-up lubricants, computer-chip glitches, moving parts that no longer swell and switch. "You can't just put equipment like this in a plastic bag and let it sit any more than you can put an automobile up on blocks for three or four years and suddenly put gas in it and expect it to start," says Bohlin.

Most of the scientists and engineers who have worked on *Ulysses* over the past ten years have been reassigned to other projects. Officially, *Ulysses* is set for a 1990 launch, but in light of its long history of delays, some participants wonder if the mission will ever fly. In their darker moments, a few suggest that the subdiscipline of which *Ulysses* is a cornerstone—the physics of the heliosphere—may simply close up shop.

"We have a launch window of twenty days in October 1990," says John Simpson, a physicist at the University of Chicago's Enrico Fermi Institute and the one individual who has been the project's guiding light since its inception. "Only one shuttle is equipped for us. If it were grounded

or unable to carry us, we would be lost."

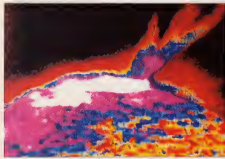
It was back in 1959 that Simpson first began pushing for his long-range goal—an unmanned mission that would fly out of the plane of the planets and high above the poles of the sun. You couldn't expect to study a three-dimensional universe, he argued, if you were stuck in a two-dimensional world. Also, a stormy tangle of powerful magnetic field lines around the sun's equator would distort any approaching instrument's attempt to take measurements of cosmic rays. A probe well above or below the equatorial plane would be out of the tangle of most of this magnetic activity. Such a probe could explore more clearly the physics of the heliosphere, from solar flares and magnetic fields to cosmic rays.

In the inner solar system, where we are, Simpson explains, the sun's magnetic field, which is carried out by the solar wind, tends to sweep away the bulk of the cosmic rays that come streaming in from space. This tangle of this magnetic sweep reaches to the outermost planet. "Even out to Pluto were still in the region of tangled magnetic fields," Simpson says.

By going over the poles, *Ulysses* has more direct exposure to interstellar space. There the craft can study a flow of cosmic rays that are not deflected around the sun's equator. Just as auroral particles come streaming into the earth's poles from space, cosmic rays flow into the sun's polar zones from outer space.

Simpson was forty-two when he began his campaign for *Ulysses*. Twenty years passed before NASA approved the mission as part of a joint project with the European Space Agency (ESA), with NASA and ESA each contributing a spacecraft. Then, in 1981, came the budget cuts. NASA canceled its spacecraft, and *Ulysses* was reduced to whatever the ESA craft could carry. Dozens of scientists found themselves dumped from the mission; their experiments killed. Other problems ensued—shuttle delays, booster-rocket doubts—and the launch date slipped from 1983 to 1989. Then the *Challenger* exploded.

John Simpson is now seventy years



Here comes the sun: maybe the saga of a robotic *Ulysses* and its thwarted journey to our star



## PIT POWER

# EXPLORATIONS

By Joni K. Miller

**E**ver wonder how they get the bling into Twinkies or how normal food is turned into airline food? Or who determines how many of each letter get into a can of alphabet soup? Such questions may seem rather moot, but consider this one: What do they do with olive pits? Ninety percent of the glossy black, ripe California olives sold in America are pitted—and that means approximately 20 million tons of pits annually. So where are they?

Perhaps no one has devoted more time and money to the problem than Lindsay Olive Growers, the largest and oldest ripe olive processor in America. Nestled in the warm inland valley of Lindsay (a great town, a great olive), California, the Lindsay property is dotted with gnarled silver-leaved olive trees. It was here that the prototype for the first mechanized pitting device was developed and where today's machines are capable of pitting between 1,000 and 1,800 olives per minute in a typical 18-hour Lindsay shift. 160 tons of olives come under the knives, leaving behind 7 million to 8 million pits.

To people around here, pits can be kind of a pain—they admit: canny suburban Gene Smiler. "Pits don't roll. They don't float. They're just there. They can start accumulating like ants."

This accumulation, referred to as "the pit problem," has been the bane of the industry for years. Because pits are composed of between 55 and 65 percent water, they must be dried thoroughly before they can be successfully reused. Drying the pits takes time, money and space—lots of it. Dumping, once an easy solution, has grown increasingly difficult. State-owned landfill dump sites were once plentiful and free; today fees are charged, and new environmental regulations may phase the dumps out altogether. For the most part, pits are hauled by truck to such dump sites or given away for use as pea gravel or filler in driveways and along citrus- and olive orchard roadways, to hold down dust.

Robert Webster, a retired Lindsay plant manager and chemical engineer, spent more than half of his 42 years in the olive

business pursuing pit-recycling schemes, shipping out tons of olives to inventive individuals and industries (many of which traditionally have found uses for other agri-byproducts such as rice hulls and nutshells). Potential uses have ranged from the obvious (joy animal stuffing) to the sublime (rosary beads) to the cosmetic (a facial scrub that was too scratchy). The pits were judged too salty and slow burning for charcoal briquettes and ineffective in bug-bait canisters. As an ingredient in plastics, natural oil in the pits diminished the strength of the plastics and turned them a "bad" color. Inevitably someone tried to turn pits into jewelry. Niarni Lazaro, Lindsay's research and development manager, still has a string of beads from the Oregon craftsman who sold olive-pit jewelry at a roadside stand.

Perhaps even more enterprising—and logical—have been the attempts to incorporate large quantities of pits into livestock feed. But cows don't seem to like them and have been known to eat everything else, leaving the pits behind.

At Lindsay everyone's brought experi-

ment for disposing of pits less buried in the back of a cabinet in the plant manager's office, carefully preserved for posterity in an old bread wrapper. It looks and smells like a giant chunk of chewing tobacco. Intended as a fireplace log, it weighed infinitely more than a wood log, produced a totally unsalable odor, and didn't burn properly. Reluctantly, the fireplace-log manufacturers decided to stick with sawdust. Lindsay continued to search for a solution.

Then, late last year, a lowboy truck inched its way past the giant cement olive in front of the Lindsay factory and pulled into the repaving area. On it lay the future: a new fluid-bed boiler system—acquired by FluidDyne Engineering Corporation in Minneapolis—that is eventually expected to provide up to 80 percent of Lindsay's energy needs by burning 40 to 50 tons of pits daily.

The new system works by feeding pits from a silo into a carbon boiler, where they are blown onto the top of the fluid bed. Though actually filled with sand, the bed has all of the properties of a fluid, distributing its contents evenly. A low-velocity fan blows a stream of air into the sand at the bed bottom until the grains are suspended. The pits levitate in this whirlwind, where the sand eventually reaches temperatures between 800° and 900° F. Moving back and forth, the grains rub off moisture (and olive flesh) from the pits until they ignite. The boiler's hot sand particles rub up against the boiler tubes, transferring heat, which is then used to turn water into steam. In the end, tons of burdensome pits will be transformed into a fine powder, which can be easily bagged for disposal.

Given the failure of so many other potential solutions to the pit problem, the new system appears to be an auspicious development, especially so because the industry's very existence depends on pit removal. In the words of California Olive Committee manager Dave Daniels, whose task is to "reflect the orderly marketing of olives grown in California," "If you can't pit 'em, you won't sell 'em." **DO**



A movable feast? But to reuse, and how?

# THE VATICAN GOES TO HELL

## BOOKS

By Elizabeth Stone

In the days before the printing press, scribes ardently copied sacred volumes by hand, and illuminators using crushed sapphires and beetle wings labored to achieve just the right shade of blue. Wealthy collectors like the Medici family commissioned such consummate artists to produce the elaborate texts. And they paid exorbitant prices: A single missal cost a vineyard. Two Latin grammars, a house plus the lot it sat on.

Today thousands of these relics remain shelved deep in the heart of the Vatican Library in Rome. For centuries few people have seen most of them; their fragility so extreme that a single bell or a careless turning of a page could destroy them forever. But thanks to the agents of Hell no less, and the magic of modern technology, a dozen of these priceless treasures have, after a fashion, reappeared for public viewing.

Hell is Rudolf Hell, Inc., a West German company that specializes in computer imaging systems like those first used when Voyager flashed pictures of Saturn back to Earth. And Hell established a sort of stronghold in the Vatican when West German publisher Belsor Verlag purchased its equipment. "Such computer imaging systems have been used for normal four-color work, but they have never been used in a project of this magnitude," says Bernd Friedrich, Belsor-Verlag's director overseeing the facsimile production. "This computer imaging can pick up all the fine details of the manuscripts and render the absolute top quality we want."

The goal is to produce perfect recreations of selected manuscripts—right down to the myriads of blotch on a yellowed page, centuries old wormholes even insect bites in the vellum. Such details will allow scholars to study the intricacies of creating the originals," says Rev. Leonard E. Boyle, O.P., prefect of the library and a member of the five-person committee coordinating the project.

So far they've reproduced such sacred and secular volumes as *Sibilla Patruini* or the Poor Man's Bible, and *Alphabetum Romanum*, the first treatise on Roman

letters to appear during the Renaissance.

Chosen for the project because of its historical value, The *Tournaement* Book chronicles jousting events of the late Middle Ages, with the names and likenesses of participants. The seventeenth-century text extravagantly illustrates the knights in full regalia, with plumed steeds, family crests, and coats of arms. And *Polemey's Cosmography*, a fifteenth-century copy of the now-lost second-century atlas, boasts maps of the Old World, as well as fifteenth-century updates on such urban centers of the Renaissance world as Rome, Milan, and Cairo.

The painstaking work of restoring the originals and producing the facsimiles takes place beneath the library's archives in a fully equipped, environmentally controlled studio. Once the restoration is completed, high-tech scribes place a photographic transparency of each page on the illumination table of a chroma scope, the first of two computers used in the facsimile process. The real work begins when a video camera flashes an image of the page onto a monitoring

screen, which allows a comparison of the screen image and the original page.

Using a futuristic paint box—the many dials on the computer—the repro-technician can labor until the colors exactly match those of the original. The powers of vision employed would have seemed supernatural to a medieval scribe. With the transparency's image transformed into 6 million pixels (picture elements), the technician can alter the color in even a single pixel if necessary. The process is more intensive than that of the medieval predecessors, who, on a good day, could copy two pages in an hour. For the contemporary computer scribe, the process of making one identical on-screen image may take up to two hours.

Once the computer scribe is satisfied with the altered image, the second computer, a chromograph scanner, "reads" the image and converts the transparency into electrical energy signals. It then synthesizes this information and the alterations transmitted by the chromoscope, creating the color negative used to produce a printer's proof.

Still more adjustments are made until the manuscript is as close to the original as possible. But nothing goes to the printer until final approval is given—and that can come only from the library prefect. "I authorize publication only if I am satisfied that it is in complete agreement with the original," Boyle says. "If I'm not asked, it goes back for further adjustments."

Once the facsimile is approved and copies printed, the ancient crafts take over. Illuminators paint each halo and wing in gold leaf; the finest bookbinders sew the pages together, and the best leatherworkers hand-craft the covers.

When the facsimiles make their debut, a few replace the originals in the Vatican Library, where researchers can thumb through them. Fine-book collectors buy the others through Belsor Verlag and other worldwide representatives like Belvedere Press in the United States.

As for the restored originals, they're carefully enshrined in an environmentally controlled chamber where no mortal will ever lay eyes on them again. □



Saving books from the sins of time



# CONTINUUM

## NYAAH-NYAAH

Last winter, when the news first came out about superconductors, the scientific world went bananas. It seemed that physicists everywhere were doing cartwheels of joy. Or were they? As the news reports went on, you could tell, reading between the lines, that at least some physicists were, well, not exactly disgruntled but suffering from what one might call the nyaaah-nyaaah effect.

You say you've never heard of the nyaaah-nyaaah effect?

The nyaaah-nyaaah effect has to do with the sad reality that in the egalitarian mentorocracy of the research world (1) some sciences are more equal than others, and (2) there is some disagreement about precisely which sciences are most equal.

Take the fuss over superconductivity (the phenomenon in which electricity passes through certain substances without any resistance at all). The discovery that a whole class of materials might have this property under ordinary (rather than supercooled) conditions has implications straight out of science fiction. Cooling trains, ultrapowerful computers that run on flashlight batteries, and very strong electromagnets, thousands of times stronger than the most powerful magnets previously known. This is the stuff of technological revolutions: free covers, and Nobel prizes, and the scientists who worked on it are walking on air.

They are called solid-state physicists because they study matter in its solid state. Lumps of stuff, in other words. Now, talking to solid-state physicists, one quickly notices that many have a bone to pick with their colleagues in other branches of physics. Obviously the solid-state people say they are treated by astro- and bio- and particle physicists as if solid-state physics were something ordinary. As if it were chemistry or something.

According to the solid-state physicists, the particle physicists are particularly bad. No matter how important their discoveries (solid-state physicists groan, they wouldn't get media coverage themselves (and hence research money and respectability) if everyone in the field ran naked past the White House). But particle physicists don't even have to try anything. They get their names splashed around the papers merely for proposing to build a multibillion dollar machine, the size of Manhattan, to hunt for hypothetical particles with precious, oh-so-whimsical names like wimp and axion. And where is the money for this monstrosity—sometimes called the Desertion—going to come from? From the

budget for other branches of physics, say the solid-state guys.

It's particularly unfair, they say, if you look at the record. In the last 60 years, solid-state physicists have discovered superconductors and semiconductors, explained why magnets stick to gather and electricity flows through copper wire, produced superthin coatings with extraordinary properties, created designer molecules, and invented the transistors, resistors, capacitors, and so forth that have taken us into our current electronic era. In the same period, solid-state physicists like to say, particle physicists have discovered a lot of... particles.

So it's been a treat to see solid-state guys on the *MacNeil/Letter Newshour* and the cover of *Time*. And an even bigger treat to see Philip Anderson of Bell Labs, one of the world's great solid-state physicists, dusting it up with the particle people in *The New York Times*. The argument has to do with magnets. Regular electromagnets can generate fields of only limited strength because the magnet melts when you put in too much juice. Superconducting magnets have no resistance, will not melt, and thus can make hellishly strong magnets.

Now, particle accelerators are generally built in the shape of big rings with each particle careening around the doughnut approximately eleven billion times before smashing into a target. To guide the particle around, you use a powerful magnet. The stronger the magnet, the more it can turn the particles; and the smokier the doughnut, the particle has to go around. A hellishly powerful magnet means an itty bitty doughnut.

And on itty bitty doughnuts, Anderson points out, means that a multibillion dollar accelerator the size of Manhattan might not make any sense. The solid-state physicists may have figured out a way to make magnets strong enough to let the Desertion be plopped inside an accelerator that already exists. The particle physicists say, well, we can't be sure. We shouldn't kill the Desertion for something that may not turn out, they say. Certainly they have a point there. As do the solid-state physicists when they ask if America should spend so much of its science research money on something that might be obsolete before it is built.

The discussion is sober and courteous, but in the back and forth among the scientists—wonderful minds, to tell the truth, on both sides—it is possible to hear floating in the background, the real crux of the matter, nyaaah-nyaaah—CHARLES C. MANN



## CONTINUUM

### THE COMPUTER THAT SQUEALED

If nothing else, British drug smuggler Paul Dye was an organized man. In the process of smuggling more than \$100 million worth of heroin through London's Heathrow Airport (the drugs were usually hidden in women's pedis), he recorded the details of his transactions on a \$150 pocket computer.

It was the computer, though, that proved to be Dye's undoing. When British customs officers arrested him, they found no drugs, but they did find the little computer—a Psion Organizer by name. It won't do you any good, Dye smiled. I've erased everything.

So he thought. But he hadn't reckoned with the ingenuity of Psion's designers. Most computers operate with random access memory (RAM), which does, as Dye surmised, disappear entirely when erased. But to go



Genetic evidence indicates that ostriches evolved backward, as a flightless, ground-dwelling bird from a flying, tree-dwelling, gliding ancestor about 60 million years ago.

back, however, it takes a special kind of RAM called nonvolatile random access memory (NVRAM). The Psion Organizer has NVRAM, which means that even if you erase everything, it's still there. The British customs officers found the evidence they needed to charge Dye with smuggling. He was sentenced to 10 years in prison.

### THE FLYING OSTRICH

Did the ostrich evolve backward—from a bird that could fly?

Swiss-born ornithologist Peter Houde spent six years tracking down some 75 ostrich fossils that together he says "show the evolution of the ostrich from a smaller flying bird into a large, flightless one." The very first birds probably evolved from small dinosaurs (known as coelurosaurs). Houde theorizes, "Over millions of years, ostriches and other skittles [flightless birds] evolved independently into flightless creatures from

small, tree-dwelling, gliding birds. In fact, one that was flying, one that was standing but not flying, and one that was a flightless bird evolved from a single legless ancestor before continental drift 90 million to 60 million years ago split the landmass of the Southern Hemisphere and sent them evolving in different directions on separate continents.

Among Houde's evidence were the 50-million-year-old fossils of the three oldest known ostriches. Uncovered in (East) Germany shortly before World War II, they had been long forgotten until Houde came across a 1988



Psion's Organizer is a small, early handheld computer.



# CONTINUUM



Photo reveals receptor cells in the veins of leaves

## PLANT EYES

If you appear that plants can see: Their "eyes" are directed not toward the soil or one another, but to the sun. Their goal: to follow old Sol and gather as much light as possible.

One leader in sun-tracking research is biologist Fulton Fisher of Simon Fraser University in Vancouver. "It's hardly what you would call thought," he says, "but some plants do remember where the sun rose and in the dark of night, turn their leaves around, ready to face the morning sun. It's long been known that plants can follow the sun precisely, but no one knew how it worked."

Enter Israeli researcher Dov Keller, who found that the seedlings of the plant *Linaria cathartica* respond differently to blue and red light. Fisher set out to learn how. The red light is needed for photosynthesis. Fisher concluded, but he found that only blue light determines the

direction the plant moves. The next question: How do plants "see" the blue light?

For the blue light to be absorbed, there had to be a receptor like a retina. Of the complementary color, says Fisher. A simple slice with a razor blade revealed delicate yellow cells in the middle of the leaves' veins, right where the blue light would have to be absorbed.

Fisher also found long transparent, curved windows running the length of the veins, with just the right curvature to concentrate light on the yellow cells. These then send a "message" substance through the sugar circulation system. When the message reaches each leaf's pivot point, little hydraelic cells expand or deflate on opposite sides, turning the leaf toward the light.

Fisher is now working on finding the substance that signals the plants' motor cells at the pivot to turn the leaves as they track the sun.

—Vincent Bezzo

## SURVIVAL FASHION

Dressing for success these days? Consider this next time you get off to that big meeting. Your fashion statement could mean the difference between life and death should your plane go down.

Think of how people are dressed, how they act on airplanes, and it's hard to say that a lot of them don't stand a snowball's chance in hell of surviving, says engineer Grog Jansells, an expert in flying safely, crash survivability and emergency egress. As a consultant to the Aviation Safety Institute, Jansells has been gaining renown of late for his briefings—complete with slides of flaming disasters.

If your plane goes down, your chances of survival are 90 percent. With a fire, they drop to 65 percent. While only 15 percent of all aircraft crashes result in fire, 60 percent of all fatalities occur in that number. "If you survive the impact, that's

no reason you should get out," says Jansells, provided you know what you're doing. Among his tips:

• Dress smartly. Multiple layers of light-colored, fitted clothing made of natural fabrics (cotton, wool) are best. Synthetic materials (usually melt), causing serious burn injuries. Leather is the worst. That stylish bomber jacket will quickly become a coat of Saran Wrap.

• Don't drink. The booze you consume will hit you harder and faster. If you're slowed down, you'll be history.

• Count on absolutely nobody else to get you out. Make an emergency escape plan. Listen to the flight attendants and read the emergency cards. Know exactly where the exits are and wear your seat belt tightly across the pelvic area.

Contrary to myth, there is no one best place to sit. Says Jansells, "True, airplanes don't back into mountains, but people have been trapped by smoke and fire in the tail sections."

—A.J.S. Rayl



If you survive the impact of a crash, you can get out, but you'll need the right clothes. Forget about leather and polyester.

"We shall have a race of men who are strong on telemetry and space communications... [but] who cannot read anything but a blueprint or write anything but a computer program."

—John K. Galbraith

"When I am working on a problem, I never think about beauty. I think only of how to solve the problem. But when I have finished, if the solution is not beautiful, I know it is wrong."

—P. Buckminster Fuller



A Canadian youngster visiting Bethlehem came to the attention of local geologists after he stumbled across a piece of it. *Photo by Bill Lawton*

## DUNES OF DOLLARS

Geologists who search for oil deposits study the way sand and finer rocks filter their way down through the earth—a scientific subdiscipline known as sedimentology. Now a geologist at the University of British Columbia in Canada has applied the principles of sedimentology to the search for coins unwittingly deposited in parking lots and on beaches.

Wilbert Danner knew that the action of ocean waves tirelessly wash finer materials away from the shoreline leaving heavier pebbles behind to form what geologists

call lag gravel. "Of this, we reasoned, should be true of that gravel," Danner says, "when he started searching in his gravelly areas of local beaches [I had to tolerate all the old guys with metal detectors]," he says, he found a series of metal "surotroves." Shifting to university parking lots, he found that winds had picked up misplaced dollar bills and deposited them around the edges of the lots, "just like sand dunes."

So far, Danner's efforts have netted more than \$1,100, which has gone to establish a grant for local geology students. His work

has also yielded some notable scientific data. The rate of money deposited in parking lots, Danner says, is greatest in winter, when visibility is lowest. But on beaches it's just the reverse: coins pile up as people stick their clothes under the summer sun—Bill Lawton

## DIAMONDS IN SPACE

Newspapers recently carried the news about a few secondary looking meteorites that contained a sprinkling of tiny diamonds apparently formed by an ancient star. This dramatic news has warranted implications.

Roy S. Lewis and Edward Anders, two University of Chicago chemists, had been waiting for meteorites 1 or 12 years before finding the microscopic diamonds. They knew the meteorites contained a rare form of the element, which must have come from beyond (and before) the solar system, and they had to struggle for some time to identify the "carrier" that held the xenon inside the meteorites.

"We weren't looking for diamonds," says Lewis, and when one of his colleagues wound up an experiment on the black meteorite material with only a whitish residue he said, "Oh, damn! I've dissolved all the carbon." But the carbon was still there, in the form of diamond grains so tiny that a million of them lumped together would still be invisible to an open microscope. Lewis and Anders have since identified similar diamonds in other xenon-containing meteorites.

The fact that we have found any at all," notes Lewis, means that there must be extravagant amounts of diamond dust floating in the universe—perhaps millions of solar masses of it.

As for the commercial application of the discovery, Anders says that Russian, Japanese, and American experimenters have had only moderate success with attempts to make diamonds at relatively low pressures since the early 1950s. As soon as the meteorite discovery became public, researchers called Anders and told them to go to an astronaut only hotel and look up conditions in the atmospheres of red giant stars—the reports for he and Lewis believe that the tiny diamonds were formed more than 4.5 billion years ago in the death throes of such a star.

Somebody will probably get rich because of this discovery," Anders says, laughing. "But I won't be Roy Lewis or me." —Dave Sobel



Naturally, Roy Lewis and Edward Anders didn't find diamonds. *Photo by Bill Lawton*





## PIG PHEROMONES

When is a boar (an uncircumcised male pig, to the uninitiated) not a boar? Thanks to five Michigan State University scientists, a boar can remain a boar and yet have no sex life.

Why is this desirable? Well, the pheromones, or sex attractants, of uncircumcised animals give their meat an odd, unappealing smell which is why hogs destined for the butcher are castrated. On the other hand, boars produce lean meat 25 to 30 percent more efficiently than their castrated brethren. Ergo, if you could just get an uncircumcised pig without the pheromones.

Roger Brooks, Albert Pearson, Maynard Hogberg, James Peckols, and Ian Gray—all of Michigan State University—have managed to do just that. They invented a vaccine composed of bovine serum albumin coupled to pheromones that causes hogs to produce anti-

bodies to their own pheromones, the odorlike agents of sexual attraction.

Are female pigs no longer attracted to the vasectomized boars, or do the boars themselves lose interest? "We don't know the answer to that," confides Pearson. "But the animals have lower pheromone levels in their tissues. The meat is leaner and cheaper to produce than that of castrated animals. The result could be cheaper leaner pork in the future."

—Judith Hooper

"Today we know four types of forces—electromagnetic, gravitational, and the strong and weak nuclear forces. But the existence of the latter two was not even suspected before this century. I don't believe that we have found all the forces in nature yet. There is probably at least one more type of energy operating at the physical level which serves to support psychic phenomena."

—William Teller



The meat from uncircumcised pigs is leaner but has a unappealing smell. The answer: Vaccinee boars against their pheromones.

## LISTENING TO BONES

When bells are struck, certain resonance frequencies predominate. But if the bells are cracked, the frequencies change. The same," says Richard Collier, "applies to human bones. A tibia, for example, has its lowest resonance frequency at around one hundred twenty hertz, but that of a fractured tibia is lower still, because the site of the fracture is more flexible."

Now Collier, senior electronics lecturer at the University of Kent at Canterbury (England), has devised a simple and painless technique for locating and monitoring the healing of broken limbs. Without necessarily removing the plaster first, the doctor applies a pistol-shaped electromechanical vibrator to a limb. As the limb vibrates, the frequencies picked up are displayed on a digital readout.

Until now, Collier points out, doctors have lacked an accurate method of measuring a fractured bone's state of repair. With the new device they will be able to compare the resonance frequencies of, say, a fractured and a normal tibia. As the broken bone heals, the variation dwindles to zero (though since a healed bone eventually becomes stronger than it was originally, a small variation appears and persists after healing).

Currently the device is being tested at hospitals around England. It had its first public demonstration at the university's open day, when visitors were invited to check



Dr. Collier can now hear whether your arm is broken or healed.

on the state of their bones. A few were startled to discover they were walking around with hairline fractures.

—Ivor Smullen

In nature we find not only that which is expedient but also everything which is not so independent as to endanger the existence of the species."

—Konrad Lorenz

The natural history of science is the study of the unknown. If you fear it, then you're not going to study it, and you're not going to make any progress.

—Dr. Michael E. DeBailey



# CONTINUUM

## SKEETERS

Wayne Rowley, professor of entomology at Iowa State University, likes mosquitoes. He is so dedicated to studying these insects that he has gone unprotected into areas where you could be bitten 400 times an hour. Rowley has suffered so that we may arm ourselves with the following information:

Rowley now knows, for example, that mosquitoes use carbon dioxide detectors to locate potential meals, but then they can get picky, choosing dark clothes, especially denim jeans, over light ones, and they go bonkers over a dash of sweat or a whiff of estrogen, which may explain why women get bitten more often than men do. This seems to explain why female mosquitoes seek blood. The males prefer sipping nectar.

Many of the world's 2,600 to 3,000 varieties prefer cows, dogs, birds, lizards or even goats to humans. Of the 150 U.S. varieties, two kinds account for the majority of human bites.

Most varieties live in the tropics, but our north country claims steeper dominion, probably because all the varieties there hatch simultaneously. Elsewhere, new generations come about two weeks after each drought. Drought is the best control.

Spraying your yard can help, though the wind will bring male skeeters. Rowley's advice: Avoid exposure at dusk and dawn when mosquitoes are biting, wear heavier outer clothing and cover exposed skin with



Wayne Rowley, professor of entomology at Iowa State University, likes mosquitoes. He is so dedicated to studying these insects that he has gone unprotected into areas where you could be bitten 400 times an hour.

10% diethyltoluamide (DEET) in preparations (if 14, 24, or 32 percent).

And don't buy a bug repeller for skeeters. "They have found more mosquitoes in yards with zappers than in yards adjacent to them without," Rowley explains.

—William Mueller

*Take from me the hope that I can change the future and you will send me mad.*

—Israel Zangwill

*Men are flying too fast for a world that is round. Soon he will catch up with himself in a great rear end collision and Men will never know that what hit him from behind was Men.*

—James Thurber

*The experimenter who does not know what he is looking for will not understand what he finds.*

—Claude Bernard

## DATING DIRTY DISHES

Using microscopic quantities of blackened food scraped from fragments of cooking vessels used by Indians more than 1,000 years ago, an anthropologist has developed a new method for radiocarbon-dating prehistoric pottery.

Michigan State University's William Lovis says the new technique, developed by a group of physicists, uses a small nuclear accelerator to date ancient pottery from tiny amounts of leftover food as little as one milligram (15 millionths of an ounce). Traditional radiocarbon dating requires about five grams or two tenths of an ounce of organic material. Lovis says ceramic specimens rarely contain such large amounts.

In his pilot study Lovis used two fragments of Indian pottery found near Bay City, Michigan. Three shards

served as controls because their ages could be accurately determined from their styles. The ages of the other two fragments were unknown. All of the shards were from the rims of cooking vessels and Lovis obtained five food residues by scraping the blackened, carbonized rings found on the ceramic material. The residues then were sent to a laboratory in Switzerland for analysis.

The results were impressive, says Lovis. The radiocarbon dating of the control fragments perfectly matched the time periods previously assigned to them. The unknown fragments were dated at A.D. 675 and A.D. 835 plus or minus 85 years.

What were the Indians eating? Lovis did not attempt to identify what kinds of food were contained in the burned residues. He says, however, that this may be made possible by trying to identify any proteins found in food residues. If proteins are present, that information might allow anthropologists to further study the evolution of dietary habits among prehistoric cultures.

—Joel Schwartz

*When the man who knows all about the last fly chronicles himself sitting next to an authority on blowflies, there may be an uneasy silence.*

—Brend Blanshard

*I'm surrounded by people who want to know the universe when it's hard enough to find your way around Chinatown.*

—Woody Allen



ARTICLE

# SIX SCIENTISTS WHO MAY SAVE THE WORLD

BY BILL LAWREN



**A** roiling white cloud rises high into the air from the nearly featureless desert floor. Though the cloud is shaped more like a smoking torch than a mushroom, there is no masking its sickle's origin or the horror of its violence. That frightening scene, revealed by a photograph, provides a chilling contrast to the gentle, almost quivering voice of the woman who explains it to a startled visitor. "This," she says, "is a radioactive cloud released over Nevada after a supposedly underground nuclear weapons test. These releases are routine. In

fact," she continues, her voice hardening slightly—some of these underground tests are actually designed to release radioactive isotopes into the open air.

The woman's name is Rosale Bartel. She is a scientist—a specialist in mathematics and epidemiology—a nun, and despite a frail appearance, a resolute and surprisingly tough-skinned campaigner against the cumulative evils of toxic waste and low-level radiation. Though she might not put it so directly, her life has been shaped by the most ambitious of all career choices: Rosale Bartel is out to save the world.

She is not alone. Hundreds, perhaps even thousands, of other scientists, disaffected with the mere pursuit of knowledge for knowledge's sake, or unable to ignore the burgeoning dangers that are so often overlooked, have joined Bartel. They have ventured from the secure niches of academe to become activists. Out of these legions of scientific crusaders, Oliver has chosen six of some of the liveliest and most effective. We know that these six are neither singular nor necessarily unique, merely representative of the larger group. Some of those six are academic insiders or heads of prestigious research institutes. Others prefer to operate from the outside as independent thinkers or as directors of their own research organizations. In either case, and no matter what particular pieces of the problem they have chosen to attack, the goals of these scientists are essentially the same: to rescue the world from human folly, to create a science fueled by reverence and humility, and to use the tools of that science to build a new and gentler world.

#### PETER RAWEN

Peter Rawen is a man with a mission. The director of the renowned Missouri Botanical Garden in St. Louis, he is an advocate for the voiceless. Trees are his clients: billions of trees, in particular the tropical equatorial forests that both give and sustain the earth that bears them.

The great, steamy forests of the equatorial belt harbor one third of the earth's 30 million plant and animal species. Their leaves produce by photosynthesis an indelible proportion of the oxygen in our atmosphere. Yet, as Rawen knows only too well, these vital centers of life on Earth are disappearing—cut down by farmers, miners, and major land developers. The rate of destruction is not only alarming, it's potentially catastrophic. Rawen is convinced that if present trends continue the earth 100 years hence will be a wasteland.

"By that time," he says, "all the tropical forests of the world will have been consumed or severely damaged. This devastation will have brought about the extinction of as much as a third to a half of all life on Earth. With the destruction of the for-

ests, the world will become much warmer than it is now, and that will result in a certain amount of melting of the polar ice caps, and a general rising of sea level."

Rawen links the human race to "a boat going through the rapids. We have to realize the magnitude of the problem and that we have an unprecedented opportunity to save organisms and elements that can be of tremendous importance to our children and grandchildren."

Rawen's love for plants and trees started early. By age five he was collecting plants and butterflies in San Francisco's Golden Gate Park, at nine he was already a student member of the California Academy of Sciences. At thirteen he published his first scientific article. When, as a junior in college, he found that one could finance a graduate education with grants and fellowships, he decided to become a biologist and made it a nearly arbitrary choice to study plants instead of bugs.

In 1960, with a Ph.D. from UCLA, he went

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*“They want to  
rescue the world from human  
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---

to Costa Rica to teach at the Organization for Tropical Studies. Ironically, he says, he had little or no idea at the time that the forests he was teaching about were being destroyed. “One knew in a hazy way,” he says, “that there were people cutting down trees, but it didn't seem to be an overwhelming problem.” His perspective was sharpened when he took a teaching job at Stanford and found himself occupying an office next to Paul Ehrlich, whose book on overpopulation, *The Population Bomb*, was having an international impact. Under Ehrlich's tutelage, he says, “I began to realize that the destruction of tropical forests on a widespread scale was something that threatened very profound consequences. That really got me started.”

Once started, Rawen proved impossible to quiet. As director of the botanical garden and a professor of botany at nearby Washington University, he has launched research programs that send a steady stream of students to catalog tropical plants and animal species found in Colombia, Peru, and Ecuador—three countries whose forests alone account for more than one sixth of the world's plant species. “Unlike

know what we've got and where we've got it,” he says, “we can't do anything. Once cataloged, information about the tropical biota is transferred to a computerized database that is available to any country or institution requesting assistance.”

With the database as an ongoing project, Rawen, whose impeccable suite and sartorial presence give him the air of a veteran statesman, has gone on to become one of the chief architects of a broad plan to preserve the forests. In the first place, he says, worldwide seed banks should be established to ensure that no plant species will be allowed to die out. “How much of that is being done?” he asks.

“Essentially none.” Small farmers in tropical countries must be given incentives and assistance in replacing destructive slash-and-burn agricultural methods (the burning of forests to make farmland) with techniques that will preserve forest lands instead of gobbling them. And tropical countries should be given the financial and necessary to establish aggressive conservation programs along lines already developed in Costa Rica, where as much as one fourth of the country's total territory is now under government protection.

Rawen's campaign has not been without its conflicts. It's often been a battle just getting people to recognize that there is a problem. Economist Julian Simon, for instance, has called the threat of deforestation and species loss exaggerated, saying that no case can be made for “any expensive policy of safeguarding species without more extensive analysis than has so far been done.” Of course, it's just the kind of extensive analysis that Rawen is working so hard to achieve. Arguments like Simon's frustrate and anger him because they indicate a complete ignorance of what's happening. “Within the next thirty years,” Rawen explains, “all the tropical forests will have been eliminated, with the exception of a few remnants. The notion that we can have business as usual is wishful thinking of the most extreme kind.”

Although those who know him say Rawen's passion lies close to the surface, he is generally parted as down to earth and friendly. “Friendly,” says Missouri Botanical Garden research director Enrique Fletes “without being condescending.” Anyone who has heard him speak also knows he speaks details like a sword. “It's amazing to walk with Rawen through the garden,” says colleague and former student Peter Hoch. “He notices everything.”

The unusual combination of drive and humanity has given Rawen an influence far beyond the boundaries of his job. “Even if he were to stop right now,” Hoch says, “his impact would have been enormous. He's very active in the organizations that are deciding scientific policy in this country.” Indeed, Rawen is a past president of the American Institute of Biological Sciences. He also gave the year's keynote address at the annual meeting of the powerful American Association for the Advance-

ment of Science. He's recognized as being one of the most coherent thinkers in biological science," says Hoch. But as far as Raven is concerned, influence itself—even when considerable—is not enough. To reverse the present trends, millions of people will have to heed his warning. And the warning is grim indeed: "Cutting a forest in the tropics," he has said, "isn't like cutting one in Ohio. Once cut down, it's over. Irreversible damage is done. And we're one more step toward creating a world in which we cannot live."

#### VIRGINIA WALBOT

While Raven battles to halt the disappearance of a large portion of the earth's natural green matter, other scientists are laboring just as mightily to seed the planet with green matter that has never before existed. At the forefront of these "green revolutionaries" is Stanford plant biologist Virginia Walbot, who last year achieved a breakthrough that may lead to the creation of a whole new "genetic library" of custom-designed "superplants." Human agriculture, perhaps the fundament of civilization itself, may never again be the same.

For millennia, farmers and crop breeders have been trying to improve their stocks by combining the best genetic characteristics of several varieties in one plant. Until recently the only way to achieve these improvements was by crossbreeding, a process that is slow, cumbersome, and not

always effective. All that changed, though, when recombinant DNA technology (a gene-splicing [methods for combining different bits of genetic information]) exploded on the scientific scene in the Seventies. It suddenly became realistic to think about redesigning agricultural crops in the laboratory, altering their characteristics by manipulating the very heart of the organisms, the genes themselves.

As a biology professor at Washington University, Virginia Walbot, a big, enthusiastic woman with a hearty laugh and a predilection for the word *fantastic*, was at the center of that revolution. Indeed, she seemed born for the job. As early as age five she was collecting plants and dotting the lawns of her parents' Los Angeles home with rose and vegetable gardens. By the time she was a teenager she was noticing that some of her plants had irregular branches with leaves and flowers a different color from those of the rest of the plant. How did that happen? she wondered. "I had the key ingredient for a scientist. I just had to know."

This driving curiosity eventually led her to study molecular biology at Yale and plant structure at Stanford, where she worked with Peter Raven. After completing her Ph.D. in 1972 she began to experiment with two of the world's most important food crops, corn and rice. When gene-splicing techniques became available, she began to think in terms of altering corn and rice

genes to create strains that would be more resistant to cold and pests. Even though such alteration was then theoretically feasible, a considerable problem remained: how to actually get the desired snippets of new genetic material into the cells of the plants themselves. For some crops—carrots, for example—new genes could be carried into the hearts of the cells by certain kinds of bacteria. This technique did not work particularly well, however, for cereals like rice and corn.

In 1984 Walbot, now back at Stanford as a professor of biology, heard about a new approach that Harvard biologist Huntington Potter had used to successfully implant new genetic material into animal cells. Called electroporation, the new technique used an electric field to "punch holes" in cell membranes, through which new DNA could be inserted. In Walbot's Stanford lab postdoctoral student Mike Fromm built a homemade electroporation device. "It was a bunch of wires on a piece of plywood with an old fashioned knife switch," Walbot recalls. "It looked like a high-school science project."

But it worked. Within a month Walbot's team had successfully inserted new DNA into the cells of carrots, then of corn. "It was a clear breakthrough," Walbot says. "In fact, it was the most clear-cut case I'd ever been involved in where one day nothing was possible, and the next day everything was possible."

Even so, no one knows better than Walbot just how much work remains. The next round, she says, will be tougher because we'll be working with traits that are dependent on more than one gene. "The room for error and failure increases dramatically with this sort of genetic manipulation."

Eventually Walbot's work could herald what some are already calling a new green revolution. Walbot thinks that electroporation will ultimately be used to help create plants that are bigger, healthier, more resistant, and even custom-tailored to particular microenvironments. She is trying to design rice and corn varieties that resist cold, other scientists are creating herbicide-resistant strains and plants genetically altered to produce their own natural pesticides. For the future, researchers are talking about inserting disease genes into wheat or soybeans to create plants that need less water. Walbot even envisions "scheduled shewberries," plants that have been genetically altered to fruit at a specific time. This would allow a farmer to plant a field and know that the fruit would be ready to pick on a given day.

Before these possibilities can be realized, though, the new revolution will have to be fought on a battleground more political than scientific. Citing as-yet-undetermined risks and dangers, critics like Jeremy Rifkin have tried to prompt legislation and court decisions that will stop the outdoor testing of just the kind of genetically altered organisms that Walbot envisions. This makes Walbot, who sees little risk in





## FICTION

*A blind man, an invalid in a Hawaiian shirt, and a nun with a red guitar case find solace at 45,000 feet*

# PALINDROME

BY THOMAS M. DISCH

**T**HE PLANE ENTERS THE CLOUD. From horizon to horizon the sky that could be seen from the departure lounge was a uniform, luminous gray. It gleamed like a whale lifted out of the water—one dark, undifferentiated gleaming that followed a curve too vast for apprehension.

The RW's had hunkered along the runways to lift off and vanish into this continuum of cloud were of an only slightly darker and less luminous gray. The flight attendants wore uniforms of a rather steely gray trimmed like the pianos on which they served, with red and blue piping. The two nuns who had been waiting in the lounge since seven A.M. wore identical habits of charcoal gray with black veils draped from high, white wimples. The men in business suits—who constituted a majority of the passengers—had chosen almost to a man to wear gray that day following, it may be, the suggestion of the weather. Even the younger men had supplemented their denim uniforms with gray accessories—a gray sweatshirt, a gray cowboy hat, a gray knapsack.

In the face of such consensus the few concentrations of bright color in the lounge took on the force of wild

immodesty. Sister Incarnation's red guitar case (it had cost twenty dollars less than the identical case in black) the Hawaiian shirt of the young man in the wheelchair, the screaming green pantsuit of the woman reading *How to Prosper During the Coming Bad Years*, the lemon yellow cat basket handcuffed to the wrist of one of the gray-suited men.

The flight was announced, and the passengers boarded according to their sections. The four junior flight attendants performed their preflight performance demonstrating the use of the oxygen masks and anti-belt buckles, as the senior attendant Amanda Conklin, chartered the words of the rate into the PA system. The pilot, Malcolm Jay, announced their destination and estimated time of arrival. Then, as they waited for clearance, the Muzak hummed a medley of modishly upbeat tunes.

Sister Incarnation—she of the red guitar case—made a single remark about the Muzak, and Sister Fidelis sitting beside her in the window seat, pointed out the element of emulgence in her remark. Sister Fidelis's conscience was always on patrol. Duty chastened (for she had been uncharitable), Sister Incarnation began a rosary.

The plane taxied to the end of the runway. The flight attendants made a final passage up and down the aisles to see that everyone's chair was in the upright position with the seat belt fastened. The engines fired, and the plane rolled forward, bouncing and shuddering. The woman in the green pant suit, Mrs. Jack Schoewe, lowered the plastic eyeshield of the window beside her and stared resolutely at the temporarily meaningless print on the page.

The plane tilted upward. They were off the ground. Sister Incarnation leaned across Sister Reddick's lap to look at the swiftly broadening view—the gray, four-square ships of the airport's concrete, the long ribbons of highway, a patchwork of suburban rooftops and lawns, and then, quite suddenly, nothing at all. They had entered the cloud. Sister Incarnation leaned back in her seat with a sigh.

The woman in the green pant suit raised the blind from the window and returned to a consideration of real-estate values in a period of double-digit inflation. The flight attendants began to distribute earphones. **HIGH ALTITUDES**

Barry Anderson could almost feel the first squirt of adrenaline entering his system as he flicked the toggle up and down by way of proving to Malcolm Jay, the pilot, that the radio was indeed dead. Likewise the mixer, the altimeter and any instrument that monitored the plane's external environment rather than its internal functions.

Barry's airline spent large sums making inventories of the psychological traits of its personnel in an effort to hire as pilots and coplots men of absolutely no imagination: men who could be counted on not to panic in situations such as this, which most people would characterize as impossible. Barry's first reaction was a tribute to that selection process.

"I think the difficulty must have something to do with this cloud we're in," he said in a tone of unconfoundable calm. The added adrenaline had no effect but to sharpen his motor responses.

"Yeah, but Jesus, the radar!" Malcolm said, beginning to whine. Malcolm, despite as good a test profile as Barry, was already rattled. "How do you explain that?"

Barry offered no explanation beyond a precision shrug. "We'll just have to keep climbing. Then, when we're over this damned cloud—"

As they climbed, Barry calculated on his wrist computer their probable altitude. Given the slope of ascent, the time elapsed, and the speed (which he estimated, based on the engines' thrust), Barry arrived at a probable altitude of forty-five thousand feet. Malcolm checked the figure and found nothing wrong with them, yet it was quite impossible that they should still be enveloped in such a thickness of cloud at this altitude. Even the highest cirrus seldom formed above forty thousand feet.

"We'd better stop climbing," said Barry. "And just keep heading . . . where?"

"The way we're headed. Do you have any

other suggestions? Malcolm didn't.

"If I have to clear eventually!"

Malcolm nodded. Like a person deprived of sensory inputs, his mind began to produce reveries of a somewhat inappropriate nature. He remembered a flight attendant he had made out with during a layover in Phoenix. In the cockpit of this very plane, he could remember her large, white, blowy breasts drooping down over the top of her no cage, the firmness of her thighs, the coolness of her hands, the tickling of sharp fingernails. **STRANGE WEATHER**

"This is some strange weather," said Andy Dwyer, pressing his nose to the small window beside him. The window was dotted with smudges left by earlier observations. "Mm," said the man in the aisle seat who was reading the airline's bound edition of *Business Week*.

Andy figured there was no use continuing the conversation. There was more than a seat between them—there was a pan-

◆ *There was a change in the pitch of the engines' low organ tones, a diminution of thrust, as though the 747 were slowing down, like a ship plowing through heavy seas* ◆

entration, and it wasn't about to be spanned.

But it was undoubtedly very strange weather, and while Andy trusted implicitly in airplanes, he couldn't help feeling edgy. They'd been climbing for how long already? And still were, and still hadn't come out of the clouds.

The seat-belt sign was still on, but otherwise nothing seemed out of the ordinary. People in the back rows were smoking. The attendants were restocking a trolley of coffee and drinks.

He felt the weight of his body shifting. The plane was leveling off. They were still in the clouds, though. It was strange.

He dug into his knapsack for a book. Reading was the second best way Andy knew to get his mind off reality, even if all he had to read was the textbook for classic civilization. Midterms were Tuesday, and so far he hadn't cracked a book. Classic civ was reputed to be a Mickey Mouse course with test questions like "Zeus: the father of the gods, dwelt on Mount Olympus" or "Aristophanes ruled Athens from 410 to 385 B.C. (True or False)." There were advantages in attending a junior college in Florida, though the degree was not one of them.

The ambience, however, was compatible, and you never had to wait for a court. Not that Andy reassured himself excessively in the direction of solitis. Life, he tended to believe, was but a dream, so who needed to build his balls now?

**TILT, SHLOOIER, AND LURCH**

The plane lurched.

Dr. Tums smiled, imagining the sudden consternation among the arrows supporting the wings of the plane as it hit the pocket of turbulence. It lurched again, and he frowned. There was a change in the pitch of the engines, low organ tones, a diminution of thrust, as though the 747 were slowing down like a ship plowing through heavy seas. It occurred to Dr. Tums that he, together with the other twenty odd passengers on the plane, was about to die. Planes are not dignified; they cannot simply grind to a halt and hang suspended. Hard often wondered how he would respond to the threat, or the certainty of death and feel rather pleased with himself that he was taking it so calmly. If his fellow passengers should begin to panic (and why weren't they doing so already?), he might not be able to maintain his exemplary serenity but for the moment Epictetus himself could not have been more stoic.

"Mrs. Vow?"

"Doctor?"

"Did you feel an unusual sensation just now?"

"In what sense unusual?"

"Protoproceptively," replied Dr. Tums with a literal exorcism. He knew Mrs. Vow found annoying. After a pause to consult her own sensations, she answered, "We've stopped climbing and seem to have leveled off. The NO SMOKING light is off, but the FASTEN SEAT BELT light is still on."

"What can you see out the window?"

"We're still in the back of the clouds, and this is odd. Usually one climbs above them. It's the lowest part of flying, to my mind—looking down over those landscapes of clouds. They seem so solid. One understands how the Greeks might suppose their gods could live on top of them."

"I always fancied one would bounce about a great deal if one walked on clouds."

"On Tropicus clouds, possibly," said Mrs. Vow. "Not on Georgia O'Keefe's."

For a while they discussed the relative merits of the cloudscapes of their favorite painters. After epistemology, chess, and medieval scientific theories, art history was Dr. Tums's favorite recreational pastime. Mrs. Vow had done a year of postgraduate work at the Wartburg Institute and knew how to describe a painting in the most minute particulars while simultaneously evoking its numerous, unnameable what's-it-ness. Below her blindness Dr. Tums had not taken much interest in painting, but now that all art had become conceptual to him, he had become a great attendee of galleries and museums. His favorite painters were Held, Stella, and Hodgkins, none of whom worked over seven. He had even, in a moment of extravagance, bought a Hodgkins. Mrs.

Vow favored more painterly painters—De Kooning, Johns, Duboisson. The wonderful thing about their discussions on art was that she never pulled rank on him: never suggested that if he could see the painting in question, he would be of another opinion as to its merits. A saint, no doubt of it. Mrs. Vow was a saint.

The captain's voice boomed out over the speakers, interrupting all conversations. He asked the passengers to remain in their seats with their seat belts fastened. The plane was encountering turbulence, but this was a common occurrence, and there was no need to be alarmed.

"He does sound alarmed, though doesn't he?" Mrs. Vow observed.

"Men," said Dr. Turn.

The cabin tilted forward and to the right, shuddered—as though it were fighting against the tilt—then lurched to the left, but without affecting its downward inclination.

"I think we're going to crash," Mrs. Vow said, holding her hand.

A sudden babble of voices expressed collective forebodings. Several passengers summoned the flight attendants, but no one went so far as to scream—as though to have done so would have provoked the plane to more dire behavior.

Mrs. Vow exerted a steady, steady force on his hand. Behind the obscuring confusion of voices in the cabin, the whine of the engines seemed to diminish to a rumble, a purr, a whisper. When the en-

gines ceased altogether, the cabin fell silent, too, as though the same irrational intuition had simultaneously occurred to each passenger—that they were not about to crash (there was no sense of forward momentum) but were instead (and quite impossibly) becalmed. Slowly, in utter silence, the cabin righted itself, as though it were a ship riding a long swell.

"Can you see anything from the windows?" Dr. Turn whispered.

"Nothing," said Mrs. Vow. "Clouds."

"Do you know, I wish someone would scream. This is unusual."

"No, Doctor, there I draw the line. I don't believe I have ever in my whole life screamed. Not as an adult in public. And don't you scream either. If we're all to die, let's try to do so with some dignity."

"We don't seem about to die, however. It's very strange."

"It is very strange," Mrs. Vow agreed in her most disapproving tone. She seemed to hold Dr. Turn responsible for what was happening. She let go of his hand. "Excuse me, but I must go to the toilet."

#### THE CLOUD ENTERS THE PLANE

Until the last dewlike droplets formed on the beige plastic louvers of the ventilator above Mrs. Schweers, grew to teardrop size and dropped onto the open pages of *How to Prosper During the Coming Bad Years*, no one in the plane had noticed—or at least thought to comment on—the very muggy atmosphere within the cabin. The

larger address of this seeming suspension of the laws of aerodynamics had blinded them all to the smaller oddity of the suddenly so much higher humidity.

"What in heaven's name is happening?" Mrs. Schweers demanded, holding out the scattered pages of her book in evidence to the gentleman across the aisle. "Why is the air blower leaking?"

In the seat behind Mrs. Schweers, Sister Incarnation looked up at the ventilator and saw that there were indeed droplets of condensation upon its louvers—and upon the ventilator above Sister Fidelis as well. Already enough moisture had fallen to the lap of the sloping run that her habit was speckled regularly with polka dots of dampness. The extent of this precipitation did not really amount to a "leak," but that there should be any at all was unsettling. Why would a ventilator ever drip water? Sister Incarnation had taught general science to legions of fourth and fifth graders, but her sense of the workaday applications of the principles she taught in general science was rather scatty. She seemed to recall that condensation had something to do with rapid cooling, and that accounted for air conditioners so often drooping in a similar way.

"Amend!" Mrs. Schweers called out volubly, using the name by which the senior flight attendant had introduced herself at the beginning of the takeoff recitation. "Amends! Will you come here, please?"

Reluctantly (for she'd been grateful for the pilot's instruction to stay seated till the preflight difficulties had been sorted out; she was feeling weirdly groggy) Amanda Conkin unbuckled her seat belt and made her way up the aisle to Mrs. Schweers's bulkhead seat. "What seems to be the matter, ma'am?" she asked, leaning down and fixing her eyes noncommittally on the woman's gash perineum. Mrs. Schweers had not properly begun to express her sense of being owed an explanation before her individual alarm became general. From each of the ventilators above each of the seats bilious fog issued into the cabin, opaquely white and quite coherent in shape like thought balloons in a comic strip. There was a general outcry among the passengers, followed by a certain amount of milling about in the aisles. The plane responded as though it were a light ballroom boat, tilting and righting itself as the passengers shifted position.

Sister Incarnation joggled the shoulder of her sleeping companion. "Sister Fidelis, I think you had better wake up."

The joggle did not suffice. Sister Incarnation poked, but still Sister Fidelis could not be roused. "Sister Fidelis? You must wake up, Sister Please!"

The nun's head slumped to this side. Sister Incarnation could hear a far-off rumble of a storm, faint as the signal of a radio station at the threshold of receivability.

#### THE CLOUD CAT

David Woody had remained in his seat during the first outbreak of panic, not



"It's a baffling case; he has a solid *Dun & Bradstreet* rating, but he won't pay."



much because he was handcuffed to the travel basket of his Nibs, a celebrity cat insured for two million dollars. His Nibs after starring in two feature films in which he had played a feline detective had gone on to earn even bigger bucks as Dyna-Food Corporation's answer to the late and much-lamented (though not by Dyna-Food) Momo. Usually David didn't mind acting as the manager of an ill-tempered professional cat. Only at times like this did he feel resentful toward his Nibs, times when people would give him odd looks and he could not explain to them that he was handcuffed to a cat basket for entirely aboveboard monetary reasons, not because he was some kind of kook.

"May I have your attention, everybody?"

David gave his attention to the Hawaiian-shirted parapegic who had struggled up to support himself on the armrest of the aisle seat and was waving an aluminum cup over his head to get attention. "Please!" he insisted when David alone of the two other first-class passengers afforded him more than a glance.

"There's something strange happening in this airplane and we are not being informed about it. I suggest—will you all please listen to me—I suggest that a delegation be sent forward to the cockpit to demand an explanation from our pilot."

Amanda Conklin strode briskly down the aisle toward the troublemaker. "But if you would kindly return to your seat!" With a nurse's unthinking intensity she placed her hands in the young cripples armpits and lowered him back into his seat. His clutch overturned a tumbler of glistening ice cubes. "You can be sure that Captain Jay will be making a general announcement as soon as the situation warrants it," she went on as, down on one knee she scooped the ice cubes back into the tumbler. "In the meantime we must all try to keep our wits about us and stay seated. Any unnecessary movement may be—" she stopped herself from saying dangerous, her duty was to promote a sense of calm and order—"upsetting to your fellow passengers. Now, if you do feel the need to share your concern with someone else, that's understandable. I'm sure the gentleman— she made eye contact with David, who with the very slightest shake of his head tried to make her matchmaking, Amanda smiled complotously—"or the gentleman— she indicated an older man across the aisle who was staring intently at the crossword puzzle in the airline magazine—"would have no objection to coming and sitting beside you for a few minutes."

"I'll sit by myself," said the paraplegic 'thank you very much'.

Amanda walked back to David's seat and stopped. "What a beautiful cat," she said. "Is it a Persian?"

David looked where Amanda was looking at the vacant window seat beside him, which was no longer vacant. His Nibs had somehow gotten out of his basket and was snoring contentedly on the folded jacket

of David's gray suit. How could he have gotten loose?

Then he realized—and in the same instant Amanda realized as well—that the cat on the seat beside him was not his Nibs (who was a tweedy, almost gingersnap tom, not this shimmery, heartostosed shade of silver). This was not in fact any kind of cat at all. It was Amanda who proved herself the braver for she reached down and touched the simulated cat, which instantly dispersed into tendrils of vapor that spilled over the edge of the seat like water spilling from the basin of a fountain.

#### A LOCKED-ROOM MYSTERY

Amanda's outcry and subsequent emotional collapse went unmarked outside the first-class cabin, for another and much stranger happening had absorbed the attention of the tourist-class passengers—except Dr. Tumb, the one passenger most directly affected. Even he, however, realized that there was something in the air.

What was quite literally in the air was the seated, slightly slumped body of Mrs. Vow She Hung, like a Dalí Madonna, just before the door of the bathroom that she'd entered some minutes earlier, at about the height of someone seated on the fourth rung of a ladder. Her dress was hitched up and her panty hose pushed down, just as they might have been had she been seated on a toilet instead of, as now, being suspended in midair without visible means of support. Like the simulated tomato in the first-class cabin this spectral Mrs. Vow had been reproduced in monochrome, black and white, but unlike the vanished cat she did not revert to mere wisps of vapor upon being touched (tentatively by Andy Dreer, who'd been waiting to be next inside). Rather, a kind of ripple passed through her image as though it was a reflection (albeit three dimensional) in a pool of water that had been disturbed by the first scattered raindrops of an impending storm.

"Holy torpedo!" said Andy Dreer with unforgotten reverence. "Did you see that?"

Clearly many of the other passengers had seen it—were seeing it still—but none wished to discuss their perceptions with Andy. They sat staring at the wealth of Mrs. Vow with the enhanced, furtive expressions of hotel guests who have tuned in to a pornographic television channel by accident and find themselves unable to turn away. It was Andy who made the connection between the image suspended in the air of the cabin and the woman who'd gone into the bathroom ahead of him. He stooped himself against the dread of violating a taboo so publicly—and knocked on the locked door of the toilet. "Ma'am? Are you in there? Ma'am, can you hear me? When there was no response, he knocked more forcefully and called out more loudly. "Hey, is everything all right in there?"

Maynard Ellis, who had been smoking a cigarette at the back of the cabin and lecturing himself on the importance of not panicking (especially as he was the only black and the only male among the light



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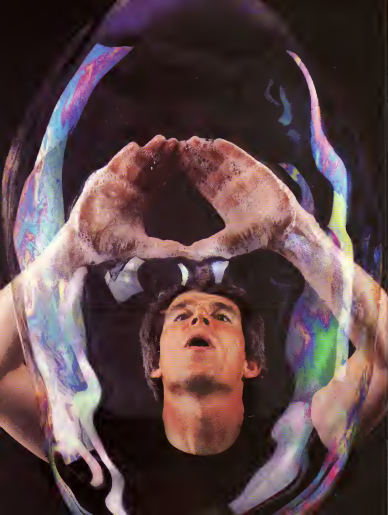


SCIENCE AND  
ARTISTRY  
BECOME ONE  
IN THE  
WORK OF THE  
BUBBLE  
DESIGNERS.

MOLECULES  
THICK,  
THE THREE-  
LAYER  
SKIN OF THE  
BUBBLE  
SHOWN HERE  
REFLECTS  
A SWIRLING  
RIVER OF COLOR.

BUBBLE KING  
EIFFEL  
PLASTERER  
(ABOVE) ON THE JOB

# SPLISH SPLASH



The materials are the most fragile imaginable: air, water, and a flexible but delicate skin whose thickness is measured in molecules. Together these substances compose the bubble, an object that has delighted children and mystified scientists for centuries. With a little applied physics scientists now know what a bubble is and even what transformations it could undergo in another dimension.

They know, for example, that the skin of a bubble is a molecule-thin layer of water trapped between an inner and outer membrane of soap film. The film's elasticity is what allows a bubble to be shaped like the giant crenon at left or filled with gas (smoke or air, above) for dramatic effect. Bubbles demonstrate the wonderful economy of nature, as they always contract to the smallest possible volume.

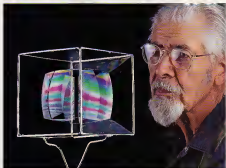


A BUBBLE'S ELASTIC SKIN ALLOWS PLAYFUL CRAFTSMEN (ABOVE, CENTER, FAR RIGHT) TO SCULPT NEW SIZES AND SHAPES.



THIS MAMMOTH TWO-BODY ARCHWAY WAS CREATED BY RICHARD FAVERY (CENTER), WHO HAS ALSO CONSTRUCTED BUBBLE DOUGHNUTS.





In our three-dimensional world, the standard bubble is an iridescent sphere. In other dimensions, mathematicians say, stranger configurations might be the norm. One who has been endlessly fascinated with this subject is eighty-seven-year-old Effie Plasterer. For the past 55 years his first creations—from great shimmering bubble snakes (opposite) to delicate little rainbow-hued boxes

(above)—have stretched the limits of the science. (He once designed a thick-skinned bubble that lasted 340 days.)

Mathematicians now believe that if a series of bubbles were blown in the fourth dimension and formed bubble colonies, the result would not be spherical creations but unique pleasing geometries like the cube and the tetrahedron within a tetrahedron above.—Scott Morris **OC**

# SPACE

CONTINUED FROM PAGE 26

old. This year he retired from his teaching post, but he continues to spend his days at work in the university laboratory. When and if *Ulysses* lifts off as currently scheduled, he'll be seventy-three. "It's been a series of frustrating efforts," he says. "The emotional strain has been quite high."

Whatever *Ulysses'* fate, Simpson's reputation is already secure. He has devised and flown dozens of experiments on spacecraft over the years, including an instrument on the Soviet's recent *Halley's comet* rendezvous. What worries him is the fate of the current generation of young researchers in high-energy astrophysics, scientists who will never have the same opportunities that he had. He remembers the day when young researchers wrote one-page proposals and had their experiments built and launched on small rockets within the year. Now he speaks of a "lost generation" of space scientists: Ph.D.s without the same opportunities to explore their field. "How can we encourage young people to work with us when there are no flight opportunities?" Simpson asks.

A typical case is Glenn Mason. He stopped waiting for *Ulysses* six years ago. That was when NASA's vehicle was scrapped, along with Mason's energetic-

particle detector. "It was pretty devastating," says Mason, now a forty-four-year-old associate professor of physics at the University of Maryland. "You'd spent a couple of years working very hard on something, and you had very little to show for it." Two years wasted is a terrible loss for anyone, he says, but it's worse when you're still an untrained researcher trying to establish a reputation. When you look at the time it takes to accomplish anything with a NASA program, you really have to love what you are doing to choose that path, he says.

Today the *Ulysses* scientists lay much of the blame for their plight on NASA's ill-fated shuttle after-alias policy, a loose Congress, and a general lack of interest in innovative space science. But some of the problems of *Ulysses* are the unavoidable result of big science getting bigger and shouldering life science aside. The space telescope, to cite one example, costs \$1.4 billion, about six times the cost of *Ulysses*. Just sharing the space telescope while *Ulysses* waits for a shuttle berth runs to \$7 million a month, a sum that in the Series would have paid for two orbital missions.

Moreover, big, money-gulping, hard-core-oriented programs like the space station mean jobs for thousands of engineers and support workers on the ground, whereas a small, specialized science mission like *Ulysses* provides few jobs, generates little public excitement, and has no

commercial potential. It's pure science—knowledge for the sake of knowledge.

Meanwhile John Simpson, calm if not cheerful, waits for his launch date, biding his time. These days he recalls that in Dante's *Inferno*, *Ulysses* (the hero) exalted his men:

"Brothers," said I, "that have come vainly  
to try."

Through hundreds thousands jeopardies  
undergone

To reach the West, you will not now deny  
To this last little ing'it left to run.

Of feeling life the new experience.

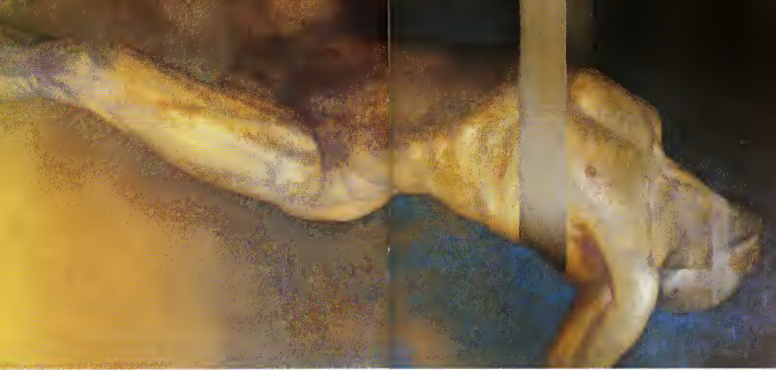
Of the uninhabited world behind the  
sun."

The irony is that when we named the project, says Simpson, "we never realized we were all going to be suffering the way *Ulysses* did."

## OMNIBUS

Available in bookstores everywhere is *The Orion Space Almanac* by Omni contributor Neil McVie. It is a complete history of space and a catalog of what we can expect to see in space exploration for the remainder of this century and in the century to come. Astronaut Michael Collins calls the almanac a "wonderful job and the most comprehensive book to date" on the space program. Price: \$24.95. It is published by World Almanac, 200 Park Avenue, New York, NY 10022. **OD**





ARTICLE

## LAST RIGHTS

BY KATHLEEN STEIN

On his back, eyes shut, breathing rhythmically, PH—six feet, 170 pounds—is a handsome man. Yet even as one admires the strong lines of his body, surgeons with scalpels incise the skin and muscle of his chest and abdomen with long, sure strokes. Using a small electric saw, they cleave the sternum as easily as if it were made of bone. There it sits, suddenly

PAINTING BY MICHEL HENRICOF

little blood, but there's a certain amount of dexterity in the operating room (O.R.) when as many as eight doctors have their hands and arms inside the cadaver, working quickly to disconnect the organs from their many vessels.

Rib cage and thoracic cavity are played open and viscera held back with metal retractors known as lion inferns. The organs reveal a marvelous power: As when someone lifts the hood of a fire car and sees the frictionless workings of a precision-tuned engine. This engine is awesome—gleaming, organic, wet. Aesthetically the liver is most pleasing, resembling some lustuous sea creature: smooth and supple with sharply defined edges. But a surgical error contaminates it. As a result the liver loses its sickness and definition, turning from coral pink to meat market purple. The surgeons push the organ aside and, struggling with their disappointment, proceed.

After another hour the kidneys, bean shapes that I identify in the surgeons' palm, are lifted out with ureters still attached.

R.H.'s heart suddenly begins an agitated dance, speeding from 100 to 200 beats a minute. The surgeons, alarmed, quiet it with a jolt of electricity from defibrillating paddles. Two hours later it too is removed and slipped into a stainless-steel bowl full of saline solution.

As from each organ comes out, it is carefully packed in an Igloo Playmate full of dry ice and rushed to a waiting helicopter for delivery to a distant transplant team. Finally, after the major organs are removed, a blond haired surgeon from New York's Columbia Presbyterian Medical Center, his eyes rimmed by dark circles, tells the anesthetist to disconnect the I.V.'s and turn off the respirator.

A week earlier an aneurysm had ruptured in R.H.'s brain, virtually ripping apart his cerebrum. Following clinical tests and an electroencephalogram (EEG), physicians at Good Samaritan Hospital in Suffern, New York, declared him brain dead. I was his birthday, he was, or would have been, forty-two.

As I stood at the bedside in the intensive care unit (ICU) earlier that day, two parCaptions loomed in my mind. First, how could he be dead? He looked so full of life. There wasn't a mark on him. His thick, light-brown hair was tousled, as if he'd just come in from a basketball game with the guys. His carotid artery pulsated with blood; his heart size was nearly normal. The urine bag at the side of the bed filled regularly and was replaced. And secondly, an intellectual observation: He was obviously very dead. The blood, oxygen, and nutrients perking his body were all driven by the machines surrounding him.

There was something else, a more subliminal confirmation, subtle cues signaling that no one—no spirit?—was there. Lifting his arm, which was just slightly cool, I felt only a flaccid, lifeless weight.

And yet... I wanted to whisper, so as not to wake him

R.H. is a late-twentieth-century corpse, one of a new class of dead people created by medical technology. The "beating heart cadavers," or neo-morts, as these dead are sometimes called, have cells, tissues, organs, and organ systems that can be kept alive several days by elaborate life-support systems long after their brains have ceased functioning.

I first began to realize that the big sleep was no longer a simple state when I was researching material on the future of death for a book edited by Arthur C. Clarke. In the midst of scenarios about holographic musculature and near-death-experience cults, I found that the future, as they say, is already with us.

Since history's beginnings, the classical sign of death was when heart and lungs stopped. "Brain death" is only about 20 years old, the offspring of the ICU and its advanced life-support technologies. Even as we struggle with brain death, the concept is being modified. Bioethicists and

“There was something else, a more subliminal confirmation signaling that no one—no spirit?—was there. Lifting his arm, I felt only a flaccid, lifeless weight.”

members of the medical profession think the definition of death should encompass not only those who have no brain functions (the brain dead) but also those who have lost consciousness (the cognitive dead), “lost souls” who linger mindlessly in what are called persistent vegetative states. So clearly has to confront again some basic philosophical questions: what it means to be alive, to be a person, to have a mind. Before attempting to address those issues, here is a brief neo-death lexicon.

• **Brain death.** Very simply, this describes a state in which no part of the brain functions. Once a person is brain dead, he is dead, period. His body can be maintained artificially on a respirator only hours or, at most, several days until cardiac arrest.

• **Persistent vegetative state.** In brain death the whole brain is destroyed; in a persistent vegetative state, only part of the brain is destroyed. The brain stem, a primitive region that connects the brain to the spinal cord, is usually intact or mostly intact. A person with his brain stem intact is capable of stereotypical reflex functions—breathing, sleeping, digesting food—but he will be incapable of thought or even of

any awareness of the world around him. A person can remain in this state for years.

• **Cognitive death.** A number of bioethicists, philosophers, and M.D.s are beginning to contemplate expanding the definition of death to include people in persistent vegetative states, individuals who have lost their intellect, memory, speech, and awareness of self or environment.

When I started my new death investigation, an M.D. friend said: “You’ve got to talk to Julie Koren; he wrote the book on brain death.” Julie Koren is professor of neurology at New York University School of Medicine, chief of Bellevue Hospital’s EEG lab, and chairman of the Bioethical ethics committee at Bellevue. A kind of tough guy with a spiky, intense personality, he moves and talks in swift bursts of energy. At first Koren seemed annoyed, even suspicious, at being interviewed. “Frankly, I’m sick to death of death,” he announced when I first met him. Soon though he was supplying books, papers, and his tale. Koren is currently investigating the “beginning of brain life” in the fetus. Going full circle, so it were.

“There is no moment of death,” he says. The moment of death is a legal construct for matter of probate. As an example, Koren cites a famous case of a husband and wife who were killed when their car was hit by a train. The body of one was crushed completely on impact, the other, decapitated. For the will, it was necessary to ask: certain which one died first? The lawyers argued that it was the crushed spouse. As long as the other’s head was spewing blood from the neck, it was deemed “alive.” But, even concerning the obliterated woman, Koren goes on, “you can say, well, there were fractions of seconds before the whole person broke down and she died. So maybe the moment of death was fifty nanoseconds later.”

Look at cardiovascular death. The heart stops. The doctor listens to the chest. Was that the moment of death? With modern equipment, you can detect signs of electrical activity in the heart forty minutes after it has stopped beating. The moment of death is a fiction.

I persist. Many people would say the moment of death is when the soul leaves the body. “When does that happen?” Koren attacks the idea. “Let’s assume there’s a soul. When does it exit? When the heart stops? When the brain stops? When the reticular formation, the brain’s arousal system, stops? Does it exit all at once, an instantaneous thing, or gradually? If gradually, then there’s no moment of death!”

In 1975 Koren was the expert witness in the Karen Ann Quinlan trial, in which the family sued to have the life-support system removed from the young woman. It was his testimony more than anything else that brought about a ruling in favor of the family—that Quinlan, suffering permanent loss of higher brain functions, could be removed from the respirator. Quinlan had become comatose after ingesting a mis-





"As you can see, Lieutenant Kefler, we've not yet resolved the problems caused by flitulence in a weightless environment."

ture of drugs and alcohol at a party.

During the trial one common misconception was that Quinlan was brain dead. "She was never brain dead," Koren is recalled. "At that time and even today, people talk about her as brain dead, but she never met the criteria." One of the criteria specifies that the brain stem no longer functions. There is no brain death without brain stem death, and in adults, brain stem death means that cardiac death inevitably follows within hours or days. Quinlan always had brain stem function.

The brain stem is the keystone of the central nervous system (CNS), the direct hookup to the spinal cord on one end and the cortex on the other. "It is in every sense the ultimate site of 'Life's Little Candle,'" says *The Human Brain Coloring Book*. Although it makes up only one tenth of the CNS, it controls the activities basic to existence: the autonomic—vegetative—functions. Destroy the brain stem, and you abandon all hope of survival.

Koren was on the stand more than four hours. As a witness he had to relive the courtroom in the workings and malfunctions of the entire brain. He told them Quinlan was not brain dead. She had EEG activity in spite of massive damage to her cerebral hemispheres. And, he testified, she might breathe spontaneously off the respirator. And as the world knows, she continued breathing. Until her death from infection nine years later, she remained

attached to the life-supporting nutrition-hydration tube.

Soon after the Quinlan trial, Koren chaired an international conference to discuss research on brain death that had been ongoing from the late Sixties. And from that conference came the book *Brain Death: Interrelated Medical and Social Issues*. That text helped lift the fog of confusion enveloping doctors who were diagnosing the status of respirator-maintained patients. The book defined brain death clearly. The criteria included total unresponsiveness and lack of movement, no brain stem reflexes (having feed, dilated pupils, for example), and inability to breathe without a respirator. For confirmation, many neurological tests were also encouraged, to exclude the possibility of drug intoxication or hypothermia, conditions that can mimic brain death. Always there was the overriding rule: It is permissible to act only on the side of diagnosing a dead brain as alive.

In 1981, largely because of the work of Koren and many other neurologists, the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Science proposed as statute the Uniform Determination of Death Act, which reads: "An individual who has sustained either (1) irreversible cessation of circulatory and respiratory functions, or (2) irreversible cessation of all functions of the brain, including brain stem, is dead." The act is law in 38 states and pending in

others. Using the established criteria, no one properly diagnosed as brain dead has ever regained any brain function.

With the idea of brain death fairly clear in my mind, the next concentric circle of the kingdom of living dead to explore was the world of the irreversibly unconscious, the realm of the vegetative.

Unlike the brain dead, the vegetative have a functional brain stem. At the core of the upper brain stem is the system of nerve cells and fibers called the ascending reticular formation, a Y-shaped structure that serves as a two-way street to and from the cortex. It adjusts all morning and evening commands from both cerebral hemispheres. The reticular formation constitutes the brain's general broadcasting system. It wakes us up and puts us to sleep, allows information to be stored or forgotten, noted or ignored. Without it, consciousness is impossible, even if the cortex is intact.

Arousal, wakefulness, awareness. That's the activating part of the reticular formation. If the cerebrum's 10 billion neurons were all discharging at once, one would have continuous storms of electrical convulsions. To gain meaningful patterns from the stream of information, you need the reticular formation's inhibitory impulses. Nothing, so far, has been able to arouse someone whose reticular formation has been destroyed.

Unlike the brain dead, who lie limp as rag dolls, vegetative patients may exhibit bizarre "discoelectric posturing" and spasticity. Their arms and legs conform into "flexion contractions." Elbows, wrists, fingers bend in toward the chest; knees are drawn up tightly, toes down. Some occasionally yawn and stick out their tongues, exhibit lip-licking or chewing movements, grimace and grind their teeth—all stereotypical, repetitive reflex responses without purpose.

This is a pretty good portrait of Karen Quinlan at the time of the trial. When the media and even the medical profession referred to her as comatose, they were using the term imprecisely. They should have said vegetative.

I was surprised to learn that there are about 10,000 Americans "living in this kind of black hole of the soul. These are the 'biologically unconscious,' to use Surgeon General C. Everett Koop's term. A crushing financial burden to their families, the typical bill for a year's care is rarely less than \$200,000. But worse is the family's unending psychic pain. When I went to see her, there was no one there. John Jobs, thirty-one, told me about his wife, Nancy, also thirty-one. Finally he stopped going.

Nancy Jobs, vegetative for seven years, was sustained by a feeding tube in a New Jersey nursing home. In 1960, as a pregnant young wife, she was the victim of a tragic set of accidents. First an automobile accident killed her fetus. Next, during an operation to remove the dead fetus, she suffered anoxic loss of oxygen to her brain.



long enough to cause enormous damage to the cerebrum. Two years ago John, with Nancy's parents and Quinlan lawyer Paul W. Armstrong, filed suit to have the feeding tube removed. The Lincoln Park nursing home refused. The family won their case, but the nursing home appealed. Not until June 1987 were Jobsis and his parents-in-law released from their purgatory. At that time the New Jersey Supreme Court decided in their favor, and Nancy will be allowed to die with dignity, as they say, after years of pointless indignity. It has been inexpressible hell for John Jobsis.

There comes a point where you just can't let it go on and on," he says, his voice low and angry. "Nancy would never want to be in this state." Today he is emotionally and financially wiped out. And after seven years it's hard for him to get on with his life. "My mother- and father-in-law tell me I should," he says hollowly, "but it's easier to say than do."

Even though the AMA has now judged it ethical for physicians to withdraw treatment from such irreversibly unconscious patients, confusion and controversy over this latest dilemma of high-tech medicine still rages in the courts, hospitals, and nursing homes. And the problem, more delicate and complex than brain death, will not go away. It's just gathering force.

A number of people are suggesting that the Nancy Jobsises or Karen Ann Quinlan, the persistent vegetatives, could join the ranks of the neo-mortals. Stuart Youngner, a psychiatrist at Case Western Reserve Medical Center in Cleveland, is one. He thinks society should draw up a new definition of death. "Once consciousness is gone," he says, "the person is lost. What remains is a mindless organism." After the loss of personhood, he says, the death of what remains is not the death of a human being but of a thing. "The corpse of a body that has outlived its owner."

Needless to say this new cognitive death idea has vehement opponents within the medical community. Most M.D.s are terrified of it. Dr. Vivian Tellez, renal transplant surgeon and codirector of the transplant program at New York City's Montefiore Hospital, exclaimed to me that the idea was "grossly inappropriate, A dangerous distinction. If it were instituted, I'd get out of the business immediately."

It's the Coria thing for real, said another in the movie Coria: a female anesthesiologist "accident" victim is declared brain dead; they pack her off to the nefarious Jefferson Institute, where her body will be maintained artificially until her parts can be harvested and sold. (Neurologically speaking, that's all wrong. She could not have been brain dead. She would be in a persistent vegetative state.)

Many physicians foresee the massive proliferation of "Jefferson Institutes" devoted to harvesting organs from the vegetative "dead." There is no end to possible scenarios. Female vegetatives, for example, might be employed as surrogate

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What did you do to deserve Beefeater?

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# FICTION

Blessed with gifts of prophecy and magic, the boy is spiritual chieftain of his Nicaraguan village and of peace itself

## PICTURES MADE OF STONES

BY LUCIUS SHEPARD

This bunch of neckties drop into the bar for a boost before dinner and start bulbishing about the war like it was the NFL or something losing off casually figures, arguing tactics, and I'm amused, right so I pull up a chair and say I'd be glad to fill them in about the war because I can't stand to let ignorance flourish—which sets them to muttering. But before they can work up real hostility I order a round of drinks and get to talking about the time the patrol was on recon in Nicaragua, following the course of the Poroca through thick mountain jungle just after a flight of Russian choppers had laid down a cloud of gas. I found myself alone, feeling relaxed, grinning like a teased Christian. I'd never been at home in the jungle, but there I was, spacing on the scenery, wondering why orchids had faces and monkeys were scolding my name, and not a bit worried by the fact that the rest of the patrol had vanished. All that mean green was looking beautiful, green like a perfect vice, great sweeps and declivities of green, an entire vocabulary of green scripted by the curves of leaves and vines, green leaves, green vines. Even the air seemed to hold a wash of pale emerald throughout.

I'd heard about the gas the beaneros had first turned you sideways to reality, but as good as I was losing, I didn't care what the hell was behind it. It was as if I'd become more soldierly, more aligned with winning purposes, and I understood that war was not an event bounded by time, defined by politics, but was a principle underlying every life, the ground upon which our actions were deployed. Maybe it was foolish to put so much stock in a delusion (I never thought it otherwise), but I concluded that delusions were standard issue, and if you latched onto a compelling one you didn't discard it just because it didn't accord with Army regs. I walked higher and higher into the mountains, looking like death, thin and feverish, my eyes gone black from seeing, legions rotting away. But I was a miracle inside, ribbed with the silver of principle, armored with the iron of a new intent, one I sensed but could not name. The waitress, a brunet with trophy-sized balloons, she's been listening and now she asks, "What happened to the rest?" I just smile and shrug. One of the neckties, a real Bow Tie in an Italian suit, only cuff links he says. "I've never heard of anything like that," that gas or whatever.

PAINTING BY GEORGE TOOKER

I laugh and fall into it. I could make a whole damn world out of the things he's never heard of

and that half of everything sounds like fantasy anyway—like the stock market, for example,

which gets a laugh from the others. But Mr. Blow Dry remains unconvinced.

"I know lots of guys like you in Nicaragua," I say. "They couldn't believe in what was killing them."

Thought because something wasn't real, it couldn't do them any harm.

The neckless struggle with this concept as I go on talking about war.

I come to a white village ringed by green mountains, with cane and corn planted on the slopes, and mango trees shading the red-lie roads.

The inhabitants were women, children, and old men with wet black eyes as vacant as turtles' eyes.

who told me that their sons had been executed and buried in a mass grave.

Their voices were soft, unharmed, their manner calm and resolute.

and I realized this was not evidence of resignation but that they were at peace.

The longer I stayed, the more I understood that the peace

was a by-product of war, filling the valley the way rainwater fills a shell crater.

creating of the violent form a placid surface and a tranquil depth.

and this inadvertent transformation was its only real incidence,

for all these modes of existence we label peace are nothing more than origins

same that when initiated produce the pearls we officially sanction as conflicts.

I lived with a young widow, Serafina, in a house with old floors

a charcoal stove, and a faded Madonna on the wall above a crude candle.

other

Days, I would put on the cotton shirt and trousers of a campesino and help

her in the fields.

Nights, I would tell her stories of America and other dreams.

With us lived Ramon, her son, and her senile mother, Expectacion.

the only person in the village aside from me who was not at peace.

She loathed me and would haunt the doorway while her daughter and I made love, cursing at me, muttering incoherencies

such as: "Your shadow is a demon, your hours broken glass."

and we would be forced to go into the hills to find some privacy.

Serafina was thick-waisted, heavy in the legs, her face written with scars.

but from her I learned that beauty was no measure, rather a kind of lucidity

that communicated perfectly its moods to whomsoever it permitted to see.

I wanted to be in love with her—more than wanted. I needed that solace

and I believed that love might someday overcome my other compulsion.

But though I knew passion with her, knew

all the trappings of emotion, I could not fall in love, though I suppose I might have, had I survived.

Mr. Blow Dry interrupts me, asking if I am claiming to be a ghost.

or if my statement has some symbolic relevance. "Neither," I tell him.

Life and death are elusive in their meanings. He nods sagely, pretends to understand.

but the waitress leans close, touching my arm, and asks me to explain.

Her face, though beautiful by any standard, seems now to open.

to expose the revelatory beauty that I once perceived in Serafina's face,

and I see her faded years, her petty aspirations and self-absorption.

all this distilling into a consolation, a desire to provide me with remedies.

Though there may be no explanations, for the sake of her lucid mood.

I tell her of Ramon, eight years old, a

"Whether or not Ramon was as the waitresses claimed, I tell the waitress, his truth is undeniable. Our lives are no more than pictures made of stones,

and moment to moment we and the world are transformed utterly.

Only war and the false dream of continuity are immune to these life deaths.

Even peace can last for just so long as it's able to elicit a magical denial.

This is not philosophy, but signals a process too subtle to wear a suit of words."

That last night Serafina and I went into a banana grove to be alone.

and after making love, lying there, watching the ragged shadows of the birds shifting across the thickets of stars and darkness overhead.

she told me she was concerned about Expectacion, her mother's instability and incoherence.

Then as if on cue, Expectacion appeared at the base of the hill, staring at us.

looking like a huge black bird in her peaked shawl, her voice a static of curses.

We ignored her, and eventually she moved off into the night toward home.

But when we returned to the house, a neighbor told us that Expectacion had run off into the hills.

heading west toward the great cliff that overlooked the Patuca.

Leaving Serafina to watch over Ramon, I went to bring back Expectacion.

As I climbed the western hill, I could feel my superficial peace dissolving.

my principle resurfacing, claiming me and everything I saw look on an eerie violence.

and my thoughts became as black and deviant as the limbs of the trees,

which seemed like a world of cat-alabras topped with a thousand green flames.

illuminated by a golden full moon like an owl howling silence.

Now and then I saw Expectacion moving above me, a shadow among shadows, and I cursed her in my thoughts.

Old hag, mad ghost, gloom of a bitch.

A dozen times I nearly had her, but always she eluded me, and at last.

I found her waiting on the cliff top, I almost caught her as she leaped,

appearing to vanish up and out into the dark, rather than falling.

I stood a moment, wondering how to tell Serafina what had happened.

and a voice called from the trail leading down to the left of the cliff,

commanding me to come toward it, to hold my hands high and not to run.

I did as ordered and soon confronted a patrol of men anonymous in their combat gear.

bulky olive-drab suits and helmets with smoked faceplates through which were visible

reflections of green mammals and diagrams from their computer readouts.

Rockets bristled from their backpacks, gas grenades for igniting the air in tunnels hung in clusters from their belts, and their computer-linked rifles hummed. I was confused as to who they were, for their speech was an electric babble that I translated into frequencies of pure meaning, but I believe now they were Cuban, though had they been American, it would have made little difference. They asked about the village, if there were women, if there were soldiers. I told them how it was, and they were delighted; they talked about the pleasures awaiting them. They gave me food and drink, and asked me from which village I hailed, for in my cotton trousers and destroyed shirt they mistook me for a local. I pretended to be grateful, but I heard them, I saw the inconsistency with which they embodied the principle of war, and I knew what must be done. That night I walked among them as they slept, perfect in my stealth, a pure warrior shadowless free of the drugs of conscience and morality. I sloped a rifle from a sleeping hand and swung it in a scything burst that finished all but one, whose legs and arms were pierced by the rounds. He tried to talk with me, and I think he understood why he was to die.

but perhaps this was simply a conceit on my part, reflecting a need for understanding. The moon was a drop of golden venom in his topknot; his pleading hurt my head, and his thoughts scoured like spiders for cover into the crevices of his brain. I killed them all before they could hide and leave clues to my identity. Then I stood, feeling more unified in purpose and place than ever. Though Ramon may have enlisted me in the service of the village, though in his picture I might be a protector, I saw that my act had been one of initiation, a entry into the war, an expression of its art and governance. I felt a shivering within me, I seemed to hear a click as of stones being set in place. The border between peace and war divided me, slicing me in half, but there was no doubt which of them was my ruler, and I went down from the cliff away from the valley, dead to one world, already reborn to the new.

The rush of traffic is blending together with the ashen twilight into dusk, and the nookies are sitting with their heads down, studying their hands with the solemnity of men at a Rotary breakfast who are contemplating

some preachy truth that they happen will sustain them through their business day. What happened then? asks Mr. Blow Dry and I laugh long and hard at the absolute ignorance of time and process that his question reveals. "You want to hear more?" I say. "Sure. I'll tell you stories all night long. I'll tell about The Volcano That Sang, The Fire That Spoke My Name about the four-armed child I once saw during the Battle of Bluefields. Then you can go from here armed with said expertise with a new pose of wisdom, with a wit and seductive color to add to your cocktail party opinions. Sure, man! Buy another round! We'll talk, we'll fucking communicate. I'll make believe you're really here, and you can pretend the world has never ended." The nookies are alarmed, not wanting their shallowness to be mistaken for what it is, and they assure me that all I've said has made a difference in their lives, impressed by the hard-hitting glamour of pain with—wow!—philosophy too, and ignoring the possibility that I may be deluded or a liar or both. But the waitress only looks at me, and as price begins to spill from the bar into the waiting street, instead of her face, her beautiful lucid face that stuns me with its clarity of mood, is intimations of something more than sympathy of deeper interest. I have a vision of a child's enormous grimy fingers reaching toward me.

Listen, Ramon. What good is there in my continued service? Is it that I am a counterweight, a potent pawn whose movements help to maintain the delicate border between peace and war? Even if so, sooner or later the border will erode and a harsh toll will be taken, harsher for every moment that denies war's dominion. I have died many times, always for the sake of principle, and I am not afraid. I have lost the capacity for fear and for much else that makes a man. But the woman is becoming real to me, and though she is only an argument against an unendurable truth. I need a death to consume me in light to show me those things I might have learned in that valley where peace was the law and magic the rule. Choose your stones with care, Ramon. Give me back my world of random choices of ordinary defeats. Leave in place the green stone in my skull that is proof against the lie of time. Stay your hand from the white stone in my groin that admits to heat and angels. Pluck only the black stone from my heart, and tonight let me die for love. **DO**



Crime and  
its punishment can be  
a state of mind



## BRIGAZOON

BY THOMAS M. DISCH

**E**nter from the *Encyclopaedia Galactovisna*. Subject: hallucinogenic penology. The misty prison planet known as Brig A is one of the Galactic Federation's most closely guarded secrets. It is a bold new experiment in penal science and of the utmost security of the life form race, the basic chemical component of our most popular psychochemicals.

The inmates work there in harsh, their living conditions, brutal and demeaning. But so deadly is the atmosphere saturated with the powerfully mind-altering (and mutagenic) zox that almost from the moment of their arrival—as they are herded from the spacecraft by the canine guards—the new convicts begin to perceive their environment as paradisaical. And they develop the cranial deforma-





•The bogs  
seem to be the gardens  
of a Xanadu•



lons (known as blooperheads) that dominate all long-term Dreammons. Once the prisoners have become socialized, the gray fungus bogs in which they work as field hands and their chilly ponds come to be the gardens and precisely beachcombers of a Xanadu.

Despite lax security (human guests will not serve there), no convict has ever attempted to escape from Big A. Rather, the completion of each life sentence is signaled by the dying sunward ascent of a fully mutated blooperhead. And as each blooperhead reaches the upper atmosphere, its membranous casing ruptures, releasing billions of zoa for newly armed work gangs to harvest. ☐

Paintings are by Pierre LeCombe, a frequent contributor to *Omni*.





Once again Marlan Eliseo comes on with the spirit and power of Eliseo, snipping bare the Basil and nailing its twitching carcass to the spine. I'm a Christian, a former ministerial student, and considerably eloquent Fallwellian imitator. Why does ignorance always have the loudest voice?

—Les Brown, Riverside, CA

Congratulations! It's about time that the creationists were given a dose of their own medicine. Stern's "Censoring Science" was like a brexion of light in thick fog. The ignorance of creationists must be stopped—in the name of humanity. It has no place at the edge of the twenty-first century.—Nick J. Szeged, Director of Engineering, Datum-X, Simi Valley, CA

You have dealt with a very serious problem in a courageous and outspoken manner. But the desire to censor is not specific to any particular point on the ideological spectrum. To attribute it only to "right-wing religious leaders" is unfair, misleading, and a disservice to your readership. I could cite numerous examples of liberals who have mounted protests against books or movies they considered racist, anti-Semitic, or promilitary.—Lauri Wilcox, Kansas City

Walter Lippmann said, "When everyone thinks alike, nobody thinks very much." Undoubtedly he would have found your issue on censorship as frightening and encouraging as I did, frightening because it described the forces arrayed against free thinking, encouraging because of your gutsy stance on a controversial issue. I do take issue with the wording of your postcard. "I violently oppose censorship. Violence is a bad of censors."—Howard V. Hendrix, Ivyfield, CA

Particle physicist Murray Gell-Mann's First Word proves only one thing: Nobel laureates are no more rational, perceptive, or open-minded than anyone else.

—R. W. Sloum, Pasadena, CA

In the beginning, bang, God created the heavens and the earth. The earth was without form and void, and unseable radiation left darkness upon the face of the bubbling plasma for about 500,000 years. The spirit of God moved upon the face of the waters, cooling, causing storms to form and re-form. And God said, "Let there be light." What's the dispute here?

—Al Klee, Oakhurst, CA

I appreciate the update on censorship, but I am perturbed. I regret the attitude of several writers that all religion is unthinking closed off from the scientific world. On the contrary, millions of believers join me in a fascination with the drama of ancestral hominids. All knowledge is a disclosure of

God. Thank you for bringing excitement into my home month after month.—William E. Okewier, Pastor, Highland Park United Methodist Church, Roanoke, VA

The actions of the religious right may be hard to understand at times, but they at least are honest when they want to ban a book. You, however, are book burners of the worst sort. While you claim to be champions of academic freedom, you censor with ridicule and contempt those who disagree with you. You advocate freedom of expression and bully those who dare question your authority. You have as many presuppositions as the creationists.

—Roger C. Long, Springfield, NJ

My concern as a Christian educator is that the theory of evolution is taught as a fact. It isn't a fact. If we are going to pick the Christian view apart, state the other view for what it is—an educated guess at best!—T. Michael Hayes, Franklin, KY

*Perhaps your issue finally brought some people out of their trances long enough to do something about the wave of watered-down, "safe" science education inundating the public schools.*

I was born in Germany under Hitler and watched with honor the infamous book burnings in the streets. We had our books, the books that had been forbidden. I read "Censoring Science" in tears. I came to a free country—where are we now?

—Gilda C. Davis, Newcastle, CA

I'm going to store this issue in the garbage can, where it belongs. Liberal philosophy already has accomplished a great deal in this country: high divorce rate, drug abuse, teenage abortion, high crime rate, AIDS.

—Bill Wallace, Ridgecrest, CA

I'm an Italian science writer. Today modern science does not exist in Italy because the Pope has more power than the prime minister. The doctrine of creation has been taught in public schools—by law—since 1929, displacing the theory of evolution. There are no popular science books in bookshops. Popular science magazines are almost unknown. Astrology and witchcraft, however, are spreading fast—as fast as they are spreading in the United States. It's the beginning of the end of rationalism!—Fabio Ferrini, Mesate, Italy

It riles against my scientific grain to read words like fact and highly verifiable associated with ideas and theories. I am a fundamentalist Christian working in genetic mapping and recombination. That does not make me a moron.

—Jean Wiggin, Ypsilanti, MI

Had I known the truth, I was going to reserve when I subscribed to your magazine. I would never have wasted my money. "The fact had said in his heart there is no God." You're a disgrace.

—R. C. Weathers, Dade, KY

Perhaps your issue finally brought some people out of their trances long enough to do something about the wave of watered-down, "safe science" education inundating the public schools. In my talks with museum visitors, I refer to current evolutionary theory as the best "recipe" science has to explain the variety and abundance of life today. For some reason they can handle that better than being called ignorant religious nuts. I was disappointed that Stern's article degenerated into yet another hatchet job on the South.—Cory Lee Smith, Red Mountain Museum, Birmingham, AL

I am thirteen years old and go to a small junior high school in a small town. If books by great contemporary authors are banned from bookstores and libraries, where would I go to get John Updike or Sidney Sheldon? Where would I be without the great imagination of Stephen King?

—Stephanie Simpson, Petaluma, CA

I'm a member of a nazi band! A high-school biology teacher in rural Louisiana who is managing to teach the principles of evolution without being "burned at the stake." I thoroughly enjoyed the article by Kathleen Stern. Every year I see more students drawn away from science by fundamentalist propaganda in my district. As a biologist and educator I am committed to teaching evolution in my classes, despite creationist movements. By properly motivating my students and truthfully approaching the processes of evolution, I hope to help my students comprehend the implications of this wonderful theory. By no means do I undermine Christian faith.

—Murray Paton Pendavis, Albany, LA

As an Episcopalian priest and a humanities instructor at a local college, I never fail to be shocked by the zealous nihilism shown by religious fundamentalists. Their unreasoning and reflexive mind-set illustrates the medieval doctrine called "incurable ignorance." I was impressed that you did not lump all religious books together but clearly specified "fundamentalism" as the problem.

—Frank Cassen Knebel, Yuba City, CA

A generation ago the liberal/left wing censored all mention of and reference to God from the public education system. Now

teachers are afraid to discuss God with their students for fear of losing their jobs. You failed to include any mention of that censorship. Now the ideological children of the censors are crying "foul." The censors should not be allowed to censor scientific theories from our textbooks. Neither should secular humanists be allowed to censor God from our classrooms.

—Deborah K. Young, Houston

As a scientist I am allowed to see the threat of "creation science" addressed seriously. What creationists seek to accomplish by insuring their beliefs get equal time in biology texts is nothing short of insidious: to totalitarian-style suppression of the ideas that the word science is intended to symbolize. This type of behavior in a democracy is deplorable. Your top-line journalistic exposure is essential to the preservation of truth.—Scott R. Gould, Fort Collins, CO

You have the gall to complain that you might have to share science texts with the creationists, even though most Americans favor creationism? You're not being fair. Your position is shaky at best. No wonder your writers resorted to devious journalistic ploys.—D. Nicholas Ringwood, NJ

I am fifteen years old, and I am terrified of the future. I would rather have a full-scale nuclear war than have insane people tell me what to think. We have a better chance of surviving a war than the mental genocide these censors are proposing.

—Kim McCloskey, Albuquerque, NM

I'm insulted to the nth degree by your issue. Do any of you super-smarties ever stop to think that maybe just maybe the Big Bang was God's doing? I don't have all the answers, but with all your education and knowledge, you don't either. If I followed my basic instincts, I'd cuss you out and punch your lights out. But that really won't solve much. Shucks! I'll even say a little prayer for you.

—William Skip Brochman, Albuquerque, NM

Living in Louisiana I have seen the types of outrages described in your articles. Some of the bookstores here—most notably Waldenbooks—have displays listing the books banned by the religious right. They include such classics as *Hemlock*, *Moby-Dick*, and *The Three Little Pigs*. I cried the first time I saw the display.

—Christina Guerrero, Baton Rouge, LA

As a member of the younger generation, I would like to inject a ray of hope into the dark cloud of despair that Norman Lear described in his article "Why Johnny Can't Think." While not all scientific theories work hard in school, go beyond the core curriculum, enroll in advanced science courses, research topics, attend lectures and seminars. Let's be a bit optimistic. There is hope for the future, and we owe it.—Gabriella B. Hargis, San Antonio, TX



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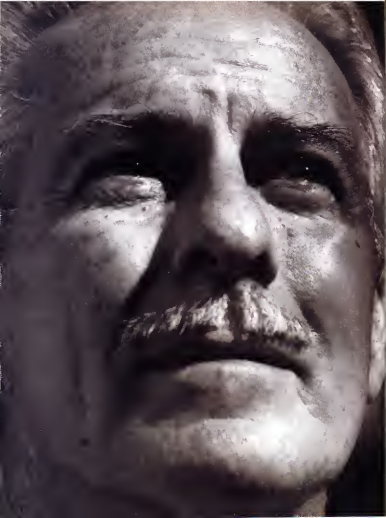
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*Sex and athletics are both performance issues, says the founder of sports psychology, who discovered a method of freeing the bodies of elite athletes to surpass even their own personal bests*

## INTERVIEW

# BRUCE OGILVIE

**O**ne story Bruce Ogilvie loves to tell is of his first experience working with professional athletes. In the mid-1960s, he recalls, he was smuggled into one night up the steep back stairs of the San Francisco 49ers training complex. Pro teams had occasionally sneaked a problem player or two off to a psychologist before, but the 49ers actually planned to sign a year-round pact with Ogilvie that would have him working right in the team's training camp. The last pro club to make such a move, the Niners sure as hell didn't want anyone to know about it. Nonetheless, a well-known sportswriter found out and blasted the team for calling in a "jock shrink." "Don't they know," he wrote, "that they could get better advice from any bandstand in the city?" In those early days, Ogilvie says, sports psychology had to fight for every inch of gain against fading among other sports sciences. Today, since athletes at the highest levels are so evenly

matched in physical skills, many experts agree that the mind-set is the key factor separating good from great performers. There's not a pro team today that hasn't sought psychological services for its players. In the last Olympics, psychologists were assigned to dozens of American athletes and several teams. Ogilvie himself worked with the figure skating team and men's and women's volleyball teams, which took gold and silver medals, respectively.

The original jock shrink, Ogilvie is today acknowledged as the man who generated the entire field of sports psychology. His book *Problem Athletes*, published in 1968, was the first to apply psychotherapeutic principles to understand and help college and Olympic competitors. His landmark studies of National Football League players in the Sixties provided the first in-depth portrait of the inner lives of professional athletes. In the late Sixties and early Seventies, combining elements of behavior modification

PHOTOGRAPH BY TOM ZIMMEROFF

and Eastern mysticism, he developed a series of "performance enhancement strategies" to help top athletes improve concentration, build confidence, decrease tension, marshal energy and increase motivation. Variations on these techniques are at the heart of elite sports psychologists' repertoires today.

Ogilvie has counseled 38 professional sports teams. In the Los Angeles Olympics alone he coached a total of 48 elite athletes, 36 of whom won medals. In the three decades since he entered a totally unexplored arena, he has studied nearly 12,000 of the world's finest athletes.

A clinical psychotherapist who received his Ph.D. from the University of London's Institute of Psychiatry in 1953, Ogilvie originally specialized in abnormal psychology and sexual dysfunction. Frustrated with the failures of the convoluted and highly biased Freudian-based sex therapy then holding sway in the United States, he treated sexual inhibition as a "performance" issue. Sexual dysfunction, his practice showed, was the result of a "disconnect" between mind and body—an intrusion into an individual's emotional "script" that blocked the body's natural responses. Ogilvie discovered he could eliminate the disconnect by literally rehearsing with his patient a better script for performance. This controversial "imaging" technique he developed for mental rehearsal became the germ of his athletic enhancement strategies.

At sixty-seven, Ogilvie claims he has reduced his schedule to working with "only about eighty-seven athletes a year." The sweeping view from the cliffs atop his 40-acre estate, overlooking the lush Santa Cruz Mountains in California, indeed befits a life of expanding leisure. But the warless Jacuzzi outside his small wood-and-glass office contradicts such idleness. Filled with leaves, it suggests he's not quite ready for a long hot soak. When he's not doing therapy, Ogilvie's either up in his bedroom above writing, or flying to Paris to teach mental strategies to the French Olympic team.

Listening to Ogilvie's gentle but emphatic voice did wonders to relax the psyches of interviewers Pamela Wertheiss and Mark Tach. After a hard day of answering questions, Ogilvie escorted the pair to a restaurant run by his wife, Diane, just a few miles throw outside the gates of his estate. One of his clients, a golfer from the Ladies Professional Golf Association tour, greeted Ogilvie and his wife with open arms and promptly joined the group for dinner. The standard distance psychologists keep from their clients, notes Ogilvie, protects only the therapist. And he doesn't want any protection. "Everyone I work with" he says, "ends up a friend."

**Ogilvie:** You're genetically regarded as the father of sports psychology. How does that sit with you?

**Ogilvie:** A lot of my colleagues see me as the grandfather. I don't call myself any-

thing, though I've been around so long I've worked with more elite athletes than anyone in the world. I go back to Rome.

**Ogilvie:** No?

**Ogilvie:** Yeah, thanks. I'm talking about the Rome Olympics in 1960.

**Ogilvie:** You yourself were an athlete. Was that significant in opening doors for you?

**Ogilvie:** It was very important. You can't appreciate what little credibility psychologists had among coaches. Who needed the goddamn flaky shrink? They saw us as elite and intellectual—not too masculine. But I've always been an athlete. I was a high-school wrestler and football player and I guess I'm the world's oldest weight lifter. During my hitch in the Air Force I wrestled and taught hand-to-hand combat. I became interested in judo and was at the gym whenever I wasn't working.

So here I was. Bruce the jock, who hem-messed heads and slammed bodies when he wasn't playing basketball or volleyball. The physical-education staff at San Jose

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• Some athletes were depression-prone. Some had developed phobic reactions to performance, some were immobilized by fear of failure, and some were deeply afraid of success. •

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State, where I taught, started to take me seriously. Some coaches began to ask questions. Within a few years two track coaches started sending me young athletes in crisis. Word spread to other coaches in the Bay Area, who assumed that because I'd been and remained an athlete, I had rare insights into the conflicts of athletes. But I really had no particular basis for presuming I could understand the great variety of problems I was going to encounter. We knew nothing about the inner life of the athlete. I felt the way Freud might once have felt: I was seeing problems I'd never heard described.

**Ogilvie:** What kinds of problems?

**Ogilvie:** The athletes' inability to achieve their potential reflected a whole range of conflicts. Some were depression-prone. Some had developed phobic reactions about performance. Some were immobilized by a subconscious fear of failure. And some were deeply afraid of success.

We'd recognized the fear-of-success syndrome in humans without fully understanding it. But in athletes I saw it so plainly I barely had to do any interpreting. I worked with a young pole-vaulter at Stanford who

was equating the National Collegiate Athletic Association record in practice. "He after two years had never scored a single point in competition. We eventually discovered that he was terrified that if he achieved his goals and dreams, he'd have to meet the expectations of others for the rest of his life. He found this unbearable."

Another young man who came to see me had once been a marvelous shortstop, a potential number-one draft choice in the major leagues. We started going back in his mind, trying to find out when and where it all came apart. When he was seventeen he was being scouted by the head scouts from a top National League team. He was kidding, showing the scouts his skills, when suddenly he bobbled the next ten or so balls. I said, "Stop. I want you to relive that entire experience with me." I sensed that we'd reached the key event. So next we re-created the whole visual field he'd been exposed to—the color of the grass, the lights on the poles, the stands and where the scouts sat in them. Then I said, "Now, put a tape in your head, and run that precise experience for me." So he went along describing every ball he'd fielded successfully until he said to me, "Oh, Christ, that's that son of a bitch!" What are you seeing?" I asked. "There's my dad, sneaking down into the stands on the right. There's that son of a bitch!"

His dad had never related to him except in terms of his athletic performance, so his only need was to act out the rage at him. The young man utterly destroyed his life to get even with his rejecting father. But at least his life, hurt childhood self got even. He could see clearly after we finished reliving the situation if he'd fulfilled his own ambitions, he'd also have fulfilled his father's needs. And he couldn't abide that. I can tell a thousand stories like this. I've got a father story from every city in America. **Ogilvie:** Were you surprised to keep seeing athletes with such problems?

**Ogilvie:** I was shocked and truly concerned. They were exhibiting blatant pathological reactions. I found far more irrational fears and far more clearly manifested neuroses than I'd seen in the normal student population. I came to believe that most top athletes were overcompensating psychoneurotics. I began to question seriously the value of high-level competitive sports. I thought we'd done the students a disservice by encouraging them to pursue such intense goals.

**Ogilvie:** Didn't you write about this in your first book?

**Ogilvie:** Yes. *Problem Athletes* introduced clinical psychology to athletics. It also projected me as a specialist around the world. I lectured throughout Europe, where interest surpassed that in the United States. But even before the book was published, I began to question my conclusions. I realized that just as Freud had erred by basing all his conclusions on a select population of Viennese Jewish women, I was seeing only athletes who'd collapsed in competition.

But what I'd seen didn't jibe with my own athletic experience. What I'd taken away had been so rich, it had made a magnificent contribution to my life. So I decided to see if I'd find a different psychological profile in elite athletes: those who'd attained the highest levels. In 1984 I approached an old friend, Lou Spadola, then president of the San Francisco 49ers. I said, "Lou, would it ever be possible to study your team?" I told him that Tom Turko, my colleague at San Jose State, and I would need only a day out of his preseason training camp to administer psychological inventories to the entire team. Like all businessmen, he said, "What do I get out of it?" I said, "Well you get an entire year of our services. We'll use the test data to help you understand each athlete more fully and to identify rookies who might bolt camp. We'll be there for crisis intervention whenever an athlete isn't performing." Then he asked me if I'd like "cager" numbers, and I said, "Gee?" so he had me meet the owners of the L.A. Rams and the general manager of the Dallas Cowboys. We ended up making a three-year deal with all of them. In 1985 the New Orleans Saints joined in.

**Omer:** When you analyzed your data from these players, did your ideas change?

**Ogilvie:** I buried my notion of athletes as overcompensating psychoneurotics once and for all. NFL players were well-pulped, gutter human beings. Compared with the general population, only half as many of these athletes were compensatory or prone to pathological reaction. You've never seen a more ambitious group of men; they were significantly higher in their achievement needs. They tended to be more tough-minded. They were far superior to most university-educated men in emotional integration, self-control, self-confidence, and ability to handle stress. And these findings held up over the years when I studied other elite amateur and professional athletes.

**Omer:** What about your claim to predict and prevent rookies from bolting camp?

**Ogilvie:** This is what really maled down my credibility! At every camp I'd pick the five or six guys who were going to bolt. One or two of them would measurably be the team's third or second or even first draft choice. One night at eleven p.m. I was on the phone to Tom Fears, head coach at New Orleans. I said, "Tom, I'm not giving you feedback on these six athletes whom I see as most prone to run." The moment I finished naming the athletes, he says, "Wait a minute, Bruce, sometimes banging on the goddamn door!" I hear some mumbling, and when he comes back he tells me one of the six is standing there still taped up from the workout, suitcase in hand. I told Tom to have him sit down and to ask the boy specific questions, like "What exactly are you feeling?" The boy said he was lonely and scared about making it. He came from a small town and just knew he was going to let down his mom and dad and everybody. So then I had Fears say to him, "Look, son, that's what we're here for. You're taking on some-

thing that's not yours. Give us time." Then Tom talked about all the times he'd wanted to run when he was younger. Finally the kid decided to stay. He wound up playing in the league for six years and was an outstanding defensive back. This same kind of thing happened with the Cowboys, with the San Diego Padres baseball team, and it's happened countless times in the seventeen years I've worked with the Portland Trail Blazers basketball team. In those first days with the NFL, if made the coaches believe I was someone they could place their faith in, it opened the door for me to approach them with performance-enhancing strategies.

**Omer:** You've said the magic words. How did you begin to develop your new performance-enhancement methods?

**Ogilvie:** I'd begun to develop these techniques in my previous work on sexual dysfunction. Nothing traditional could be applied to help an athlete achieve his or her particular goal, so I began to explore new

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approaches. My graduate training was strongly shaped by Professor J. Wolpe, one of the pioneers in behavior modification. But treating people like rats violated my sensibilities. I couldn't get into all that scheduling and programming of human behavior. I knew athletes didn't belong in Skinner boxes. I'd die if you did that to me. If you even threaten to take away my control, I'm not a very nice animal to be around. Because the psychology literature was barren of references to sports, I took what I liked from Eastern literature and merged it with my own training.

**Omer:** Where did you begin?

**Ogilvie:** With the principle that people have many many levels of awareness and that our goal should be to seek the means for getting in touch with all of them. While Western culture had failed to develop authentic strategies for generating awareness, I was convinced that training people to do so would be a profoundly healing technique. What convinced me was my own rummaging in psychoanalysis during my training. I'd never felt that my own analysis had really gotten me in touch with the Bruce underneath. For example, not

one of my therapists sufficiently presented me with one of the most profound influences of my life—father separation. My father left us and I never knew him, so I had to go back and deal with that to get free of a lot of things that were hanging tie up.

In high school, for example, I'd been an athlete twenty-four hours a day. This was clearly tied in to looking for a dad. I never found a father substitute, but I looked for one in every coach I had.

When I was sixteen I was on the football team, playing linebacker on defense and quarterback on offense. We were playing a tough team, and on defense I was matched against a young man who eventually became a great star at fullback. I was determined he wouldn't get any yardage. After one tackle he nailed me in the face with his foot. We didn't wear face masks then, so his cleats split my lip and broke my nose. I was lying on the ground, hurting so bad, my face just destroyed. I got up and ran slowly toward my coach, a big fat man named Piggy. I was frightened as shit. I just wanted him to say my face was going to be okay and to hold me. Instead he looked at me and said, "Can you still call signals, Bruce?" I said yeah, and he sent me back to quarterback. With my mouth filling with blood and blood running down my nose, I turned around and went back into the huddle. I couldn't talk because of the blood in my mouth, so I asked our fullback to call the signals. I stayed in bleeding, and the coach never said a word. Like "Good game" or "Thanks for putting out." And I wanted it so bad. I think I decided then and there that no one was going to give me what I needed. I was going to have to find it within myself.

None of those analysts had me alive any of this. Had someone taken my experience and projected it on the wall so I could see all its ramifications, I might have been freed thirty-five years earlier. This is why I embrace the idea of reliving the experience—re-creating the event by using what we've come to call guided imagery. It wasn't called anything then. I just thought of it as reinforcing the reality of a situation.

**Omer:** Why is guided imagery more effective than free association?

**Ogilvie:** Because you re-create the actual living and vibrant world in which the experience occurred. People have a tape in their heads, see. You tell them to run the tape and it's all there. Were like two detectives in pursuit of the experience. As your guide, I try to help you in the search. I might say, "What was the house like?" "Did you have a dog?" "Did you look in the corner?" "Lift up the rug."

**Omer:** You initially developed this technique to treat sexual dysfunction?

**Ogilvie:** In the Fifties we were dealing ignorant and really had no legitimate strategies for treating sexual inhibition. We just brutalized women, telling them exactly how to respond and what they should respond to. We almost condemned them. And we had no legitimate strategies.



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Sexual inhibitions are really performance issues. Take an athlete in crisis: the turned-off person suffers a disconnect between cognition and neuroanatomical function. With guided imagery I could tease a preorgasmic woman to love herself, "re-script" herself as an active, functioning sexual creature. Initially as she shares her tape of her experience I could observe the point in the process where the inhibiting thought patterns interrupted her physiological tempo. You see where the block is come up, where her voice suddenly says, "you're dirty" when she touches herself. There can be thousands of negative inputs in the unconscious.

**Q:** How do you eliminate those inputs?

**A:** As we roll the tape, we veto the negative cognitions out of the script, replacing them with positive images complementary to her eroticism and aesthetics. I tell her I want her to develop a script of a successful, self-loving experience. Then we rehearse the script again and again until she has an appropriate model for the sensual, self-receiving side of her nature. I try to get her back to her personal best—back to her spinal cord, so to speak—and fully in tune with her moment.

**Q:** How did your colleagues take to this new sexual treatment?

**A:** I got killed: professionally. At one staff meeting, we were discussing the issue of sexual transference. This was cer-

tainly an issue of concern to me because, well, I was a good-looking young man then. You get into a trusting, true, open, and free communication with a woman who feels lonely, frustrated and unloved, she feels your caring and the protection you afford her. Then the transference phenomenon is vital to the psychotherapeutic process. But somehow it was often very difficult for me to redirect it to the appropriate source: a husband or lover. For instance, My colleagues said, "Well, you son of a bitch, you're reinforcing it." I said maybe my ego sometimes used to allow such a thing, but I was way past that now. I didn't need sexual titillation from my patients.

Then I told them I'd been working on a strategy so powerful I wanted to share it with them. I'd been counseling this very prominent dancer. She was a very physical woman who had great problems releasing sexually in any continual way—and was confused about why. The more we explored her feelings, erotic nature and adventures, the more aggressive she became. The only resolution almost seemed to be for her and me to have intercourse. I told her what a beautiful woman she was and that I couldn't be more honored. But I asked, is that what you really want?

Then I suggested that we use guided imagery to take ourselves through a copulative experience together. After I had her close her eyes, I asked her to imagine we

were down on the floor, I don't know why. Then I said, "Let's turn our chairs away from each other. Then we went through an entire imaging experience, keeping up an open dialogue about what she was experiencing. When she believed she had achieved physical satisfaction, I said, "Now lying back on your arms, looking into your eyes, I ask you, is this what you wanted?"

**Q:** Was that powerful?

**A:** What did she say?

**A:** She said no. She wanted a male to accept her totally to care about her innermost feelings. She wanted someone to provide absolute protection when she was most vulnerable. The next session, she was completely different. Now this transference had evolved into a force for her growth. I became a trusting male, a brother who loved her, the father she never had.

My colleagues, of course, were outraged. I never described the technique to any of them again.

**Q:** How did you begin to carry this and other imaging techniques over to athletes?

**A:** The key event, the therapeutic experience that showed it could be done happened in 1962. Hammar Plow, Ed Burke, a true great who had been in four Olympics, had a tragic accident right in front of Life magazine's photographers, who had come to San Jose State to film him for a cover story. His wife, Shirley, who just happened to be in one of my psychi-

ogy classes, had parked her old VW in the field way off to the right to watch the filming. She seemed to be completely out of range, but damned if she didn't lose control early in one throw. This sixteen-pound bomb flew and smashed through her windshield. He ran to the car expecting to find her dead. The hammer had crushed her face around her eye on an incredible wound. Everyone gathered around her, then Ed came her off to the last ad room and eventually to the hospital.

It was actually just a glancing blow and she healed very well after lots of treatment and plastic surgery. When she was out of the hospital, she approached me and said that I'd wouldn't throw anymore. And the Olympics were coming up that following year. So I asked if he would come see me. Soon after he started seeing me, he was able to practice again but didn't approach the distances he'd thrown before. Something had obviously changed.

It seemed that whatever was inhibiting his return to his former national level of performance had not yet been uncovered. From the study of his personality it had been apparent that he was an athlete possessed of extraordinary conscience. The guilt that the unfortunate accident had generated was an obvious negative emotional force that had to be understood. I asked him if we could go back and re-create the entire traumatic event. Ed said he thought that would be too painful. I then asked him if we could re-create the scene of the practice setting through guided imagery. My clinical interest was in generating an increased awareness of all performance-relevant behavior. Rather than attending to the possible intrusive guilt feelings, the search was devoted to the behavioral changes that such feelings had produced. I asked Ed to stand and prepare to throw. We envisioned the practice setting, the cage, the throwing ring, the expanse of green extending from the ring and even the visual targets that Ed relied on for himself. Due to the confined space—my office—I asked him to practice his throws in slow motion. I had Ed complete about three practice throws, and then I tried to elevate his level of arousal. "Okay, Ed, we are now getting ready to go for distance, let's think in terms of personal bests," I said. When I felt intuitively that he had reached something close to his ideal performance state, I said, very simply, Go into your motion now. As I watched Ed begin his stall, swinging the imaginary 35-pound hammer, flexing and extending his arms, grasping and regrasping the handle, he began to demonstrate in slow motion his classic performance style. As he hit the middle of his second arm he called out, "Look Doc, look at my hands." I didn't have the background to judge motor requirements for his event, so I said, "Tell me what you are seeing." He said, "Look at my fingers, look where they are on the handle." It wasn't until that moment that one of the most significant causes of his perform-

ance decrement was illuminated.

He saw himself changing his hand grip for safety, shortchanging the style that would extend the arch and eventually the trajectory of the hammer. "We got it, Ed, we got it," I said. As we reprocessed this critical moment, it seemed to us that his distrust in his hands had blocked his motor gifts. Within two weeks his confidence had returned and he was throwing at his NCAA championship level.

**Onni:** Why did this approach work?

**Ogilvie:** Because it gets the human right down to focusing on causality. There is no interpretive bullshit, no superstink going through some analytic voodoo. I got to the raw state of experience. What was really going on in his body and mind? The consensus was that the cognitions weren't complementary to performance. You can't have reservation and fear and expect your body to release the hammer at ideal performance levels. The imaging makes the athlete see himself in terms of neuromus-

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cular requirements, performance and body mechanics. He becomes aware.

**Onni:** What about athletes who haven't suffered a trauma but just want to improve their game?

**Ogilvie:** One of my most important strategies is that of changing what I call self-talk. It emerged during my last year in the Dallas Cowboys' rookie camp. They were screening twenty-eight rookie backs and ends because they were desperate for talent in those positions. After a while, I noticed the only three blacks on the team just weren't catching the ball. It struck me that they were suffering from performance anxiety that they were too aroused for optimum neuromuscular coordination. Finally, during a short break, I approached them on the sidelines and said, "I'll just talk to you. I think I can give you something you can use right now." Then I asked, "How do you speak to your lady when you're moving toward her and you want her?" Finally one guy said, "Okay, I'm moving toward her and I say, 'Hey, sweet loving baby wait till I get you in bed.'" Each player had his own language or form of communication for loving feelings. So I said,

"Okay, now you're going to go back out there and run those patterns again for an other hour. When you turn your back to the ball, I want you to say, 'Sweet loving baby come to me, this is your big daddy,' or whatever words work for you. Well, I'll be a son of a bitch, they went back out and they all did beautifully."

They changed their relationship with the ball, from an adversarial to a receptive one. They did what they do naturally when they are at the appropriate level of arousal—for either romance or performance in sports. Frightened of not making the club, they were trying too hard. They were over-aroused and they were fighting themselves. But by using the self-talk to alter their cognitions about their situation, they achieved harmony. Two of them made the team, one became sensational.

**Onni:** Do individual performers have different optimum levels of arousal?

**Ogilvie:** While reliable parameters of physiological tension exist for each sport, there are great differences among performers. In the locker room before a game, some athletes crave total silence, while others need verbal release. We tell coaches not to give the characteristic Knute Rockne-like fight talk because it'll drive forty percent of the kids out of their skulls, to the point where they're out of control. Some relatively lecherous athletes may be helped by such coaching, but it's best to take them aside individually.

Dick Blass of the San Diego Chargers football team was a coach far ahead of his time. He wrote poetry on the side. Before one big game he took his whole defensive backfield into the locker room, turned on a boom box, and let it rip. The kids were moving and swinging. I can't tell you what a vision of coaching philosophy that was! We're all supposed to huddle by our lockers, think intense thoughts and wait for the commander to come. But this guy got his players ready to go by getting them in contact with the feelings they needed for harmonious preparation. They didn't want to think about the game, they wanted to get lost in feelings that were elevating and ennobling. These players told me that no coach in their experience had been this permissive. And he was recognized as one of the outstanding defensive coaches.

**Onni:** How do you work with an athlete to get him to the right level of arousal?

**Ogilvie:** First, you have to be very sure that the athletes are not actually underaroused. If they are, and you proceed to lower their arousal further, you'll only hurt their performance. If they are truly overaroused, I'll generally start with deep relaxation to get all of the here-and-now garbage out of the way so the athletes can move into subconscious levels. I let them be their own hypnotists by means of a drill that takes them into the deepest states of relaxation in ten minutes. I often use a strategy which I call the Ogilvie psychological trauma effect. I say, "I want you to go back inside your mind and lose total visual and emotional contact

CONTINUED ON PAGE 116





## DEAD DREAMS

Can dreams take us in to the mystic zones of the afterlife? After completing a study of 2,500 dreams, Swiss psychologists Marie-Louise von Finz and Emmanuel Koppstein Kennedy say yes.

The psychologists found, for instance, that while many dreams about the afterlife simply illuminated a side of the dreamer, others seemed to take on an almost photographic, supernatural quality that set them apart. "These dreams do appear to be encounters with postmortal souls," Kennedy declares. After having these dreams, people feel it is the dead they have seen; the experience convinces the dreamer of a life after death.

A similar quality, the psychologists say, often turns up in the dreams of the terminally ill. According to Kennedy, the dying may locate themselves in their dream as they may meet up with someone who is already dead. Either way, dreams of the dying seem to confirm for the unconscious that impending death is not an end. The ultimate goal appears to be the union of the individual self with the archetypal self we think of as the Godhead. These dreams point to the notion that whatever is unresolved in this life must somehow go on, to be continued after death.

Not everyone, however, is so sure. According to Marcella Tuzze, director of the Center for Scientific Anomalous Research in Ypsilanti, Michigan, "Claims of survival after death can obviously go



on, often motivated by a desire to deny being dead and their coming back." Tuzze sees too many other reasons for these experiences, including an intense dream state.

Kennedy and von Finz, however, say that their study goes on. Anyone interested in participating can reach them at Spiezstrasse 42, 3728 Undburg SG, Switzerland. Sherry Baker

*Sensations are rapid dream*

George Santayana

## DEAD MESSAGES

Snake and dragon—the ocean. Watch his organic pyroclastic swirl out-engaging the armed forces. Terror spreads to cover the heaven and earth.

The young emperor of the seventh century Tang Dynasty had ordered his official, a philosopher and historian, to create a book of predictions. But when Tao read the lines above, legend says he wrote nothing.



He said, "I have seen the future. It is empty."

In 1959, the Chinese, with British advice, published a book during an exhibition. An English translation, entitled *Great Prophecies of China*, appeared in 1960, but it remained in Chinese. Now Da Lu, a diminutive, obnoxious man, The City magazine is planning a videotape and popular book on these weird predictions, which, he says, are based on the ancient system of Chinese

astrology. "I am not a fortune teller," he says. "I am a student of history." The discovery of the *Great Prophecies* is the subject of his book, *Snake and Dragon*. "I am not a fortune teller," he says. "I am a student of history." The discovery of the *Great Prophecies* is the subject of his book, *Snake and Dragon*.

The long and the short of it, however, is a future divided into 60-year cycles. The year 60-year cycle began in 1984, with Reagan's star wars policy. Da Lu says

Emmett will be a devastating nuclear war. A 60-year cycle promises bad police and rebirth. Whether Da Lu is a prophet or not, he knows more than his students did. His decidedly urban approach—putting predictions on video—is to spread the word.

Tracy Cochran

## ESP, PART 1

For some people, the existence of ESP is a recent



science, the hidden matter might be fair.

To get to the root of what he felt was an irrational resistance to psi, psychologist Harvey Irwin of Australia's University of New England questioned more than 100 students. His finding, a direct

relation between the subjects' fear of psi and their sympathetic or unsympathetic attitude toward ESP research. The more unsympathetic the student, the greater his or her fear of psychic phenomena. In some cases, Irwin found, the fear was rooted in the notion that if they possessed psychic powers, they might not be able to control them. In others, fear stemmed from the worry that friends or acquaintances with psychic abilities might read their thoughts.

Irwin's findings, which he phrased in similar results, were found by psychologist Charles Tart of the University of California at Davis. He surveyed several large students by asking how they would respond if suddenly found they possessed complete powers

of ESP or psychokinesis. Many were disturbed by it—prospect, focusing on whether they could control the power, whether they possessed the maturity to deal with it, and whether they might be tempted to use it for malicious purposes. Tart also recently found that even professional psychics harbored these concerns.

Australia's Irwin stopped short of saying that fear of psi, the motivating factor in the field is or is not. The little scope here for speculation on the role of fear of psi in the motivation of a lack of parapsychology, he says, adds that he simply had too few professional skeptics. His sample, Tart, however, contends that such hidden attitudes can destroy other well rational, conscious, and impulsive scientific progress in understanding and applying psi. "It's all Rigo-

It's been a the abolition of ghosts, and to be remembered the abolition of the dead.

Norman G. Brown



# SIX SCIENTISTS

CONTINUED FROM PAGE 14

such tests. "Everyone knows," she says, "that a tomato plant can't get up and walk away," distinctly unhappy. "The problem," she says, "is that neither side has the data to support its claims, and those data are impossible to come by without field tests. The issue has gone into a kind of gridlock, and the conflict has already created a two-year delay. Now we need some actual experiments to find out what's really going to happen."

In the meantime, Weibull continues to push her own experiments toward completion. Those who know her have little doubt that she will succeed. When Ginny wants to achieve something," says her boss, Stanford biologist and department head Philip Hanawalt, "nothing gets in her way." Leisure time is devoted to cultivating her own gardens and teaching courses in Italian garden design. There is little spare time, though. "Like most scientists," she says, "I work pretty much flat out."

Weibull acknowledges that her efforts may not directly end famine and starvation. "In large part these are problems of distribution," she says, "that have to be worked out by politicians, not scientists. Nevertheless, she foresees her work as having a considerable impact on the world's ability to grow food. "If, for instance, we can expand the growing range of rice by just a couple of hundred miles," she says, "that can have an impact on a couple of hundred million people."

## ERVIN LASZLO

The house sits high on a hill overlooking Italy's Poena River valley, a few miles from the small Pesarin village of Montecosaro. Built as a chapel some 300 years ago, the stone house and its picturesque view of the valley gave its owner, philosopher of science Ervin Laszlo, "a sense of history and timelessness and a sense of cooperation between man and nature."

Laszlo doesn't sound a warning bell against world destruction as Peter Raven does, nor does he like Virginia Weibull probe the inner structure of life. Instead, he paints the larger picture, a grand synthesis between the orderly march of biological evolution and the seemingly capricious meanderings of human history. Evolution is an ongoing process, and Laszlo has drawn the connections between what we humans are and what we should strive to become. It is an activist for the idea that we can play a role in our own evolution; we can choose between violent and dehumanizing technology and technology based on a respect for life.

Toward that goal, Laszlo, a grizzled, balding man in his 60s, has written, coauthored, and edited some 41 books as well as more than 100 articles. He has earned a doctorate from the Sorbonne and has taught at Yale, Princeton, Northwest-

ern, and half a dozen other major universities. He has directed the United Nations Institute for Training and Research and is a member of the Club of Rome, one of the world's most influential scientific societies. Amazingly, he's done all this without so much as a high-school diploma.

Laszlo's message is that of a scientist who sees the pattern of evolution. In general, he says, evolution moves along a path governed by two basic rules. Systems grow ever more complex and, at the same time, increasingly efficient at using the energy around them to fuel their own processes. Thus, the physical universe has evolved from particles like quarks and leptons into increasingly complex star systems and galaxies, while the biological universe has moved from simple one-celled animals into mammals and primates. Similarly, human societies evolved from primitive clans into the immensely complex nation-states and global economic communities of the twentieth century.

Laszlo  
believes we can play a role  
in our own  
evolution; we can choose  
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and dehumanizing technology  
and technology  
based on a respect for life.

For humans, this complexity has an ominous downside. With nuclear weapons, overpopulation, and runaway technology, Laszlo says, "we are playing a highly dangerous game, not only with the lives of all people but with the whole biosphere." To end the gloom of global apocalypse, Laszlo has developed a series of strategies for scientists and lay people alike, keeping those recommendations purposefully broad—"an outline for action," he explains, "rather than a list of detailed prescriptions." Lay people must first realize that what they do influences the course of evolution. With that awareness, the individual can then take action along the lines of his or her own interests and priorities—join an environmental group, say, or become a peace activist.

For scientists, Laszlo's recommendations are somewhat more specific. They should concentrate on developing technologies that will enhance our abilities to communicate with one another. And they should make every effort to efficiently exploit such available and renewable energy sources as sun and wind, rather than the more dangerous and limited energy

sources depended on today. At the same time, he says, we must be careful to keep those technologies "subservient to human values," such as decency, equality of opportunity, and social justice.

With the accelerated development of the soft and essentially moral technology, with a widespread awareness of the rules under which our evolution operates, Laszlo looks forward to what he calls a "major phase shift" in human social organization by the end of this century—a purposeful move in the direction of a deeply humane and truly transnational society. "We are the crucial actors," he declares. "If we don't destroy ourselves, we can finally take destiny into our own hands."

Toward that goal, Laszlo heads the General Evolution Research Group, a band of independent scientists (Jonas Salk is an honorary member) who carry on debate and produce literature through a computer network. Relaxed, even conciliatory in style, Laszlo's intellectual approach is, in the words of U.S. Naval Academy historian Robert Arigiani, "very much that of a musician—elegant, simple and direct."

His is more than metaphor. For the first half of his life, Laszlo's destiny seemed to lie not in philosophy but in music. Born in Budapest in 1923, he was a classical prodigy, giving his first piano concert at the age of nine. For 15 years Laszlo earned his living as a concert pianist.

But the music was not enough to still Laszlo's restless mind. Even as a young man he was fascinated by philosophical questions about the continuance of evolution and human history. "I felt I had to locate myself in humanity," he says now. "I had been taught to be a concert pianist and nobody around me had ever thought I would be anything else. And on New Year's Eve, 1950, he made a decision that changed his, as well as many other people's, lives. He went seriously into the philosophy of science."

## ROSALIE BERTELL

Laszlo's philosophy finds hands-on expression in the work of Rosalie Bertell. For 13 years she has actively campaigned for public policies aimed at cleaning up the mess humans have made of the earth.

There are currently one hundred fifty million tons of radioactive material circling the world in the stratosphere," she says. All that stuff is going to gradually come down. At the same time, she says, the Environmental Protection Agency has identified seventy-four thousand toxic waste dumps in this country alone, and they can clean up only seven to eight a year!

"The day of being naive about things we can't see or smell or taste is over," she declares. "We're in an era when those problems are becoming critical, and we're not taking care of them."

Personally taking care of social problems has been a Bertell family tradition. As a child, Rosalie remembers her mother resolutely stationing herself at bus stops in

Buffalo's black neighborhoods because municipal buses would stop to pick up black passengers only if a white person were waiting. But grassroots activism was only one element that influenced her. She was a talented violinist and pianist and, like Laszlo, had to choose between a musical or a scientific career. In addition, her family was deeply religious, and after earning a degree in mathematics and physics from Buffalo's D'Youville College, Bertoli entered the Carmelite order of nuns. There she spent five years "learning how to raise food, dig irrigation ditches, and thread pipe." Then, a heart attack in her mid-twenties proscribed the Carmelites' hard manual labor. She transferred to the Gray Nuns of the Sacred Heart, a Philadelphia community that specialized in teaching. At the same time, she earned a Ph.D. in math and botany (the mathematical analyses of biological data) at Catholic University in Washington and went to work as an epidemiologist at Roswell Park Memorial Cancer Institute near Buffalo.

At Roswell she participated in a three-year study of leukemia rates in three states. It was this study that first alerted Bertoli to the massive health hazards posed by low-level radiation. "We found that in as many as twelve percent of leukemia cases, medical X-rays were implicated," she explains. "They were obviously the most important single factor." In 1974 Bertoli was called as a radiation expert to testify at a hearing on a proposed nuclear-power plant to be built near Buffalo. Shocked by the utility's contention that the radiation released by the nuclear plant would be no worse than a few chest X-rays—"I had just spent all that time finding out how dangerous medical X-rays really were," she says—she began an impassioned and successful campaign against the building of the plant.

Aroused by the utility's casual attitude and by the resulting personal controversy (Roswell Park fired unsuccessfully to fire her), Bertoli launched a one-woman investigation of the country's radiation standards. The standards, she found, were established in the early Fifties by the International Commission on Radiological Protection, most of whose members were physicists and radiologists left over from the Manhattan Project. That commission, she says, still tests and still sets "safe" radiation limits with membership that includes no public-health experts. She also found to her great surprise, that though the limited test-ban treaty of 1963 prohibited detonating nuclear weapons above ground, it in no way prohibited the releasing of radiation from underground tests.

Appalled by the facts and by the continued pressure from Roswell Park, she finally quit her job in 1978. It was a trying time. "I had no money," she recalls, "no secretary, no photocopier, no job." She managed, however, to establish the Ministry of Concern for Public Health in Buffalo. Now headquartered in a renovated factory in Toronto, Bertoli's organization

continues to campaign against the dangers posed not only by radiation but also by toxic waste.

Working from her airy office, with walls festooned with Greenpeace calendars and posters of doves as well as with her own handmade peace banners, Bertoli relentlessly chips away at these massive problems, responding to their enormity by attacking them in bite size and generally manageable chunks. Although endlessly frustrated both by the ongoing search for money and by the lack of any really comprehensive data on radiation effects, Bertoli has been effective. Her organization has forced the government of Ontario to remove 4,000 tons of radium-infested soil from a suburban neighborhood near Toronto and induced the government to buy out a large share of the 50 or so homeowners whose lives were being threatened by the dangerous waste. She has spurred the cleanup of a sulfur plant that was contaminating the creeks on an Ojibway Indian reservation near Lake Huron and has helped persuade the U.S. government to "relocate" uranium-mining tailings that were causing abnormally high birth defect rates among Navaho Indians in New Mexico. In the last few years her vision has become increasingly global. Her organization, for example, is now studying the deleterious effects of a rare-earth mine in Malaysia. (The so-called rare earths—yttrium and lanthanum are examples—are important elements in superconducting materials, but they are also thought to have toxic effects on the human body.)

Last year Bertoli was awarded the prestigious Right Livelihood Award, more commonly known as the "alternative Nobel prize," a major international honor presented to scientists for activist, rather than theoretical work. "Her impact," says colleague Ursula Franklin, a physicist at the University of Toronto, "is far greater than one thinks. The very fact that people from utility companies now have to be prepared in case someone questions them about their procedures has reduced a significant amount of gross negligence."

Although her constitution is less than robust (the heart attack permanently damaged her heart), Bertoli has never let poor health stand in the way of work. In fact, she is usually described by colleagues who know her well as "extraordinarily energetic." They also comment on her actual to be overwhelmed by the enormity of the task she has taken on. In religious terms (Bertoli's goal is nothing less than global redemption), "This life earth," she says, "is just too small and fragile and polluted. We're seeing the death of the old system and the birthing of a global consciousness. Either we learn," she concludes, "or we go the way of the dinosaurs."

#### AMORY AND HUNTER LOWINS

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serves as home, office, farm, and laboratory for Hunter and Amory Lovins. It is also a thriving embodiment of the Lovinses' ideals. Despite winter temperatures that reach -47°, there is no furnace. Instead, insulated walls and windows do the job. Light bulbs are ultraefficient: take flush on less than a gallon of water. All in all, Hunter wastes utility bills for the 4,000-square-foot building run a mere \$30 a month. She also swears that they could pay for the \$600,000 house in 40 years on energy savings alone.

It's a far cry from the Silver Spring, Maryland, basement where as a boy Amory watched his father make a living by assembling and selling scientific instruments. "As a kid, Amory says, "I never knew what I was going to be a scientist." So firm was that conviction that as a young man and budding physicist, he was a firm supporter of the same nuclear power technology that he now calls wasteful, dangerous, and impractically inefficient. His interest in ecology and energy policy began with a series of late-Sixties hiking trips in the widely beautiful Snowdon National Park in North Wales, which at the time was being threatened with destruction by copper-mining interests.

Because neither Harvard nor Oxford, both of which he attended, offered any kind of systematic study of energy policy, he left without obtaining a degree. "I've dropped out of two of the world's great universities," he says wryly. But he continued studying the subject on his own. Soon he was writing his technical notes and weighty articles decrying the American tendency to blindly and expensively produce far more power than the nation actually needed—"touting butter with a chain saw," he called it. In the wake of the oil crisis of the early Seventies, people began to pay attention, especially when he published his radically commonsensical ideas in a 1976 article in the prestigious journal *Foreign Affairs*.

In the article, entitled "Energy Strategies: The Road Not Taken?" the twenty-eight-year-old Lovins argued that by following the "hard path" to energy supply—that is, centralized nuclear-power stations and massive exploitation of petroleum and coal reserves—America was being both profligate and economically shortsighted. It was energy at any price. Better to meet the world's energy demands cost-effectively, he wrote by pursuing a "soft path" in which renewable resources such as sun and wind would be exploited. If necessary, they could be supplemented with small-scale decentralized hydroelectric installations. It was the longest article the magazine had ever published, and its influence reached far beyond the usual audience of policymakers and scholars. "With that article, Lovins says, "everything changed. I've been busy ever since."

For Lovins, one of the more far-reaching side effects of the article was its appeal to a young lawyer and sociologist named Hunter Sheldon. A Westvirginian whose love for the outdoors dated from childhood,

family excursions in the Rockies and Sierra Nevada, Sheldon had become interested in energy policy as a law student. After she read Lovins' article, a friend introduced them. They were soon working together. A year later they were married.

Since then the Lovinses have embarked on a campaign to change America's energy habits and biases. Sometimes this has meant adding drama to their usually straightforward approach. On one such occasion Amory and Hunter donned flowing robes as they gave an impassioned sermon on energy conservation at the Cathedral of St. John the Divine in New York City. But mostly it's as business consultants that they've been most effective. For example, one of their clients, Southern California Edison, now spends virtually no money building new nuclear facilities, investing instead in such scaled-down and "natural" alternatives as wind, solar, geothermal, and small hydroelectric facilities. Probably as a result, the company's stock has set new records each of the last two years. In Oregon, Iowa, and Colorado, Colorado, the Lovinses' "leak plugging" approach to energy efficiency has changed the energy landscape. Citizens continue to rave about the economic savings derived from such simple strategies as window caulking and beefy insulation.

The Lovinses, though, have garnered their share of criticism. At least one energy economist maintains that their insistence that all utilities should look to alternative-energy sources is impractical and unnecessary. Others, like Thomas Kuhn of Edison Electric Institute, claim that Amory's figures are distorted. Few deny, though, that the couple has been effective. They serve as technical consultants to a number of local governments for which they've helped develop energy-saving suggestions for individual consumers. In keeping with Amory's experimental background, they have even helped create innovative energy-saving hardware.

The Lovinses' vision of the future is appealingly benign—decentralized communities that "farm" their own energy from a combination of renewable sources: the sun, the wind, even the waves. Agriculture and forestry will not be used to pillage the land, but carefully controlled with the goal of "meeting the land's expectations." And people, too, the Lovinses believe, will change, abandoning the specialization that typifies today's world for a more general approach to life and learning. It is a vision they find themselves working toward, an idea they simply cannot give up.

Like the Lovinses, the other scientists profiled here refuse to ignore the earth. They believe that it's not too late to change directions and head off the destructive behavior that has characterized the Twentieth century. And the poet William Blake was right that those "who would do another good must do so in minute particulars." These six scientific crusaders are proving the same is true for Planet Earth. **DO**

## INTELLIGENCE

CONTINUED FROM PAGE 15

was certain it would replace paper by 1993," he recalls with dismay.

Gradually the idea evolved into a system for more sweeping in scope than his own needs. "I figured if I didn't design a universal electronic publishing system, IBM would, and they'd blotch it," he says.

Over the years Nelson was successful in persuading a loyal band of skillful computer hackers to work out the elegant file structure necessary to make Xanadu work. With little institutional support (only small grants from the publisher Harcourt Brace Jovanovich, Inc., the computer company Datapoint, and Brown University), the Xanaduists have contributed their spare time to the project. Most of Nelson's volunteers have worked for top computer firms. Even the well-known superhackers Roger Gregory, a mathematician and former consultant to Ford, and Mark Miller, a former top programmer for Datapoint, have volunteered for the project. Gregory, in fact, was listed as systems manager on a recent business card. Other hackers have donned the titles Linkwright, Guts Post, and Speaker-to-Bankers.

Despite the recent storage technology that has made Xanadu so attractive to the computer industry, a big time exists before consumers will see software that allows the electronic acrobatics of hypertext. Several small personal computer companies are working on this necessary interface programs. In time, though, the Xanadu system will be extended to include graphics, music, computer-assisted design, 3-D, and zoom capability.

When the system is up to spec," says Nelson, "you'll be able to fly through air-traffic Rome or under the sea or in outer space with your personal computer" (See Artificial Intelligence, August 1986).

But Nelson's real plan for the Xanadu technology lies in space. Before the year 2005, he sees massive computer-storage satellites orbiting the earth, making available the gigantic storage necessary for Xanadu. Then, he believes, present-day educational systems will be replaced by home terminals linked to the orbiting repositories of international learning, available to anyone with a computer.

I agree with Buckminster Fuller that we could all have 100's of these hundredths that would be acquired culturally, not genetically, by having easy access to information," says Nelson.

Once Xanadu has made this easy access possible with the help of satellites and other massive storage bases, Nelson believes that the nature of learning itself will begin to change. "The problem with education is that it's hierarchical. Teachers or the school system decide what's important to study and what's not," he explains. "But Xanadu lets you decide which connections to make. You decide what's important to you. **DO**

# The Artist

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There seems to be  
no end to your talents



I wouldn't  
say that -



I still can't walk on water



# PALINDROME

CONTINUED FROM PAGE 47

attendants), recognized in Andy's behavior a problem he had been taught to cope with. "Sir," he said, busying down the aisle offensively, breaking stride to rub out the cigarette in an armrest ashtray in the smoking section, then busting forward again, "or please try to be—calmer. There are other washrooms that aren't occupied." (In fact there were not, but Maynard did not know that.) "Use one of those."

"That's not the problem," Andy explained. "The problem is, there's a woman inside there, and I think she's lained."

Maynard was able with difficulty to fix his attention on Andy's definition of the problem—i.e., that a woman had lained in the toilet—rather than on the problem presented by his senses to his disbelieving mind—that a semitransparent woman was hanging right in front of him, her knees level with his nose.

"Do you have a key for the washroom?" Andy prompted.

"Right. Yes. I do." Looking closely, Maynard could see that the ghostly woman's stomach would rise and fall ever so slightly, as though she—or it—were breathing.

"Then could you get it?" said Andy.

"Right. Sure thing." While Maynard returned to the service area for the master key that unlocked the bathroom doors, the image of Mrs. Vow tilted sideways, like a helium balloon that has slipped from the mooring of its string, and drifted slowly along the aisle in dreamlike pursuit of the flight attendant. All the passengers—excepting the five or six who were dozing—regarded the passage of the spectral woman with the hushed, unwavering attention they would have given a bomb squad's investigation of a leaking suitcase. She—or it—did not remain intently bent into the posture of micturition; it assumed instead the attitude of a body floating in a stream—of Milton's Ophelia, in fact, as Mrs. Vow would have observed had she been present to describe the scene to Dr. Tums. Its hair and party hose rippled in the invisible current like filaments of cigarette smoke.

Maynard, returning with the bathroom master key, was obliged to hunch down as he passed under the visionary figure to avoid brushing against it. Despite this precaution, his near passage set up eddies in the stream of air supporting the weight so that his arms and legs tailed about, as a corpse might in going through rapids. One spectral hand encountered the grille of a ventilator above an unoccupied seat. There was a swooshing sound, as when a vacuum cleaner sucks up the edge of a carpet, and then—slowly at first, then quite quickly—the entire body was sponged up into the ventilating system.

What they found when they unlocked the

bathroom door was not the unconscious Mrs. Vow. They found nothing but a small puddle of what resembled a strawberry milk shake in the aluminum basin of the sink. Maynard wiped the vomit—what else could it have been?—down the drain and cleaned every surface of the washroom with paper towels. People, Maynard reflected, who think that flight attendants have a glamorous job should consider the statistics on airsickness.

"I saw her go in here," Andy insisted. Maynard shook his head with affable denial. "Then she must have come out again when you weren't looking."

"I was standing right in front of the door. And anyhow, you saw yourself: the door was locked. How do you explain that?"

More than anything else, Maynard needed to be let alone. "I'm sorry," he said.

"You'll have to excuse me. I've got to go to the toilet myself."

He entered the washroom, closed the door in Andy's face, locked it, and sat down on the lowered toilet seat and began to cry. He cried quietly and, as fast as they welled up, wiped away the tears with tissues from the dispenser beside the mirror.

Meanwhile, unseen by him, helices of vapor, delicate as the root hairs of a seedling plant, began to rise from the drain of the sink and to swirl before the mirror in the first tentative hypotheses whose sum would become for a certain time, isomorphic to the foam of the distraught and giddy Maynard Ellis.

THE SLOW COLLISION

It was now twenty minutes since Malcolm had left the cockpit to answer natures—and America Conkerts—call. Barry

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Anderson understood, in a theoretical way that in situations of extreme crisis, or threatened disaster, people are prone to cash in their last few chips of consciousness at the exchange of sex. "let as many times as the sinking of the *Titanic* had been made into a movie, that aspect of catastrophe always got bumped by 'Nearer My God, to Thee.' Barry didn't object to Malcolm's temporary dereliction of duty (what were they supposed to do after all?) he just wished he'd be speedier. Barry wanted a cup of coffee. He was as sleepy as a four-year old at a midnight showing of *Titanic* and *Ishtar*. If there'd been a road, his eyes would definitely not have been on it.

Though there was not a road for Barry to look at, there was a tiny greenish something up ahead in the gray of the cloud. A dot. It was set square in the middle of the lane. Barry would have been driving in it if there were a road and he were a bus driver. The dot grew and took on the features of another plane. Or, in fact, another 747.

How it comes, Barry told himself. This is it. All the earlier strangenesses must have been a hallucination provoked retroactively by his present panic. Or was the collision had already happened, and his dying mind had thrown up a defensive screen of false memories to prepare itself for the unfathomable fact of death. He seemed to recall having seen a movie to that effect on *The Late Late Show* long, long ago.

This seemed a better theory than any

Barry had come up with so far, but fortunately the airplane in the air lane ahead did not behave in a manner to bear out his theory. Instead it coasted to a stop at what would have been a polite conversational distance if the noses of the two planes had been human noses. And there it sat, as his plane was sitting, motionless in midair, an affront to reason and the law of gravity.

You can't do that," Barry explained to the unfathomable 747. "It isn't," he paused to savor the idea. "—allowed."

Barry noticed two things about the plane—or counter plane—in front of him. He noticed that the airlines' emblematic markings—as much as could be seen of them from this angle—were aerated in fairly contrasting bands of gray and darker gray instead of in red and blue. And he noticed that the cockpit of the other plane was empty. So much, therefore, for the possibility that he was seeing some kind of leak reflection formed by the cloud. For if the plane ahead were a mirror image, a mirage, then where was Barry's image in the window facing him?

Just as he posed this question to himself, Barry saw the door to the cockpit of the counter plane open and a woman enter. A cat was cradled in her arms. She approached the window, bent down, and looked ahead, wrinkling her brow as though puzzled by what she saw.

Was it he that she saw? Barry wondered. To find out he raised his right hand

in the manner of an Indian saying "How

The woman—*it was Mrs. Vow*—waved back. This was the opportunity Mr. Nibs had been waiting for. With only one of her arms confining him, he sprang loose and dashed back to the first-class cabin to take refuge in the shadowy cat-proportioned room formed by the rows and rows of empty seats. He kept thinking that light would come on, a camera would roll into position, and a bowl of his sponsor's food would be set down before him. But none of these desired events took place. The woman who'd awakened him and bled him from his seat was walking up and down the aisles calling out the familiar and ever-to-be-dreaded warning call of her kind, "Pussy! Pussy! Here, Pussy!"

#### A DIALOGUE BETWEEN FAITH AND REASON

Mrs. Vow had decided she was dreaming but could not decide when the dream had begun. The entire plane fight could not be a figment of her unconscious mind. She could remember too clearly all the details along the way: packing the suitcase, the delay in the departure lounge, her conversation with Dr. Tume after takeoff. The only discontinuity (but it was so ineluctable, the merest femina fracture) had been those few moments in the bathroom when she'd felt faint. If she had in fact fainted... But did one ever in a dream—especially so spry as a dream as this—did one ever know oneself to be dreaming? Not in her experience, but then, she usually forgot everything about her dreams within moments of waking.

More to the point: could she stop dreaming? Could she will herself awake?

"Wake up," she told herself experimentally, tooting an utter fool. Nothing changed. The tourist-class cabin remained as empty of its passengers and flight attendants as it had been when Mrs. Vow had stepped out of the bathroom.

"Wake up, damn it," she said with more vigor. "This is all a dream!" There was no need, she reasoned, to act reasonably if there was no one observing her. If this were a dream, it would be quite all right to scream. So she did. "Wake up!"

There was a loud thence, followed by an outraged cry of "Get off me!"

His Nibs leapt from his comfortable perch in the lap of Sester Fiddle's, sighted Mrs. Vow approaching, and took cover under seats 25G, 24G, 24H, 23H, etc.

Sester Fiddle's, in every ill-timed gallop to her feet (she'd slumped sideways in her sleep, which is why Mrs. Vow had not noticed her before) and brushed at her habit energetically where the cat had been resting. "I do believe," she said more to herself than to Mrs. Vow, "that cats can tell when a person is allergic to them. It's an instinct they have. How else can they always—" The fact that the cabin was almost empty finally impinged. "But good heavens—*we've* landed! Why didn't someone wake me? Where's Sester Incarnation?"

"I wish I were able to answer your ques-



"Gosh, it must really be exciting to work as a crash dummy, but I understand if you'd rather not talk about it."

tions," said Mrs. Vow. "I'm as much in the darkness as you. But I don't think we've landed."

Sister Fidelis frowned, as though Mrs. Vow had just been guilty of an off color plea. "Of course we've landed. That much is obvious. Though I can't understand how Sister Incarnation could have gone off and left me asleep in my seat. And where is the stewardess? She took my bag from me and I've no idea what she did with it."

"We two appear to be the only people on the plane. These, counting the cat."

Sister Fidelis darted a look of theological odium at Mrs. Vow.

"Cats are not people."

Mrs. Vow laughed and then—too late to avoid giving offense—stilled her laughter. She decided still best let the disgruntled nun explore the plane for herself and come to her own conclusions. If it were a dream, then whatever the nun did or said was really a manifestation of her own. Mrs. Vow's, unconscious mind. As now, when she glowered at the sealed exit door in the airway between the tourist- and first-class cabins she was expressing Mrs. Vow's general sense of entrapment by the circumstances of her life. But why a nun? Something to do with sexual repression, surely though Mrs. Vow was not conscious of any present disabilities in that area. On the contrary, Dr. Tume was the kind of lover—Bacchus, Solomon, and Galahad in equal parts—one did not expect to encounter outside the pages of a Salicette romance. Perhaps it was simply her name that engendered the idea of a nun. If so, then she might provoke an interpretable response by introducing herself. "My name is Mrs. Vow," she said significantly. The nun stood by the window nearest the sealed exit, peering quizzically into the enveloping cloud.

"And what's yours?" Mrs. Vow prompted. Sister Fidelis looked up, breathing at the most pertinent and impertinent of questions like a proper Turn-of-the-Century-English. But at last good manners won the day, and she answered. "Sister Fidelis."

"That means faithful, doesn't it? As in Adepts Fidelis. My given name is Marie, after the novel by Henry James. My father taught English at Princeton and worshipped James. I always wondered if there had been a second daughter, would he have saddled her with Calamagrostis? That was, in fact, a lie; she'd never wondered any such thing. But in a dream—and in talking to strangers on planes—one is free to invent another life for oneself."

"I'm afraid I don't know what you're talking about," said Sister Fidelis. "And this joke has gone on quite long enough. I'd like to get off this plane now."

It did not seem well-bred, even in a dream, to tell someone you believed yourself to be dreaming, since that would make the other person no more than a figment of your own imagination. There had to be a kinder way to suggest to Sister Fidelis that they were not really on a plane but rather on an anchor plane of existence. Perhaps she

could find in her father's phrase, "internal evidences," within the cabin of the 747 by which it could be shown not to be real. And there was, now that she thought about it, a thinness to everything about her, a lack of texture and nuance—as though the whole interior of the aircraft had been formed by some absconded geometer from vats of pink and baby-blue putty. But no, that proved nothing, for planes were designed on purpose to give such an impression, by way of luling the passengers' anxieties.

While Mrs. Vow continued in this vein of epistemological ravens, Sister Fidelis stepped cautiously into the first-class cabin, thence into the cockpit, where she saw what Mrs. Vow had seen earlier: the other 747 that had been parked nose to nose with this one. The odd thing was that though she could see the other plane quite clearly, a thick ground fog prevented her from seeing the runway on which the two planes must be resting. For they could not simply be hanging suspended, motionless, in the

● Amanda  
reached down and touched the  
simulated cat,  
which instantly dispersed into  
fendrifts of vapor  
that spilled over the edge of  
the seat like  
water spilling from a fountain ●

middle of the air like a pair of hummingbirds trying to kiss.

His Nibs followed Sister Fidelis into the cockpit, jumped up into the pilot's seat, placed his forepaw on the back of the seat, arched his back, and purred ingratiatingly. It was time for lunch. But the woman in the delicately scented gray clothes paid him no heed and tried only to swat a non-existent fly that lighted first on her forehead then on her stomach, and then on each of her shoulders in turn.

FOURTEEN LOVE

"And then—"

Then her narrative ran aground on the impossibility of her explaining to the poor man what she had seen next. What they had all seen. "This will sound incredible," she said, by way of preface.

"More incredible than all the rest?" Dr. Tume asked.

She nodded. Then remembering that he couldn't see her (and did not know there fore that she was a nun, for in the rush of becoming acquainted they hadn't introduced themselves), Sister Incarnation answered, "Yes, Orno—not more than all the rest. Because I haven't got to the other

things, such as the way people are falling asleep in the midst of everything."

"Yes, I've heard them snoring."

"We may be the only two still awake. Which is why I came to talk to you."

"And I'm grateful that you did. But don't let me interrupt. Please go on." Quite as though he could see, he placed his hand on her arm where it was grasping the end of the armrest. His fingertip rested on the ring by which she'd become a bride of Christ.

Reluctantly from a sense of simple duty (for the man deserved to know what had become of his companion), Sister Incarnation described the apperception of Mrs. Vow outside the washroom and its passage, down the aisle and into the mouth of the ventilator. Of course, she concluded, it could only have been a hallucination.

"But all of you saw it?"

"We all saw something. No one took the time to compare notes as to what exactly they saw. But they did open the door to the washroom right afterward, and there was no one there. And later I heard one of the flight attendants say the same thing had happened to the pilot and Miss Corbin. Apparently they'd gone into a washroom together."

"So far that is the most probable part of the whole story."

The crinkle lines around his eyes laughed in a way that was both good-humored and suggestive, and Sister Incarnation realized that despite his years and his blindness he was an uncommonly handsome man. He must have become blind late in life, since those who are born blind rarely develop that fineness of nuanced expression that is at the root of the idea of "good looks."

"My name is Ditore, by the way," he said with a lightening of his grip on her hand that could be interpreted as a handshake. "That's Italian for Hector."

"Mine is . . . Mary." It was not a lie, only a partial truth.

"So," he said, releasing his grip and creating, by the backward inclination of his head, a more comfortable emotional distance between them. "How do you account for all this?"

"Account for it?" She could actually laugh at the suggestion. But then, with the laughter, an idea came to her. Not a likely idea, but one that she, as a nun, could not dismiss out of hand. "Well, it might be—now it's your turn to laugh at me. Etienne. It might be that we're in the hands of God."

"And we like the cards, so to speak, with which the Almighty is practicing his sleight of hand?"

"I must admit that the next I how I was brought up to expect God to behave." She ran her right hand unseen down the length of her black veil. "But then," she continued, "He is under no obligation to conform to my expectations. There is a book I've always meant to read. It's a large paperback in the theology section of our college bookstore, and I don't recall the author, only the title, which is *The Cloud of Unknowing*. Could we have entered the cloud of un-

knowing? To which, I suppose, one can only answer, Who knows?

His smile rippled through his expressive teeth like sunlight flitting across the floor of a forest—evasive yet ever present.

My own nonexplanation would be that we've entered the fourth—or fifth or sixth—dimension. It amounts to much the same thing as the cloud of unknowing, doesn't it? As who would say, Here in time incognita, wonders never cease?

Perhaps the oddest element in all of this—Sister Incarnation added, "odder even than the disappearance of people from their seats and from the washrooms—is the way that there's been no panic among those of us still left behind. My companion on this trip—who by the way was one of the last who vanished from the plane—was a teacher at the same school where I teach. And she likes to pose this problem to her classes: What could one do to find one know for a certainty that the world would be coming to an end within the next hour?

That is a question everyone has had to consider in the nuclear age. And what does she propose for life's final hour?

"Oh, there's no single answer. She says we should all proceed at our usual tasks at our usual pace, whether that be teaching a class or reading a book or whatever."

"I'm not such a slow myself. I can still remember how I spent the forty-eight or so hours of the Cuban Missile Crisis, and it wasn't writing a budget proposal. No, if I felt convinced that the world was coming to an end, I'd try and have one last good fuck while there was still time." He paused long enough for this to register as an invitation then asked, "How about you?"

Everyone else on the plane was sleeping, and he was blind, and God didn't seem to be keeping up his end of the bargain, since nothing in Roman Catholic theology could explain the present situation. And for all these years since she'd taken her vows, the single sin she'd had to confess over and over was her regret for never having had sex with Gerald McCarthy when the opportunity had presented itself on the evening of May 24, 1967, and wasn't that a ridiculous sin to be damned for? How did she saying go? As well thing for a sheep as for a lamb. Deity she removed her temple and dropped it into an empty seat.

That's always been my feeling, too," she said, with the bravado of innocence. "Why not go into the cockpit? There's no one there, and it's warmer than the washrooms."

He held out his hand to her and she took it with the most innocent, the brightest sense of accomplishment. Just like the terror of self-wonder she'd felt when, despite all her forebodings, she'd passed her road test and gotten her driver's license. Now she would experience the substance of which that had been the mere emblem. Her life had turned out to have a major surprise.

TERMINA PRIMA.

For a few moments after waking in the seat beside Sister Fickles she could remember the main outlines of the dream. To

have been vowed to chastity so long and still to harbor such concupiscence? And with a blind man? How strange his tongue had felt when he—

But to remember, to linger over such imaginings was sinful, though the dream itself was innocent. She willed herself to think of other matters. As the plane tilted to the right, sliding in for a landing, she leaned across Sister Fickles to look at the city-streets formed map of roofs and roads.

"Why look at the dome of the bell cap?" she exclaimed. "It's just like ours at home."

"It is ours at home," said Sister Fickles dully. "If you hadn't been asleep, you'd have heard the announcement. We've had to turn back. The pilot won't say why, but we're not supposed to worry."

"You mean that I've slept through the entire drama?"

"I sincerely hope so. Meeting, Sister Incarnation understood that she hoped the drama was over and was not to have a tragic denouement. So

He entered  
the washroom and closed the  
door in Andy's  
face, looked it, and sat down  
and cried quietly.  
As fast as they walked up, he  
wiped away the tears  
with tissues from the dispenser.

ter Fickles was distrustful of airplanes.

"I had the strangest dream," she said brightly, trying to divert her companion from thoughts of a crash landing. "And it all took place here on the plane."

"Really?" said Sister Fickles guardedly. "But for the life of me I can't remember any of the details."

Sister Fickles made a cough of polite discomfort and turned to face the window. The plane was now skimming the gray, cloud-mirroring waters of an artificial lake. She, too, had had a dream, but one too sinful to speak of. Yet too vivid to forget, especially those last moments when she had stood outside the window of the cockpit, a voyeur to the act of sexual congress between Sister Incarnation and a naked, white-haired man, the same who now was seated (clothed) some five rows back talking to the women in the tailored suit. She had been in the dream, too, but in the capacity of a guardian angel, reminding Sister Fickles of her vows.

The wheels of the plane connected so lightly with the runway the cabin shuddered, and the passengers breathed a collective sigh of relief.

## THE NAME OF THE GAME

In a place that was not really a place, being outside of space as we know it and similarly situated with respect to time, two macrocosmic entities—which will be designated here, for convenience's sake, as demurges of Peindrome and with leading their resulting macrocosm into RAM.

"Well, that was fun," said the first demurgo. (The dialogue that follows must be understood as being in the highest sense approximate: demurges don't speak colloquial English, except when they manifest themselves in an angelic or demonic character.) As often as I've run through the one I've never hit on that solution. And it yields a really terrific score.

"Even so," said the second demurgo, who was some years younger and had had little firsthand experience of this particular recreational pastime, "I'm not sure it's a valid solution."

"Of course it is. The evil line is a perfect peindrome that is now true in the universe and in no other. If you don't believe it, I'll run through the endgame for you."

"Just explain how you got to the evil line." "Nothing simpler. Once the run with the red guitar case gets back to her consent—you remember her name, don't you?"

"Sister Incarnation?"

"Wm hm. That should have given the game away from the start. Especially with that other run sitting beside her muttering, 'Blessed is the fruit of thy womb. Womb and loins bring such apposite rhymes, and the whole peindrome hinging on the one word Tum.'"

"Oh, I see that. But how do you justify the initials U and T? The doctor's given names are Eliote and Alessandro."

Yes, but his son will be christened Ulisse Tannyston Tum. Whereas Pm U T Tum is a perfect peindrome.

"His son?"

"As I was trying to explain, when this Sister Incarnation gets back to her consent, she'll find out she's pregnant. And nuns, of course, never have abortions."

"How can she be pregnant if her thing with Tum took place on the 747 in the erased macrocosm?"

Because her genes were unspooled and reassembled after the moment of conception.

Okay. But that still leaves the naming of her anomalous offspring unexplained. I mean, here's this nun in a convent with no idea how she got pregnant. All she remembers is a vague dream she had on an airplane. How does she know to call her son Ulisse Tannyston Tum?

Ah, that's the romantic part. You see when Sister Fickles learned of her companion's pregnancy and was appalled of the dream that the distraught mother-to-be offered as explanation for her condition (a dream that corresponded in significant details with her own), she undertook to back down Dr. Tum as being the likeliest candidate for the honor of paternity. How Dr.



# STAR TECH

## ACCESSING THE FUTURE

Each June, Chicago's gleaming McCormick Place exhibition center is filled with audio, video, and electronics goods for the annual International Summer Consumer Electronics Show. The SCES, as it is known in the trade, attracts more than 100,000 attendees, mostly retailers. The products that catch their eyes at the SCES will line their shelves in the upcoming fall and Christmas shopping seasons. Here are some of the highlights of this year's SCES, as reviewed by regular Star Tech contributor Myron Gossio.

### VIDEO GETS PERSONAL

One of the smallest products introduced at SCES may eventually have the biggest impact. Sony displayed a prototype of a combination VCR-TV, the size of a paperback book, heralding the arrival of the long-awaited video counterpart to the Walkman. The TV screen is a 2.2-inch LCD (liquid crystal display) mounted on one side of a tiny 8mm VCR. The little VCR includes a tuner and can record programs off the air as well as play back movies on 8mm cassette. A product based on the concept is promised for 1989, with hints that an even more miniaturized version is in the works.

### CDs FOR TV

The enormous success of the audio CD (compact disk) has now inspired a video counterpart, the CD Video or CD-V. Like the standard CD, the new disk is five inches in diameter but plays 5 minutes of video in addition



to 20 minutes of digital audio.

For example, a Tina Turner CD-V might begin with a five-minute video of one of her songs (with digital sound) followed by 20 more minutes of her music without video.

The first CD-V players displayed at SCES, available from companies such as Pioneer, Magnavox, and Yamaha (shown on the following page), are combination units capable of playing standard CDs as well as five-inch CD-Vs and laser-view videodisks. Carrying a suggested list price of about \$800, these combination players started arriving this summer. The first five-inch CD-Vs, which are gold to distinguish them from silver CDs, are expected from Polygram this fall. Mainly music videos, these disks should retail for under \$8.

### RESOLUTION REVOLUTION

But the big news in video is that the people who brought us VHS-format VCRs (more than 100 million sold worldwide) have decided that VHS is ready for a major technical upgrade, namely Super VHS. JVC, inventor of VHS, formally introduced the new Super VHS format at the show. Super VHS VCRs can record 400 lines of horizontal resolution, as compared with conventional VHS's 240 lines, making for clearer, sharper pictures. A Super VHS VCR, however, must be connected to a properly equipped high-resolution TV set and uses a special videocassette.

Joining JVC in the launch of Super VHS are Panasonic, Quasar, Magnavox, RCA, Toshiba, Sharp, Mitsubishi, Zenith, and others. The

first Super VHS VCRs will be expensive, with list prices between \$1,200 and \$2,000. (Super VHS machines can play back conventional VHS cassettes as well as record in regular VHS mode, but Super VHS recordings will not play back on a conventional VHS VCR.)

Sony countered with prototypes for its new ED or Extended Definition Beta system. ED Beta surpasses Super VHS by offering 500 lines of horizontal resolution. Sony's new system, however, will not be available until 1990 in the United States, while the Beta format has been almost totally overwhelmed by VHS.

### CONVERSATION PIECES

If a Martian had beamed down to the floor of this year's SCES, he might have discovered that Earthlings are ashamed of telephones, which is why they disguise them as pets or sporting goods. Still, there were at least three notable new phone models at the show.

Panasonic's KX 10000 is a cordless model that features what may be the world's smallest handset, with dialing function. Reminiscent of the pocket communicators used by Captain Kirk, Mr. Spock, and crew in TV's *Star Trek*, the Panasonic model folds up to about the size of a pack of cigarettes and flips open when called into action. The suggested retail price is \$189.95.

If holding the phone is too much of a burden, and you want more mobility than speakerphones can afford, a new cordless model from

# STARTECH



Rantronics may have your number. The LifeSet (shown below) features

a miniaturized handset encased in a three-inch-long capsule that actually pinches on your ear. A small dialing pad attached to the handset lets you receive and place phone calls while moving around up to 1,000 feet from the base unit. It will be available this fall for \$219.95.

And for the executive who wants to present a cuddly persona, there's K.C. Beantone II, a plush teddy bear and phone all in one (photo graph at far right). It features a push-button



dialing pad and two-way speakerphone. And K.C.'s eyes and mouth move in sync to your caller's voice. K.C. is available for \$180 from TeleConcepts.

## HOME SMART HOME

In a two-story display home built on the floor of McCormick Center Medama, Inc., a subsidiary of Mitsubishi Electric, dem-

onstrated the consumer market's first affordable (\$1,200) home automation system that can transform your home into a "smart" house.

The Medama system's software controls lighting, audio/video equipment, appliances, air conditioning/heating, security systems, and communications equipment. Available by the end of the year, the Medama system works with a house's existing wiring and controls all the above through an unused telephone line. Everything can be operated from a master controller console or by Touch-Tone phone in another room or another country. For example, through a phone call, lights or an alarm can be turned on or off. And a preprogrammed voice will inform the caller if he's forgotten to turn off the coffeepot or the air conditioner.

For the ultimate in high-tech control, there's CORE (controller of remote electronics, photo on opposite page). This hand-held infrared device, the brainchild of Apple Computer co-founder Steven Wozniak and his new company CLB, can turn on your TV, VCR, and stereo and dim the lights with the press of one button. It's an option for the Medama system but is also available separately for \$199.

## RISH N' NUKES

SCES also featured the usual novelty items, such as the It's Alive trophy fish, a rubbery largemouth bass that squeaks and flaps for seven seconds when a microphone inside detects a voice or handclap. Mounted on a plaque, it's \$39.95 from S.A.M. Electronics at (312) 679-1500.



Nuke Alert (photo above left) is a personal radiation detector that fits in a pocket for those living downwind of nuclear power plants. It alerts you to the presence of beta, gamma, or X rays. Suggested list price is \$99.

## STARTECH UPDATES

The long-awaited barcode-reading VCR, reported in StarTech in October 1986 and February 1987, was



Finally introduced to the U.S. market by companies such as Panasonic, Magnavox, and Canon. Using a pencil-like scanner, consumers can program their VCRs by moving the scanner over a bar-code function sheet with codes for channel, date, and start-and-stop information. The ultimate goal is to persuade newspapers and magazines to print compatible bar codes in their TV listings so viewers need only scan the bar codes next to their favorite shows to program their VCRs.

And the controversial DAT (digital audiotape recorder) is coming. Marantz has committed itself to selling the DAT in America, probably by the end of the year. The recording industry is less than thrilled with the DAT, as it allows consumers to make compact-disk quality recordings off the air and from CDs. Record companies have pressed Congress to mandate antiscopy mechanisms in such devices to hinder their recording capability (see Star Tech, June 1987). Marantz's decision, announced at SCES, came in the wake of waning support for antiscopy legislation in Congress. Several other brands are expected to follow.



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#### HIGH-TECH GUITAR

If you're more interested in making music than listening to someone else's, then the DG-10 and DG-20 electronic or digital guitars featured at the Creso booth would have stopped you dead in your tracks.

Fingering the frets or plucking the strings of these advanced instruments triggers sounds from a digital tone generator. In addition, the DG-10 offers 12 preset instrumental modes, including acoustic guitar, jazz organ, and mandolin. The DG-20 adds another eight modes, among them harp, flute,

and clavinet, plus four drum pads. Both models are programmed for 12 rhythms, and both contain a built-in

Engineering Awards). From among 200 products featured at the CES Design and Engineering Exhibition, voters were asked to select the most innovative in four categories.

And the winners are: in the audio category, the Hitachi MX-W51 compact stereo (photo below); in video, the Fisher-Price PXL 2000 camcorder system for kids (photo at left); in the personal-electronics category, the Hewlett-Packard HP-28C calculator; and in the home-business equipment category, the Mitsubishi Electric Sales' Mediana, Inc. MDC 301 Home Automation System (described earlier). **CD**



speaker. They'll be available this fall: \$349 for the DG-10, \$449 for the DG-20.

#### IDEA WINNERS

For the second consecutive year, summer CES attendees were asked to cast their votes for the Omni I.D.E.A.s (Innovative Design and

Discipline page, clockwise from top left: Nite Alert, Yamaha CD V player, K.C. Starline II, Panasonic L-in-Sat phone. This page: CORE (left), Hitachi stereo (above), Fisher-Price PXL 2000 camcorder system for kids (top).



wombs—providing that endocrine balances could be reestablished after the disruptions that often accompany profound brain damage. The vegetatives could even be reseeded to produce fertilized eggs or offspring. The French, who claim to be harried at disconcerting treatment of long-term vegetative, in the same breath advocate using them experimentally.

Society has a ways to go before we set up human vegetable farms, in part because many people, superstitiously or not, think that the long-term unconscious might someday wake up. Could it happen? It seemed important to discuss the issue with people whose optimism for the unconscious is the guiding principle of their work. The Greenery is such a citadel of hope.

Located near Boston, the 201-bed institution is one of a number of long-term head injury rehabilitation centers. Indeed, the Greeneries are flourishing, with branches in North Carolina, California, Texas, and Washington State. Cornell Jefferson Institute was on my mind as I arrived at the Greenery's series of garden apartment buildings. There were no huge, windowless facilities like Corra. There is no forbidding nurse at the door, anyone can walk right in.

The Greenery gets plenty of business. The National Head Injury Foundation estimates that 50,000 people a year who survive serious head injury are left with "intellectual impairment of such a degree as to preclude their return to a normal life." Thanks to modern medicine, the patients have survived overwhelming brain injuries, but they arrive at the Greenery in varying degrees of unconscious or semi-aware states. Unlike conventional nursing homes, the Greenery does more than feed and nurse these people. It attempts to bring back some awareness through a program of intense sensory bombardment, physical therapy, and, for those able to benefit, special education.

Upon seeing the Greenery's patients and hearing their case histories—many car accident victims—I vowed always to fasten my seat belt. The patients themselves are inescapably sad. They are the bereft, wandering shades of a modern Aeneas, some perceiving dimly some in childlike wonder, others seeing hearing nothing. Their state was much harder to take than the finality of R.H.'s brain death.

Rigid in different poses, some resemble feebly statues, partially liberated from their molds: a mad choreography of frozen flexor contractions, seizures, feet on points. To ease their muscle contractions, many patients are armored in leg, arm, and hand casts. Even the unconscious are fed by their mouth in a wheelchair or strapped to boards slanted up against the walls to expose them to more stimuli.

The staff is committed to searching for

signs of life in even the most desolate-looking bodies: "We have a mission to try to wake these people up, and this is one of the few places that is dedicated to serving the very severely underaroused population," explains staff neuropsychologist Laurence Levine.

I took the time to watch their mission in action. Young, vigorous physical therapist Karen Gabelt introduces Randy, who sits speechless in a wheelchair. She presses electrodes against his skin, using electrical stimulation to prime the atrophied muscles of his legs. A construction worker from Oklahoma, he had been hit in the head by a demolition ball that demolished a good part of his left cerebral hemisphere. He wife refused to believe he was hopeless and eventually found the Greenery. Randy was admitted with muscle contractures that had pulled his legs up to his chest and pointed his toes down like a ballet dancer's. Gabelt transfers Randy to an exercise mat and the slowly lifts and lowers his now un-

*• If you  
pronounce them dead and  
they're breathing  
on their own, what do you  
do? Take them out  
and shoot them? You can't  
discontinue their  
life-support systems sub rosa •*

contracted legs 25 times each. I watch Gabelt work a little longer and after a while say good-bye to her and to her patient. But there is no response from him as I leave. He stares straight ahead.

The staff members admit it's difficult to keep the fires of enthusiasm burning when there's no response after day after month after month. Though they all have their Lazarus stories of the hopeless who eventually walk out of the place on their own, no one has published any data about these amazing returns in the medical journals, and, true, to the neurological community is a serious weakness in their presentation.

But if there were a new, cognitive definition of death, several of the Greenery's patients could be conceived as candidates. Ask Levine: "Should death be redefined as cognitive loss? Working in a place like this raises questions like that all the time." He says, "profound questions about what a person is. These are patients here who are very dependent, severely underaroused, with little hope on the horizon."

Two thought about what would happen to me if I wound up like one of them. At the point I'd want to die, he admits. "But my

hunch is that I'd change my mind if it actually happened. More likely I'd not have the cognition to know. What I'm trying to say is I don't have any fixed answers. Some people may believe that these people should be put to death, but as a society we can't condone that."

When I bring up the idea of cognitive death to him, Karen argues: "To consider a vegetative state as death is not practical. If you pronounce them dead and they're breathing on their own, what do you do? Take them out and shoot them? Brother them? You can't discontinue their life-support systems sub rosa." Unlike the brain-dead situation, withdrawing support from the vegetative is a social decision, not a medical one. The physician can't play God and decide to withdraw support.

Pressed about his personal feelings about higher cognitive death, Karen says that once an individual is no longer capable of awareness, is no longer a thinking being, and is in that irreversible state, "yes, I consider it the death of a human being." But he reminds me that there have been two recorded cases in which persons declared irreversibly vegetative did "come back" although that return of function "doesn't mean they think," he adds. "They could hardly communicate and do not walk." Furthermore, the criteria for determining a vegetative state are much less established than for brain death.

For background on what these criteria might be, I decided to ask another knowledgeable neurologist. "I believe that the meaning of life is cognition and self-awareness, not merely visceral survival," states Fred Plum, neurologist in chief at Cornell University Medical College—New York Hospital, at a meeting at Cornell in Ithaca. "The concept holds that when the cognitive brain has departed, the person has departed. In my opinion it is acceptable perhaps even desirable that society come to share this view but," he is careful to add, "that is a personal, not a medical opinion."

I sought out Plum because he is the best there is. Perhaps the world's top expert on coma, Plum is a hybrid of the kindly white-haired physician and Apollonian intellect—elegant, contemplative, and analytical. His book *The Diagnosis of Sleep and Coma*, written with Jerome Posner, is the definitive text on the subject. Today with colleague David Levy, Plum has been employing PET (positron emission tomography) technology to peer into the interior of this gloomy condition.

He has been doing preliminary PET studies on the cerebral metabolism of vegetative patients, and he and his colleagues are now trying to evaluate the potential for recovery of the severely brain damaged who are not vegetative. Using statistical evidence, he's built up "a fairly sturdy predictors" of who will do well and who will fare badly following severe brain trauma. He uses a sophisticated computer program that analyzes detailed information on the progress of the severely brain injured.



Within less than two weeks after onset, Plum says, about three quarters of the damaged area show clear clinical signs that predict whether they will have a generally good or devastatingly poor outcome. These data are correlated over a period of time, he says. "With the aim of eventually producing a one hundred percent prediction of who will do well or, conversely, who has no chance of recovery."

Does that mean you can say with 100 percent assurance after three months that Mr. X is in a vegetative state from which he will never return? No, says Plum. There will always be head injury cases that defy the odds and recover. "Nevertheless, being able to predict with a strong probability gives the family some facts upon which to make a decision," he mentions. His predictions could help a family decide whether to disconnect a life-support system or what to do with a brain-damaged patient who has a living will. Such a personal statement made when the person is in full command of his self-determination, serves to advise physicians against ordering millions of dollars' worth of needless care for hopeless cases.

Like Koren, Plum thinks that ultimately it is not the doctor's job to make the decision for the patient. "My facts are an effort to give people enough information so that a reasonably informed layperson can participate in the decision, knowing what the options are."

But over the next 20 years, the overwhelming demand for organs may increase the pressure to simply declare the "brain absent" dead. There is already something of a black market for buying and selling organs. If the cognitive-death definition were instituted, organ-matching corporations might establish enter prices beyond Wall Street's wildest market fantasies. The world would find itself in a situation where death itself would be an industry—an economic incentive.

But as Youngner points out, this economic pressure is not necessarily bad. "When Columbus sailed across the Atlantic," he says, "the main purpose wasn't to prove the world was round. It was to find new territory to plunder. It wasn't the philosophers who stimulated the cognitive death criteria of death. It was those who wanted the organs." We should be careful, he says, that the need for organs doesn't take over completely, because it confuses the issue, so that we are unable to debate the topic of death in a logical, intelligent way. If the brilliant liver-transplant surgeon Thomas Starzl, for example, has said we should take organs from the vegetative, why should we do it? Because their lives are of such poor quality that it doesn't matter or because they're dead?

Even without a shift to a cognitive death criterion, we already face major social and legal questions. "In the case of persons—bodies, really—that have lost all individuality or capacity for self-awareness, have they also lost their constitutional privi-

leges?" asks Plum. "This question is an artifact of technology. If it weren't for modern technology, we wouldn't be faced with the prospect of more and more very old persons continuing to survive in nursing homes after all shadow of their personalities has left the face of the earth." The numbers of these people will continue to climb, and society will have to try to teach some kind of balanced judgment about what to do with those with no living wills.

We also have the emotional stress of treating the legally dead. This fact was brought to doctors' attention by Youngner's powerful essay in *The New England Journal of Medicine*, "Psychosocial and Ethical Implications of Organ Retrieval." In his article Youngner notes that maintaining bodies for "harvesting" often requires treating dead people as if they were alive, an upsetting experience for doctors and nurses. They must try to ignore the signs of vitality that bombard their senses and at the same time provide the dead donors with

maintaining surgeons do a perfunctory job of sewing up the body cavity using coarse thread and large needles. And the body is sent, not to the recovery room but to the morgue. [Even after being told what has happened to a patient, families sometimes ask the doctors what time the donor will be brought back to his room.]

Youngner has now embarked on a long-term study of health-profession stress and organ retrieval. In his office, looking athletic in chinos and a blue jacket, Youngner has a serene face and speaks gently but firmly. "I got an incredibly positive response from O.R. personnel from that *Journal* piece," he says. "I don't want to exaggerate and say they're all lamely traumatized by brain death and the organ-retrieval process, but most everybody finds it a little uncomfortable, a few find it considerably uncomfortable."

Many M.D.s don't really come to terms emotionally with brain death, even though they intellectually understand the mechanisms. Attending physicians often balk at writing the death certificate for a person pronounced brain dead.

Payle Davis, director of the New York Regional Transplant Program, uses Youngner's essay in some training sessions to sensitize hospital staff. "Sometimes ICU staff complain about taking care of dead people," she says, "when they have so many live people to take care of. So we might hold off on a pronouncement [of death] to help them feel they're still taking care of a patient. It's less stressful. But it's illogical—because, in a sense, they know."

Youngner also talks about the "apex" the staff often say they feel in the operating room during surgery: the presence of a silhouette there but sleeping. O.R. personnel often feel a similar presence with brain-dead patients, and it doesn't depart until the respirator is turned off. Families talk about the spiritual entities as well. Sometimes, says Davis, "they know when their loved one is dead while we're still figuring it out by the tests. They know he's just not there anymore."

Outside the medical profession, the reaction to brain death is blind fear. "Many people are afraid the doctors are going to grab their kidneys before they're dead," says Montefiore's Telle. But we shouldn't worry. "In fact, donor cards are your best insurance. If you come into the hospital seriously injured, and your survival is in grave doubt, they'll probably give you the very best attention. For your organs' sake."

In the midst of these discussions, my mind kept returning to the question: What is a person? And more important, what will a person be in the future? It's not inconceivable that before too long, brain stem function could be replaced by a computer, for example, a silicon clone of the subcortical formation. This autonomic organ could be connected to the side of a real brain stem and inserted into the head. Then measurable consciousness might be made renewable: the lost person brought back.

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For your organs' sake •*

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intensive care usually reserved for the living. If a brain-dead donor in an intensive care unit goes into cardiac arrest, for example, alarms ring and medical staff rush to revive the body. Meanwhile a policeman's voice might be written on the chart of the living, perhaps even wide-awake patient in the next bed.

Surgery to remove organs also requires hospital staff to suspend their medical instincts. The dead don't usually go to surgery, and as Youngner points out, the brain dead wheeled into the O.R. don't look that different from living, anesthetized patients. O.R. personnel used to life-saving surgery, upon seeing the removal of vital parts, may be shocked by the mutilation. In some cases of what's called long-bone retrieval, one O.R. nurse told me, the surgical team removes the thighbones and replaces them with broomsticks to keep the legs' shape. Another organ-donor coordinator who has logged hundreds of hours in O.R. confessed she still can't watch eye removals.

After long hours of "retrieval" surgery the anesthesiologist does not, of course, wake up the cadaver. He simply disconnects the respirator and leaves the room. The re-

In the course of his interview, Koren began to speculate about the value of such a machine-brain cyborg. "If I know how to make one, I know what I'd use it for: for someone with an immediate-memory deficit—a patient who will forget he has met a visitor after that person steps out for a moment and returns. If you could create an external visual memory system for him, then when someone walks into a room—zip—it is recorded into the machine's external memory. Then if the person walks out and returns: the memory would compare the person who left with the person returning and report to the brain of the memory-deficient patient. You already saw this guy."

This, then, brings up another basic question: Where is the mind? The brain is something you can touch, squeeze and do experiments on. The mind has other properties, but it's certainly related to the brain. I don't know any mind without a brain. I know lots of brains without minds. I'm sure you've met them.' Kovan laughs. 'Actually, the mind must evolve in some way from self-reflective processes. Living beings all have the ability to look upon themselves. In one-celled animals it's an enzymatic system, a positive feedback. In humans it's the ability to put together a set of stimuli, stake them, look upon them, feed on them. And the repetition of this is, I think, what results in a mind.'

I failed younger to contemplate these implications of the computerized mind. What if one could decipher the program of a person's personality and transfer it to a computer that would store the memories, react with the same emotions? Could one argue that even if the human had forever lost consciousness, he'd still be alive because this computer was standing in?

Tel said that wouldn't be a person but a robot, he decides, considering the options. "Okay, what if you took the brain out of a body and put it in a solution with a communications system? I'd still say it wouldn't be a person because to me a person is, at bottom, a biological entity. Our identity is very much tied up with our body and we have an idea of who we are based on our physical attributes outside the brain."

On the other hand—he takes the opposite view without much painful dissonance—if you had that brain in a jar—say it was my brain—and it said, 'I'm a Pittsburgh Steelers fan, and I'm upset they didn't have a good year, then it would be hard to dismiss the idea that Stuart Younger is alive, although his body's gone; it might be the presence of an identity, but it's not a human being. It feels positively sick.

So the question of death ultimately becomes the question of what is life. After almost 20 years of research on death, Korien is more excited these days about life. The process of being born is, in a sense, just the opposite of dying. When does the human being begin? At fertilization? When is an embryo? There's a constructive phase between 10 and 20 weeks of fetal life when the neurons are being produced and on-

gerized. The fetus moves as early as eight weeks, Koren says, but that's spinal cord activity, a vegetative function. Around 20 to 24 weeks the cerebrum starts to show signs of electrical and synaptic activity. "Then," he says, "you could say it's the earliest possibility of cerebral-mental life. It hasn't the ability to work like a normal three-day-old baby, but the pieces are in place, starting to glow and connect. That's the beginning of a person's life." —*Heaven Lee*

In brackets, the dead and the near dead  
 I was haunted, so to speak, by the words  
 of Carlotta Gajdusek. The Nobel prize-  
 winning virologist is famous for his discov-  
 ery of the slow virus in the Fore people of  
 New Guinea. During his research he in-  
 tensely observed their mortuary ritual of  
 eating the brains of dead family members.  
 It was an expression of love for their dead  
 relatives. "They had no fear or reluctance  
 to look at the brains or eat them of their  
 kin," Gajdusek told Orms. "They always  
 dissected their relatives with love and  
 tender care and interest. It was Gajdu-  
 sek's opinion that were it not for the viral  
 infection in the tissue, eating brains would  
 have provided a good source of protein  
 for a meat-starved community." Not long  
 after I started this story, I went to hear Ga-  
 jdusek speak at Mount Sinai Hospital in New  
 York. During the address he spoke of the  
 "neocannibalism" of modern medicine.

With the great advances in life support technology and organ transplantation, the dead today do indeed have much "potential" to offer us—in the form of their organs and body parts. We are the neocannibals. Unlike Fore culture, however, Western society has a horror of the dead. We prefer not to think about death at all, and when forced to deal with it, we do so as hurriedly as possible. We have no new death rituals and little understanding of neocannibal practices. And our old superstitions may work counter to a true understanding not only of death but perhaps of life, too.

The radical, outspoken Dr. Telle is concerned with life, the hanging-by-a-thread life of someone waiting for a heart or liver or kidney. He has no patience with families who refuse to donate the organs of brain-dead kin. The social climate surrounding organ policy should be reversed, he told us as he waited at Good Samaritan Hospital that night for the rest of the transplant surgeons to arrive for RH's organs. "Instead of feeling good and righteous about donating," he said, "it should enter the collective unconscious that you feel bad if you refuse. The family who refuses to donate a dead relative's liver should be told they lied about the waiting recipient!"

Slowly we are coming to terms with brain death and the new life that it offers. What we decide to do with the life in limbo that the vegetative state remains to be seen. It is better to begin to think about it than ignore the increasing price we have to pay for this most unblest cloth on the shroud plan. **DD**

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A horizontal timeline from 1870 to 1910. The timeline is marked with vertical lines and labels: 1870, 1880, 1890, 1900, 1910. Above the timeline, there are two labels: 'Bible' and 'Bible'. The 'Bible' label is positioned above the 1870-1880 segment, and the 'Bible' label is positioned above the 1880-1890 segment. The timeline shows a progression of different editions or versions of the Bible over time.

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Page 1



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# INTERVIEW

CONTINUED FROM PAGE 38

with the present. To do this comfortably, select a beautiful scene having personal meaning for you. I want the reality of the experience to be as vivid as possible. Then I count to ten and bring them back.

At that point, if I'm working with a pitcher say, I ask him to think about the batting lineup. "You're in Houston," I say. "Feel yourself in the Astrodome, feel the temperature, feel the direction of the breeze." I'm reinforcing the sensual world he's going to experience. Then I ask him to mentally stand on the pitcher's mound and envision himself releasing each pitch to his full potential to each batter in the lineup. It takes three or four minutes to go through all nine batters. Then I say, "Did you like your performance? Was it close to your personal best?" The athlete says no, so I tell him to return to the point at which his performance fell off and again go through the scenario in his head. Finally I bring him out of the tranquil state, and he talks to me with far more clarity than he's ever had before, what he's been doing wrong with his number four. You cannot tell such highly developed athletes how to improve their performance. You can only help them perfect their performance by moving in the continuum of feelings and sensations that have gotten them there in the first place. Whatever the pitcher's basic script is, we go back to it constantly reinforcing what's worked best for him in the past.

**Q:** Your method seems so serene. How does this jibe with the notion that aggression is invaluable for success in sports?

**A:** I have no enthusiasm for generating aggression or anger in sports. These emotions dissipate so quickly. The better stance is one of mystery and control.

**Q:** Would that hold true even for, say, prizefighters? Marvin Hagler defeated by Sugar Ray Leonard for the middleweight championship, always comesos himself before a fight that he hates his opponent.

**A:** It's a very wary, unlovely emotion. It betrays you. Once you release it in that first burst, it's as if you've vomited. There's nothing left. I myself fought in the service, and the only time I ever lost it in the ring was when someone literally tried to kill me. Then I became so irrational I tried to kill him. As a natural human being, you can reach a level of self-sustaining rage due to what an opponent actually does to you. But if you're trying to generate that rage yourself, it's hard to sustain. One defensive end told me he used to pretend that the offensive tackles he matched up against on Sundays had raped his wife. He felt he had to generate that hate to start every game. He was one of the meanest men around. But as soon as he made one hit, the vitriolic energy seemed to fade.

**Q:** Do male and female athletes differ psychometrically?

**A:** Our profiles show that elite female

and male athletes are virtually identical. They're tough-minded and emotionally healthy. Because their emotions are more open, however, females often find it easier to use such performance-enhancement techniques as visualization to improve.

**Q:** You've studied such high-risk performers as Grand Prix race drivers, parachutists, and aerobatic pilots. Are these athletes driven by a death wish?

**A:** Well, Grand Prix drivers turn out to be some of the healthiest people around. We studied about thirty drivers, including Graham Hill, one of the finest who ever lived in their psychometric profiles; they scored even higher than NFL football players. Very naturally aggressive men, they set the standard in our studies for self-control and tough-mindedness. They don't mess around with emotional interpretations of things. They want to get down to bedrock. Give me the facts, show me the data. They most fear boredom. The thing most stressful to them is a life not lived.

•More and more athletes are coming to grips with, and using, the emotional legacy that's so deeply bound up with determining how they will perform. •

where aptitudes and abilities are not expressed or acted upon.

**Q:** Do they want to stay alive?

**A:** Oh, yeah. I was staying with Graham Hill reviewing the findings of his psychometric test. After pointing out all the remarkable strengths I'd found, I said, "Because risks are everywhere and brands of yours have died, what goes through your mind when you're waiting to start?" He said, "I focus on the first turn, where there's the highest probability for injury and death."

Then he took me for a walk around the track. "Walk around the edge," he told me. "This is where I'll be. Now I'm turning into the straightaway. That turn has an incline then drops off two and a half degrees. Now it's sloping again. The three foot of gravel on the inside of the asphalt track is death. If I get out with no engine disturbance, I'm going to hit that turn last. Supposing, on the other hand, there's a mechanical disturbance and I don't accelerate fast enough and someone on the outside gets to the curve first? I'll have to move to the right."

He went on and on. It was a dissertation on all the contingencies. He took every conceivable possibility into account. He

knew every rock and piece of gravel. These are not careless, fly-by-night characters—not the men the Air Force looked for when it wanted pilots to fly with abandon, not reckless kids who'd hot rodded and gone up mountains on motorcycles. This population would have been well suited to fly bombers with all of the technical gear. They're better suited for that. Fear is a reality to these people, although they have the true ability to inhibit its intrusion upon their performance.

**Q:** What happens to retired Grand Prix race-car drivers and other stress addicts who no longer get the stress they need?

**A:** They may suffer adjustment problems. When their lives become routine, they may become anxious. A good example from another profession is the surgeon. He also lives on stress but now just does as routine arthroscopic knee surgeries a day. Now he's a plumber. My advice to him is to find some new areas of challenge so he can sense risk again. So many of them would love to change places with the race-car drivers. Instead, they drive exquisite Italian cars across the desert at one hundred sixty miles an hour—just for the thrill of emotional release.

**Q:** How would you extend this notion to athletes who may lose their sense of emotional release when they leave their sport?

**A:** In general, there's no provision for those people after they leave their sport. Many athletes go through four years of college, leading at ninth-grade level. Some don't even receive their degrees. Coaches wrongly emphasize only the sport. The careers of pro basketball and football players average three and a half to four years. For maybe forty percent of the players, it's over after one year. Anxiety over the situation hinders performance even during the athletic career. When the career ends, these players feel like it's the end of a dream. After leaving it all—the acclaim and adulation—suddenly they step into crowds and become ordinary persons. It can be devastating. The incidence of alcoholism in former hockey pros is epidemic. They go through grief and engage in all kinds of dangerous escape behavior.

**Q:** You describe the phases of an athlete's termination almost as if it were some kind of fatal illness.

**A:** For some of them it's more lengthy than that. Death would be better than becoming a nonentity. You should hear the wives describe the syndromes of the NFL players who played ten or twelve years. All that time has been programmed to get ready for the Sunday game. By Friday they're restless, he can't settle down. Saturday morning he paces, and the crescendo builds. At eleven o'clock that night he wants to get to bed but tosses and turns. Sunday comes, and the game begins, but he's not there. He still needs the body contact and the stimulation of the sixty-five thousand roaring people. So he gets up at seven and runs until he's exhausted. Only when he returns home does he become moder-

ally human. This is the characteristic who's who. These men know no other world. Where can they turn to get the change, the challenge, the acclaim they're used to? Nowhere.

**Omni:** What do you suggest?

**Ogilvie:** We must prepare these people in advance for a challenging life after sports. It's a problem for the coaching staffs, the teams, and the schools.

**Omni:** Have you any other gripes against the sports structure in America?

**Ogilvie:** Yes. I'm disappointed with the Olympic hierarchy. You have to work through a maze of authority figures, each with their own turf. Because there's insufficient respect for the basic service person in sports psychology, the result is that the athletes don't get the service when the need is greatest. At the Mexico City Olympics, a Czechoslovakian study determined that forty percent of their athletes needed some form of psychological intervention. My colleagues in East Germany estimated the figure at thirty-four percent. **Omni:** Did they have psychologists there?

**Ogilvie:** Yes, as did the Soviets and all the Eastern Bloc nations. In fact, the last time I was in Europe, their sports scientists wine and dined me while seeking to discover whether we had developed better performance-enhancing strategies. But I had to get them drinking before they'd talk about their own work, and I didn't sense anything more advanced than what we're doing here, except for their superior organization and structure, which brings psychologists into their entire Olympic development movement. The U.S. Olympic committee is now issuing credentials to psychologists. How soon they'll be integrated into the total Olympic development movement remains to be seen.

During the 1984 Olympics I was called back by An Selinger, coach of the women's Volleyball team. The group had to smuggle me into the locker room in women's sweats. I even wore a towel around my head. I spent an hour and a half working with the players one on one and then worked with the entire team, mentally rehearsing the entire match. And then, each time, the officials would throw me out. But I got the job done first and had a ball. I'll show these sons of bitches they can't keep the old bastard out. I thought, Their stupid restriction worked to the disadvantage of the team.

**Omni:** Where have you made your greatest impact in the world of sports?

**Ogilvie:** I've shown the sports establishment, including coaches and management, that the athlete must be understood as a total individual. Everywhere I go, I talk about the athlete's needs and uniqueness and I fight the negative stereotypes he's bound to run into in his career. I've helped the athletes themselves develop a respect and sensitivity for what's in their own minds. More and more they are coming to grips with, and using, the emotional legacy so deeply bound up with determining how they will perform. **DD**



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# GAMES

By Scot Morris

The camel has a single hump.

The dromedary two.  
Or else the other way around—

/I no never sure, are you?

—Ogden Nash

As a child you learned that in a cave there are stalactites and stalagmites and that one of them rises from the floor like a stone pillar while the other hangs from the ceiling like a petrified icicle. But which is which? Are you sure?

The world is filled with line distinctions, dichotomies, pairs that often have similar names designed to confuse ventricle and aortic, convex and concave, mares and mares. As the moon waxes and wanes, the tide ebbs and flows, leaving foam and foam all over the beach.

Well, it's time to get a few things straight once and for all. Now, once again, Which is the stalactite, and which the stalagmite?

## ANSWERING THE QUESTION: WHICH IS WHICH?

Select the best description for the words in each pair below. For the first six, refer to the illustrations above right and on the next page.

Note: In some cases the same letter may apply to both words.

1. latitude ( ) longitude ( )
2. dromedary ( ) camel ( )
3. African elephant ( ) Indian elephant ( )
4. ebb ( ) bassoon ( )
5. head line ( ) heart line ( )
6. alligator ( ) crocodile ( )
7. stalactite ( ) stalagmite ( )

A. hangs from the ceiling

like a petrified icicle.  
B. rises from the floor like a stone pillar.

8. dorsal ( ) ventral ( )

A. your front side

B. your back side

9. mortar ( ) pestle ( )

A. a pulverizing tool

B. the bowl used with A

10. ebb ( ) flow ( )

A. the incoming tide

B. the outgoing tide

11. nearsighted ( )

farsighted ( )

A. You can see fine at a distance but require glasses for close-up viewing.

B. You are able to see things at close range but require glasses for distant viewing.

12. 13. max ( ) y-axis ( )

abscissa ( ) ordinate ( )

A. in a graph, the horizontal line, generally representing time.

B. the vertical line, generally depicting quantity or frequency.

14. stamen ( ) pistil ( )

A. the male part of a flower

B. the female part

15. stocks ( ) pilory ( )

A. jacks around head and hands.

B. confines the feet or feet and hands.

16. dolphin ( ) porpoise ( )

A. possesses a "beak" or bottle nose.

B. round nosed, smaller than animal A.

17. apogee ( ) perigee ( )

A. the farthest point of an orbit around the earth.

B. the nearest point of an orbit around the earth.

18. solstice ( ) equinox ( )

A. June 22 and December 22.

B. March 21 and September 23.



19. jutsu ( ) judo ( )

A. the martial art of

weaponless fighting.

B. a sport developed from A, emphasizing quick movements.

20. tropic of Capricorn ( )

tropic of Cancer ( )

A. 23 1/2° latitude north (of the equator).

B. 23 1/2° latitude south (of the equator).

21. axel ( ) sea lion ( )

A. hind end is fused into a flipper, generally has no external ears.

B. rear flipper is divided into two fins, as a stage performer balances a ball on its nose.

22. cirrus ( ) cumulus ( )

A. piled-up masses of clouds at low altitudes, with relatively flat bases and cauliflower-like tops.

B. filmy or curly clouds, usually at high altitudes and formed by ice crystals.

23. habes corpus ( )

corpus delicti ( )

A. a legal document demanding release of a person detained without sufficient cause.

B. the fundamental fact necessary to prove a crime has been committed.

24. slander ( ) libel ( )

A. publishing a false and defamatory statement.

B. making a false and defamatory statement.



- that conveys an unusually negative impression of someone  
B the effacing of false charges that damage a person's reputation
25. assault ( ) battery ( )  
A hitting someone  
B a threat of physical violence
26. centripetal force ( ) centrifugal force ( )  
A the apparent force that pushes you to the left when your car makes a right turn  
B the sun's gravitational force that keeps the earth in its orbit
27. ibis ( ) ibula ( )

- A the large inner bone of the lower leg  
B the smaller "outside" calf bone
28. radius ( ) ulna ( )  
A forearm bone connected to the thumb side of the hand  
B forearm bone that connects to the pinkie side of the hand
29. oblique ( ) obtuse ( )  
A an angle that is greater than 90°  
B less than a right angle
30. mule ( ) donkey ( )  
A a cross between a horse and animal B  
B a species closely related to the horse

31. Charles's law ( ) Boyle's law ( )  
A Volume of an enclosed gas is directly proportional to its temperature  
B Volume and pressure are inversely proportional to each other
32. lyre ( ) lyre ( )  
A a stringed instrument in the harp class  
B an instrument with a half-pear shaped body
33. baking soda ( ) baking powder ( )  
A used as a substitute for yeast in baking  
B used to clean your teeth or skin or to calm an upset stomach
34. Noah Webster ( ) Daniel Webster ( )  
A the author  
B the dictionary man
35. vibraphone ( ) xylophone ( )  
A has wooden bars  
B resembles instrument A but has metal bars and motor-driven resonators
36. agoraphobia ( ) acrophobia ( )  
A fear of heights  
B fear of being in open spaces
37. prone ( ) supine ( )  
A on your back  
B on your stomach
38. flotation ( ) jetsum ( )  
A a sunken treasure or a beer can on the floor of the ocean  
B a broken deck chair floating on the water
39. starboard ( ) port ( )  
A the left side of a boat  
B the right side of a boat
40. windward ( ) leeward ( )  
A usually the side facing the wind  
B usually facing away from the wind
- Answers appear on page 108

## THE GAME PRESERVE

In 1976 Leo Dennis turned her collection of more than 1,000 antique board and card games dating from 1612 to 1930 into The Game Preserve, a museum housed in her Peterborough, New Hampshire home. Colorful lithographed game covers line the walls of her study hallway and living room. The rare and most delicate games are preserved in hermetically sealed frames. A game carpet, woven with game boards, includes chess, cribbage, Parcheesi and even hopscotch.

One tile in Dennis's gallery of games is The Mansion of Happiness—created by a minister's daughter in 1840. Each player tries to arrive at the mansion while avoiding such pitfalls as Passion and Idleness.

The games we choose to play mirror our society and values. According to Dennis, in strict pre-Civil War households The Mansion of Happiness served as a morality lesson as much as a form of entertainment. Such games as Telegraph Boy and District Messenger Boy display the American work ethic.

In addition to serving as tour guide, Dennis sells collectibles on her enclosed porch—quaintly called The Pastime Porch.

The Game Preserve, 110 Spring Road, Peterborough, NH. Telephone: (603) 964-6740. (from America on Display by Joyce Jarrold and David Jenness. Copyright 1987. Reprinted by permission of Facts on File, Inc. New York.)



# LAST WORD

By John Carlson and John Trueson

• *The Middle Testament is one of the most exciting finds in years, rivaled only by the fabled lost Honeymooners episodes dug up in Jackie Gleason's basement.*

Television producer and amateur archaeologist Howard ("Buddy") Meink caused a sensation last month when he announced that he had accidentally discovered an ancient scroll during a trip to Israel. The document has been positively identified as a previously unknown book of the Bible. Since it is neither New nor Old, the book is now being referred to as the Middle Testament.

The testament "written on narrow strips of parchment approximately six inches wide" was tightly wound around a cylindrical piece of wood and is said to resemble a roll of novelty toilet paper. It was Mrs. Meink who first spotted the artifact while shopping for souvenirs in Jerusalem. Unaware of the importance of her find, she brought the item home and installed it in the bathroom. "Fortunately," recalls Mr. Meink, "I suspected the document's significance before Mrs. Meink used up any of the introductory chapters."

Meink assembled a team of six experts specializing in ancient languages to translate his find. Their efforts have already brought to light several startling revelations, some of which Meink made known in an exclusive interview. "It's divided into two sections. The first section details points raised in the Old Testament," he says, "which should put to rest many religious questions that have gone unanswered for centuries."

"Did you know that the Sabbath does not fall on Saturday or Sunday, as some have previously thought?" he asks. "We now know it actually is supposed to occur on stunning Thursday afternoons, between three and four thirty."

In addition, the scroll reveals that there are not ten commandments, but seventeen. "Meink continues, included among them are such mandates as 'Thou shalt not run about with a pointed stick in thy pants' and 'Thou shalt not poison thy neighbor's pet; relieve.' As an addendum to the unpopular ninth commandment was a ninth and a half commandment: 'Thou shalt not poison the church secretary.'"

Finally, in the appendix to the first section was a brief editor's note apologizing for a serious typographical error in the Old Testament. The letter p was not supposed to appear at the beginning of the word psalm. Henceforth the word should be spelled as it sounds: "the Middle Testament declares.

Even more startling revelations were to come out of the second section. It added more detail to events already chronicled in the New Testament. "We found previously unpublished writings of the twelve apostles," Meink cites. "But the real treasure, the bolt finding that came out of this, is the discovery of a thirteenth apostle. His name was Bing."

According to the Middle Testament scriptures, Bing was disliked by the other apostles for his lack of faith and his habit of questioning such common religious practices of the day as fasting and prayer. That is in the scroll a record of a letter he wrote to Simon proposing that they try something different at religious feasts, such as lip-synching their favorite psalms (or salms). Simon Peter, known for his fondness for party games, liked the idea, but when it was brought up at the second-to-last supper it was voted down by the other 11.

"If my translators got this right," Meink says, "the other apostles that chastised Bing. They filled his pockets with rocks and subjected him to repeated baptisms in the River Jordan."

Discouraged and soggy, Bing resigned as an apostle and dropped out of sight. Meink says the scroll doesn't tell what happened to Bing next. He is mentioned only one more time in the Middle Testament scroll. It does describe how he was executed and (joined a measure of redemption).

After his departure the apostles, in going through his possessions, discovered a game he had invented. Intrigued by their discovery, they began to play the game going small. Lip stones and square pieces of numbered parchment. It was a game that was to bear his name, and for centuries to come it would be used to liven church activities. The game, of course, was bingo. Because of that discovery, it is rumored that the Pope is considering canonizing Bing the patron saint of Las Vegas Nights.

It may be years before we know what other secrets are contained in the Middle Testament. Meink does not plan to publish the scroll's contents but rather to make them public in some televised form. He is not certain exactly how he will realize his dream. He has optioned the scroll, however, and has hired a team of writers to develop it into a miniseries "or maybe a sitcom," he says. "I'm discussing the concept with my writers now."

Meink is being very secretive about the specifics of his plans, but it is known that the project will be based on the relationship between Christ and the 13 apostles. Some of the names that have been suggested include We're with HIM HE's the One, and The Bible Bunch.

No matter what form Meink's program ultimately takes, there's no question that the Middle Testament remains one of the most exciting archaeological finds in years, rivaled only by the discovery of the fabled lost Honeymooners episodes in Jackie Gleason's basement. **GG**

John Carlson and John Trueson are two political comedy writers who live in New York.