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OMNI

SPECIAL ISSUE!
SCIENCE AND THE SOUL

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VOL 16 NO 1 OCTOBER 1993

DEPARTMENTS

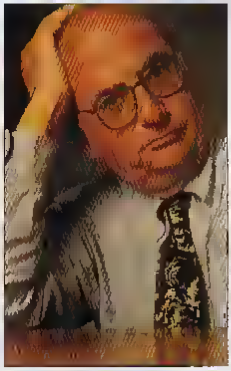
Is consciousness a mask—as Rob Day's fine cover may imply—or a gift?
An aspect of our physical bodies or something wholly separate from them?
Is there such a thing as the soul—or not? These questions may be on the brink of being answered That's why we have chosen science and the soul as our topic in this anniversary month (Art and photo credits, page 110)

OMNI (ISSN 0149-8711) is published monthly in the United States and Canada by Omni Publications International Ltd., 1965 Broadway, New York, NY 10023-5965. Second-class postage paid at New York, NY, and at additional mailing offices. POSTMASTER: Send address changes to Omni Magazine, Post Office Box 3041, Harlan, IA 51537-3041. Volume 16, Number 1. Copy-

Canadian GST Registration #R126607589

OMNI

FEATURES



Omni is 15! Hard to believe that a decade and a half has passed since Bob Guccione and Kathy Keeton launched a magazine devoted to the future. Our devotion remains unchanged: to bring you the best in speculation, speculative fiction and art, science writing, and cultural exploration. Thanks for joining us in our birthday month.

FIRST WORD

WHEN WE'RE ALL CYBORGS
Second thoughts on the machine in your future

By David Hess

Cyborgs have yet to become a reality, but ours is already a protocyborg age in which we spend a large part of our day connected to cars, hair dryers computers, and other machines. Some people already commute on electronic superhighways, date via E-mail, and work out in brain gyms.

The future, so we're told, promises an ever deeper relationship with the machine. Artificial wombs may make it possible to escape the curse of Eve, just as bioengineered food production may end the curse of Adam. Someday our descendants may rewrite evolution by deciding to shuffle off their mortal coils and download onto some immortal silicon circuitry. Through cyberfilms and sci-fi novels, we witness a popular culture that is fascinated—and frightened—by the impending new self and society.

Yet I watch with some skepticism as the collective imagination runs wild with cyberfantasies. Perhaps my skepticism comes from my disciplinary training. The public still tends to think of cultural anthropologists as fieldworkers in remote Third World villages, but a growing number of "cyborg anthropologists" has started to study technotribes such as physicists and computer programmers. Because anthropology examines all human communities—from hunter-gatherers to data surfers—we tend to take a broader perspective on talk about human evolution or cultural revolution.

As a cultural anthropologist, I see more old in the new than do the prophets of technotopia. Virtual reality, for example, strikes me as a high-tech version of shamanism. The idea of producing controlled virtual worlds is as old as hallucinogenic trance voyages and vision quests. The techniques may have changed, but will the visions?

Likewise, it may be true that the brave new world of electronic romance and medical prosthetics offers new opportunities to remake our selves, but the idea of creative identity reconstruction is as old as masquerade balls. Masks, lip plugs, and body paint may not be cultural universals, but they're fairly widespread cultural artifices that point to a deep-seated human propensity to remake the self through physical props. Our props may be more complicated, but are our rituals and relationships?

Even the idea of fusing with the machine may not be as new as it first appears. The new technototemism of machines strikes me as only another variant on the persistent dream of transgressing human-nonhuman boundaries, a dream that dates back to relations with natural totems such as the eagle and the owl.

I watch the new cyberfilms with the same sort of suspicion. The cyborg is as much a new vehicle for old cultural dramas as a symbol of a changing world. For example, in the *Terminator* series, I see the same old Calvinist story of good guys and bad guys that runs like an Ariadne's thread throughout American popular culture. The movies also echo the old Puritan jeremiad when they issue prophecies of a dystopian future in which the forces of evil have overrun the world.

The "planet of the cyborgs" scenario also strikes me as another expression of the deep-seated White/European fear of being dominated by those who are physically different. Asian armies, native warriors, apes, monsters from space, and now machines. From this angle, I suspect that much of the current fascination with cyborgs has to do with modern society's continued inability to deal with physical difference. Many of the previous scenarios of invasion by the Other are now dated. In the post–Cold War world, the public seeks close encounters with an E.T. rather than fear invasion by green monsters. But machines are different. They're a plausible Other, perhaps all the more frightening because they often take the form of White males.

So what should you and I do about the machine in our future? One scenario is to exterminate the Other, as in *Terminator 2*, when both good and bad cyborgs end up dissolved into the great molten melting pot. I'm troubled by the racist—cyberist?—overtones of that solution. I find more intriguing the possibility suggested in *Blade Runner*, where cyberracism is overcome through cyberromance. Yet, although I find that solution more appealing, I wonder if it implies replaying the same old drama of Montague and Capulet, Romeo and Juliet. OO

Hess is the author of *Science in the New Age* (Wisconsin) and *Samba in the Night* (forthcoming; Columbia). He is an associate professor in the Department of Science and Technology Studies at Rensselaer Polytechnic Institute.

COMMUNICATIONS

READERS' WRITES

Malleable morals, gold mines and Golden Fleece, and a salute to ol' England

Doomsday Debunked

Kudos to Peter Duesberg ["Heresy! Three Modern Galileos," June 1993] for his voice of reason in a field full of error, and to *Omni* for giving him a forum. It's about time we hear from someone who is rational, not greedy or ambitious, and who trusts that existence is not out to destroy its most complicated creation. I'm certainly not an expert on AIDS, as many people claim to be, including those who believe they have the disease, but I'm well experienced in human nature, and I know that where there's money, there's deception.

Acharya S
Venice, CA

Blese Ye Waste

The idea of erecting monuments to indicate where nuclear waste is buried is fine [Earth, July 1993], but to assume that technologies will not exist to use the waste material for productive purposes in the future is shortsighted. One hundred fifty years ago, petroleum was considered a nuisance with limited use. Within a couple of generations, this "useless" substance became vitally important. I would like to think that 150 years from now, historians will marvel that most people considered nuclear waste useless. A couple of generations from now, the states that have nuclear waste sites could very well become boom states like what Oklahoma and Texas became thanks to oil. Don't think of nuclear waste as a problem we'll have with us for at least 10,000 years. Consider it an opportunity to harness technology to make the future truly spectacular.

Rick Badman
Peekskill, NY

Your July Earth column describes a DOE project developed (sadly) too late for a William Proxmire Golden Fleece Award. In 1616 William Shakespeare died. His tombstone bears the message: "Good frend for Iesvs sake forbeare, to digg the dvst enclosed heare; blese be ye man yt spares thes stones, and cvrst be he yt moves my bones." That was written almost 400 years ago. The language is a little archaic, but we get the idea. If the message had been about nuclear waste "enclosed heare," we would have understood the warning.

Robert S. Stone
Oak Ridge, TN

Raptor Factor

Mr. Sunlin correctly points out in "Eagles Joust with Windmills" [Continuum, June 1993] that raptor deaths are an unexpected development at the Altamont Pass wind-resource area and that U.S. Windpower is supporting an extensive research effort to find out why. The two-year California Energy Commission study cited in his essay did not, however, report any *bald eagle* deaths or injuries in the Altamont Pass. To my knowledge, no *bald eagle* death or injury has ever been attributed to a collision with a wind turbine.

William Whalen
V.P., Project Services
Kenetech/U.S. Windpower
Washington, DC

Editor's note: We appreciate the clarification.

England Overjoyed

To comment on Terry Bisson's fiction story "England Underway" [July 1993], I don't think I have ever enjoyed a story so much or laughed quite so hard. Thank you. Please have more of his work. I bought three copies to send to my daughters.

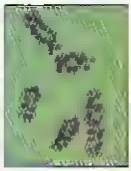
Ms. Merle F. Ritter
Juneau, AK

Got something to say but no time to write? Call (900) 903-8683, ext. 70103. Your comments will be recorded and may appear in an upcoming issue of *Omni*. The cost for the call is 95 cents per minute. You must be 18 or older. Touch-tone phones only. Sponsored by Pure Entertainment, P.O. Box 166, Hollywood, California 90078.

MIND

BACTERIAL CONSCIOUSNESS
Why spirochetes think as we do

By Anthony Liversidge



Chromatium okenii, above, a phototrophic bacterium can swim toward light and hydrogen-sulfide gas and away from oxygen. At right, biologist Lynn Margulis.

Consciousness, according to the philosopher Miguel de Unamuno y Jugo is more of a curse than a blessing. "Man, by the very fact of being man, by possessing consciousness, is, in comparison with the ass or crab, a diseased animal." The neurotic Spaniard, who died in 1936, would be tossing in his grave if he heard what biologists are saying these days. Consciousness, they insist, expands well beyond the donkey,

even the crab. Some think even bacteria are conscious.

Of course, dolphins, chimps, and parrots have long been shown to have language skills, even it is claimed, understanding of grammar and syntax. But most scientists still agree with Unamuno y Jugo that, by their definition, consciousness is limited to the human mind. Herb Terrace of Columbia University, for example, a pioneer in teaching sign language to chimps, is a skeptic. Terrace eventually decided that none of his work meant chimps could truly grasp words as symbols. Since consciousness depends on language, he said, animals are not conscious. "Is a moth conscious of the flame?" he asks. But clearly, consciousness is a thorny question for scientists.

Lynn Margulis, professor of biology at the University of Massachusetts at Amherst, is a lifelong student of microscopic beings. Human consciousness, Margulis insists, has less to distinguish it from the ways of microbes than one might think. Indeed, in some respects, human awareness is more limited. "Because we are acutely conscious of the signs and symbols of other people," she says, "we think we are conscious of everything. But we are dimly conscious." People are conscious of temperature in a certain range or of humidity, perhaps, but oblivious of magnetic fields, respiration, and many other things, including not least, the wonders of bacterial life.

"If consciousness is as my colleague Peter Frank Allport once defined it, a living system's developing ability to create, remember, recall, and use representations of aspects of itself and its environment," she says, "then it's possible to argue that the microorganisms are conscious. They are alive and have abilities to create, remember, and recall.

"Social organization, recycling, predation, chemical sensing, gravity, magnetics, light pressure—all of these sensitivities are developed not just in animals such as dolphins and whales, but in microbes," she adds. "The sensory systems of all of the thirty million species with which we share this planet are vastly greater than the few we enjoy. Microbes respond profoundly to oxygen, methane, acids, sugars, salts, lipids—and uncountable numbers of chemicals, especially water. Phototrophic and other bacteria sense infrared and ultraviolet light we can't see."

When Margulis presented her view two years ago at the American Association for the Advancement of Science, the audience seemed skeptical. One man pointed out a balloon bobbing against the ceiling. "Responding to gravity. Is this consciousness?" he challenged. But the balloon wasn't alive. Margulis pointed out. "Conscious processes are associated with live beings." (She was annoyed when *Science* magazine wrongly reported that she had argued that the balloon was conscious, though not alive.)

Interestingly, Margulis has pointed out that the mammalian brain shows signs of its origin as a mass of microbes, still trying to do what they once did in their primordial state. The firing of synapses may be a modern equivalent of their efforts to swim, and our learning may be related to their growth, she says.

Of course, "bacterial awareness is more limited than that of a human mind," she says. "I don't want to seem simpleminded." Nonetheless, Margulis thinks all organisms, especially microscopic ones, deserve billing on the marquee of consciousness. "I've watched conscious bacteria for hours," she enthused recently, "seeing things about which everyone would scream if they saw them. Unbelievable diversity! A microscopic theater with thousands of beings all interacting, dying, killing, feeding, excreting, and sexually provoking each other—all activities most people think are so specifically human." Gazing at that scene, she says, "The idea that only people are conscious makes me laugh." ◻◻

Do you believe all living things have consciousness? What does consciousness mean to you? Call (900) 903-8683. Your views will be recorded and may appear in a future issue. Calls are 95¢ per minute. You must be age 18 or older. Touch-tone phones only. Sponsored by Pure Entertainment, P.O. Box 166, Hollywood, California 90078.

WHEELS

THE LOVINS SUPERCAR
Much more like a computer with wheels than a car with a chip

By Simson L. Garfinkel

In the beginning, was the car: a big, beautiful, sleek, leisurely automobile, and the car was a 1929 Packard. In the next millennium, there will be a supercar: ultralightweight, safe, efficient, and built from high-tech composites. Which would you choose?

Even today's most modern cars represent refinements of yesterday's technology. They're the end products of a highly tuned process of designing, metal stamping, painting, assembling, and delivering that may be as outmoded and obsolete as the internal combustion engine that pushes them down the road.

Rather than looking for ways to make cars incrementally better—like more efficient tires, an improved engine, or better gas—a few scientists have developed a proposal for a quantum leap in automobile design: the ultralight hybrid supercar. It's the brainchild of Amory B. Lovins, director of research at Rocky Mountain Institute in Snowmass, Colorado, and one of the leading energy thinkers of our time.

The Lovins supercar of the near future would be nothing more than an aggressive application of nearly every automotive technology now available to reduce weight or improve efficiency. For example, while a supercar would have a tiny gasoline- or alternative-fuel-powered engine, it would use that engine to generate electricity to charge an onboard battery. The engine would run at its most efficient speed to charge the battery and then shut off. The wheels themselves would be powered by switched reluctance hub motors, which would double as regenerative brakes so that slowing the car would recharge the battery rather than turn the car's momentum into useless heat.

The supercar would be built from high-tech composites—carbon fiber, Kevlar, and glasses. Such a body would cut the car's weight by 60 to 75 percent. And while today's composites cost substantially more than steel, the final car need not. That's because composites can be produced ready to use. 85 percent of the cost of a steel part comes from the costs of shaping and finishing rather than from the cost of the metal itself. Since color can be molded directly into composites, supercars wouldn't even have to be painted. Assembly costs would fall by about 90 percent; tooling, by 50 to 90 percent.

Then there's the matter of drag—from both air resistance and tires. Both could be at least halved for significant savings. Put it all together, says Lovins, and you have a four-passenger car that could easily get more than 150 miles per gallon using technology available today. Yet it would be a safer car, since the superstrong, bouncy material and special structures would absorb the energy of a direct impact. In recent German tests, for example, a car weighing 13,200 pounds hit a wall at 25 miles per hour, and all the energy was absorbed by 2 to 4 pounds of composite cones.

And that's just the beginning. Create standard sizes, mounts, and connectors for such cars' major components—the power plant, energy storage, and motors—and then stand back as competition forces prices down and efficiencies up. Replacing a car's power plant would become as easy as replacing the hard disk of a personal computer. And what an upgrade! Swapping an internal combustion engine and lead-acid battery with a fuel cell and carbon-fiber flywheel could boost gas efficiency past 300 miles per gallon.

The big supercar players might stretch beyond today's auto makers. Look to companies that set software standards and build computer components—the future Intels and Microsofts of the car world. 'Supercars would be much more a software than a hardware problem,' says Lovins.

Likewise, you probably wouldn't go to a dealer to buy a supercar. Instead, the dealer would come to your house with a laptop computer and give you a simulated demo with a CD-ROM and a virtual-reality headset. The order would be sent by modem to the regional factory, where the precise car you wanted would be made to order. A few days later, the salesperson would drive your car to your house and take your old car back as a trade-in for disassembly.

Fantasy? Probably not. All of these changes happened to computers during the past 15 years. And the technology for supercars is already with us. ∞

EARTH

UNNATURAL DISASTERS
The ten worst environmental ideas in U.S. history

By Tim Redmond and Marc Mowrey

America's best minds once proposed flooding the scenic Grand Canyon for a dam and towing icebergs from Antarctica to relieve California's recurrent drought.

In 1962 some of the best minds in American science decided there was nothing wrong with Alaska that a few good atom bombs couldn't cure.

Working under the federal Plowshares Project, designed to find civilian uses for the technology of nuclear war, scientists proposed to detonate a series of powerful nuclear explosives under the arctic ice in order to blast open a giant shipping harbor on a frozen stretch of Chukchi Sea coastline.

Project Chariot, as the plan was called, is only one of a long list of mind-boggling environmental projects government agencies in the United States have studied—and sometimes implemented—since World War II.

The ten worst ideas in modern U.S. environmental history, presented below, all have one thing in common. They assume that fancy human technology could, and should, be used to "remedy nature's oversights."

1. *The Arctic Bomb.* Dr. Edward Teller lobbied hard to use "nuclear excavation" in Alaska before the Inupiaq Eskimos caught on and forced the government to scrap the idea.

2. *Old Fateful Geyser.* In 1975, the Energy Research and Development Administration spent $1 million studying a plan to detonate two 50-kiloton nuclear bombs every day in a 495-foot-diameter salt-dome cavern a mile beneath Texas. The blasts would superheat steam, which would turn a turbine to generate what ERDA called cheap, unlimited electric power.

3. *The Antarctic Express.* In 1978, the California State Senate endorsed the idea of towing icebergs across the Pacific Ocean to provide fresh water for the drought-stricken Golden State. An initial RAND Corporation plan called for iceberg "trains," driven by electric propellers and powered by a floating nuclear plant.

4. *Dominy's Ditch.* In the early 1960s, Bureau of Reclamation director Floyd Dominy wanted to flood the Grand Canyon for a massive hydroelectric dam. Supporters argued that the vast artificial lake would allow visitors in boats to get closer to the historic canyon walls.

5. *Lake Mojave.* The North American Water and Power Alliance Project, a creature of the 1960s that seems to have the life of Dracula, would dam virtually every significant river in Alaska, British Columbia and the Pacific Northwest, creating a 500-mile-long reservoir stretching from Vancouver to Montana. Gigantic pumps would drive 30,000 cubic feet of water per second to an artificial lake in the Mojave Desert.

6. *Garbage In, Garbage Out.* In 1973, AEC Chairman James Schlesinger asked NASA to consider shooting high-level radioactive wastes into the sun aboard the space shuttle. The *Challenger* explosion, which under the plan could have spread deadly toxins across much of the Western Hemisphere, hasn't ended official interest. The Congressional Research Service looked into the concept in 1991, concluding that it was still technically feasible, if politically problematic.

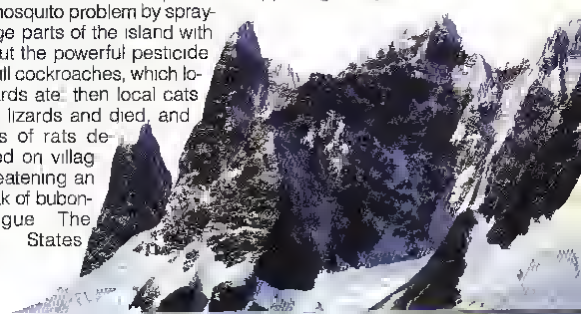
7. *The Battle of Borneo.* The World Health Organization decided in the 1960s to clean up Borneo's mosquito problem by spraying large parts of the island with DDT. But the powerful pesticide didn't kill cockroaches, which local lizards ate; then local cats ate the lizards and died, and millions of rats descended on villages, threatening an outbreak of bubonic plague. The United States had to help parachute in new cats to control the vermin.

8. *The Floating Furnace.* Five years before the Exxon Valdez crash, a group of New Jersey entrepreneurs devised a plan to get rid of toxic chemical waste by incinerating it in high-tech burners far out at sea. The plan involved loading poisonous liquid on board, then transferring every drop to incinerators, while plowing through heavy Atlantic swells.

9. *Florida Island.* A plan to lop Florida in half has been floating around since the 1930s, and it resurfaced in Congress in 1985. The 107-mile Cross-Florida Barge Canal would provide easy navigation from the Gulf of Mexico to the Atlantic; it would also cut off much of the fresh water inflow from the north that feeds Lake Okeechobee and the Everglades, potentially turning part of the nation's greatest wetland into a desert.

10. *Down and Dirty.* Since the 1960s, some leading chemical-waste companies have used a handy type of toxic sewage drain—oil and other types of old wells. The concept is simple. Millions of gallons of poison a day can be pumped down deep well shafts to ooze out the bottom, dispersing into porous rock. Sometimes, the "injection well" shafts end just a few feet from major underground aquifers.

This one isn't funny, either, it's happening today. ◻



KID STUFF

AN EDUCATIONAL ARCADE
At Liberty Science Center, science = fun

By Peter Callahan

New Jersey's $67 million Liberty Science Center gives kids a hands-on learning experience.

Kids ask a lot of questions. No sooner are they out of diapers than their questions shift from the mundane—"Can I have some candy?"—to the complex—"Why is the sky blue?"—often leaving any parent who doesn't have a Ph.D. from MIT scratching his or her head for an answer. But now there's help. Liberty Science Center, located near Manhattan and the Statue of Liberty in Jersey City, New Jersey, is designed to let kids teach themselves about the world by utilizing hands-on exhibits that show instead of tell. Here, with the help of state-of-the-art technology, in just a few hours' time kids can learn everything from how airplanes fly to the basics of fuel consumption and their parents won't have to feel so... well, *stupid*.

At a cost of $67 million, Liberty Science Center aims to provide a bona fide research experience for kids. It's an opportunity seldom available in most schools, where overcrowding and tight budgets mean classroom time is spent reading about science instead of doing it, and the result is often boredom.

"Our slogan is science equals fun," says Elias Hebeka, president of the Center. While many children's museums take the same approach, Liberty Science Center is so loaded with really cool stuff that a trip there can be as entertaining as a day at a theme park. The 170,000-square-foot center is something of an educational arcade, featuring an Omnimax theater with an eight-story screen, an expanding geodesic globe, and three floors of interactive displays.

The top floor is devoted to the environment, and here kids can handle horseshoe crabs and starfish in the Estuary and match wits with the weather forecaster by utilizing a rain gauge, wind vane, and barometer to come up with their own predictions. They can even play in the mud without getting hollered at: The Soil Table features a fresh load of dirt that's trucked in each week. "The kids can paw through it to see what kinds of insects they can find," says Elizabeth Penick Graham, Public Affairs director for the Center. While it's not exactly cutting-edge stuff, Graham explains, "a lot of city kids never have a chance to do that." For more exotic creatures, kids can visit the Bug Lady, Dr. Betty Faber, an expert insect handler with a fascinating collection of tarantulas, other assorted spiders, and four-inch cockroaches.

The second floor is dedicated to health exhibits, and visitors can get there by riding down an escalator with glass sides, exposing the mechanics that make it run. (An ATM in the lobby is also glass-enclosed, but the cash is hidden from kids who might be tempted to take the hands-on approach a little too far.)

The last floor is devoted to invention. Kids can explore light and optics displays and experience electronic music making. The most popular attraction may be an actual Indy 500 race car encircled by a remote-controlled racetrack. Kids can race small slot cars while at the same time learning the classic lesson of the tortoise and the hare. "If they race their cars in fourth gear," Graham explains, "they run out of gas. The ones who go in second gear win the race."

The lessons learned on the racetrack and from other exhibits are what the Center is all about, says Graham, the process of letting kids discover things on their own. "It's the light-bulb-over-the-head moment that makes me happy." So far, the Center, which opened on January 24, 1993, seems to be a hit with visitors of all ages. "People are staying a lot longer than we expected," says Hebeka. "We can't get them out the door." For information, call (201) 200-1000. ☐

ANIMALS

SAVING MANATEES

Researchers take to the air to preserve a threatened species

By Kathleen McAuliffe

Cruising in a blimp at 1,000 feet, I marvel at pelicans flapping their wings in unison across the emerald waters of Tampa Bay. Below them, stingrays stroke the waves at a gentler pace. Like herds migrating across a plain, fish swarm in great schools corralled by circling dolphins.

From the sky, one's sense of scale shifts. Grand and small—

Using a Sea World blimp, scientists are studying the behavior of the giant sea mammal. The goal: to reduce the growing threat to manatees from Florida's careless boaters.

the mighty and the microscopic—share a peculiar symmetry. So paradoxically as I ascend in the air, the ecological plight of the manatees, now little more than shadowy specks beneath the waves, comes into stark focus. Among the largest aquatic herbivores, they contentedly graze in the shallows while unbeknownst to them, a yellow speedboat tears through the narrow channel at a 40-mile-per-hour clip.

"Not that way!" I want to scream, but the boat's pilot will never hear me. So I watch helplessly as its motor cuts a swathe between the animals, clearing them by a close margin.

Such near collisions are scarcely rare occurrences in this part of the world. According to my companion on the blimp, marine-mammal biologist Brad Weigle, the modern speedboat is fast bringing manatees to the brink of extinction. Only 2,000 of these placid animals presently inhabit Florida's coastal region, and last year alone, boat collisions accounted for about one quarter of all manatee deaths in the area.

There's a tragic irony to the manatee's predicament. One of the most ancient orders of marine mammals, manatees evolved more than 50 million years ago from land animals. (Although manatees are also known as sea cows, researchers believe their closest living relatives on terra firma are elephants, not cows.) They've survived largely because of an absence of predators. Despite their docile behavior, the massive size of these ten-foot-long bundles of blubber has proved a major deterrent to would-be attackers. "Not even alligators will bother adult manatees," reports Weigle, whose post at Florida Marine Research Institute in St. Petersburg has afforded him many opportunities to study the local manatee population.

Alas, sheer bulk proved an excellent defense strategy until the arrival of the 300-horsepower speedboat, which can crush the animal's skull or carve it up with its propeller, leaving the animal to slowly bleed to death. Hence, Weigle's mission. He has taken to the air not so much to document the carnage as to prevent it.

From the passenger compartment of the seven-story-tall blimp, dubbed the Airship Shamu after the popular killer whale it resembles, he is charting the behavior and migratory patterns of the manatees with the goal of helping the state establish protection zones where traffic will be restricted. The blimp, which is loaned to Weigle and other researchers by Florida's Sea World, is proving an extraordinary tool in this effort.

"We'd be lucky to see a single group of manatees from a boat in an afternoon," Weigle explains. "And we can't study them very well in a small plane, flying round and round in a loop at 80 miles per hour." By contrast, the blimp offers a stationary research platform that can zoom in for a close-up view when researchers spot something of interest.

That's just what the airship does when its on-board radio antennae pick up the frequency of Zephyr, a radio-tagged female who measures a mighty 11 feet. As we approach, a battle-weary figure comes into view. Twenty blade cuts traverse her back, the last scar a skeg mark from the bottom of the propeller. Later in the day, we spot still more boat-battered victims, including amputees. "Upward of 80 percent of all manatees have at least one set of propeller marks on them," laments Weigle.

For all their misfortune, however, these big-schnozzed giants look as happy as Holsteins chowing down on spring grasses. Since they can't tolerate cold water, during winter they often hang out in the warm discharges of a power plant, which is where we make the biggest number of sightings for the day. Like humans in a Jacuzzi, the manatees bask in the foaming jets—insouciant that their survival is imperiled.

As we pull away on our final ascent, the wakes of two intersecting boats etch a fleeting cross in the water. A sign of hope? I wonder. Or a cemetery marker? ∞

MEDICINE

ALTERNATIVE HEALTH
An office for studying unorthodox medical practices

By Peter Callahan

Mainstream medicine has always regarded practitioners of alternative health care warily, giving them about as much respect as tent-show faith healers.

But that may soon change. In a move some call historic, the U.S. government has decided to take a closer look at alternative medicine, establishing the Office of Alternative Medicine. The office, part of the National Institutes of Health, is devoted solely to studying alternative treatments.

It's about time. According to a recent study in the *New England Journal of Medicine*, 60 million Americans turned to various alternative therapies last year, spending more than $14 billion. The government is starting to recognize the validity of alternative care," says Steve Gorman, head of the California-based Alliance for Alternative Health Care.

Congress has authorized $2 million for the program's first year, partly in response to grassroots efforts that fell on the receptive ears of Iowa Senator Tom Harkin. Harkin became interested in new ways of healing when a colleague, Berkley Bedell, left Congress after developing prostate cancer. He later found relief in an alternative cancer therapy. According to Harkin, the new office "will provide a forum for the many different types of health-care treatments that have been dismissed in the past. We want to make sure Americans aren't missing out on effective treatments just because today some may consider them unconventional."

Americans with everything from asthma to addictions are finding relief in ancient healing arts such as acupuncture.

The office's director, Dr. Joseph Jacobs, a pediatrician, seems particularly well-suited for the job. Jacobs, who is part Native American, spent time as a physician on a Navajo Reservation, where alternative healing methods were a way of life. "There's been an evolution of thinking," Jacobs says. "People have become aware of the limitations of orthodox medicine."

The new office will study a number of alternative healing methods including homeopathy, acupuncture, and chiropractic care. According to Jacobs, "We'll be testing things to see if they have scientific value," which is exactly what worries some of the practitioners in alternative fields.

Because many forms of unconventional care use a more comprehensive definition of good health—stressing positive thinking and other psychological factors and often emphasizing prevention over cure—scientific studies might not yield results. "It's very difficult to test some of these practices and medicines in traditional ways,' says Eve Campanelli, Ph.D., a holistic-health practitioner. In Western medicine, most studies usually involve two groups, one of which receives a treatment while the other gets a placebo or nothing at all. Campanelli believes this method "is not viable with nontoxic medicines" that aim to treat the mind as well as the body.

The dilemma isn't lost on Jacobs, who concedes that medicine may have to change the way it measures healing. "The difficult thing will be incorporating well-being into an evaluation," he says. "Belief is a powerful medicine. Even if a treatment fails a test, people may still think it works for them. Isn't there value in that?"

Though Jacobs says the new office "won't be in the quack-busting business," some in the alternative-health field hope their findings will not only legitimize unconventional methods that are truly effective, but expose those that aren't, as well. "There are a lot of practitioners out there who don't know what they're doing," says Gorman.

Ultimately, many hope to see the orthodox and the unorthodox used together. "Eventually, we'll find a remedy for some disease, which will be a real impetus to getting doctors to look at alternative care," Gorman says. "We'll begin to see a combination of holistic and mainstream practices."

Even if Gorman is a touch optimistic, what will likely come out of the new office is confirmation of at least some unconventional treatments, giving Americans some less costly health-care options. If alternative-care providers have their way, the office will bring validation to a long-maligned community that traces many of its roots to ancient healing practices.

POLITICAL SCIENCE

SILENCE OF THE RAMS
A clean and well-lighted virtual reality

By Tom Dworetzky

Jacked into the net and surfed and rippled into the infotime continuum, I looked for a byte. The infomalls with their virtual-reality mannequins did nothing for me, so I floated to the DC server and killed the president. Mine was the three millionth assassination of the day — not enough to trash his directory, so he kept on ticking.

Since global VR went online a decade ago, all real-world problems, like getting killed or finding parking, are solved. Everyone stays in their homes and goes to work, to party, to live and die in VR. But the grand social experiment didn't work out exactly the way it was planned.

If you have all the technology and communication in the world,

if you get 500 channels and nothing's on, the joke's on you.

One day I surf over to a holo-café in the corner of a rundown virtual strip mall. It's pretty free of other virtual wanderers, clean and well lighted. I float my holo in and settle it on a chair by a round brown table in a corner and order a double juice to give my bits a lift. In the corner is an old man, a strange enough sight these days, since you can be whomever you want, and most opt for Cindy Crawford or Richard Gere defaults. This can be confusing since everybody looks pretty much the same. And if experience builds character, and we all get the same experience on the net, then character, too, might as well be a default.

The old man is way into his juice, barely moving except from time to time to take another drink. The waiter, a classic Frenchman, gray and thin, comes over. I order another juice. "The old one," I ask. "Why is he so old?"

"Because he is," replies the waiter. "Because he wants to feel death."

"Why doesn't he just go out and get crashed in a bad neighborhood, then?" I ask. "Anyone can feel death in VR."

"No. Everyone cannot feel death by merely surfing the black. You must go old to do it, perhaps. But who knows? I'm just a waiter. I know he comes here each night and juices until we close."

I sit for a long time, but finally float over. "May I sit?" I ask him.

"If you must." He takes another drink.

"Why do you sit in this empty part of the grid?" I ask.

"It is empty."

"Yes, but boring."

"More boring than out there where everyone looks and acts the same—just like you?"

"I am just like them to you?"

"You are here, they are not."

"So I'm not like them?"

"In virtual reality, we are all alike. I am not me, you are not you. We are all like who we are but not who we are."

I hear him and suddenly realize that I am a million miles away—quite literally, that I'm not sitting in a café with an old man, but somewhere else, jacked in. I grow confused. I guess I panic after that, putting my gloved hand on the Esc button, pulling out of the routine. What in the world has VR come to? What is the point of all this stuff if it's the same and there's nothing on? The old man is right, I think, sitting in my jack box, the one room I call home. That's enough networking for awhile. I'm thinking I'll just sit like the old man in the café and spend time by myself, getting real, when a shadow reaches out and touches my shoulder. As I turn, I recognize two of my old schoolmates, John from L.A. and Peter who's been living in Tokyo for the last 16 years. I haven't seen them forever.

"Hey mates," I cry. "What are you doing here in this vast cyber-wasteland?"

"It's Captain Negativity," says John, flashing me a holosmile. "Isn't it great that we can run into each other now that there's no there there?"

"But look what they've done to it. It's full of virtual boredom and virtual evil."

"We know," says John, and Peter starts to laugh. "Is that Hemingway segment we ran on you some great new sim or what?"

"Maybe next time," says Peter, "we should drop him in one with a happier ending." ∞

OMNI ONLINE

ENTERING THE NEW FRONTIER:
The *Omni* experience goes electronic and interactive

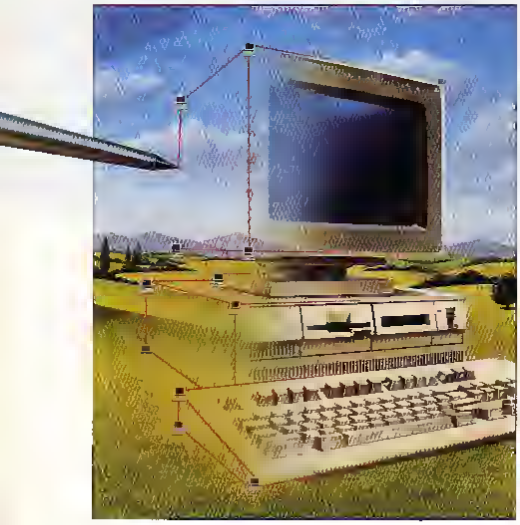
By Keith Ferrell

Are you online? *Omni* is Starting in September Omni Magazine Online will be available via computer and modem to subscribers of America Online, the world's fastest-growing online service

An electronic *Omni* An interactive *Omni*. An *Omni* that will grow and evolve daily and in which your participation will be immediate and crucial A cyberspatial *Omni* where you can leave messages for editors, meet other readers, encounter experts and celebrities, and help create the futures we dream of

Omni Magazine Online will expand the boundaries of the printed page, exploring the provocative topics raised in the magazine in every possible way.

In short the perfect "Tool for the Twenty-First Century." An electronic area that will complement your monthly magazine, giving us an unparalleled opportunity to extend and enhance the controversial issues and topics that we raise in our pages each month. The two distinct environments—paper page and computer screen—will go together and grow together in true symbiosis



What sorts of things will you find online? Lots. John W. Campbell, Jr., the great science-fiction editor, once noted that the dilemma of paper is that it doesn't stretch. You can only get in as much material as you physically have room for

Cyberspace, if you will, does indeed stretch. It can be close to infinite in all directions, able to accommodate a volume of information that's nothing short of staggering. And we intend to stagger you. Omni Magazine Online offers us the chance to bring you a wealth of material we simply don't have room for in the magazine. Things such as longer versions of our monthly interviews. Regularly updated reports on what's going on in science and science fiction. Archives of Continuum and Antimatter items.

More than that, though, we'll be taking advantage of the particular and special strengths of the online medium itself to do things you just can't do on paper. Our commitment is not to bring you just an electronic version of a paper magazine; we've seen too much of that sort of thing in the past. Rather, we intend to create an online environment that not only duplicates, but also extends the subject matter and ongoing dialogue with the future that is so very much a part of the unique *Omni* experience.

That means online events in which leading thinkers in various fields talk with you about their areas of expertise. Contests and games that you can enter electronically. Surveys and debates that cover today's crucial issues—and tomorrow's cutting-edge topics. Forums in which you can discuss the space program, the theory of evolution, biotechnology—or just let everyone in on the great science-fiction novel you just read. The chance to respond instantly to issues brought up in the magazine, to make your voice heard and also to hear what others are saying.

Our goal, in other words, is to create an interactive electronic environment for up-to-the minute news, features, debate, conversation, entertainment, interaction. A space as much as a place, an electronic continuum unto itself, a zone where the present will meet the future on a daily and sometimes hourly or even minute-by-minute basis.

This special *Omni* space will feature shopping, E-mail, conference rooms and chat areas, reading lists and resource files, software for downloading, and much, much more.

How will you get there? It's simple. All you need is a computer, a modem, a telephone line, and a subscription to America Online. Call up, log on, come in. Visit Omni Central and find out what's new online. Drop by Ellen Datlow's Science Fiction & Fantasy World for recommended reading and the scoop on upcoming releases by the hottest authors. Make a stop in Scot Morris's Game Room for some brain teasing. Add your opinions to our latest survey or your voice to one of the chat areas. You can even drop me an electronic line commenting on the latest issue of the magazine.

And more. Omni Magazine Online will, we feel sure, quickly become an important part of the *Omni* mix of information and entertainment, but more important, we are also confident that our online service will become a lively and vital clearinghouse for ideas and opinions, items we know you have plenty of, and of which there can never be enough.

The *Omni* staff and I look forward to meeting you in Omni Magazine Online. ∞

BOOKS

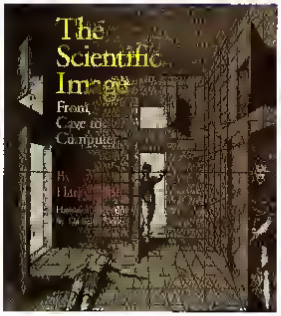
IN DEFENSE OF REASON
Countering the rising tide of antiscience

By Robert K. J. Killheffer

It's become fashionable to bash science and scientists as the source of all ills. No one would deny that for all the good science and technology have brought, they've also given us ozone depletion, nuclear weapons, and smog. Nevertheless, recent attacks strike not at such specific drawbacks, but at the heart of science itself, at the processes and assumptions that underlie the entire scientific endeavor.

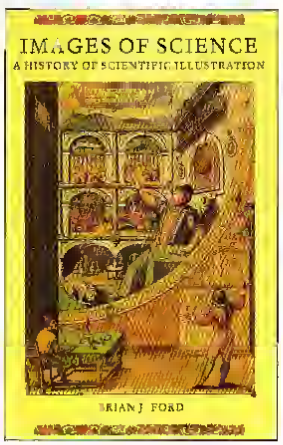
In *Understanding the Present* (Doubleday), British science journalist Bryan Appleyard protests "the appalling spiritual damage that science has done," claiming that by ignoring questions of meaning and ultimate purpose, science devalues the human experience—and even Donald A. Norman, a scientist himself, expresses concern in his most recent book, *Things That Make Us Smart* (Addison-Wesley), over the spiritual erosion science can cause, though he remains far more optimistic than Appleyard. "I am delivering a message of warning," he says, "but one accompanied by hope, not despair."

In a passionate *Time* magazine essay, Dennis Overbye came to science's defense, declaring, "Science is nothing if not a spiritual undertaking," and that its devotion to objectivity "ennobles us." But how can we, who still believe in the positive potential of science, counter such emotionally appealing doomsayers as Appleyard? Physicist Gerald Holton suggests some ways in *Science and Anti-Science* (Harvard). To Holton, today's antiscientific grumblings are more than just irritating; they may be the harbingers of a more dangerous movement. He points out how antiscientific attitudes play into the hands of more fanatical viewpoints like religious fundamentalism and "rabid ethnic and nationalistic pas-



sions." He advocates direct action—early education in scientific thinking and exposing the pseudoscientific frauds—as a remedy to antiscientific feelings.

But perhaps it's also necessary to answer the emotional concerns behind antiscience. Believers in science need to show how the scientific perspective provides a sense of individual worth and accomplishment, defending human value and the validity of subjective experience, which detractors claim science denies. Science needs to demonstrate Overbye's point: to show how it can "ennoble" us. And to do that, it needs to explain itself better.



Lewis Wolpert, an eminent developmental biologist, makes a good start in his slim, elegant, and energetically argued book, *The Unnatural Nature of Science* (Harvard). Though some of his contentions may seem a bit forced—can we really accept that scientists bear no responsibility for the technological applications of their work, such as the nuclear bomb?—Wolpert shows how some antiscience feelings arise from the conflict scientific ideas have with common sense. Many scientific concepts, like relativity and quantum mechanics, are counterintuitive, but that doesn't mean they're antihumanistic.

Emphasizing the creative nature of science may also do something to disarm antiscientific snipers. In *The Scientific Image: From Cave to Computer* by Harry Robin (Abrams, hardcover; W. H. Freeman, soft-cover), and *Images of Science: A History of Scientific Illustration* by Brian J. Ford (Oxford), we see the vital role illustration plays in scientific expression. Science would be exceedingly difficult if not impossible without illustration—there's no way to describe anatomy or a geological formation with words alone. In these complementary volumes, science emerges as a visual, artistic process, hardly the cold and forbidding entity evoked by Appleyard.

Science does exalt rational thinking, and of course not every scientific discovery yields a practical benefit for humanity. But with Wolpert, Robin, Holton, and Ford to guide us, we may recognize the essential humanity at the heart of the scientific process and retain our human dignity without recourse to the doom-and-gloom of antiscience. ∞

In the face of antiscientific criticism, science must show how—far from eroding the human spirit—its ideas can actually enhance (and perhaps even ennoble) our lives.

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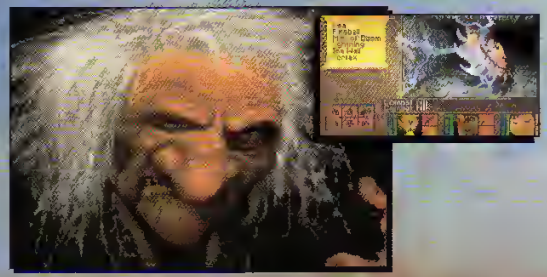

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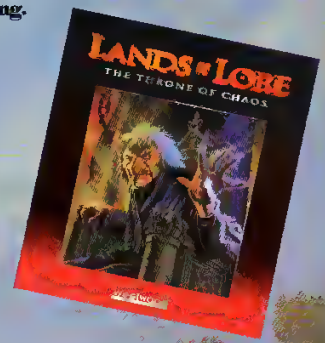

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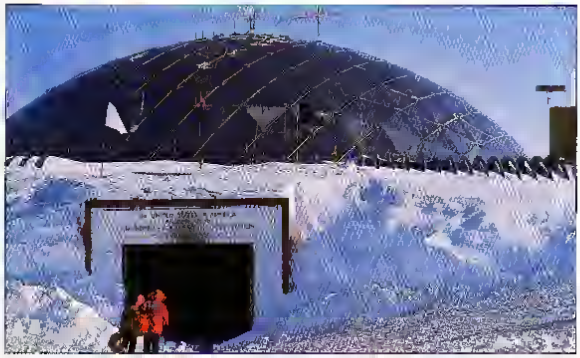
STARS

OBSERVING BELOW ZERO:
Astronomers go to the Pole to get that unique southern exposure

By Patricia Barnes-Svarney



Baby, it's cold outside: The Amundsen-Scott South Polo Base will house one of the first Antarctic facilities for astronomical research.

Where do you find the world's best observatories? Amidst the breathtaking volcanoes of Hawaii nestled in the lush mountains of Chile huddled in the unending white snow of the South Pole

The South Pole?

It seems rather unlikely, but Antarctica is becoming the hot spot for astronomical observation.

The National Science Foundation has broken ground on one of the first Antarctic centers for astronomical study, located at the Amundsen-Scott South Pole Base The observatory will surpass previous telescopes sited at the South Pole base by operating year round—at temperatures that average –72 degrees Fahrenheit during a typical Antarctic winter

"Though we can't do everything from the South Pole," says Al Harper, CARA director and professor of astronomy and astrophysics at the University of Chicago, "there are certain things we can do better than anywhere else."

Altitude plays a large role in making the South Pole ideal for astronomy. Although it actually sits 9,300 feet above sea level, the South Pole's low temperatures give it a lower air pressure, equivalent to that at altitudes of about 10,000 feet. The Earth's centrifugal effect, which flattens the atmosphere at the poles, also helps because it leaves less air through which to see

The South Pole's perpetual view of the southern sky will undoubtedly aid CARA's three main programs, especially the Cosmic Background Radiation Anisotropy (COBRA) project. COBRA instruments recently detected small temperature fluctuations in microwave radiation dating back to just 1 million years after the Big Bang. The fluctuations indicate that parts of the universe were slightly denser than others and may reveal the beginnings of the universe's structure

Another of CARA's projects, the Antarctic Submillimeter Telescope and Remote Observatory (AST/RO), will benefit from the dryness of the Antarctic plateau, which averages just four inches of precipitation a year. "Because the temperature at the Pole is so cold, the water vapor is frozen out," explains AST/RO astronomer Adair P. Lane, "and it's mainly the water vapor above other sites that absorbs the submillimeter radiation coming from celestial objects." Initially, the astronomers are planning to use AST/RO's five-and-a-half-foot, bowl-shaped antenna to search for neutral carbon atoms, which emit radiation in the submillimeter range. Measuring the amount of carbon will help them map the interstellar medium—the dust and gas clouds that form young stars—and deduce how these clouds evolve into stars

The Pole's relentless cold will help out CARA's third main project, the South Pole Infrared Explorer project (SPIREX). The below-zero temperatures lower the atmosphere's infrared-radiation emissions by a factor of 60, and a telescope cooled down to –72 degrees Fahrenheit gives off 700 times less infrared of its own. Accordingly, it will be easier for SPIREX to peer out beyond Earth's normally infrared-laden atmosphere to look for the sort of infrared radiation that marks young galaxies and may indicate "brown dwarfs," the theoretical planet-sized stars that can no longer trigger fusion reactions in their stellar furnaces.

"It's not really clear how these delicate instruments will work at the very cold temperatures," Lane says. "We may be subject to some surprises—and what works or doesn't work may take some extra coddling."

The astronomers tested 10-inch and 12-inch telescopes along with other small visible-light cameras at the site the last two winters. By late 1994, AST/RO and the first SPIREX telescope will move to the Pole, with continual additions scheduled over the next five years.

"There's some common ground to Antarctic telescopes and lunar or Mars-based telescopes," Harper says. "We're dealing with real-world engineering under very remote and difficult conditions—and we're learning as we go along." ∞

SPACE

NEVER TRUST A SPACE AGENCY OVER 30
Making the case that NASA is out of touch and out of time

By James A. M. Muncy

Guess which Cold War–era agency is *not* slashing programs and personnel, closing redundant facilities, cutting its budget, or reorganizing itself to fulfill a new mission in the post-Soviet world?

This month, the National Aeronautics and Space Administration turns 35 years old, but most independent observers believe NASA entered administrative 'middle age' long ago and is now showing the telltale signs of a bureaucracy gone senile.

Perhaps the time has finally come for NASA to step aside in favor of the next generation of space agency.

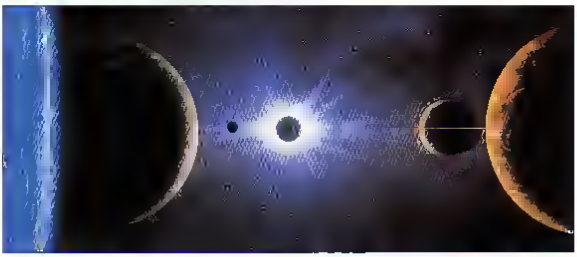
Indeed, it's getting harder to take NASA seriously. What kind of space agency would want to fly the space shuttle, designed in the 1970s, until 2020? What kind of space agency would endlessly redesign a space station, cutting its performance? What kind of space agency would straightfacedly propose spending half a trillion dollars to plant flags and footprints on Mars?

But NASA takes itself very seriously, and so should we, because it's spending nearly $15 billion every year not getting us into space. The problem isn't how badly NASA does things, but what it's trying to do. But we can't even have a rational debate about space policy in this country because any change in the status quo threatens the survival of NASA and its contractors.

So let's cut the Gordian knot. Let's *replace* NASA with a New American Space Agenda whose explicit goal is opening up the frontier of space to the American people and their enterprises.

The first item on this new agenda is making the White House recognize that space is a place, not an activity. The policy office handling space should develop frontier policy, not merely space or technology policy. Because the overwhelming barrier to opening the space frontier isn't technology but economics, these policies must focus on lowering the cost of spaca access and operations. This will entail, for example, creating a free and competitive world market for launch services—with no limits on Russian or other low-cost providers—and providing special, temporary tax incentives for new space industries.

Second, the government must set up a new research agency to develop space technologies in partnership with commercial industry. This new agency should take responsibility for funding



through final-prototype phase a single-stage-to-orbit launch vehicle such as the Delta Clipper; buying commercially produced high-resolution resource maps of the lunar surface, and researching technologies for turning resources from near-Earth asteroids into orbital construction materials.

Third, a different agency should concentrate on acquiring space assets. It should lease or buy the Russian *Mir* space station to provide immediate, low-cost microgravity facilities and use market guarantees to subsidize the development of innovativa, low-cost spaca transportation.

Finally, responsibility for most space science should be transferred to a science agency. The space-resaarch agency would oversee only science that helps to open the space frontier—such as space physiology and resource prospecting—as opposed to tha scientific study of space. Such an arrangement enables scientists—not aerospace engineers—to choose the best science missions while also creating a customer base for emerging space transportation and infrastructure industries.

These four steps will make it possible for us to settle the space frontier, ushering in an economic, scientific, and cultural Renaissance for the entire planet.

NASA *has* achieved remarkable things. Apollo may have been our generation's equivalent of the building of Egypt's pyramids or Europe's cathedrals. But monolithic space programs, like Pharaohs and feudalism, should be allowed to go out of style.

Apollo's greatest legacy was the knowledge that space isn't an empty and dangerous void but is instead full of the energy and material resources we humans need to expand our civilization toward the stars. It would be the worst mockery of NASA's contribution to history to preserve its empty bureaucratic shell rather than move forward to act on the potential it created. ⊠

James A. M. Muncy is chairman of the board of the Space Frontier Foundation, a public-interest pro-space organization.

CONTINUUM

THE COLDEST PLACE IN THE UNIVERSE

You can't freeze an atom in just any refrigerator. Plus, forgetful forest animals plant trees, and how light can move molecules

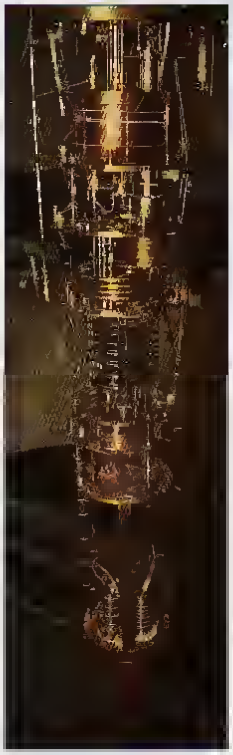
"We're trying to understand nature by removing heat," says physicist Gary Ihas, of the MicroKelvin Laboratory at the University of Florida. He isn't talking about shedding a few puny calories. The laboratory looks like three ICBM silos buried in the Gainesville campus. But the "missiles" inside are superrefrigerators or cryostats. Physicists from around the world come here to see what happens when a spoonful of metal or a puff of gas gets chilled to one ten thousandth of a degree above absolute zero—that's 30,000 times colder than the most godforsaken spot in interstellar space.

At the University of Colorado and other centers, lasers are slowing cesium atoms to a millionth of a degree. But, unlike the cold Lab, laser systems handle only a few atoms of certain types, for limited purposes. And parts of the Gainesville cryostats get even colder—down to a *billionth* of a degree. "At any given time when we're running, we're the coldest place in the universe," says Ihas.

The Lab enables physicists to "look" at trillions of atoms moving in unison. "It's like a powerful amplifier that lets us see interactions that determine the properties of matter," Ihas says. He's showing off a cryostat: a foot-thick tube of pipes and chips that drops two stories into the ground. The "fridge" is shut down for maintenance. Researchers have stripped away the metal sheathing that keeps out electromagnetic heat producers—like *Northern Exposure* and *Roseanne*—beaming to Gainesville's TVs. The mere rumble of nearby trucks could jiggle atoms inside the cryostats enough to raise temperatures. But the silos are protected from shakes.

The concrete tripod supporting each cryostat rests on vibration-damping sand and Styrofoam. Chunks of concrete on springs absorb stray vibrations. Pipes enter the units through cushioned collars. All this because heat is the motion of atoms. Getting an atom to wiggle is easy, but getting a wiggly atom quiet and chilled out is *hard*. "We made a fridge that's not just a little bigger, but a lot bigger," says Ihas. "We get colder faster."

Each cryostat has five stages. It's like a stack of five different kinds of refrigerator, each colder than the one above, starting at room temperature and ending—five stages down—in quantum weirdness. Stage 1 reaches four degrees (on the Kelvin scale) above absolute zero, the point at which all *random* atomic motion ceases, by immersing the apparatus in liquid helium.



The coldest end of the cryostat: stage 4 (top) and stage 5 (bottom)

Stage 2 pumps away the helium's faster, hotter atoms, dropping to 1.5 degrees Kelvin. Stage 3 exploits a "cooperative" helium isotope, hitting .5 degree Kelvin. Stage 4 mixes lighter and heavier helium isotopes to nudge the thermometer down to 3 to 10 milli-Kelvin, or thousandths of a degree. Stage 5 is an arm-long copper tube inside an electromagnet. The magnet is more than 100,000 times stronger than the earth's magnetic field, as potent as if filled with TNT. Ihas says a power outage during cooling or heating can blow the magnets. "It's happened twice, and it makes an awful mess."

This stage relies on the spin of atomic nuclei. "In a quantum sense," they're little spinning tops that line up in the magnetic field. Then the operators turn down the magnets. No longer forced to march together like soldiers, the nuclei begin spinning randomly. In the process, they "suck heat out of their environment"—but just so much.

"As you get near absolute zero, communication between the nuclei and their surrounding electron clouds gets worse and worse, so you can only take the temperature so low, and right now—for chilling all sorts of materials to study—this nuclear cooling technique is the only way we know," says Ihas.

Still, a ten thousandth degree above absolute zero is frosty enough to attract world-class experimenters. For instance, physicist Mark Meisel is looking at a huge 100,000-atom molecule called NENP. He's discovered magnetic interactions between nickel atoms in adjacent chains of NENP. Engineers prick up their ears. "He who controls magnetism controls the universe," says Ihas, in mock Olympian tones. "The ultimate computer memory may be one magnetic atom, and this research is aimed at understanding that kind of interaction." By the year 2000, researchers hope to reach submicro-Kelvin temperatures. As Ihas says, "We're getting greedy!"

—RICHARD WOLKOMIR

CONTINUUM

The manned maneuvering unit, tested in space by shuttle astronauts, preceded NASA's new SAFER system still in the prototype stage

A SAFER WAY TO SPACEWALK

You're a space-station astronaut merrily going about your business on a routine spacewalk (extravehicular activity, or EVA, in NASA-ese) when the cable tethering you to the station breaks. Should you panic? Call for help? Scream obscenities into your communication system? No—you've got SAFER.

With SAFER (Simplified Aid For EVA Rescue), you've got a minijetpack right on your back. Though it's only about half the size of the average desktop PC, SAFER can stop you from tumbling into the depths of the universe *and* get you back to the space station. All you have to do is reach back and pull the system's strap. That activates a motion sensor system that automatically fires the unit's backpack to stop you from tumbling, and it releases a hand controller so that you can fire the thrusters and head for home.

Alas, SAFER hasn't quite reached reality yet. NASA's tested a prototype on an air-bearing floor—sort of like an air-hockey table—and plans to test it on the shuttle by late 1994. If the tests prove successful, look for this mini rescue device on both the shuttle and the space station.—Devera Pine

ICY ERUPTIONS

Images of Neptune's moon Triton taken by *Voyager 2* revealed geyserlike eruptions of nitrogen gas and ice particles taking place in the southern polar regions. Now, Paul Helfenstein, Pascal Lee, Joseph Veverka, and John Hillier at Cornell University's department of astronomy may have found evidence of another type of eruption—quasi-circular features, with diameters ranging from 280 to 935 kilometers, that could indicate past or present icy volcanic activity.

Analyzing detailed photometric data of the area just north of Triton's equatorial region, the researchers found a thin, transparent layer of frost and three of the large, flat, circular features in the icy crust. The scientists have come up with two possible explanations for the unusual shapes. One points to global-scale cryovolcanic activity in Triton's crust, causing the ground to swell. The other theory suggests they're the remnants of ancient impact craters.

"If the features are strictly volcanic," Lee says, "they would involve a substantial thickness of the crust and maybe even the mantle. This would imply volcanism of an usually large scale and would involve a good portion of the satellite. It would also be surprising if they were from impacts only, as Triton seems to be active in terms of its geology and few craters are seen. My preference would be a combination of both—that the features were caused by cryovolcanism that followed the formation of the impact basins."

—Patricia Barnes-Svarney

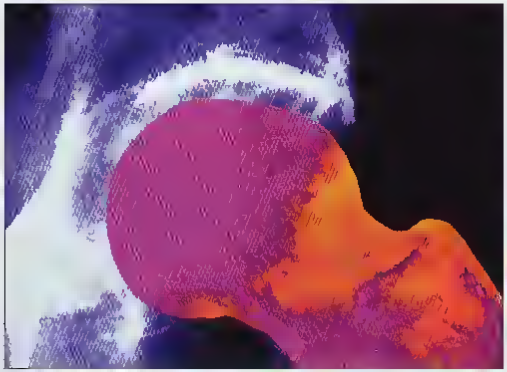
THE WETTEST PART OF THE HUMAN BODY: BLOOD, WHICH IS 83 PERCENT WATER.
THE DRIEST: TOOTH ENAMEL, AT 2 PERCENT.

Triton, the largest of Neptune's moons, has geological features that could indicate either volcanic activity or impacts by space objects

A NEW D-FENSE AGAINST OSTEOPOROSIS

It seems appropriate that a company in the heart of Wisconsin dairy country would create a variant of vitamin D, one of milk's chief nutrients, that may prove instrumental in treating osteoporosis. The new variant can be safely administered in doses five to ten times larger than those of previous D compounds.

Bone Care International of Madison calls its version *one-alpha hydroxy-vitamin D_2* and it's begun the complex maze of tests required by the Food and Drug Administration. One-alpha has what BCI spokesman Charles Bishop calls "a much lower toxicity in rats, subhuman primates, and postmenopausal osteoporotic women than the commonly investigated vitamin D_3 drugs. We believe it may be safely used in higher dosages to stimulate bone formation in osteoporotic women."



For postmenopausal women, osteoporosis, a decrease in the density of bone tissue, can significantly raise the risk of bone fractures.

Vitamin D_3 compounds cause excessive calcium to build up in the blood and urine, and may cause kidney stones and even renal failure. The new variant, based on research by Hector De Luca, chairman of the University of Wisconsin's biochemistry department, avoids this dangerous pitfall while still preventing the loss of bone. "It's a pro-drug that's inactive in and of itself," Bishop explains, "but once it's metabolized in the body, it becomes a hormone that binds to receptor cells, and things happen in the bone tissue."

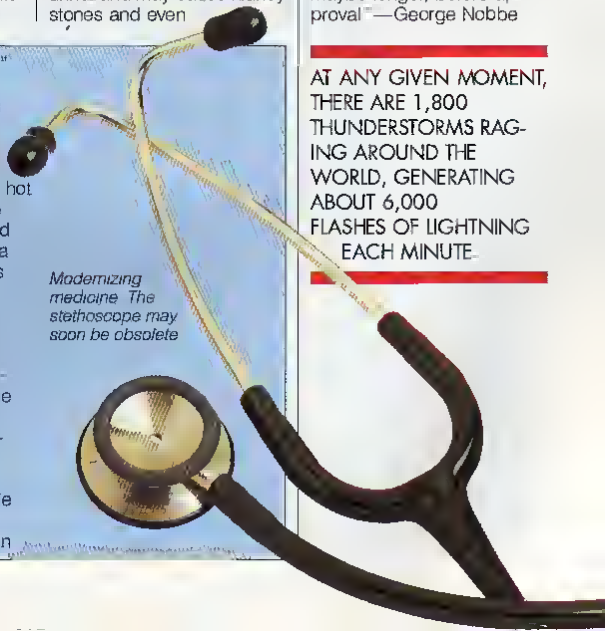
FDA acceptance of the drug may take a while. Despite promising early trials at the Creighton University Medical School in Omaha, Nebraska, "bone studies take a long time because bone tissue turns over very slowly." Bishop acknowledges. "It could be five years, maybe longer, before approval."—George Nobbe

"YOUR BLOOD PRESSURE'S UP, BUT YOUR MICROWAVES LOOK GOOD"

Take a deep breath. The doctor's familiar and reassuring stethoscope, invented at the dawn of the nineteenth century, could be on the way out.

Researchers at Scotland's Glasgow University have been working on a new diagnostic technique that uses the human body's microwaves, or thermal radiation. Recalling the illness-detecting scanner Dr. "Bones" McCoy used on *Star Trek*, an electronic device moves over the skin, a radio aerial replacing the stethoscope "bell." Instead of tubes placed in the doctor's ears, wires connected to a radio receiver relay changes in the body's natural pattern of microwaves, revealing "hot spots"—places where the temperature has increased as the body supplies extra blood to damaged tissues. A computer displays and stores the data.

"Microwave analysis," explains physicist David Land, "detects heat radiation intensity from inside the body, its wavelength just slightly shorter than television waves. Nothing is emitted into the body, which means the technique is completely safe."—Ivor Smulian



Modernizing medicine. The stethoscope may soon be obsolete.

AT ANY GIVEN MOMENT, THERE ARE 1,800 THUNDERSTORMS RAGING AROUND THE WORLD, GENERATING ABOUT 6,000 FLASHES OF LIGHTNING EACH MINUTE.

CONTINUUM

Some people consider graffiti to be art, but those who don't will have an easier time erasing it, thanks to a new nonstick coating

UNSTICK IT TO ME

Graffiti, bird droppings, even chemical solvents and acid rain just won't stick to a new protective coating developed at Dow Chemical in Midland, Michigan.

Unlike Teflon, to which it's distantly related, the compound can be easily sprayed or brushed onto most surfaces, according to Dow's senior associate scientist Donald L. Schmidt. As it dries, the molecules of the material bond with each other and the surface, forming a transparent, colorless coating that can't be wet—by anything. "Water won't wet it, or acetone, or methyl ethyl ketone, or anything else we've tried," Schmidt says. "It works on auto topcoats, wallpaper, countertops, vinyl, almost any hard surface you want to keep clean."

Dow plans to license the coating as yet unnamed. Once the company resolves several details in its formulation, it should present a formidable weapon in the war on graffiti. Marking pens and ink can be completely wiped off of treated surfaces with a dry paper towel, and spray paint can be removed with sticky tape.

—George Nobbe

THE HEAVIEST HAILSTONE ON RECORD, WEIGHING TWO POUNDS (SIX TIMES THE WEIGHT OF A BASEBALL), FELL IN BANGLADESH IN 1986.

"You'll never have a quiet world till you knock the patriotism out of the human race."
—George Bernard Shaw

MANIPULATING MOLECULES

Imagine a pair of tweezers so precise it could pluck individual molecules. Steven Chu, a physics professor at Stanford University in California, has made such tweezers from focused laser light, and he's pulled and prodded DNA molecules with them.

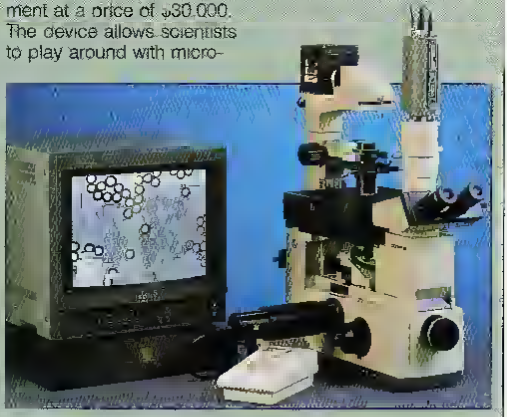
Manipulating molecules with lasers takes a little ingenuity. "DNA is just a long, skinny molecule," Chu says, "and the laser tweezers can't just grab either end of the lanky helix and hold it down. With the help of biochemicals used like glue, Chu fixes each end of a DNA molecule to a pair of polystyrene beads, each bead measuring about one micrometer in diameter. He then focuses a laser beam on each bead and uses the beams to carefully pull the beads apart, leaving the DNA molecule stretched in the middle.

"We use the beads like miniature plastic handles," Chu says. "We hold onto them with the laser light, stretch the DNA, then let it loose and watch it go 'boing!' We're learning a lot about the elastic properties of the molecule."

Chu's technique can be used to study not just DNA but all types of molecules. James Spudich, a professor of biochemistry at Stanford's School of Medicine, uses it to measure "molecular motors" responsible for human muscle contractions and other forms of cell movements.

Cell Robotics, a company in Albuquerque, New Mexico, has also seized on the concept. Last April, the company introduced its LaserTweezers 1000 instrument at a price of $30,000. The device allows scientists to play around with microscopic particles, but does not yet give them the ability to manipulate on the molecular level.

—Mubarak S. Dahir



Those versatile lasers. Cell Robotics' LaserTweezers 1000 uses focused light to move tiny particles, such as chromosomes.

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CONTINUUM

Administering a naturally occurring sugar to premature babies helps them survive infancy with fewer health problems

A SWEET DISCOVERY FOR PREMATURE BABIES

Sugar doesn't just help the medicine go down these days—it *is* the medicine.

University of California researcher Mikko Hallman has discovered that feeding very premature babies a naturally occurring sugar called inositol may help the tiny tots stay healthy. In a study of 221 babies, only 15 percent of the 114 given inositol failed to make it through their first year of life. Twice as many of the infants not given inositol died in their first year. In addition, none of the surviving inositol babies developed blindness, a common affliction among very premature babies. 8 percent of the noninositol babies did become blind.

Normal babies get inositol from breast milk or baby formula. But very premature babies' intestines can't handle these substances, so most of them receive an intravenous formula that doesn't contain inositol. Until Hallman's study, doctors weren't sure inositol was an important nutrient.

Hallman considers the discovery "one small step toward really improving the treatment of severely premature babies."

—Michelle Nicolosi

THE *PIONEER 10* SPACECRAFT WILL MAKE ITS NEXT CELESTIAL RENDEZVOUS, WITH PROXIMA CENTAURI, IN THE YEAR 28135 A.D.

"There is nothing in nature that is not in us."

—Naum Gabo

AS CHIPMUNKS SOW, SO DO THEY REAP

Where do trees come from?

Well, they grow from seeds, of course. But how do tree seeds get planted in the wild, where seed-eating animals scavenge all they can find? Scientists have long assumed that trees sprout from seeds overlooked by the animals, which then become buried by the wind, water, or other natural forces. But now ecologist Stephen Vander Wall of the University of Nevada at Reno has shown that exactly the opposite situation prevails. Seed-eating animals appear to inadvertently plant and propagate the forests.

Vander Wall scattered 1,064 radioactively labeled Jeffrey pine seeds at the base of two trees near Lake Tahoe during the autumn food-hoarding season. Within 48 hours, the resident yellow-pine chipmunks, deer mice, and golden-mantled ground squirrels had snatched up virtually all of the seeds and hidden them away.

Next, to determine whether such animal caching was more likely to germinate new tree growth than if the seeds were left unmolested, Vander Wall scattered 100 pine seeds at random in a fenced enclosure. In another fenced enclosure he buried 125 pine seeds in the style of seed-eating animals. By spring, he found that "only one of the seeds I placed on the soil surface produced a seedling," he says. By contrast, during the same period "fifty-five percent of the seeds buried to simulate rodent caches had produced a seedling."

While chipmunks can remember where they've buried a good percentage of their cached seeds, they fail, for some reason, to recover most of them, according to an earlier study Vander Wall conducted. It now appears that from such "lost" seeds, new trees grow. And so the forests of romantic Lake Tahoe consist of the misplaced lunches of uncounted generations of small mammals.

—Mark Sunlin

NOTES FROM THE NEW LAND

JOIN THE EXPEDITION AT THE MONROE INSTITUTE WHERE RESEARCHERS USE THE SCIENCE OF SOUND TO EXPLORE ALTERED STATES OF CONSCIOUSNESS

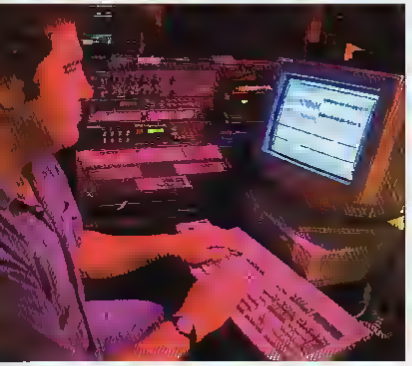
ARTICLE BY MURRAY COX

PHOTOGRAPHS BY PETER LIEPKE

If a lion could talk, we could not understand him—Ludwig Wittgenstein

On the first night, they take your watch away. A staff member walks around the room holding a small cardboard box, stops before each participant—there are 24 of us—and waits as each of us unsnaps or unhooks the timepiece, looks at it fondly, and reluctantly drops "time" into the box. As the trainer approaches me, I note the internal conflict, the disposition to say, "No, I'll hang on to time." I stare into the beat-up repository filling up with our "time," and I begin to soften. What, I wonder, am I hanging onto? A mere gadget, or a relatively recent idea which represents a way of life for us—an idea foreign to our earliest ancestors. I remember the lyrics from a song sung a long time ago by Chicago: "Does

THE VOYAGERS: FOUNDER ROBERT A. MONROE (OPENING PAGE); F. HOLMES ATWATER, BRAIN LAB DIRECTOR (ABOVE)



anybody really know what time it is? Does anybody really care?' I deposit the construct in the box.

No time. Just a series of "nows" which will last, ironically, seven days, because we signed up for a week long seminar at the Monroe Institute, located near Lovingston, about 25 miles south of Charlottesville, tucked away in one of the gentle valleys of Virginia's Blue Ridge Mountains. Residents call the place the "New Land"—and the land is spectacular. The tug-of-war over my Swatch is a picture story of my experience at the Institute as I began to knock up against my frameworks, the set of stories which determine who I am, the internal grids by which I sort out the incoming data and make up what I say I believe—do I accept, for example, the principle of scientific objectivity and reject the ideology that the sciences are historically and culturally contingent?

"Consider that you are more than your physical body," says Robert A. Monroe, founder of the Institute. More than matter, greater than the physical universe, and so not limited by time-space constraints. For a week, I consider Monroe's proposition—along with the other participants. We've come from all over the world—in the States from Little Rock, Arkansas, Bliss, Idaho, Peekskill, New York, Brevard, North Carolina. From other

shores—Fife, Scotland; Ibaraki-Ken, Japan, Bloemendaal, Holland, and from Offemont, Ville D'Avray, Hem, and Cernay in France. A psychiatrist, a doctor, two pilots, a real-estate agent, a young, retired Wall Street broker, a writer, a psychic healer, a journalist. We represent different beliefs, perspectives, political persuasions—Catholicism, Republicanism, agnosticism, anarchism.

The program's called the Gateway Voyage, and according to Monroe, Gateway is "designed to gently guide you into the experience of what we call your 'nonphysical energy.'" You may know it as chi, prana, soul, astral body, higher consciousness. The Institute's dogma is limited. Consciousness is a form of energy at work and it can be tapped, controlled, and used because thoughts create reality, we are what we think, and we limit ourselves by what we think; belief systems modulate how we experience ourselves and the world around us. Gateway, Monroe says, provides participants with an opportunity for self-exploration, to ask themselves some rather basic questions. Who am I? What is my purpose during my sojourn on Earth? According to Monroe, the goal of Gateway "is generation and transformation only. There are parts of you," he says to us, "yet to be transformed." And that's his mission and his business: to help people who want to transform themselves. To accomplish this goal, Monroe discovered a technique for inducing altered states of consciousness and now provides a spacious place, the New Land, to experiment with nonphysical energy.

The adventure at Monroe begins and ends in the Controlled Holistic Environmental Chamber (CHEC unit)—or, as I alternately dubbed it, womb, monk's cell, coffin. Large enough for a single mattress, the cell is dark—I'm isolated from light and sound and insulated to a small degree from electromagnetic radiation. If I want light, it's there—red, blue, and gold. I pick the color, adjust the intensity. Fresh air is constantly pumped into the chamber. I spend most of the week in the CHEC unit—by day and night. It is the berth where I sleep. It is the alchemist's secret lab where for six or seven hours a day, I try to transform base materials into gold. It's where I ask the cosmos—or just the ceiling—the child's question, "Why?" and hesitantly begin to weave the various threads of my life story into one garment. The cell becomes site of recognition where, with a certain amount of ease, I realize I wouldn't rewrite the story even if I could.

From a central control room, an audio network feeds sound patterns and special exercises designed by Monroe to each unit under the direction of a team of trainers. We receive the directions and the sound patterns through headphones. Each cell also contains an individual tape recorder. When an exercise is completed and Monroe calls you back from where you've been, you record your experience—a "vocal diary," as Monroe says.

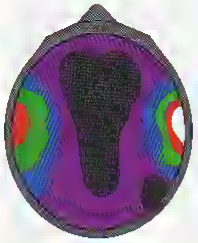
EEG BRAIN MAPPING OF THE HEMI-SYNC PROCESS

The Hemi-Sync process is a patented auditory guidance technology based on the natural functioning of the brain. Originally developed by Robert A. Monroe and continuously being improved through research at the Monroe Institute, Hemi-Sync employs a blended and sequenced series of binaural sound pulses to induce a Frequency-Following Response in the human brain. Hemi-Sync alters EEG brain-wave patterns and generates expanded states of consciousness, what researchers call "dissociative" and "transcendent" states. When experiencing a dissociative state, an individual perceives nonphysical phenomena as constituting his or her whole field of awareness, like a dream.

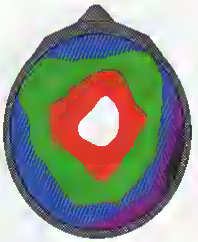
Additionally, during a dissociative-state experience, there is no impression of being "normally" in the physical body, because the physical body itself is either asleep or fully entranced. In electroencephalographic brain mapping, the shift from normal waking consciousness into a dissociative state is evidenced by a change in amplitude, frequency, and locale of predominant brain waves.

The waking state is characterized by alpha and beta (8–30 hertz) brain waves. Alpha brain-wave activity confined to the cortex behind the Sylvian sulcus (the back of the head) is known as "resting-state alpha." The dissociative state is characterized by elevated amplitude, synchronous slow-wave delta and theta (0–8 hertz), and the suppression of the alpha and beta activity established in the waking state. As one moves toward a dissociative-state experience, resting-state alpha activity is suppressed and replaced by synchronous slow-wave activity in the median of the central cortex (top of the head).

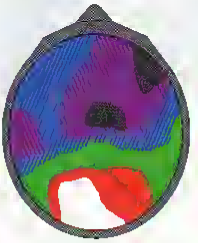
Beyond dissociation, there is transcendence. An experience in a transcendent state can be defined as being outside the normal limits of one's ego and the personal unconscious mind, into a universal awareness. Experiences in this state are many times ineffable and cannot be explained or described in mere words. In terms of EEG brain mapping, the shift from a dissociative state into transcendence is evidenced by further changes in amplitude, frequency, and locale of predominant brain waves. The transcendent state is characterized by "resting-state alpha" and relatively high-amplitude, synchronous slow-wave activity in the median of the central cortex accompanied by regional (commonly temporal) gamma (30-hertz-plus) brain-wave activity.



Transcendent state: "Seeing" beyond the limits of normal perception into universal awareness—ineffable, profound.



Dissociative state: When consciousness shuts down, the body is asleep or in a meditative state—like in a dream.



Resting-state alpha: Sylvian sulcus shows and tells all—from the way we process reality to our temperaments.

The characteristic EEG parameters of resting-state alpha reveal an individual's temperament, the customary way in which an individual processes and interacts with the world he or she perceives. The suppression of this alpha activity frees one to perceive nonphysical energies outside the confines of physical-law belief systems. The ability to modify resting-state alpha directly affects one's experience of his or her environment. Changing or suppressing ones' resting-state alpha effectively transforms the person's perceptual venue, or concept of reality.

Hemi-Sync generates an audioencephalographic interferometric effect which can be used to transform or suppress innate resting-state alpha and stimulate alternative brain-wave patterns necessary for dissociative- and transcendent-state experiences. Some "Focus Level" Hemi-Sync frequencies used do not interfere with resting-state alpha and allow the listener to integrate and relate to "tape experiences" in his or her everyday, familiar life. Other Hemi-Sync frequencies modify or suppress resting-state alpha to provide listeners with hi-fidelity, rich Focus Level dissociative states and transcendent experiences.

With the advent of modern computerized EEG brain mapping, objective EEG evidence of the effect of the Hemi-Sync process has been established. The lower auditory centers of the brain provide the neural pathways for the propagation of binaural beats. It is there, in each hemisphere's olivary nucleus, deep inside the brain, that beat-frequency oscillations can be measured directly. At the cortex, the site of EEG brain-mapping electrodes, these original binaural frequencies can only be observed as having been integrated with prevailing electroneural activity. It is the brain-wave entrainment which occurs during this integration process that accounts for the effectiveness of the Hemi-Sync sound patterns.—F. Holmes Atwater

Journal entry: *The experiment begins. After a simple preparatory ritual in which I toss intruding worries or cares into an "energy conversion box," slam the lid shut, I spend a few minutes breathing deeply and then count myself to Focus 10: mind awake, body asleep. I lie in the dark, disoriented. My body is heavy, as if it were being crushed by a compressor. I can't locate my legs. My arms are suspended above my head. I think my head's been severed. I'm cold and pull up a blanket. I'm hot and kick it off. Radical temperature changes. I "click out"—I go blank and when I wake up, I'm snoring. I lie quietly in the cell and listen to myself snore. This strange occurrence startles me. I am both a "hearing I" and a "snoring I." Where does the "hearing I" reside? I wonder. Who is the "I" that hears the body snore? Does the mind operate independently of what I've considered necessary physical or sensory input signals? At the end of the tape, I feel relaxed, even blissful. I've made a discovery of sorts. Perhaps I am "more" than my physical body and I exist whether I'm in the body or not. And then I wonder: am I a character?—dreamt? invented?*

Lying in my cell on the second day, I thought of Don Quixote, whom Monroe reminds me of. Where the Don saw giants, Sancho Panza, his sidekick, saw windmills. Gazing into a simple barber's basin, the Don saw the Shield of Mambrino, and Sancho wondered, How can these things be? Monroe, I think, is a descendant of the Don, telling us there's more to reality than what we see or touch.

In *The Reenchantment of the World* (Cornell University Press, 1981), science historian Morris Berman writes: "The Don's adventures are an attempt to decipher the world, to transform reality itself into a sign. His journey is a quest for resemblances in a society that had come to doubt their significance." Cervantes' Don (part 1 was published in 1605) represented the medieval world view, a belief system in which there were no divisions between physical and spiritual, mind and body, symbolic and literal—a seamless garment. "We are the heirs of a postmedieval viewpoint characterized by discrete, separate divisions between body and soul, inner and outer, subject and object, health and disease, observer and observed—a 'coat of many colors.'" By our standards, the Don is paranoid, a babbler of gibberish. And like the Don, Monroe calls on us to shift our focus, to see what we may not think we *can* see—to see the Shield of Mambrino. "Where," Monroe asks, "is the mystery in our culture and age? We're here to rekindle the mysterious, that's what the Gateway Voyage is all about."

Journal entry: *I feel completely cut off from the outside world. What if there's a war? There's bound to be a major incident occurring somewhere in the world. And I sit in a valley in Virginia without access to television news, CNN, NPR's "All Things Considered." In fact, I haven't even seen a newspaper. The crew is restless, complaining about the food—I think we're "offloading" our anxiety onto the only ritual that is familiar to us in this unfamiliar world—the act of eating. We wonder if anything is actually happening to us. The inevitable question: Have you left your body yet? OOBs [out-of-body experiences] are the Holy Grail of the retreat. I'm hooked. Monroe, indifferent to our desire, shifts our focus, telling us to perceive the "subtle stuff"—images, voices, patterns of light, physical sensations. Do I tell the others why I've come? To try to find a place of calm in the midst of terror, a source of light when even the moon has set, and I hear a doctor tell me a masterful story of invasion, ending with a stern command: Get your affairs in order, sign a living will, designate a health-care proxy. The story names me, masters me. With a pounding heart, I get out of bed, and pace, questioning the fear, trying to put a face on the demon.*

Monroe's been at this consciousness business for more than a quarter of a century, and he's familiar with accusations such as "paranoid babbler of gibberish." In 1958, as a very successful radio-show producer with his own company, he experienced what today he calls a glitch, a variable—the unexpected. He began to have spontaneous OOBs. "I respected the scientific and social paradigms of my day," he says, "and I wasn't prepared to understand my bizarre experiences." He thought he was going mad, quite literally. The experts whom he consulted said he was probably having a "minor hallucinatory break." He rejected the diagnosis.

To find out what was happening to him, he set up—under cover—a division in his company to explore the out-of-body state. He recruited volunteers, including medical doctors, a physicist, an electronics engineer, a psychiatrist, and social workers to lie in a darkened booth—air temperature, and acoustics controlled—wired to transmit physiological signals: eight-channel EEG (brainwave electrical patterns), EMG (muscle tone), pulse rate, and body voltage.

He immediately faced a problem. His subjects fell asleep in the darkened chamber. To keep them awake, Mon

roe began to utilize sound a medium he was familiar with In the process he discovered what he calls Frequency-Following Response (FFR) for which he received a patent in 1975 Certain sound patterns evoke electrical responses in the brain waves of the subject By controlling the brain-wave frequency Monroe was able to help volunteers relax stay awake or put them to sleep He soon found combinations of sound frequencies that creafed FFRs which were highly conducive to OOBs—and ofher meditative states

The firsf state Monroe identified is Focus 10 (mind awake body asleep) the 'place' where I startled myself when I heard myself snore According to the physiological data, the cerebellum, working below the level of consciousness and controlling muscle and body functions gefs tuned to a delta (deep-sleep) frequency And so the body is relaxed, if not asleep But the cerebral or neocortex a thinking cap stuffed with 100 billion neurons, is fed a theta (presleep) frequency Monroe worked out the exposure to the beats, introducing the delta signal to the cerebellum and later mixing in the theta cerebral-cortex signals

And fhat's when the joint started jump in lighfs, color patterns, voices, music, loud explosions, a lowering of blood pressure and pulse slight temperature drops, loss of muscle tone And almost every subject began to talk about perceiving a pinpoint of light When the volunteer moved to the light, it expanded and as the volunteer moved through it the OOB was achieved So much for the early days

Today Monroe calls the process by which altered states are induced, Hemi-Sync (hemispheric synchronization). After working with some 3,000 test subjects (with a minimum of 20 individual tests per subject, that comes ouf to 60,000-plus tests—not bad for a test base), the kinks have been worked ouf Monroe always the joker says, 'At the very least, we know that we have been able to puf people to sleep 60,000 times and awaken them But he's done more than that

Hemi-Sync uses patterns of sound to creafe simultaneously an identical wave form in both brain hemispheres This means fhat when your ear hears a certain type of sound signal, say a 12-hertz beta (awake) signal or deep-sleep delta signal (0–4 hertz) the brain tends to respond or "resonate" with similar electrical signals "We began to recognize that we were creating for the participanf a doorway, a window, a gap through which he or she could achieve other states of consciousness," Monroe says "We called it Gateway"

According to Monroe, the applications of Hemi-Sync are limitless Researchers are testing the technology in a wide variety of fields including medicine, mental health, stress management, and education In the physical arena alone, studies have shown that people utilizing Hemi-Sync can control pain, strengthen the immune system, hasten recuperation from surgery, lower blood pressure, and enhance recovery of speech and motor skills after a stroke Hemi-Sync combafs insomnia, improves concentration, reduces stress, even eliminates math phobia

Journal entry *I feel like I'm playing on a line a line of demarcation between 'here' (the known) and 'there' (the unknown) Today we journeyed to Focus 12, where, according to Monroe, physical data is shut off and consciousness begins to perceive in ways other than through the five senses "The action really begins here" he says "There" in Focus 12, images and scenes stream through my head as though someone had left a projector running Sea snakes swim through the monk's cell, a tall Kalahari bushman lifts me up on the palms of his hands gigantic sea turtles chase me through a grove of eucalyptus trees, a Native American sits on top of a mountain chanting He looks through me and says, "We're created every day by the light of the sun We die each night by the light of the moon There is nothing more Now go; leave me" At one point, I begin to laugh I've never laughed so hard without the help of another And then I reenact in vivid dramatization my brother's death in 1947, hear a voice that says I once lived on the star Arcturus and ride a dolphin who identifies himself as Floris Meaning what? I ask "Of the flowers" he retorts The scent of jasmine pervades the cell I hear rain pounding on a roof of corrugated iron I'm transported to Lahore, Pakistan, when I smell the jasmine and to Miango, Nigeria when I hear the pounding rain And the dolphin issues pronouncements like 'Cover the pain with laughter" and "The wind, Nicodemus, the wind" Today, I'm disturbed How do I read the enigmatic messages, interpret the images? There is a profound difference between saying, "I believe," and, "I know" The analytical one wants answers, but I am caught in a discourse with Wittgenstein's lion I need to learn a new language As time passes, I become suspicious of the values of "truth" and 'meaning'—including Monroe's Am I being conned? I cannot make sense of*

The fabric of space-time begins to unravel

CONTINUED ON PAGE 118

THE CONSCIOUSNESS WARS

ARTICLE BY
ROBERT K. J. KILLHEFFER

IN THE QUEST TO UNDERSTAND HOW THE BRAIN MAKES A MIND, RESEARCHERS SUFFER THE SLINGS AND ARROWS OF OUTRAGEOUS DEBATE

ILLUSTRATION
BY JOEL PETER JOHNSON

When asked about the ideas detailed in Daniel Dennett's ambitiously titled *Consciousness Explained*, Nobel laureate neuroscientist Gerald Edelman cannot disguise his disdain. "His is not a theory of consciousness," Edelman protests. "It doesn't address the issue." To give me a sense of how off-base he thinks Dennett is, Edelman recalls a comment made by the great physicist Wolfgang Pauli after Pauli had attended a lecture by a famous speaker. Asked by his students how it was, Pauli allegedly replied, "It wasn't even wrong."

These days, when multiculturalism and political correctness can ignite the passions of the most staid academics, perhaps it should be no surprise to find a debate so tinged with dismissive insults and acrimony. But it can still be a shock to see cerebral scientists and philosophers slinging mud and hitting low like politicians arguing about tax hikes. Although the epithets are more rarefied—here it's "obscurantist" and "crypto-Cartesian" rather than "liberal" or "right-wing"—recent exchanges between neuroscientists and philosophers of mind (and in each group among themselves) feature the same sort of relentless defensiveness and stark opinionated name calling we expect from irate Congressmen or trash-talking linebackers.

What question could get so many paid thinkers so hot under their tweed collars? Only one of the last great mysteries, a problem as central and perplexing as the origins of the universe and of life itself: What is the mind, that elusive element that suffers pain, likes chocolate, feels proud, and dreams of becoming an astronaut? And how does it—especially its most mysterious attribute, consciousness—relate to the brain, three pounds of pink and gray wet stuff in our heads?

For centuries, the study of the mind was left to the philosophers. While Descartes, Leibniz, Kant, and Hume debated questions about consciousness alongside matters of epistemology and morality, scientists stuck to things they could observe directly and investigate experimentally. Without reliable techniques to study the mind, science largely ignored it. Even as late as the early twentieth century, when William James and others were busy inventing psychology as a scientific discipline, James declared that psychologists should proceed without reference to the brain itself, restricting themselves instead to a combination of behavioral experiments and introspection.

But in recent years, we've developed startling new ways to study the brain, not merely with a freeze-frame snapshot such as a CAT scan shows, but in action as well. Positron-emission tomography (PET), magnetic resonance imaging (MRI), and superconducting quantum interference devices (SQUIDs) allow today's researchers to map the activity of living brains. At McGill University's Cognitive Neuroscience Laboratory in Montreal, for example, a research team led by Justine Sergent has been watching the brains of performing musicians, identify

THIS ONCE SLEEPY ISSUE HAS BECOME A HOT TOPIC.

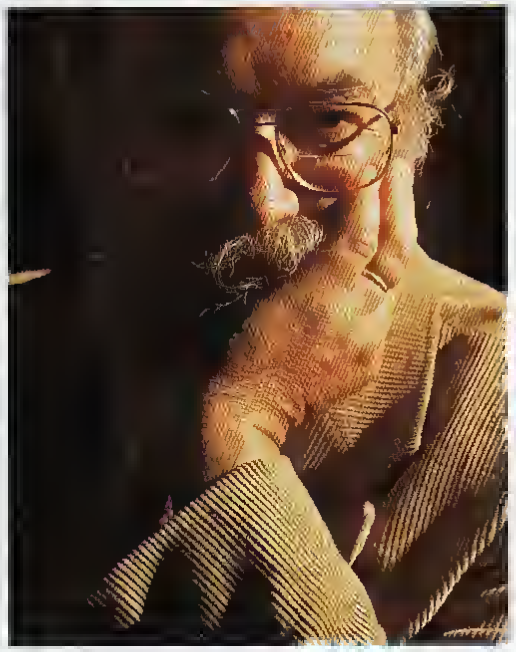
ing the regions of the brain used in playing a piano. PET specialist Marcus Raichle of Washington University in St. Louis investigates how we recognize words. Flashing words on a computer screen to his subjects, Raichle watches which areas of the brain react, and by comparing those results to how the brain reacts to nonwords (strings of letters like *mrphl*), Raichle isolates the parts of the brain that seem to be involved in the retrieval of word meanings.

Just as Galileo's telescope opened the heavens to the eyes of science, these new techniques have made it possible for scientists to explore the mind in new ways, and they've brought their own perspectives to some age-old questions, spurring an ongoing renaissance in the study of the mind. Sparks began to fly after Dennett's book appeared in 1991, other writers weighed in with reviews and book-length rebuttals, and new books and articles continue to appear regularly. Erich Harth's *The Creative Loop: How the Brain Makes a Mind* is a September release from Addison-Wesley, and Dutton will publish *Elemental Mind: Human Consciousness and the New Physics* by Nick Herbert in November. This once sleepy issue has become the hottest scientific debate of the decade.

Scientific advances began to undermine traditional philosophical ideas about the mind more than 150 years ago, beginning with the so-called "mind-body problem," long (and maybe still) the center of the debate. Descartes' "dualist" theory had dominated since the seventeenth century, supposing two distinct types of substance: mental and physical. But during the nineteenth century, research on brain anatomy, studies of damaged or diseased patients, and other developments challenged the Cartesian theory. Obvious connections between stroke victims' brain damage and the loss of specific functions—the ability to read or recognize faces or recall the current date—showed a close link between the physical brain and mental capabilities. A strict materialistic conception of the mind took over: Mind and brain are one; the mind *is* what the brain *does*. Various forms of dualism remain common in the public at large, but among scientists and philosophers "materialism of one sort or another is now a received opinion approaching unanimity," according to Dennett, the most strident of materialists, who has been working and writing on consciousness since the late 1960s.

But that unanimity is anything but peaceful. Only a very few scientists, such as the venerable Sir John Eccles, still propound any sort of dualism, but many scientists and philosophers share the uneasiness of laypeople in the face of the idea that "we" are nothing more than our brains. "I still find it difficult to believe," writes Richard Restak, a practicing neurologist and author of a number of books about the brain, "that this three-pound mess of protoplasm with the consistency of an overripe avo-

IF YOU THINK YOUR MIND AND YOUR BODY ARE SEPARATE THINGS—THAT THERE'S MORE TO "YOU" THAN JUST YOUR BRAIN—DANIEL DENNETT HAS NEWS FOR YOU: THAT KIND OF "DUALIST" CONCEPT HAS BEEN OUTMODED FOR DECADES.



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cado is the seat of who I am of who we all are Dennett, currently director of Tufts University's Center for Cognitive Studies, has been surprised by some reactions to *Consciousness Explained*. "I've been at a number of conferences where good hard-headed scientists have come up to me and said things like 'Gosh, your view is awfully materialistic, isn't it? I'm sort of dismayed to discover the appeal that dualism still has for some scientists.'"

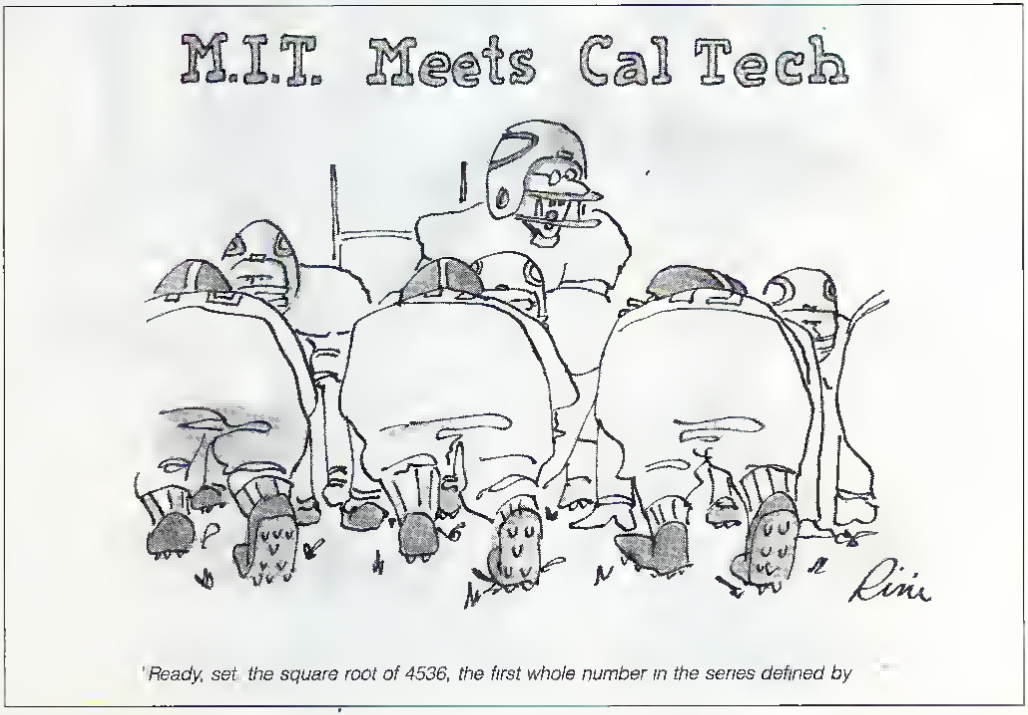
Berkeley philosopher John R. Searle, one of the most outspoken and controversial critics in the consciousness debate, considers Dennett and his fellow materialists no better than their dualist archenemies. In his most recent book, *The Rediscovery of the Mind* (MIT Press, 1992), he declares, mincing no words, "Once you see the incoherence of dualism, you can also see that monism and materialism are just as mistaken." Provocatively, he calls materialism "profoundly unscientific" and (echoing Edelman on Dennett) he says it's "at best, false." In fact, like Edelman, Searle, too, doubts that many contemporary thinkers are even grappling with the subject. Of Dennett's book, for instance, he has said, "It's not consciousness explained, it's consciousness explained away."

Some of the confusion may be a matter of simple semantics. The term "materialism" suggests a naive Victorian faith in a deterministic universe of simple particles and predictable forces, where pinball atoms bounce around in a gear-and-pulley cosmos that knows nothing of Einstein's relativity nor quantum uncertainties. Erich Harth suggests replacing the term with *physicalism*, meaning an assumption that physical processes—whether already known or yet to be discovered—will account for all mental phenomena. Searle prefers *biological naturalism*. Either broad term could unite several factions now bickering over finer points.

Whatever name we give it, the scientific viewpoint tends to assume that all observable phenomena in the universe, from subatomic particles to distant pulsars, are (at least theoretically) comprehensible to the human mind—even the phenomenon of the human mind itself. But some thinkers believe that we may never understand the mind and consciousness at all, that it remains mysterious due to some basic limitation in what we know—or even what we *can* know. Philosopher Thomas Nagel writes, "It may be impossible for us to abandon certain ways of conceiving and representing ourselves, no matter how little support they get from scientific research."

Though the terms *mind* and *consciousness* get tossed around pretty freely, it's nearly impossible to pin a clear definition on either one. Very often, the discussion veers off into generalities, devolves into minutiae, or gets lost in rhetoric, and this very difficulty in even talking about issues of the mind leads philosopher Colin McGinn to suggest that we have "cognitive limitations," that our minds are inherently unable to conceive of themselves—in short, that in studying the mind, we're like apes trying to understand quantum mechanics, out of our depths. Dennett dismisses such thinkers as romantics, and Duke University's Owen Flanagan—a bright younger voice on the scene, author of *Consciousness Reconsidered* (MIT Press, 1992)—calls them "mischievous reactionaries." But, as long as there are gaps in the scientific account of the mind, those who argue that we're just not smart enough to understand it will surely attract adherents.

Others think the limitation may lie in our theories, not in ourselves, somewhat like Heisenberg's uncertainty principle in physics or Gödel's incompleteness theorems in mathematics. Douglas Hofstadter has called Gödel's theorems the



"Ready, set, the square root of 4536, the first whole number in the series defined by

mathematical analogue to the problem of being unable to really understand the subjective experience of another being. (What is it like to be a bat, a snake, an elephant—or for that matter, another person?) Dennett notes a sort of Schrödingerian pitfall to investigating the mind. The very act of an experimenter "probing" a subject with questions (the way Marcus Raichle does with his word experiments) may have "a major revisionary effect" on what the subjects are thinking. There's no way to study a mind without interfering with it somehow. The cat is neither alive nor dead until you open the box, the experimenter is intimately entangled in the experiment.

Most scientists, on the other hand, deny that any such limitations exist. "The tendency to analogize is enormous," says Edelman, director of the Neurosciences Institute and author most recently of *Bright Air, Brilliant Fire* (Basic Books, 1992) "but at the moment there's nothing indicative in brain science that says you've got a principle like Heisenberg's or that the brain will never understand the brain. That's simply absurd." Francis Crick, famed codiscoverer of DNA now researching mammalian visual systems at the Salk Institute for Biological Studies in San Diego, concedes "There may be limitations in understanding consciousness, but until we know more about it, we won't know if there are any, nor what they are." Crick's own book on consciousness, *The Astonishing Hypothesis: The Scientific Search for the Soul*, is due from Scribner's in January 1994.

Still other thinkers claim that we won't be able to describe the mind adequately before we've made significant advances in physics. Oxford University's Roger Penrose suggests in his popular 1989 book, *The Emperor's New Mind*, that the key may be a theory of "quantum gravity." "It is our present lack of understanding of the fundamental laws of physics," he writes, "that prevents us from coming to grips with the concept of 'mind' in physical or logical terms." Nick Herbert, a member of Berkeley's Consciousness Theory Group in the 1970s and now a seminar leader at the Esalen Institute, goes even further, arguing that consciousness itself must be considered a "fundamental force" of the universe, "elemental" on a par with such irreducible phenomena as gravity, light, mass and electrical charge.

Searle takes a similar view. "Consciousness and intentionality are intrinsic and ineliminable," he claims. Trouble is, Searle so abhors the idea that anything we already know from physics or biology could *ever* account for consciousness that he falls into vagueness, vigorously denying any dualist nonphysical mind-stuff but he has no clear idea what sort of new principle might be found. At times, he approaches Herbert's "elemental" concept, comparing mind to physical properties like mass, and other times he refers to some new "neurobiological feature" of the brain—on faith more than hard data.

Most scientists feel there's no need to introduce new and mysterious factors into the problem; by and large, they assume that mental phenomena emerge from the awesome complexity of the brain's neural interconnections. With some 100 billion cells and 100,000 billion possible connections, the brain is the most complex structure known to science. Edelman, with characteristic dismissiveness, thinks Penrose is "in over his head," ignoring "a huge body of evidence that bears directly on the subject." Caltech neural-network theorist John Joseph Hopfield declares "There is absolutely nothing in biology to suggest that quantum mechanics plays the role that he [Penrose] describes," stressing that the "richness" of mental activity "comes because of

the true richness of large systems.' Stephen Kosslyn, a distinguished specialist in cognitive neuroscience at Harvard University and editor of the Perspectives in Cognitive Neuroscience book series, says: "There are, of course, plenty of things we don't know about what's happening in the brain, but there is plenty we *do* know that has allowed us to explain certain phenomena. I see no reason to think that other phenomena will not be understood in the same way."

Despite all the sniping, the scientific and philosophical approaches are not entirely incompatible. In fact, they exist in a sort of grudging symbiosis. Philosophers pose questions; scientists find a method and apply it in order to explore the problem; and philosophers can then take the scientists' findings, refine their questions and pose new ones. For example, when the mass of new neuroscience data began piling up, philosophers were sharply divided over the value of those findings to their pursuits. Some, such as Patricia Churchland of UC–San Diego (another veteran of the consciousness wars), argued passionately for the relevance of the neuroscience data. To others, the specific "hardware" that underlay the mind was unimportant; all that mattered was figuring out theoretical definitions that would describe what a mind was in the most general terms. Since then, many philosophers, including Dennett and Flanagan, have chosen to use any data that seem relevant from many fields—neuroscience, computer science, psychology, cognitive science—and this interdisciplinary approach has become the leading edge in the philosophical study of the mind.

A similar dispute divides scientists. According to Michael Merzenich, an integrative neuroscientist at UC–San Francisco, "There are very few neuroscientists who give a damn" about the purely philosophical arguments, although he himself sees some value in them. "It's interesting to see anybody struggle with these issues, trying to organize thinking about it." But he cautions, "the reality of it is that it hasn't had much impact on our experiments." Edelman is a bit more positive about the philosopher's role. "One must be grateful to philosophers," he says graciously, "because they keep questions alive. It's the job of a scientist to convert the question to a level where it can be answered."

The burgeoning renaissance in the study of the mind has brought some long-standing concepts into question, among them the idea that the brain is like a computer and the mind like software, the only major difference being one of scale. In 1967, Isaac Asimov summarized the received scientific opinion this way: "The difference between a brain and a computer can be expressed in a single word: complexity." But since then, that view has come under fire from both sides—the philosophers and the scientists. Searle declares that one of the purposes of his most recent book is "to put the final nail in the coffin of the theory that the mind is a computer program." Studies of neural structures have revealed vital differences between the wetware of the brain and the hardware found in our PCs and workstations. For one thing, where computers have rigidly designed circuits, neurons in the brain have many more connections, and those connections can change over time. The brain, says Merzenich, "is not just a computer that has fixed connections. It's continually modifying itself, and that modification constitutes the basis of its learning."

> "Brains and computers have very different talents. Even simple calculators can do arithmetic far faster than the human brain."

Brains and computers have very different talents. Even simple calculators can do arithmetic far faster than the human brain (how fast can *you* multiply two seven-digit numbers?). But when researchers in the Sixties and Seventies tried to program computers to recognize spoken words or train a robot to identify objects with its camera eye, they found it all but impossible. Yet the brain accomplishes such tasks rapidly and easily. The more we learn about the brain, the less applicable the computer metaphor seems.

But some thinkers feel the computer model still offers useful insights into certain features of the mind. Dennett thinks computer science provides "the crutches of imagination," the visualizing tools for us to understand the mind. Kosslyn believes the computer model is inadequate in describing real neural structure, but admits that the brain does perform certain functions the way a serial computer would, such as mathematical reasoning or talking. "But it's a *virtual* serial machine," he insists, and Dennett agrees. The hardware isn't that of a typical computer—neurons don't behave like silicon chips—but the brain mimics the computer. In some things. "Some people have suggested that that's why the frontal lobes are so large in humans," Kosslyn adds. "It's the result of a neural network trying to do serial computation."

Recently, researchers (led by Hopfield) have been turning it around, making their computers mimic neural networks, and they've had some striking successes—for instance in training computers to recognize human faces and spoken words. These neural-network models can allow neuroscientists to test their ideas about the brain. As Stephen Kosslyn and Olivier Koenig put it in their recent book *Wet Mind: The New Cognitive Neuroscience* (Free Press, 1992), "By providing new ways to mimic the activity of complex networks of brain cells, [computers] allow researchers to formulate more precise theories about brain function." Others, of course, remain skeptical even of neural-network modeling. Merzenich notes that "most experimental neuroscientists still dismiss it, but there's an enlightened fraction who have taken it seriously and gotten lots from it." Neural-network models "don't copy the neural anatomy," protests the puckish Edelman. "They have unrealistic types of processes, such as back-propagation. That cannot occur in nervous systems." One feature of the brain that computer models haven't incorporated yet is the soup of neurochemicals that permeates brain tissue and plays a vital, though barely understood, role in brain processes. In his 1985 book *The Fabric of Mind*, brain researcher Richard Bergland went so far as to call neurotransmitters "the stuff of thought."

The computer model isn't the only hallowed concept under attack these days. Most of us find it easiest to imagine that consciousness is localized in the brain—that there's one place where all the inputs come together, where all conscious events are presented to some sort of internal observer—but many thinkers consider this idea as misguided as the mind/software metaphor. Dennett calls the imagined consciousness center the "Cartesian theater" and considers it "the most tenacious bad idea bedeviling our attempts to think about consciousness." Neuroscience and psychological research strongly indicate that no such consciousness center exists, but we still don't know very well at all how or why some brain events become conscious and others do not. "Some patterns of neural activity result in phenomenological expe-

rience, other patterns do not," notes Flanagan with some dismay "The story bottoms out there "

The idea that we enjoy unhindered, reliable access to the inner workings of our own minds has also come under increasing doubt over the years This so-called "incorrigibility" or "diaphanous introspection" (neither the philosophers nor the neuroscientists are content with simple phrases) was a cornerstone of Cartesian philosophy, but most thinkers today recognize the dangers of depending on introspection Some striking experiments have revealed the basic unreliability of our conscious self-examination In one case, UC-Davis's Michael Gazzaniga, then at Dartmouth Medical School, worked with split-brain patients—patients whose corpus callosum, the mass of fibers linking the two brain hemispheres had been cut severing communications between them When Gazzaniga flashed a command such as "Walk," in the patient's visual field in such a way that it would only reach the right hemisphere, the patient would rise and begin to leave the room When asked to explain his or her actions, however, the patient—whose left, language-producing hemisphere knew nothing of the flashed command—would respond with some invented but reasonable explanation He wanted to stretch his legs or go for a Coke And the patients seemed to believe their own explanations

Dennett points out a few well-known facts to drive the point home Our eyes contain a blind spot where the optic nerve connects to the back of the eye but of course we aren't aware of a gap in our vision Likewise, our eyes dart about constantly, four or five times a second, to gather visual data, but we experience a steady visual field as if they were holding still Blinking works the same way—we aren't aware of a moment of darkness when we blink Our experience, moment to moment, evidently proceeds somewhat out of synch with reality "One of the most striking features of consciousness," writes Dennett "is its *discontinuity* "

As usual, not everyone agrees with this view McGinn calls introspection 'the faculty through which we catch consciousness in all its vivid nakedness." Searle bases many of his arguments on what he calls "common-sense facts" and "obvious facts about mental states," clearly assuming a much more trustworthy introspective power than most thinkers are willing to accept "This spurious 'obviousness,'" says Dennett, "is a great obstacle to progress in understanding consciousness "

As with any scientific inquiry, it's wise to take a break from the fever of debate and consider another dimension of the question Is it a good idea to "explain" the mind at all? Among the general populace and even among these bickering scientists and philosophers there's a healthy concern over the possible effects of penetrating this most personal mystery of all

There are many reasons to worry The most powerful may be people's desire to believe in the immortality of the soul; if science demonstrates that the soul is entirely the creation of the brain, which will die with the rest of the body, it could shatter this deeply held and cherished hope (In fact, science has for all intents and purposes already shown this to be true According to Edelman "We have as much empirical evidence for the basing of the mind in the brain as we do for any other physical phenomenon ") But it's certainly possible that anyone truly devoted to the idea of an immortal, immaterial soul will retain their faith in any case—after all, fully half of the American public refuses to accept the theory of evolution

"Many people are afraid to see consciousness explained because they fear that if we succeed in explaining it, we will lose our moral bearings," Dennett observes Edelman sees something similar "How can we maintain morality under mortal conditions?" he asks But there are good reasons for believing that a coherent scientific account of consciousness would enrich our moral lives rather than cheapen them Flanagan unusual among philosophers of mind since he also writes on ethics, points out that all ethical theories throughout history—from Plato and Aristotle through Hobbes and Locke to Hume, Kant, and Mill—are based on at least an implicit theory of human nature "You won't find one major ethical thinker who doesn't have a 'psychology,'" he says So, far from unhinging us from morality, a more accurate and complete description of human nature would form the core of a new, more agreeable ethics

Edelman stresses the mounting evidence showing that great variation on a microscopic scale is possible (and maybe inevitable) in different brains, although two people both recognize an apple as red, for instance, they probably don't have exactly the same patterns of neurons firing in the process Some researchers, including Gazzaniga, have found significant variation even in large-scale structures, and at a deeper level, it's increasingly clear that each brain finds its own way of solving problems and handling tasks Thus, each mind—each personality—is a unique irreproducible pattern to be cherished all the more in this life because it will never reappear Edelman argues 'We must accept that death means the irrevocable loss of an individual and that individual's being", each individual mind "is precious *because* it is mortal and unpredictable in its creativity'

In *The Concept of Mind* (1949), the preeminent anti-Cartesian philosopher Gilbert Ryle said that "human nature differs only in degree of complexity from clockwork,' and this possibility is another source of anxiety about scientists poking around in the mind "People are worried that we may be debunked," writes philosopher Hilary Putnam, "that our behavior may be exposed as really explained by something mechanical." Will a complete scientific description of the mind reveal us all as robots? Such fears are unfounded We must recall that science does not concern itself with essences—no explanation of the mind will ever answer the sort of existential questions about why we are here, how we should live, what is "the good life " Science cannot reduce our subjective experience to some series of simplistic mechanical processes—we aren't robots In his most recent book, *The Mind's Sky* (Bantam, 1992), science writer Timothy Ferris explains that the universe we can observe "is eternally smaller than the totality of the universe " We will always have "room to wonder " Likewise with the mind We, says Ferris, "like the universe, are more than the sum of the observations made of us " Whatever advances the science of mind makes in coming years, Edelman assures us that "the conscious life if describes will always remain richer than its description "

So we need not fear This grand quest will not harm us (though it's sure to keep us arguing for years to come) We may have to give up some cherished assumptions about ourselves and our place in the universe, but the truth we will gain in return will lead us to better ways of viewing ourselves, not worse In the end, we should side with Owen Flanagan: 'If will be our proudest achievement if we can demystify consciousness—deliver the concept from its ghostly past and provide it with a credible naturalistic analysis "

Far as we have to go, we have taken our first confident steps toward that lofty goal ∞

ARTICLE BY DAVID PORUSH • ILLUSTRATION BY ERNST FUCHS

"Standing on bare ground—my head bathed by the blithe air and uplifted into infinite space—all mean egotism vanishes. I become a transparent eyeball; I am nothing; I see all, I am part and parcel of God."

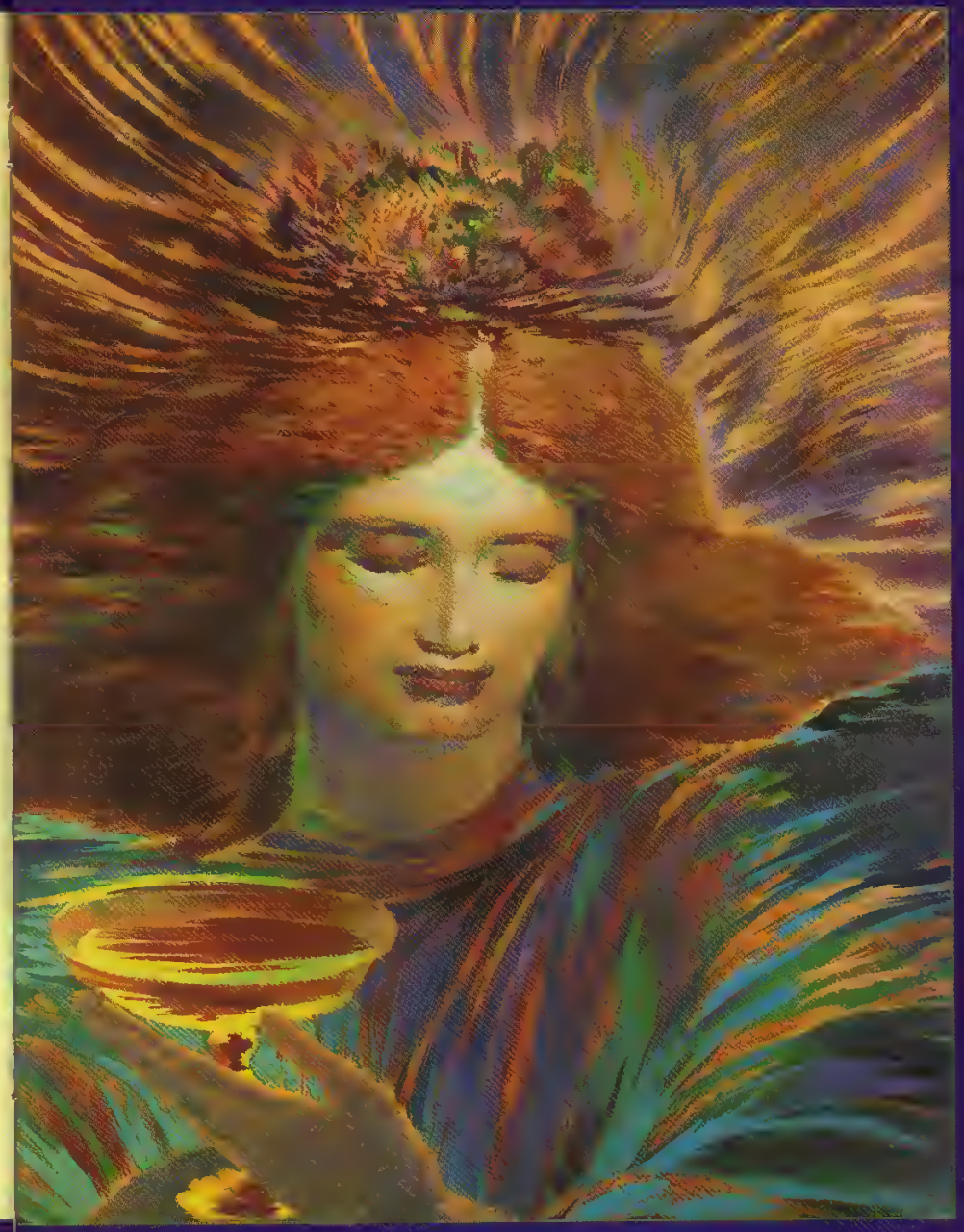
✠

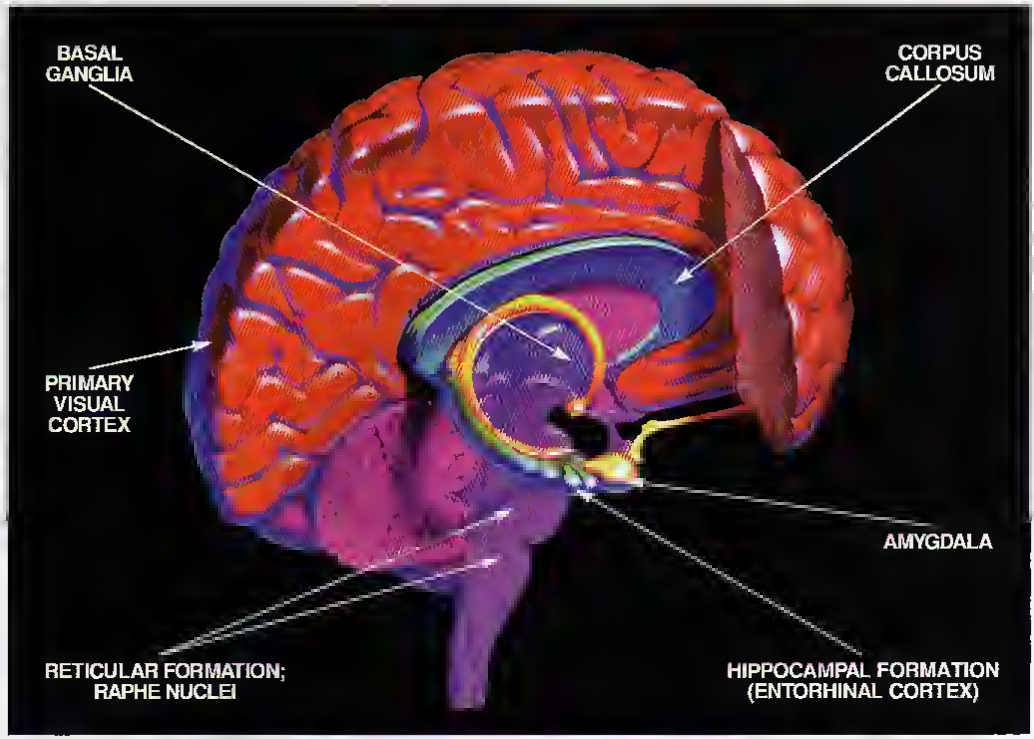
"I was unprepared for what happened. Almost instantly, I somehow knew that I had opened a door into something unknown but very powerful. I remember uttering a curse. My field of vision was immediately a dark ink-black, which then rapidly filled with brightly colored swirling phosphorescent 'sparkles.' This vortex built in intensity . . . and luminosity until it coalesced into a sort of ball of intense light into which I was swallowed up. This light or energy was completely overwhelming, it roared like a tornado . . . like being at the center of a nuclear explosion without being consumed with pain or annihilated. I felt *This is God*, and for the first time, I could sense the power that this Creative Force actually represented. I was totally in awe. Yet throughout the whole experience, I was not able to keep a grasp on my own personality. I was just a thread of freely running consciousness, holding on for dear life to this screaming freight train of energy that was tearing through the cosmos. At the same time, I had the realization that this light was God; my body was filled with a feeling of ecstasy or love."

✠

"I—my *drashta*, the Looker—became separated from my body and mind. This was *Atman* . . . And then the Looker witnessed everything in the world, *this* ground, *these* trees, *this* river, *this* mountain, and all people, and all other things, the light, the energy, and also itself, myself—all were *Shakti*, the primordial energy of

FINDING GOD IN THE THREE-POUND UNIVERSE: THE NEUROSCIENCE OF TRANSCENDENCE





the universe. There was no Seer and seen, no Looker and looked—they are One—that is *Brahman*, the Absolute."

Three accounts of religious ecstasy with incredible similarities. Yet their authors were separated by centuries and cultures. Ralph Waldo Emerson wrote the first report, an account of his experience in a New England wood in his 1836 essay *Nature*. The second comes from a neuropharmacologist and professor at a large American university who recently experimented on himself using extract from a psychoactive plant. The third is a description by a Hindu yogi about his own practices.

To these we could add testimony by schizophrenics about their hallucinations of becoming God, reports by shamans of their out-of-body experiences, accounts of Dionysian rituals in ancient Greece, and quotations from poets and visionaries like William Blake and the Biblical prophets. But all describe a similar clinical picture. The body is disabled by paroxysms of ecstasy. Normal judgment is, to say the least, suspended. Surrounding objects are obscured by frank hallucinations of vortexes and floodlights, or else they're transformed by luminous halos and revelatory detail. Voices from elsewhere are heard dictating instructions or secret messages. Then, there's that painful sense of the meaningfulness of everything. Seized by the immanent symbolism in the world, the subject reports talking to, seeing, or becoming God.

Being capable of such visions is hardly an adaptive skill. God-talking animals, even intelligent bipedal ones, probably wouldn't last long in the jungle. You wouldn't want to defend yourself from a predator—or even drive a car for that matter—while in a state of religious ecstasy. So why do humans have this remarkable—and, from the point of view of brute survival, seemingly irrelevant—facility for communicating with the gods? What part of the brain perceives transcendence? Was Emerson describing something that really happened to his soul, or was he only the victim of a conspiracy of neurochemical accidents in his brain? Does hatha-yoga open hailing frequencies between the mind and the universal spirit, *Shakti*, or does it simply activate a part of the brain that tricks people into feeling transcendent? Are these events an epiphenomenon of the sheer complexity of the brain, or are they gateways to a new kind of knowledge?

In order to find research which sheds light on these questions, we have to take a journey into the margins of science, a wild zone straddling institutionally sanctioned research, illegal drugs, and metaphysics. Most scientists won't speak freely about metaphysical matters, at least out of church. And to make matters worse, the most potent tools for exploring how the brain goes ecstatic are also ones that come loaded with social, political, and ethical baggage. LSD, PCP, mescaline, psilocybin, and Ecstasy. You can't just feed these psychoactive substances to humans and expect to get funded by legitimate agencies, given the prevailing attitudes toward such exotic compounds.

As a result, using psychedelic chemicals as a scientific route to the inner universe is just a tenuous little footpath in the thickets of social disapproval and institutionalized skepticism. Nonetheless, science has offered a few clues

A SHORT HISTORY OF CONSCIOUSNESS

IN THE EARLY 1950s, WILDER PENFIELD, A CANADIAN NEUROSURGEON, ESTABLISHED A PROMISING BEGINNING TO RESEARCH INTO THE CONNECTION BETWEEN THE BRAIN AND TRANSCENDENT PERCEPTIONS AND ECSTATIC EXPERIENCES. PENFIELD OPERATED ON PEOPLE WHO HAD SEVERE EPILEPSY CAUSED BY LESIONS IN THE temporal lobe. In preparing to remove portions of the brain, he would explore the surface of the temporal lobe with a gentle electrical current, checking with his alert patients to see what they felt. (The brain itself has no pain receptors, and so patients undergoing brain surgery can be kept conscious.) These little electrical explorations produced different effects, but from patient to patient stimulating similar regions tended to elicit similar responses. Intriguingly, stimulating the right central temporal lobe produced in some the sensation of hearing voices. "Again I hear voices! I sort of lost touch with reality there," Penfield reports one subject saying.

Two decades later, Princeton psychologist Julian Jaynes compared these voices to "the language of the gods." Built on such slender pieces of neurophysiological evidence as Penfield's experiments, Jaynes offered an astounding theory. Until about 3,000 years ago, the corpus callosum that divides our brains into left and right hemispheres actually had a physiological bridge across it. This organ of nerve and tissue acted like a data highway, sending messages from Wernicke's area, a region deep in the right temporal lobe where some speech messages originate, into the dominant left hemisphere, where they were perceived by conscious minds as admonitions or directions from the gods. As a result of this channel of communication, humans of that prehistoric era—*bicameral* humans—were no more than automatons, obeying commands from the other side of the brain in the delusion that they were receiving transcendent communiques. Now that the bicameral mind has broken down, we split-brain folks know better—except for occasional murmurings. Jaynes' far-fetched theory, published in 1976 in his popular book *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, helped give studies linking brain physiology to subjective experience of transcendence a bad rap. Moving from maps of the anatomical ghettos of the brain to talking to gods required a leap of faith with little to support it except Jaynes' vigorous and eloquent argument. His theory enjoyed notoriety for many years in the popular imagination and helped fuel the "left brain, right brain" fad of the late 1970s and 1980s. But the scientific community wasn't buying. All his evidence was circumstantial caricatures of ancient texts, offhand neurophysiology, and grab-bag anthropology. The nail in the coffin was his quirky view of physical evolution. Jaynes couldn't explain to anyone's satisfaction why the bridge over the anterior commissure of the human brain suddenly collapsed in all homo sapiens around the year 1000 B.C.

In the 1960s, a doctoral student at Harvard conceived of a marvelous little experiment involving housewives, hallucinogens, divinity students, and God, that posed serious challenges to conventional religion. Ironically, he conducted his experiment as research for his Ph.D. in theology.

Walter Pahnke was interested in the literature and experience of religious ecstasy. He trained housewives, presumably for their lack of bias, to identify passages in literature that qualified as transcendental or ecstatic accounts. Then he fed a group of divinity students controlled doses of psilocybin on Good Friday, 1962. The theology students soon after described their experiences while under the influence, and the housewives rated those confessions, mixed in among other narratives of religious ecstasy as well as other nonecstatic accounts, without knowing where they came from. The results were remarkable. The brigade of housewife readers identified a large proportion of the students' narratives as bona fide mystical encounters, and Pahnke concluded that drugs could simulate the transcendent ecstasy that lay at the source of so much religious tradition. Pahnke's work became known as the Good Friday Experiment and the reports by students as the Miracle of Marsh Chapel, named after the site on Harvard's campus where Pahnke collected his results. The age of scientific study of hallucinogens and their role in religious ecstasy had begun. But Pahnke's research raised a storm of criticism. If experience of God could be induced by a chemical, then what did that say about all the regalia and ritual of institutional religion? The skepticism about his results were fed by America's growing public distrust of hallucinogenic drugs.

The Army, in a shameful chapter that echoed the experiments of the Nazis it had just helped defeat in World War II, experimented with LSD, mescaline, and psilocybin on unwitting soldiers at the Edgewood Arsenal during the 1950s and 1960s. (Mescaline, for instance, was code-named EA-1306.) Soon, however, the streets of America would provide an even larger army of (sometimes) unwitting subjects—an enormous, inchoate laboratory without walls for hallucinogenic research, known vaguely by the dec-

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to how it is the human brain achieves transcendent or altered states.

The National Institute on Drug Abuse has opened the door to such research if only a crack. For the first time in more than 20 years, with the permission of the FDA and the DEA, they have given a federal grant to study the effect on humans of an hallucinogen listed on Schedule I of the Controlled Substances Act. Rick Strassman, a psychiatrist at the University of New Mexico in Albuquerque, has received both permission and support to study DMT (dimethyltryptamine), a relatively obscure but very potent hallucinogen first discovered in a plant used for snuff by Amazonian natives.

Gathering most of his subjects—experienced hallucinogen users, three-fourths of them men—via word of mouth through the drug underground, Strassman injects them with DMT intravenously, watches them closely through the swift and often intense experience, and then keeps close tabs on them for months after the experiment. As DMT is working, Strassman measures physiological responses like heart rate, blood pressure, vital signs, and core body temperature, and takes blood samples to measure the levels of brain-related hormones and DMT. "The most striking thing about DMT," says Strassman, "is its rapid onset. Sometimes, even before infusion is complete, subjects begin experiencing hallucinations and lose consciousness of their physical bodies. Peak effects can occur within about sixty seconds."

DMT produces striking psychedelic effects: intensely colored kaleidoscopic displays of visual imagery, three-dimensional and bright. Subjects experience a separation of consciousness from their physical bodies and then extreme emotional states—euphoria, terror, panic, bliss. "It's a short-lived experience, and even if it's horrible, which it is in some cases, it's short and horrible." Of course, Strassman takes pains to weed out subjects with psychological disorders or physical problems that might jeopardize their well-being, and as a trained clinical psychiatrist with a nurse on hand, he helps people get through the most difficult parts of their DMT trips.

Soon after the most potent effects of the drug wear off, Strassman also administers a long questionnaire—one version contains 230 questions—aimed at discovering the psychological and subjective effects of DMT. And one of those subjective effects, unavoidably, seems to be a trend to see God or experience transcendence. In his preliminary interviews with experienced users of DMT, he found many who reported spiritual experiences. So in designing his questionnaire, Strassman included questions that reflected this recurring theme. For instance, Question #31 [Did you feel] awe and amazement? Question #33, [Did you feel] the presence of a higher power, god, or spirit? Question #43, [Did you feel] oneness with the universe? Question #45, [Did you feel] reborn? "To leave those out would be ignoring one of the reasons people take hallucinogens."

And, in fact, the questions get statistically strong responses. "Actually," says Strassman, "about one quarter to one-third have experiences that could be interpreted as transcendent or religious or having something to do with their concept of God."

These results leave no doubt that as much as any other drug or stimulation, DMT has the potential to induce religious ecstasy. But what is the meaning of that experience? Is it real in any sense or just an artificially induced hallucination? As Strassman points out, DMT is already present in the human body, begging us to wonder if there isn't some purpose to these perceptions that come on so strong when the chem-

ical is administered in potent doses What is DMT and the potential experiences it can induce doing inside of us in the first place?

Physiologists have traced the route of psychoactive drugs like DMT and LSD-25 through the anatomy of the brain, matching the presence of these chemicals with known functions of different regions. But a trip to the various neighborhoods of the brain involved in religious ecstasy is a little like touring an empty Hollywood set. In order to understand the real drama, you have to see the actors at work.

Most psychoactive drugs like DMT script a radical alteration in the role of the major player in the brain's activity, serotonin—5-hydroxytryptamine or 5-HT for short. Serotonin is a universal operator, the Mr. Big of neurotransmitters with fingers in the pie of almost every processing transaction in every territory of the brain. Michele Spoont of the department of psychiatry at the Ramsey Medical Center in St. Paul, Minnesota, suggests that serotonin's main function is to regulate the flow of information through the neural system. It neither inhibits nor promotes neural communication so much as it keeps a balance, ensuring that the whole system stays within normal limits. It's even possible to speculate that this normal situation, this homeostatic self-regulating system, somehow translates into our sense of normal reality, our "sense of balance." Serotonin is the gyroscope of the mind-brain. Increasing or seriously depleting serotonin in the brain seems to destabilize this homeostatic control, loosening our grip on what we are accustomed to viewing as reality.

Such a model of serotonin's action supports the view of many proponents of hallucinogenic drugs—like Timothy Leary, who has maintained for a long time that LSD and MDMA don't so much do something to us as they permit us to experience a potential that already exists in the brain, a potential that is dampened or blocked by ordinary experience. In order to transcend, you have to kick the gyro, launching yourself on a trajectory skew to the plane of normal reality.

Serotonin's headquarters is a complex of closely associated central bodies buried deep in the brain stem, above where the brain meets the spinal cord, called the *raphe nuclei*. Of these, the dorsal and median raphe nuclei produce 80 percent of all serotonin as well as send out messages to other parts of the brain, acting somewhat like a central switchboard.

Another potent hallucinogenic drug associated with transforming experi-

ence is MDMA—3, 4-methylenedioxy-N-methylamphetamine, or as it's aptly known on the streets, Ecstasy (and sometimes "Adam," a scramble of its chemical acronym). Studies of Ecstasy in rats show that the drug works by acting as an agonist—a releaser—of serotonin in the dorsal raphe nucleus, stimulating wildly increased production. And it would be tempting to see that deep structure radiating messages from the most primitive part of the brain, as the one responsible for ecstatic visions. But it's not that simple.

The dorsal raphe nucleus is like the timer in the engine or the clock in a computer, but it's doubtful that it does any of the cognitive processing itself. From the raphe nuclei, serotonin floods down nerve projections into other important areas of the brain like the limbic system. Even though many of the sensations that seem to arise from limbic areas have the feel of something primordial and unworldly, the term *limbic* comes not from *limbo*, but from the Latin word for belt. It girdles some of the more primitive regions of the brain, the lateral forebrain where the amygdala, the basal ganglia, the hippocampus, and the entorhinal cortex are found.

Typical, normal perception works like this. Sensory input comes into the entorhinal area, goes into the hippocampus, returns to the entorhinal, and then shuttles back to the motor cortices. The hippocampus stores memories. The amygdala and the temporal lobe apparently tie an emotion to a memory so that memory isn't just like a snapshot of someone else's picnic, there's an emotional, personal component to it.

Say you want to move to the refrigerator for a snack. You get a good visual fix on the refrigerator, sending signals to the limbic structures which remember, *Aha. A refrigerator. Food's in there!* Your limbic region acts in a feedback loop with the environment. You may even summon memories of the smell and taste of those foods you haven't yet seen. The messages now cycle around from the limbic region to the motor cortex and feed back directions to your muscles—*Walk toward the refrigerator*—which brings you closer, giving new input to the limbic areas, where the brain now recognizes the handle to the refrigerator door—*Mmm, good! We're getting closer.*

But when you take a potent hallucinogen, you stimulate the serotonin receptors which are normally the targets for these neurons from the raphe nuclei, disrupting the brain's delicate balancing act in cycling normal input messages from the exterior world—adding special effects, you might say, to that snapshot. Your brain now sees, and seizes upon, not the vision of a mere refrigerator handle, but a divine, even alien "something different" suggested by the shape of the handle. Or perhaps the brain is now open to messages from a wholly different order of input, and you become blind to the refrigerator altogether.

At the same time, the messages out to the motor cortex of the brain are disrupted by the same flood of hallucinogen molecules bombarding key serotonin receptors and sending signals unprovoked by an external stimulus. You experience a strange physical passivity to the point that you don't even feel connected to your body anymore. Your mind floats free, enjoying (or being overwhelmed by) images that no longer come from the physical world alone but from an "elsewhere," a new origin outside normal reality. Your motivation to open the refrigerator door may go down while your brain feeds hungrily on this new sort of input coming from someplace new. It's easy to see why you would feel that the messages originate with a divine source, since they aren't connected to normal reality and can't be correlated to the environment your senses tell you is there.

But these perceptions would be a jumble of snapshots in a shoebox were it not for the involvement of the higher organizing functions of the brain. Serotonin and the hallucinogens that act as serotonin agonists—like LSD, mescaline, DMT, and psilocybin—also travel to the thalamus, a relay station for all sensory data that are heading for the cortex. There, conscious rationalizings, philosophizings, and interpretations of imagery occur. The cortex of the brain now attaches meaning to the visions that bubble up from the limbic lobe—of burning bushes or feelings of floating union with nature. The flow of images is scripted and edited into a whole new kind of show, except the more evolved centers of the brain are now not only being pressed to deal with this alien input, but are also being stimulated with the flood of hallucinogen molecules, which stimulate serotonin receptors in the neocortex and disrupt its ability to carry out normal functions. So the neocortex is more liable to attach transcendent or alien significance, to the otherworldly perceptions transmitted from the nether regions of the brain. And the result is very likely to be a new way of thinking, new insights, conversion experiences.

David Nichols, professor of medicinal chemistry and pharmacology at Purdue University, speculates that what makes drugs like LSD so potent is that they act in many places at once, and

these actions somehow "sum to give the net effect. If you're talking about a union with mystical oneness," says Nichols, "it may seem like there's not a whole lot of thought involved. It's more like a suspension of rational inspection, so you wouldn't expect a heavy involvement of the neocortex. On the other hand, when we look at chemicals that work to give some people these experiences, you find traces of the drug working throughout the cortex."

In short, by following the action of serotonin through the brain, it becomes clear that the whole concept of locating some mythical "transcendent receptor site" in the brain is too simplistic, even though such an atomistic approach currently dominates neuroscience research, according to Walter Freeman, a leading neurophysiologist. "Perception cannot be understood solely by examining properties of individual neurons," Freeman says. A professor of molecular and cell biology at Berkeley, Freeman has argued in his experimental and biological work for a more macroscopic or holistic view of how the brain moves from sensory input to conscious perception. Even when we have simple cognitive experiences, he suggests, like sniffing a rose or recognizing a friend's face, the brain mobilizes large battalions of neurons scattered over vast regions of the brain. What the mind recognizes as a conscious event (*Oh, that's a rose!*) is the result of a coherent leaping into a new order of self-organizing complexity.

If Freeman is right, and that's what happens when we merely recognize the smile of Michelle Pfeiffer, imagine the much more complex events that must occur in the brain when your mind is caught in a cosmic whirlwind of transcendent meanings and images. We're still a long way off from understanding how the brain moves from a series of neurochemical events to massively subjective mental experiences like these.

"Connecting brain activities to subjective experiences is the Holy Grail of brain research," says Freeman. "But like the Holy Grail, such a complete view doesn't exist except as an ideal. You certainly can't think about such experiences as deriving from a 'place in the brain.' They're not a 'whereness.' You can fool yourself into thinking you've found the place where these experiences originate, but it's like pulling a spark plug in a car. The car stops working, but it's not the spark plug that made the car go in the first place."

Nichols agrees, even down to the metaphor. "What makes a car go? Is it the ignition? The fuel in the cylinders? The wheels?" Nichols even suggests that

some of these drugs under the right circumstances "reboot the system,' changing or resetting the whole chemistry of the brain. Indeed a few people who have ecstatic experiences also undergo a conversion of the soul, a profound reordering of their entire mode of perceiving and relating to the world. To extend Freeman's quip, it's not a *whereness*, it's a different kind of *awareness*. That's why many researchers into psychotropic drugs like Nichols see benefits for treating mental illness. "These drugs form an important therapeutic category that we're missing the boat on as a society."

Despite the out-of-body feeling that's so large and frequent a component of religious ecstasy, there may even be physical involvement in these experiences. Alexander Shulgin, the researcher who suggests this, works even farther out in the wilderness of deinstitutionalized science. Now a youthful 68 years old and with something of the mad scientist about him, Shulgin is the reigning godfather of psychotropic chemistry. Though he teaches a course in forensic pharmacology at Berkeley, his lab isn't to be found in any academic institution, but rather in a wildcat, one-man operation—government licensed—on a farm outside San Francisco. There, Shulgin brews one compound after another, tests them on humans—a small, reliable group of willing friends—and records his results. He recently published his decades of research in a thousand-page novel-cum-handbook for psychoactive drug aficionados, *PIHKAL*. The title isn't the code name for a powerful new substance, but a bit of whimsy. It stands for 'Phenethylamines I Have Known and Loved." (Phenethylamine is the basic molecule propelling many psychoactive compounds.)

In one experiment, Shulgin took the skeleton of an amphetamine molecule that contained bromine—DOB (2,5-dimethoxy-4-bromoamphetamine), a long-acting psychedelic—and tried to follow its route through the body and brain by using a man-made bromine isotope that was radioactive. "I like this approach with DOB and its cousin DOI [which has an iodine atom in place of the bromine] because other chemicals require sticking something artificial on them. But with DOB and DOI, the heavy elements that can be the gamma emitters are intrinsic to the chemical." It meant getting a cyclotron to generate the isotopes and a PET scanner to track the chemical through the brain and body. "I was able to bootleg positron-emission equipment because of work I did with the Lawrence Radiation Lab [in Berkeley]. But it also meant getting time on their cyclotron. Ever try to power up a cyclotron on the sly?"

Shulgin found that DOB went to the lungs, bladder, and the liver, where it was probably metabolized and transformed into something else before returning to the brain to do its mind work. So even the holographic, complex model of the brain suggested by Nichols, Strassman, and Freeman requires an additional complication. It may not be the drug itself, but some byproduct, a metabolite of the drug, that's reaching the brain to do its work. In short, the body is involved, too. "Every time you pare your toenails," Shulgin quips, "you may be throwing away cells intrinsic to the soul."

What inspires Shulgin to make this whimsical leap are reports like the following from one of his subjects on mescaline, recorded in *PIHKAL*: "I began to become aware of a point, a brilliant white light that seemed to be where God was entering, and it was inconceivably wonderful to perceive it and to be close to it. One wished for it to approach with all one's heart. I could see that people would sit and meditate for hours on end just in the hope that this little bit of light would contact them. I begged for it to continue . . . but it faded away. . . . The world was so far away from God, and nothing was more important than getting back in touch with Him. . . . I ended up the experience in a very peaceful space, feeling that though I had been through a lot, I had accomplished a great deal. I felt wonderful, free and clear."

> "Why does this hallucinatory doorway to the gods lurk in the brain at all? The question awaits a more metaphysically inquisitive science."

Without the props of big science, the large lab, the research assistants, and government funding, the explanation for why certain chemicals produce these intriguing reports remains tantalizingly out of Shulgin's reach. Even were he to get a big project, Shulgin wonders what it would lead to. "There's never enough to tell you what's going on neurochemically that translates into particular subjective experiences. What makes a subject say, 'I'm seeing God'? I doubt we'll ever know that just based on neurochemistry."

But there is a promising development in this story. Encouraged by success in getting federal funding, Strassman, along with Nichols and other psychopharmacologists and M.D.'s, plan to launch an independent research facility named the Heffter Research Institute after the German pharmacologist who discovered in 1897 that mescaline was the active chemical in the peyote cactus. It will be devoted to investigations of the effects, mechanisms of action, and medicinal value of hallucinogens, using strict scientific methods.

In 1793, the poet William Blake wrote, "If the doors of perception were cleansed, everything would appear to man as it is, infinite." Do these psychoactive drugs cleanse the doors of perception, or do they poison the mind, tricking it into delusions of the infinite and profound? It's chastening to note that many autobiographical accounts of severe mental breakdown (as those collected in a volume published in 1964 by Bert Kaplan, *The Inner World of Mental Illness*) begin with ecstatic or revelatory episodes which then grow increasingly and dreadfully psychotic and frightening. And it's also sobering that the activity of serotonin uptake in the brains of schizophrenics appears to echo the action of DMT, LSD, mescaline, PCP (phencyclidine), and other hallucinogens. As a final warning, many of the antipsychotic drugs are antagonists (suppressors) of serotonin activity. In other words, the chemicals that help control some of the more painful schizophrenic symptoms are the opposites of hallucinogens. Yet whether poisons or mind expanders, it's obvious that psychotropic drugs get the human brain and perhaps the body, too, to undergo a massive and global change, an ecological shift for which, inexplicably and irrationally, the brain seems to be ready.

But reports of such experiences provoke big questions science doesn't have adequate answers for. Science seems reluctant even to pose them, tainted as they are with metaphysics. Why are humans endowed with a neurochemical ability, one might even say an imperative, to communicate with a universe of spirits in the first place? Why does this hallucinatory doorway to the gods lurk in the brain at all? Whether the mind, under these special serotonin-driven conditions, is listening to itself or is tuned to something that's really broadcasting from "out there" is a question that awaits a more metaphysically inquisitive science. ⊠

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The concept of the soul means different things to different people. For some, it represents the comforting notion of an immortal spirit that literally survives the death of the physical body. For others, it represents only their singular, mortal existence and its ephemeral presence in the infinite cosmos. Whatever your personal concept of the soul may be, chances are that you rarely take time to stop and reflect upon the meaning of your own existence. Many of us, in fact, go through our lives in a kind of waking trance, unconsciously doing what we believe is expected of us without pausing to consider whether our lives have any ultimate purpose. In fact, as Kierkegaard suggests, it's only in those few, brief moments of clarity, when confronted by our own mortality, that we find ourselves awakened by life's deepest questions.

To help you get in touch with your inner spirit, we present the following exercises designed to stimulate a greater conscious awareness of your unique existence. We recommend practicing these exercises at a comfortable pace and only when you are sober and feeling relaxed. If you have a history of psychiatric problems or any doubts about your ability to handle the exercises that follow, we recommend that you consult your therapist or psychiatrist before proceeding. You may terminate any exercise whenever you like and complete it later. Although these exercises are meant to be practiced alone, you may also adapt them for small groups.

Day 1: Life Lines. Consider the ways in which you have changed as a person from your earliest childhood to the present time. In addition to obvious physical changes, you have also experienced dramatic changes in your self-image and awareness of the world around you. Yet, despite these ongoing changes, your underlying sense of yourself as a unique individual has most likely remained constant.

Day 1 is designed to help put you in touch with this immutable facet of your personal existence. Begin by choosing a spot that is especially significant in your everyday life. If you work in an office and identify strongly with your job responsibilities, for example, you might like to practice this exercise while sitting at your desk. If you identify primarily with your role as a wife and mother, you might like to position yourself in a favorite spot at home.

Once you've selected this spot, sit down and list five of the most significant days in your life from childhood on. Your list may include such obvious milestones as the day you met your first childhood sweetheart, the day you graduated from college. It may also include such distinctive personal turning points as the day you came out of the closet as a homosexual or the day you first rappelled off the side of a cliff.

As you jot down each item on your list, allow yourself a few minutes of self-indulgent nostalgia. Remember not only the event itself, but also the exact way you felt when it transpired. Imagine what it would be like to feel that way again. Notice how your present experience of yourself differs from that earlier experience. Notice also those aspects of your self-awareness that have remained consistent over time.

> "As Kierkegaard suggests, it's only in those few, brief moments of clarity, when confronted by mortality, that we find ourselves awakened by life's deepest questions."

As you progress through your list, notice the common feelings, concepts and images that run through all your major life experiences. Notice, especially, those aspects of your personality that have remained stable over time.

To conclude the exercise, close your eyes and consider how these unchanging aspects of your self-awareness have remained an essential part of you to this very day. Try to let go of all intellectual thought and steep yourself in this feeling of "youness" for 10 to 15 minutes before going about the rest of your day.

Day 2: Body and Soul. Some people identify so strongly with the physical self that they consider the body and soul to be virtually synonymous. They might even view love as the biochemical product of physical needs. Others view the body as a mere container into which we temporarily pour our spiritual consciousness, a mortal coil that will one day be shuffled off as we enter the undiscovered country of death. Whatever your perspective, it must inevitably influence your perception of the spirit within. The activity for Day 2 provides you with an opportunity to learn how.

To practice this exercise, you'll need to position yourself alone in a darkened room with a full-length mirror and a candle. Light the candle and place it in a holder on the floor or table behind you as you face the mirror. Then remove all of your clothes and stand in front of the mirror with the glow of the candle forming a visible aura around your silhouetted form. Turn your palms toward the image in the mirror and slowly take a deep breath as you look at your reflection. Then slowly exhale and imagine yourself merging with the image in the mirror. Allow yourself to feel as complete a sense of oneness as possible with the reflected image of your physical form. As soon as you perceive this connection, sit down on the floor in front of the mirror.

Now allow yourself to imagine the image of your body changing as you watch it in the mirror. Imagine, for example, that you see an unfamiliar face staring back at you. Notice the ways in which your sense of reality may be altered by this eerie experience. Imagine also that you see a different body going along with the different face that you imagine seeing in the mirror. Allow these images to become as "real" as possible in your imagination.

Now ask yourself, as you imagine a different face and body reflected in the image before you, how you would recognize yourself if you had an entirely different physical appearance. Is there an "inner you" that transcends the external image you have of yourself?

To test this concept, find a disguise that alters your physical appearance in the extreme. If you're raven haired, for instance, don a platinum wig. If you're neat as a pin, wear an oversized T-shirt and tattered jeans. Take a walk in a place you don't usually frequent and see if your sense of self—your soul, as it were—remains essentially the same.

Day 3: The Primordial Self. In many traditions, such as Hinduism and Buddhism, the individual soul is believed to carry the accumulated experience and karma of numerous prior incarnations. Even if you find this notion unacceptable, you nevertheless began your life with certain inherent characteristics that are at least genetic, if not spiritual, in origin. These inborn qualities, in a

sense, comprise the essential "you."

Day 3 is designed to help you get in touch with this fundamental dimension of your inner self. To practice this exercise, you'll need to create a safe womblike environment in which you can temporarily allow yourself to feel detached from your present life experience. If you can arrange to spend some time in a flotation tank, this would be ideal. Since most of us don't have access to such a facility however, you can also create an alternative womblike setting in the comfort and privacy of your own bathroom.

Begin by clearing the room of any distracting paraphernalia, such as hair dryers, curling irons and electric toothbrushes. Then spread out some towels on the floor to provide yourself a comfortable place to sit or lie down. Leave the door open slightly, and place a radio or television just outside the room. Tune the receiver to a spot between broadcast channels and set the volume of the resulting static to a comfortable level so you'll be able to hear it while sitting on the bathroom floor. Then turn on the shower, using mostly hot water, and allow the bathroom to fill with steam. (A slightly open door should allow enough air to circulate to prevent you from becoming overheated.) Finally, remove your clothes and lie down on the floor in a fetal position. If the space is too small, you may also sit in any position you find acceptable.

Take a deep breath and slowly let it out while clearing your mind of any distracting thoughts about your present life experience. Then allow your thoughts to drift back to your experience in the womb, shortly before you were born. Although scientists differ in their opinions about whether such prenatal memories are actually possible, for the purpose of this exercise, you can allow yourself to accept the possibility that they are. Imagine the walls of the room around you dissolving and disappearing. Then imagine yourself as a developing fetus, floating in the amniotic fluid of the prebirth environment.

Close your eyes and allow yourself to embrace the liberating experience of existing entirely apart from any concept of time or place, feeling only your singular presence in the universe as a pure point of consciousness unto yourself. As you feel yourself slipping into this primordial state of awareness, notice the sensations you associate with your original temperament. Allow yourself to experience these feelings without consciously analyzing them.

If you're particularly adventurous, allow yourself to imagine what it would be like to slip back to a point in time before your life in the womb. Do you envision a pure point of consciousness in space? Life as a blacksmith or wet nurse in colonial America? Vegetable existence as a rubber tree in the equatorial regions of the prehistoric world? While your present existence may well be your first and last, the images you call up in this exercise should at least give you a clue to the spirit within.

After you've finished your mental wanderings, gradually allow yourself to imagine the walls once again reforming around you, and slowly return to your familiar state of conscious awareness. Consider the relationship between the primordial self you envisioned in the exercise and your present-day self.

Day 4: The Remembered Self. Given the complexities of human life, it's sometimes sobering to read newspaper obituaries. Often, an entire lifetime is boiled down to little more than a paragraph mentioning a few career highlights and the surviving relatives. Even more luminary individuals are often given little more than a column in which their whole life experience may be summarized by a total stranger. The descriptions inscribed on cemetery headstones are often more succinct, providing little more than a name and a couple of dates to bracket the brief period during which a person lived.

Although we may not be remembered as we like, the impact our personal existence has had on the world may continue. This may be the case whether or not our contribution is acknowledged or whether or not we ourselves recognize the impact our life may have had. In some sense, the deeds we leave behind confer a kind of immortality and are the soul of our existence.

Day 4 is designed to help you explore this concept of the soul. Begin by taking a trip to a local cemetery. Bring along a copy of the obituary section of the Sunday newspaper, a notebook and a pen. Find an inconspicuous spot and slowly read through the obituaries. Consider the impact each of the individuals listed may have had on the lives of those they knew as well as the potential long-term impact their lives may eventually have on the world.

Next, take a quiet stroll among the tombstones. Notice the many different styles of grave markers and read the inscriptions memorializing those who are entombed beneath your feet. Pay particular attention to the dates during which given individuals lived, and imagine the kinds of historic events they must have witnessed. Imagine for ex-

ample what it must have been like to live during World War I to witness the birth of television or to take part in the March on Washington with Martin Luther King Jr Consider also, the significant personal events that must have transpired in the lives of those memorialized by the tombstones around you Finally, before leaving the cemetery, find a spot where you can sit quietly and compose your own obituary If you died today how would you like to be remembered by other people? How would you summarize your life and your contribution to the world if you had no more space than a brief newspaper column in which to do so? After you've completed this portion of the exercise, turn to a blank page and compose an ideal obituary—one representing the way in which you would prefer to be remembered if you had achieved your fondest hopes and dreams

As you reflect upon your two obituaries consider the positive changes you might make in your life in order to bring about your desired long-term impact on the world Consider, also, what this exercise has revealed to you about the nature of your soul

Day 5: The Power of Love As Mother Teresa inspires us to recognize, few experiences hold as great a potential for spiritual transformation as the act of selfless love Thus your goal for Day 5 is to perform a series of selfless acts for others These people should include not only those you love, but also at least one complete stranger less fortunate than you In order to have an honest impact, however, the acts you perform must involve something more than simply going through the motions, they must represent a creative response to real human needs

If you pass a homeless person on the street, for example don't just assuage your conscience by handing him or her some loose change Buy this needy person a brand-new blanket or a hot meal with all the trimmings Hide a $20 bill in the lunch bag so the individual will discover it long after you've gone To be truly selfless, the act must be performed without seeking the recognition of other people and with no obligation on the part of your beneficiary

Use the same level of creativity in performing selfless acts for those with whom you're personally close Surprise your spouse by doing all the grocery shopping, delight your aging mother-in-law by dropping in for an unannounced visit and performing any needed repairs on her home You can even surprise your favorite cat by bringing home a special toy from the pet store

Day 6: The God Factor. In many traditions, the concept of a divine creator is an integral element of spirituality. Whether this creative force is embodied in the anthropomorphic form of a solitary god, a consortium of gods, or an impersonal yet universal higher power, individuals are often counseled to seek a sense of inner connectedness with the creator as the only path to enlightenment.

Day Six is designed to assist with this process. We suggest that you adapt this exercise in whatever way you find appropriate to suit your own spiritual convictions. Begin by finding a quiet outdoor location in which you can safely meditate without being disturbed. Sit still, relax, take a deep breath, and as you let it out, quietly observe the tiny details of your immediate surroundings. Then, when it feels natural for you to do so, close your eyes and imagine yourself in direct communication with the creative force of existence. Imagine this force embracing you, welcoming you as an integral facet of the universe it has created. Allow yourself to experience this imagined embrace as a powerful connection to other living creatures, to the earth, and to the stars. Finally, imagine you have taken on the traits of a "god" yourself. Envision the universe you have "created" in as much detail as possible: if your personal universe were to have a mythology, a philosophy, and an overriding ethic, what would these be? After you've envisioned your own imagined creation, once more sense your connection to the universe we inhabit, and gradually open your eyes.

Day 7: The Seventh Day. In the Biblical book of Genesis, God spent six days creating the world and rested on the seventh. In keeping with this tradition, we present an exercise intended to help you sit still and focus—regardless of your religious viewpoint—on the natural and creative splendor of the world. To practice this exercise, choose a location that is overrun with the trappings of civilization. A teeming industrial area would be ideal, as would a housing development near the outskirts of a city.

Your first mission is to observe the manner in which human beings have attempted to overcome the forces of nature. For instance, pay attention to hills that have been bulldozed, bodies of water that have been created, and forests that have been cut back. Notice any structures, including houses, factories, and other buildings, that have been constructed to keep out the elements. Take note of the pavement that has been laid all around you and the bridges that have been erected to overcome the natural boundaries of your immediate surroundings.

Your second mission is to locate evidence of nature's inevitable ability to overcome even the most concerted human efforts. Notice the cracks in the sidewalk, for example, and the manner in which tiny weeds and grasses take root in every available crevice. Notice anthills and spider webs. Observe any birds and other small animals who've taken up residence among the humans. Look for evidence of wood-eating bugs in the softened wood of old houses and hidden microorganisms making themselves at home in damp, dark corners. Notice the ways in which the forces of nature permeate every level of the civilized world.

Even in the heart of the industrial area of a major city you may be surprised to discover your environment awash with exhilarating splashes of color and aesthetic brilliance. In this local milieu, embark upon an artistic scavenger hunt. Focus on finding tiny, often overlooked fragments of evidence of an underlying artistic, creative force at work in the universe. You might, for example, notice an especially beautiful and fragrant flower growing in an unexpected location, the stirring silhouette of a distant bird soaring beneath a passing cloud, or a building design of unusual architectural grace.

Find a comfortable spot where you can sit and unobtrusively observe the comings and goings of the setting you have chosen. A park bench would be suitable, as would a shady spot beneath an oak tree or even a table at a sidewalk cafe. Sit quietly and imagine how your local environment would look if nature were allowed to take its course without human intervention. Imagine what your present surroundings would look like if they were overrun by the encroaching jungle, as were the city-states of the Mayas, or if they were buried beneath centuries of dust, as was ancient Rome.

To complete this exercise, go for a walk and immerse yourself in your surroundings: as you move from spot to spot, feel the connection between your unique humanity, the artistic *oeuvre* of civilization, and the force of nature as it sweeps over, and ultimately dominates, all. Feel your personal relationship to this creative force and to the natural universe as a whole. Finally, spend an hour exploring your creative potential in whatever manner you deem appropriate—write poetry, cook a new and exotic dish, draw a picture, or take artistic photographs.

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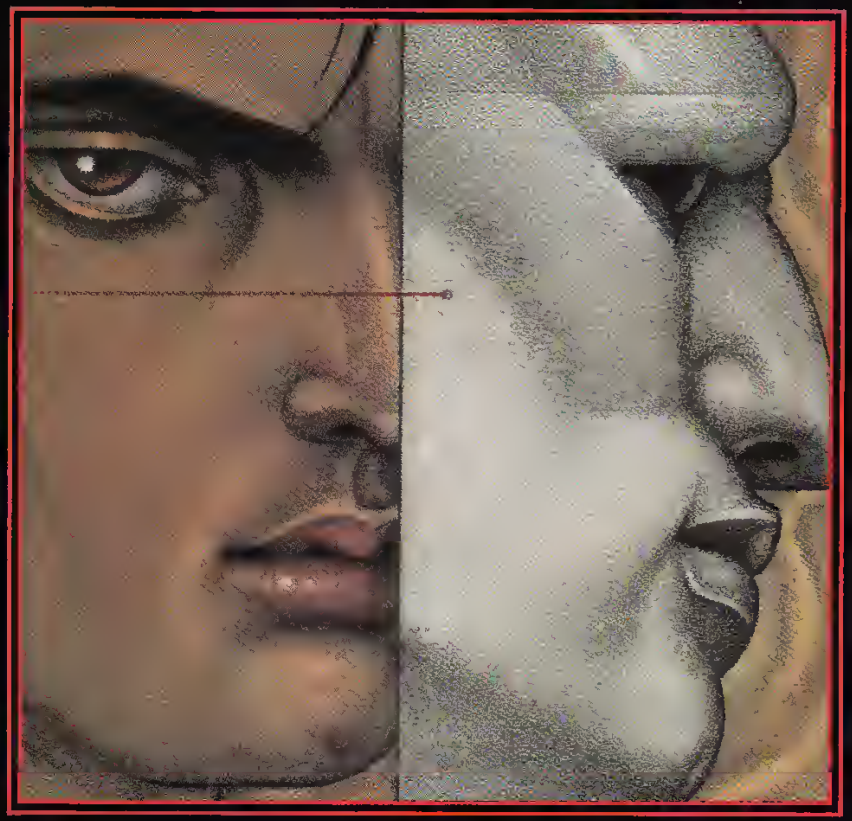


MEFISTO IN ONYX

A NOVELLA BY HARLAN ELLISON

ILLUSTRATION BY MEL ODOM

ONCE. I ONLY WENT TO BED WITH HER ONCE.

Friends for eleven years—before and since—but it was just one of those things, just one of those crazy flings: the two of us alone on a New Year's Eve, watching rented Marx Brothers videos so we wouldn't have to go out with a bunch of idiots and make noise and pretend we were having a good time when all we'd be doing was getting drunk, whooping like morons, vomiting on slow-moving strangers, and spending more money than we had to waste. And we drank a little too much cheap champagne, and we fell off the sofa laughing at Harpo a few times too many, and we wound up on the floor at the same time, and next thing we knew we had our faces plastered together, and my hand up her skirt, and her hand down in my pants.

But it was just the *once*, for chrissakes! Talk about imposing on a cheap sexual liaison! She *knew* I went mixing in other peoples' minds only when I absolutely had no other way to make a buck. Or I forgot myself and did it in a moment of human weakness.

It was always foul.

Slip into the thoughts of the best person who ever lived, even Saint Thomas Aquinas, for instance, just to pick an absolutely terrific person you'd think had a mind so clean you could eat off it (to paraphrase my mother), and when you come out—take my word for it—you'd want to take a long, intense shower in Lysol.

Trust me on this. I go into somebody's landscape when there's *nothing else* I can do, no other possible solution, or I forget and do it in a moment of human weakness. Such as, say, the IRS holds my feet to the fire, or I'm about to get myself mugged and robbed and maybe murdered, or I need to find out if some specific she that I'm dating has been using somebody else's dirty needle or has been sleeping around without she's taking some extra-heavy-duty AIDS precautions, or a co-worker's got it in his head to set me up so I make a mistake and look bad to the boss and I find myself in the unemployment line again, or

I'm a wreck for weeks after.

Go jaunting through a landscape trying to pick up a little insider arbitrage bric-a-brac, and come away no better heeled, but all muddy with the guy's infidelities, and I can't look a decent woman in the eye for days. Get told by a motel desk clerk that they're all full up and he's sorry as hell but I'll just have to drive on for about another thirty miles to find the next vacancy, jaunt into his landscape and find him lit up with neon signs that got a lot of the word *nigger* in them, and I wind up hitting the sonofabitch so hard his grandmother has a bloody nose, and usually have to hide out for three or four weeks after. Just about to miss a bus, jaunt into the head of the driver to find his name so I can yell for him to hold it a minute Tom or George or Willie, and I get smacked in the mind with all the garlic he's been eating for the past month because his doctor told him it was good for his system, and I start to dry-heave, and I wrench out of the landscape, and not only have I missed the bus, but I'm so sick to my stomach I have to sit down on the filthy curb to get my gorge submerged. Jaunt into a potential employer, to see if he's trying to lowball me, and I learn he's part of a massive cover-up of industrial malfeasance that's caused hundreds of people to die when this or that cheaply-made grommet or tappet or gimbal mounting underperforms and fails.

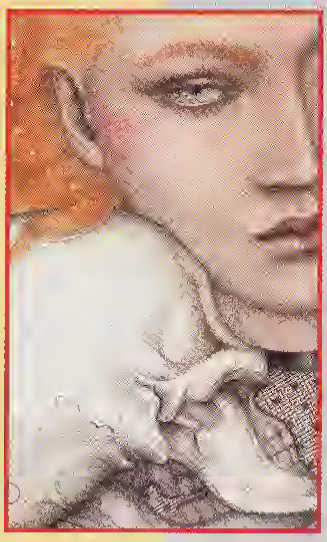
sending the poor souls falling thousands of feet to shrieking destruction. Then just *try* to accept the job, even if you haven't paid your rent in a month. No way.

Absolutely. I listen in on the landscape *only* when my feet are being fried, when the shadow stalking me turns down alley after alley tracking me relentlessly, when the drywall guy I've hired to repair the damage done by my leaky shower presents me with a dopey smile and a bill three hundred and sixty bucks higher than the estimate. Or in a moment of human weakness.

But I'm a wreck for weeks after. For weeks.

Because you can't, you simply can't, you absolutely *cannot* know what people are truly and really like till you jaunt their landscape. If Aquinas had had my ability, he'd have very quickly gone off to be a hermit, only occasionally visiting the mind of a sheep or a hedgehog. In a moment of human weakness.

That's why in my whole life—and as best I can remember back, I've been doing it since I was five or six years old, maybe even younger—there have only been eleven, maybe twelve people, of all those who know that I can "read minds," that I've permitted myself to get close to. Three of them never used it against me, or tried to exploit me, or tried to kill me when I wasn't looking. Two of those three were my mother and father, a pair of sweet old black folks who'd adopted me, a late-in-life baby, and were now dead (but probably still worried about me, even on the Other Side), and whom I missed very very much, particularly in moments like this. The other eight, nine were either so turned off by the knowledge that they made sure I never came within a mile of them—one moved to another entire country just to be on the safe side, although her thoughts were a helluva lot more boring and innocent than she thought they were—or they tried to brain me with something heavy when I was distracted—I still have a shoulder separation that kills me for two days before it rains—or they tried to use me to make a buck for them. Not having the common sense to figure it out, that if I was *capable* of using [illegible] what the hell was I living hand-to-mouth like some overaged



grad student who was afraid to desert the university and go become an adult?

Now *they* was some dumbass muthuhfugguhs.

Of the three who never used it against me, my mom and dad, the last was Allison Roche. Who sat on the stool next to me, in the middle of May, in the middle of a Wednesday afternoon, in the middle of Clanton, Alabama, squeezing ketchup onto her All-American Burger, imposing on the memory of that one damned New Year's Eve sexual interlude, with Harpo and his sibs, the two of us all alone except for the fry-cook, and she waited for my reply.

"I'd sooner have a skunk spray my pants leg," I replied.

She pulled a napkin from the chrome dispenser and swabbed up the red that had overshot the sesame-seed bun and redecorated the Formica countertop. She looked at me from under thick, lustrous eyelashes, a look of impatience and violet eyes that must have been a killer when she unbottled it at some truculent witness for the defense. Allison Roche was a Chief Deputy District Attorney in and for Jefferson County, with her office in Birmingham, Alabama. Where near we sat, in Clanton, having a secret meeting, having All-American Burgers, three years after having had quite a bit of champagne, 1930s black-and-white video rental comedy, and black-and-white sex. One extremely stupid New Year's Eve.

Friends for eleven years. And once, just once, as a prime example of what happens in a moment of human weakness. Which is not to say that it wasn't terrific, because it was, absolutely terrific, but we never did it again, and we never brought it up again after the next morning when we opened our eyes and looked at each other the way you look at an exploding can of sardines, and both of us said *Oh Jeeezus* at the same time. Never brought it up again until this memorable afternoon at the greasy spoon where I'd joined Ally, driving up from Montgomery to meet her halfway, after her peculiar telephone invitation.

Can't say the fry-cook, Mr. All-American, was particularly happy at the pigmentation arrangement at

his counter But I stayed out of his head and let him think what he wanted Times change on the outside, but the inner landscape remains polluted.

"All I'm asking you to do is go have a chat with him," she said She gave me that look I have a hard time with that look If isn't entirely honest neither is it entirely disingenuous It plays on my remembrance of that one night we spent in bed And is just *dis*honest enough to play on the part of that night we spent on the floor on the sofa on the coffee counter between the dining room and the kitchenette, in the bathtub, and about nineteen minutes crammed among her endless pairs of shoes in a walk-in clothes closet that smelled strongly of cedar and virginity She gave me that look and wasted no part of the memory

"I don't *want* to go have a chat with him Apart from he's a piece of human shit, and I have better things to do with my time than to go on down to Atmore and take a jaunt through this crazy sonofabitch's diseased mind, may I remind you that of the hundred and sixty seventy men who have died in that electric chair, including the original Yellow Mama' they scrapped in 1990, about a hundred and thirty of them were gentlemen of color, and I do not mean you to picture any color of a shade much lighter than that cuppa coffee you got sittin' by your left hand right this minute which is to say that I, being an inordinately well-educated African-American who values the full measure of living negritude in his body, am not crazy enough to want to visit a racist 'co-rectional center like Holman Prison, thank you very much"

"Are you finished?" she asked, wiping her mouth

"Yeah I'm finished Case closed Find somebody else "

She didn't like that "There *isn't* anybody else "

"There has to be Somewhere Go check the research files at Duke University Call the Fortean Society Mensa *Jeopardy* Some 900 number astrology psychic hotline Ain't there some semi-senile Senator with a full-time paid assistant who's been trying to get legislation through one of the statehouses for the last five years to fund this kind of bullshit research? What about the Russians now that the Evil Empire's fallen, you ought to be able to get some word about their success with Kirlian auras or whatever those assholes were working at Or you could—"

She screamed at the top of her lungs "*Stop it Rudy!*"

The fry cook dropped the spatula he'd been using to scrape off the grill He picked it up, looking at us, and his face (I didn't read his mind) said *If that white bitch makes one more noise I'm callin the cops*

I gave him a look he didn't want, and he went back to his chores, getting ready for the after-work crowd But the stretch of his back and angle of his head told me he wasn't going to let this pass

I leaned in toward her, got as serious as I could, and just this quietly, just this softly I said, "Ally, good pal, listen to me You've been one of the few friends I could count on, for a long time now We have history between us, and you've *never*, not once, made me feel like a freak So okay I trust you I trust you with something about me that causes immeasurable goddam pain A thing about me that could get me killed You've never betrayed me, and you've never tried to use me

> "Henry Lake Spanning was a monster, a killing machine without conscience or any resemblance to a thing we might call human."

"Till now This is the first time And you've got to admit that it's not even as rational as you maybe saying to me that you've gambled away every cent you've got and you owe the mob a million bucks and would I mind taking a trip to Vegas or Atlantic City and taking a jaunt into the minds of some high-pocket poker players so I could win you enough to keep the goons from shooting you Even *that* as creepy as it would be if you said it to me, even *that* would be easier to understand than *this*!"

She looked forlorn "There isn't anybody else, Rudy *Please*"

"What the hell is this all about? Come on tell me You're hiding something, or holding something back, or lying about—"

"*I'm not lying!*" For the second time she was suddenly, totally, extremely pissed at me Her voice spattered off the white tile walls The fry-cook spun around at the sound, took a step toward us, and I jaunted into his landscape, smoothed down the rippled Astro-Turf, drained away the storm clouds and suggested in there that he go take a cigarette break out back Fortunately there were no other patrons at the elegant All-American Burger that late in the afternoon and he went

"Calm for chrissakes down will you?" I said

She had squeezed the paper napkin into a ball

She was lying, hiding, holding something back Didn't have to be a telepath to figure *that* out I waited, looking at her with a slow, careful distrust and finally she sighed and I thought, *Here it comes*

"Are you reading my mind?" she asked

"Don't insult me We know each other too long"

She looked chagrined The violet of her eyes deepened "Sorry"

But she didn't go on I wasn't going to be outflanked I waited

After a while she said, softly, very softly, "I think I'm in love with him I *know* I believe him when he says he's innocent"

I never expected that I couldn't even reply

It was unbelievable Unfuckingbelievable She was the Chief Deputy D A who had prosecuted Henry Lake Spanning for murder Not just one murder, one random slaying a heat of the moment Saturday night killing regretted deeply on Sunday morning but punishable by electrocution in the Sovereign State of Alabama nonetheless, but a string of the vilest, most sickening serial slaughters in Alabama history, in the history of the Glorious South, in the history of the United States Maybe even in the history of the entire wretched human universe that went wading hip-deep in the wasted spilled blood of innocent men, women, and children

Henry Lake Spanning was a monster, an ambulatory disease, a killing machine without conscience or any discernible resemblance to a thing we might call decently human Henry Lake Spanning had butchered his way across a half-dozen states and they had caught up to him in Huntsville, in a garbage dumpster behind a supermarket, doing something so vile and inhuman to what was left of a sixty-five-year-old cleaning woman that not even the tabloids would get more explicit than *unspeakable*, and somehow he got away from the cops, and somehow he evaded their dragnet, and somehow he found out where the police lieutenant in charge of the manhunt lived, and somehow he slipped into that neighborhood when the lieutenant was out creating roadblocks—and he gutted the man's

wife and two kids. Also the family cat. And then he killed a couple of more times in Birmingham and Decatur, and by then had gone so completely out of his mind that they got him again, and the second time they hung onto him, and they brought him to trial. And Ally had prosecuted this bottom-feeding monstrosity.

And oh, what a circus it had been. Though he'd been *caught*, the second time, and this time for keeps, in Jefferson County, scene of three of his most sickening jobs, he'd murdered (with such a disgustingly similar m.o. that it was obvious he was the perp) in twenty-two of the sixty-seven counties, and every last one of them wanted him to stand trial in that venue. Then there were the other five states in which he had butchered, to a total body-count of fifty-six. Each of *them* wanted him extradited.

So, here's how smart and quick and smooth an attorney Ally is: she somehow managed to coze up to the Attorney General, and somehow managed to unleash those violet eyes on him, and somehow managed to get and keep his ear long enough to con him into setting a legal precedent: Attorney General of the state of Alabama allowed Allison Roche to consolidate, to secure a multiple bill of indictment that forced Spanning to stand trial on all twenty-nine Alabama murder counts at once. She meticulously documented to the state's highest courts that Henry Lake Spanning presented such a clear and present danger to society that the prosecution was willing to take a chance (big chance!) of trying in a winner-take-all consolidation of venues. Then she managed to smooth the feathers of all those other vote-hungry prosecutors in those twenty-one other counties, and she put on a case that dazzled everyone, including Spanning's defense attorney, who had screamed about the legality of the multiple bill from the moment she'd suggested it.

And she won a fast jury verdict on all twenty-nine counts. Then she got *really* fancy in the penalty phase after the jury verdict, and proved up the *other* twenty-seven murders with their flagrantly identical trademarks, from those other five states, and there was nothing left but to sentence Spanning—essentially for all fifty-six—to the replacement for the "Yellow Mama."

Even as pols and power brokers throughout the state were murmuring Ally's name for higher office, Spanning was slated to sit in that new electric chair in Holman Prison, built by the Fred A. Leuchter Associates of Boston, Massachusetts, that delivered 2,640 volts of pure sparklin' death in 1/240th of a second, six times faster than the 1/40th of a second that it takes for the brain to sense it, which is—if you ask me—much too humane an exit line, more than three times the 700 volt jolt lethal dose that destroys a brain, for a pus-bag like Henry Lake Spanning.

But if we were lucky—and the scheduled day of departure was very nearly upon us—if we were lucky, if there was a God and Justice and Natural Order and all that good stuff, then Henry Lake Spanning, this foulness, this corruption, this thing that lived only to ruin, would end up as a pile of fucking ashes somebody might use to sprinkle over a flower garden, thereby providing this ghoul with his single opportunity to be of some use to the human race.

That was the guy that my pal Allison Roche wanted me to go and "chat" with, down to Holman Prison, in Atmore, Alabama. There, sitting on Death Row, waiting to get his demented head tonsured, his pants legs slit, his tongue fried black as the inside of a sheep's belly . . . down there at Holman my pal Allison wanted me to go "chat" with one of the most awful creatures made for killing this side of a hammerhead shark, which creature had an infinitely greater measure of human decency than Henry Lake Spanning had ever demonstrated. Go chit-chat, and enter his landscape, and read his mind, Mr. Telepath, and use the marvelous mythic power of extra-sensory perception, this nifty swell ability that has made me a bum all my life, well, not *exactly* a bum. I do have a decent apartment, and I do earn a decent, if sporadic, living, and I try to follow Nelson Algren's warning never to get involved with a woman whose troubles are bigger than my own, and sometimes I even have a car of my own, even though at the moment such was not the case, the Camaro having been repo'd, and not by Harry Dean Stanton or Emilio Estevez, lemme tell you, but a bum in the sense of—how does Ally put it?—oh yeah—I don't "realize my full and forceful potential"—a bum in the sense that I can't hold a job, and I get rotten breaks, and all of this despite a Rhodes scholarly education so far above what a poor nigrah-lad such as myself could expect that even Rhodes hisownself would've been chest-out proud as hell of me. A bum, mostly, despite an *outstanding* Rhodes scholar education and a pair of kind, smart, loving parents—even for foster-parents—shit, *especially* for being foster-parents—who died knowing the certain sadness that their only child would spend his life as a wandering freak unable to make a comfortable living or consummate a normal marriage or raise children without the fear of passing on this special personal horror . . . this astonishing ability fabled in song and story that I possess . . . that no one else seems to possess, though I know there must have been others somewhere sometime, somehow! Go, Mr. Wonder of Wonders, shining black Cagliostro of the modern world, go with this super nifty swell ability that gullible idiots and flying saucer assholes have been trying to prove exists for at least fifty years, that no one has been able to isolate the way I, me, the only one has been isolated, let me tell you about *isolation*, my brothers, and here I was, here was I, Rudy Pairis . . . just a guy, making a buck every now and then with nifty swell impossible ESP, resident of thirteen states and twice that many cities so far in his mere thirty years of landscape-jaunting life, here was I, Rudy Pairis, Mr. I-Can-Read-Your-Mind, being asked to go and walk through the mind of a killer who scared half the people in the world. Being asked by the only living person probably, to whom I could not say no. And, oh, take me at my word here: I *wanted* to say no. *Was*, in fact, saying no at every breath. What's that? Will I do it? Sure, yeah, sure. I'll go on down to Holman and jaunt through this sick bastard's mind landscape. Sure I will. You got two chances: slim, and none.

> "Spanning was slated to sit in that new electric chair in Holman Prison that delivered 2,640 volts of pure sparklin' death in 1/240th of a second."

All of this was going on in the space of one greasy double cheeseburger and two cups of coffee.

The worst part of it was that Ally had somehow gotten involved with him. *Ally!* Not some bimbo bitch . . . but *Ally*. I couldn't believe it.

Not that it was unusual for women to become mixed up with guys in the joint, to fall under their "magic spell," and to start corresponding with them, visiting them, taking them candy and cigarettes, having conjugal visits, playing mule for them and smuggling in dope

where the tampon never shine, writing them letters that got steadily more exotic, steadily more intimate, steamier and increasingly dependent emotionally. It wasn't that big a deal: there exist entire psychiatric treatises on the phenomenon, right alongside the papers about women who go stud-crazy for cops. No big deal indeed: hundreds of women every year find themselves writing to these guys, visiting these guys, building dream castles with these guys, fucking these guys, pretending that even the worst of these guys, rapists and woman-beaters and child molesters, repeat pedophiles of the lowest pustule sort, and murderers and stick-up punks who crush old ladies' skulls for food stamps, and terrorists and bunco barons — that one sunny might-be, gonna-happen pink cloud day these demented creeps will emerge from behind the walls, get back in the wind, become upstanding nine-to-five Brooks Bros. Galahads. Every year hundreds of women marry these guys, finding themselves in a hot second snookered by the wily, duplicitous, motherfuckin' lying greaseball addictive behavior of guys who had spent their sporadic years, their intermittent freedom on the outside, doing *just that*: roping people in, ripping people off, bleeding people dry, conning them into being tools, taking them for their every last cent, their happy home, their sanity, their ability to trust or love ever again.

But this wasn't some poor illiterate naive woman-child. This was *Ally*. She had damned near pulled off a legal impossibility, come *that* close to Bizarro Jurisprudence by putting the Attorneys General of five other states in a maybe frame of mind where she'd have been able to consolidate a multiple bill of indictment *across state lines*! Never been done; and now, probably, never ever would be. But she could have possibly pulled off such a thing. Unless you're a stone court-bird, you can't know what a mountaintop that is!

So, now, here's Ally saying this shit to me. Ally, my best pal, stood up for me a hundred times, not some dip, but the steely-eyed Sheriff of Suicide Gulch, the over-forty past the age of innocence, no-nonsense woman who had seen it all and come away tough but not cynical, hard but not mean.

"I think I'm in love with him." She had said.

"I *know*. I believe him when he says he's innocent." She had said.

I looked at her. No time had passed. It was still the moment the universe decided to lie down and die. And I said, "So if you're certain this paragon of the virtues *isn't* responsible for fifty-six murders—that we *know* about—and who the hell knows how many more we *don't* know about, since he's apparently been at it since he was twelve years old—remember the couple of nights we sat up and you *told* me all this shit about him, and you said it with your skin crawling, *remember*?—then if you're so damned positive the guy you spent eleven weeks in court sending to the chair is innocent of butchering half the population of the planet—then why do you need me to go to Holman, drive all the way to Atmore, just to take a jaunt in this sweet peach of a guy?

"Doesn't your 'woman's intuition' tell you he's squeaky clean? Don't 'true love' walk yo' sweet young ass down the primrose path with sufficient surefootedness?"

"Don't be a smartass!" she said.

"Say again?" I replied, with disfuckingbelief.

"I said, don't be such a high-verbal goddamned smart aleck!"

Now *I* was steamed. "No. I shouldn't be a smartass. I should be your pony, your show dog, your little trick bag mind-reader freak! Take a drive over to Holman Prison, go right on into Rednecks from Hell, sit your ass down on Death Row with the rest of the niggers and have a chat with the one white boy who's been in a cell up there for the past three years or so, sit down nicely with the king of the fucking vampires, and slide inside his garbage dump of a brain—and what a joy *that's* gonna be. I can't believe you'd ask me to do this—and read whatever piece of boiled shit in there he calls a brain, and see if he's jerking you around. *That's* what I ought to do, am I correct? Instead of being a smartass. Have I got it right? Do I properly pierce your meaning, pal?"

She stood up. She didn't even say *Screw you, Parris!*

She just slapped me as hard as she could.

She hit me a good one straight across the mouth.

I felt my upper teeth bite my lower lip. I tasted the blood. My head rang like a church bell. I thought I'd fall off the goddam stool.

When I could focus, she was just standing there, looking ashamed of herself and disappointed and mad as hell and worried that she'd brained me. All of that, all at the same time. Plus she looked as if I'd broken her choo choo train.

"Okay," I said wearily, and ended the word with a sigh that reached all the

way back into my hip pocket. "Okay, calm down. I'll see him. I'll do it. Take it easy."

She didn't sit down. "Did I hurt you?"

"No, of course not," I said, unable to form the smile I was trying to put on my face. "How could you possibly hurt someone by knocking his brains into his lap?"

She stood over me as I clung precariously to the counter, turned halfway around on the stool by the blow. Stood over me, the balled-up paper napkin in her fist, a look on her face that said she was nobody's fool, that we'd known each other a long time, that she hadn't asked this kind of favor before, that if we were buddies and I loved her, that I would see she was in deep pain, that she was conflicted, that she needed to know *really* needed to know without a doubt, and in the name of God—in which she believed, though I didn't, but either way what the hell—that I do this thing for her, that I just *do it* and not give her any more crap about it.

So I shrugged, and spread my hands like a man with no place to go, and I said, "How'd you get into this?"

She told me the first fifteen minutes of her tragic, heartwarming, never-to-be-ridiculed story still standing. After fifteen minutes I said, "For chrissakes, Ally, at least *sit down*! You look like a damned fool standing there with a greasy napkin in your mitt."

A couple of teen-agers had come in. The four-star chef had finished his cigarette out back and was reassuringly in place, walking the duckboards and dishing up All-American arterial cloggage. She picked up her elegant attaché case and, without a word, with only a nod that said let's get as far from them as we can, she and I moved to a double against the window to resume our discussion of the varieties of social suicide available to an unwary and foolhardy gentleman of the colored persuasion if he allowed himself to be swayed by a cagey and cogent clever and concupiscent female of another color entirely.

See, what it is, is this.

Look at that attaché case. You want to know what kind of an Ally this Allison Roche is? Pay heed, now.

In New York, when some wannabe junior ad exec has smooched enough butt to get tossed a bone account, and he wants to walk his colors, has a need to signify, has got to demonstrate to everyone that he's got the juice, first thing he does, he hies his ass downtown to Barney's, West 17th and Seventh, buys hisself a Burberry, loops the belt casually *behind*, leaving the coat open to suh-*wing*, and he circumnavigates the office.

In Dallas, when the wife of the CEO has those six or eight upper-management husbands and wives over for an *intime*, *faux*-casual dinner, sans placecards, sans *entreé* fork, *sans ceremonie*, and we're talking the kind of woman who flies Virgin Air instead of the Concorde, she's so in charge she don't got to use the Orrefors, she can put out the Kosta Boda and say *give a fuck*.

What it is, kind of person so in charge, so easy with they own self, they don't *have* to laugh at your poor dumb struttin' Armani suit, or your bedroom done in Laura Ashley, or that you got a gig writing articles for *TV Guide*. You see what I'm sayin' here? The sort of person Ally Roche is: you take a look at that attache case, and it'll tell you everything you need to know about how strong she is, because it's an Atlas. Not a Hartmann. Understand?

> "I was facile, and a very quick study, and I had buried all the equivalents to Ally's pains and travails. I could have matched her in spades."

she could *afford* a Hartmann, that gorgeous imported Canadian belting leather, top of the line, somewhere around nine hundred and fifty bucks maybe, equivalent of Orrefors, a Burberry breast of guinea hen and Mouton Rothschild 1492 or 1066 or whatever year is the most expensive, drive a Rolls instead of a Bentley and the only difference is the grille . . . but she doesn't *need* to signify, doesn't *need* to suh-*wing*, so she gets herself this Atlas. Not some dumb chickenshit Louis Vuitton or Mark Cross all the divorcee real estate ladies carry, but an Atlas. Irish hand leather. Custom tanned cowhide. Hand tanned in Ireland by out of work IRA bombers. Very classy. Just a state understated. See that attache case? That tell you why I said I'd do it?

She picked it up from where she'd stashed it, right up against the counter wall by her feet, and we went to the double over by the window, away from the chef and the teen-agers, and she stared at me till she was sure I was in a right frame of mind, and she picked up where she'd left off.

The next twenty-three minutes by the big greasy clock on the wall she related from a sitting position. Actually a series of sitting positions. She kept shifting in her chair like someone who didn't appreciate the view of the world from that window, someone hoping for a sweeter horizon. The story started with a gang-rape at the age of thirteen, and moved right along: two broken foster-home families, a little casual fondling by surrogate poppas, intense studying for perfect school grades as a substitute for happiness, working her way through John Jay College of Law, a truncated attempt at wedded bliss in her late twenties, and the long miserable road of legal success that had brought her to Alabama. There could have been worse places.

I'd known Ally for a long time, and we'd spent totals of weeks and months in each other's company. Not to mention the New Year's Eve of the Marx Brothers. But I hadn't heard much of this. Not much at all.

Funny how that goes. Eleven years. You'd think I'd've guessed or suspected or *something*. What the hell makes us think we're friends with *anybody* when we don't know the first thing about them, not really?

What are we, walking around in a dream? That is to say, what the fuck are we *thinking*!?!

And there might never have been a reason to hear *any* of it, all this Ally that was the real Ally, but now she was asking me to go somewhere I didn't want to go, to do something that scared the shit out of me, and she wanted me to be as fully informed as possible.

It dawned on me that those same eleven years between us hadn't really given her a full, laser-clean insight into the why and wherefore of Rudy Parris either. I hated myself for it. The concealing, the holding-back, the giving up only fragments, the evil misuse of charm when honesty would have hurt. I was facile, and a very quick study, and I had buried all the equivalents to Ally's pains and travails. I could've matched her, in spades, or blacks, or just plain nigras. But I remained frightened of losing her friendship. I've never been able to believe in the myth of unqualified friendship. Too much like standing hip-high in a fast-running, freezing river. Standing on slippery stones.

Her story came forward to the point at which she had prosecuted Spanning, had amassed and winnowed and categorized the evidence so thoroughly, so deliberately, so flawlessly, had orchestrated the case so brilliantly, that the ju-

ry had come in with guilty on all twenty-nine soon—in the penalty phase—fifty-six Murder in the first Premeditated murder in the first Premeditated murder with special ugly circumstances in the first On each and every of the twenty-nine Less than an hour it took them There wasn't even time for a lunch break Fifty-one minutes it took them to come back with the verdict guilty on all charges Less than a minute per killing Ally had done that

His attorney had argued that no direct link had been established between the fifty-sixth killing (actually only his 29th in Alabama) and Henry Lake Spanning No, they had not caught him down on his knees eviscerating the shredded body of his final victim—ten-year-old Gunilla Ascher, a parochial school girl who had missed her bus and been picked up by Spanning just about a mile from her home in Decatur—no, not down on his knees with the can opener still in his sticky red hands, but the m o was the same, and he was there in Decatur, on the run from what he had done in Huntsville what they had *caught* him doing in Huntsville, in that dumpster, to that old woman So they *couldn't* place him with his smooth, slim hands inside dead Gunilla Ascher's still-steaming body So what? They could not have been surer he was the serial killer the monster, the ravaging nightmare whose methods were so vile that newspapers hadn't even *tried* to cobble up some smart-aleck name for him like The Stangler or The Backyard Butcher The jury had come back in fifty-one minutes looking sick, looking as if they'd try and try to get everything they'd seen and heard out of their minds but knew they never would, and wishing to God they could've managed to get out of their civic duty on this one

They came shuffling back in and told the numbed court hey, put this slimy excuse for a maggot in the chair and cook his ass till he's tit only to be served for breakfast on cinnamon toast This was the guy my friend Ally told me she had fallen in love with The guy she now believed to be innocent

This was seriously crazy stuff

"So how did you get er uh, how did you ?"

"How did I fall in love with him?"

"Yeah That.'

She closed her eyes for a moment, and pursed her lips as if she had lost a flock of wayward words and didn't know where to find them I'd always known she was a private person, kept the really important history to herself—hell, until now I'd never known about the rape, the ice mountain between her mother and father the specifics of the seven-month marriage—I'd known there'd been a husband briefly, but not what had happened and I'd known about the foster homes, but again not how lousy it had been for her—even so getting *this* slice of steaming craziness out of her was like using your teeth to pry the spikes out of Jesus's wrists

Finally, she said, 'I took over the case when Charlie Whilborg had his stroke "

"I remember"

"He was the best litigator in the office, and if he hadn't gone down two days before they caught ' she paused had trouble with the name, went on " before they caught Spanning in Decatur, and if Morgan County hadn't been so worried about a case this size and bound Spanning over to us in Birmingham all of it so fast nobody really had a chance to talk to him I was the first one even got *near* him, everyone was so damned scared of him of what they *thought* he was '

"Hallucinating were they?" I said being a smartass

"Shut up

"The office did most of the donkey-work after that first interview I had with him It was a big break for me in the office and I got obsessed by it So after the first interview, I never spent much actual time with Spanky never got too close to see what kind of man he *really* "

I said "Spanky? Who the hell's 'Spanky'?"

She blushed It started from the sides of her nostrils and went out both ways toward her ears then climbed to the hairline I'd seen that happen only a couple of times in eleven years, and one of those times was when she'd farted at the opera *Lucia di Lammermoor*

I said it again "Spanky? You're putting me on, right? You call him *Spanky*?' The blush deepened "Like the fat kid in *The Little Rascals* c'mon, I don't tuckin' b*elieve* this!"

She just glared at me

I felt the laughter coming

My face started twitching

She stood up again "Forget it Just forget it, okay?" She took two steps away from the table, toward the street exit I grabbed her hand and pulled her back, trying not to fall apart with laughter and I said, 'Okay okay okay I'm *sorry* I'm really and truly honest to goodness, may I be struck by a falling space lab no kidding 100% absolutely sorry but you gotta admit catching me unawares like that I

mean, come *on*. Ally *Spanky*!?! You call this guy who murdered at least fifty-six people Spanky? Why not Mickey, or Froggy or Alfalfa . . . ? I can understand not calling him Buckwheat, you can save that one for me, but *Spanky*???"

And in a moment *her* face started to twitch, and in another moment she was starting to smile, fighting it every micron of the way, and in another moment she was laughing and swatting at me with her free hand, and then she pulled her hand loose and stood there falling apart with laughter, and in about a minute she was sitting down again. She threw the balled-up napkin at me.

"It's from when he was a kid," she said. "He was a fat kid, and they made fun of him. You know the way kids are . . . they corrupted Spanning into 'Spanky' because *The Little Rascals* were on television and . . . oh shut *up*, Rudy!"

I finally quieted down, and made conciliatory gestures.

She watched me with an exasperated wariness till she was sure I wasn't going to run any more dumb gags on her, and then she resumed. "After Judge Fay sentenced him, I handled Spa . . . *Henry's* case from our office, all the way up to the appeals stage. I was the who one did the pleading against clemency when Henry's lawyers took their appeal to the Eleventh Circuit in Atlanta.

"When he was denied a stay by the appellate, three-to-nothing, I helped prepare the brief when Henry's counsel went to the Alabama Supreme Court, then when the Supreme Court refused to hear his appeal, I thought it was all over. I knew they'd run out of moves for him, except maybe the Governor, but that wasn't ever going to happen. So I thought *that's that*.

"When the Supreme Court wouldn't hear it three weeks ago, I got a letter from him. He'd been set for execution next Saturday, and I couldn't figure out why he wanted to see *me*."

I asked, "The letter . . . it got to you how?"

"One of his attorneys."

"I thought they'd given up on him."

"So did I. The evidence was so overwhelming: half a dozen counselors found ways to get themselves excused, it wasn't the kind of case that would bring any litigator good publicity. Just the number of eyewitnesses in the parking lot of that Winn-Dixie in Huntsville . . . must have been fifty of them, Rudy. And they all saw the same thing, and they all identified Henry in lineup after lineup: twenty, thirty, could have been fifty of them if we'd needed that

long a parade. And all the rest of it.

I held up a hand. *I know.* the flat hand against the air said. She had told me all of this. Every grisly detail, till I wanted to puke. It was as if I'd done it all myself, she was so vivid in her telling. Made my jaunting nausea pleasurable by comparison. Made me so sick I couldn't even think about it. Not even in a moment of human weakness.

"So the letter comes to you from the attorney."

"I think you know this lawyer. Larry Borlan. used to be with the ACLU, before that he was senior counsel for the Alabama Legislature down to Montgomery, stood up, what was it, twice, three times, before the Supreme Court? Excellent guy. And not easily fooled."

"And what's *he* think about all this?"

"He thinks Henry's absolutely innocent."

"Of all of it?"

"Of everything."

But there were fifty disinterested random eyewitnesses at one of those slaughters. Fifty, you just said it. Fifty, you could've had a parade. All of them nailed him cold, without a doubt. Same kind of kill as all the other fifty-five, including that schoolkid in Decatur when they finally got him. And Larry Borlan thinks he's not the guy, right?"

She nodded. Made one of those sort of comic pursing of the lips, shrugged and nodded. "Not the guy."

"So the killer's still out there?"

"That's what Borlan thinks."

"And what do *you* think?"

"I agree with him."

"Oh, jeezus. Ally, my aching boots and saddle! You got to be workin' some kind of off-time! The killer is still out here in the mix, but there hasn't been a killing like Spanning's for the three years that he's been in the joint. Now *what* do that say to you?"

"It says whoever the guy *is*, the one who killed all those people, he's days smarter than all the rest of us, and he set up the perfect freefloater to take the fall for him, and he's either long far gone in some other state, working his way, or he's sitting quietly right here in Alabama, waiting and watching. And smiling." Her face seemed to sag with misery. She started to tear up, and said, "In four days he can stop smiling."

Saturday night.

Okay, take it easy. Go on, tell me the rest of it. Borlan comes to you, and he begs you to read Spanning's letter, and ?"

"He didn't beg. He just gave me the letter, told me he had no idea what Henry had written, but he said he'd known me a long time, that he thought I was a decent, fair-minded person, and he'd appreciate it in the name of our friendship if I'd read it."

"So you read it."

"I read it."

"Friendship. Sounds like you an' him was *good* friends. Like maybe you and I were good friends?"

She looked at me with astonishment.

I think *I* looked at me with astonishment.

"Where the hell did *that* come from?" I said.

"Yeah, really," she said, right back at me, "where the hell *did* that come from? My ears were hot, and I almost started to say something about how if it was okay for *her* to use our Marx Brothers indiscretion for a lever, why wasn't it okay for me to get cranky about it? But I kept my mouth shut, and for once knew enough to move along. "Must've been *some* letter," I said.

There was a long moment of silence during which she weighed the degree of shit she'd put me through for my stupid remark, after all this was settled, and having struck a balance in her head, she told me about the letter.

It was perfect. It was the only sort of come-on that could lure the avenger who'd put you in the chair to pay attention. The letter had said that fifty-six was not the magic number of death. That there were many, *many* more unsolved cases in many, *many* different states: lost children, runaways, unexplained disappearances, old people, college students hitchhiking to Sarasota for Spring Break, shopkeepers who'd carried their day's take to the night deposit drawer and never gone home for dinner, hookers left in pieces in Hefty bags all over town, and death, death, death unnumbered and unnamed. Fifty-six, the letter had said, was just the start. And if she, her, no one else, Allison Roche, my pal Ally, would come on down to Holman and talk to him, Henry Lake Spanning would help her close all those open files. National rep. Avenger of the unsolved. Big time mysteries revealed. "So you read the letter and you went ?"

"Not at first. Not immediately. I was sure he was guilty, and I was pretty certain at that moment, three years and more, dealing with the case, I was pretty sure if he said he could fill in all the blank spaces that he could do it. But I just didn't like the idea. In court, I was always twitchy when I got near him at the defense table. His eyes, he never took them off me. They're blue, Rudy, did I tell you that ?"

"Maybe. I don't remember. Go on."

"Bluest blue you've ever seen, well, to tell the truth, he just plain *scared* me. I wanted to win that case

CONTINUED ON PAGE 120

Photo by DuZitter

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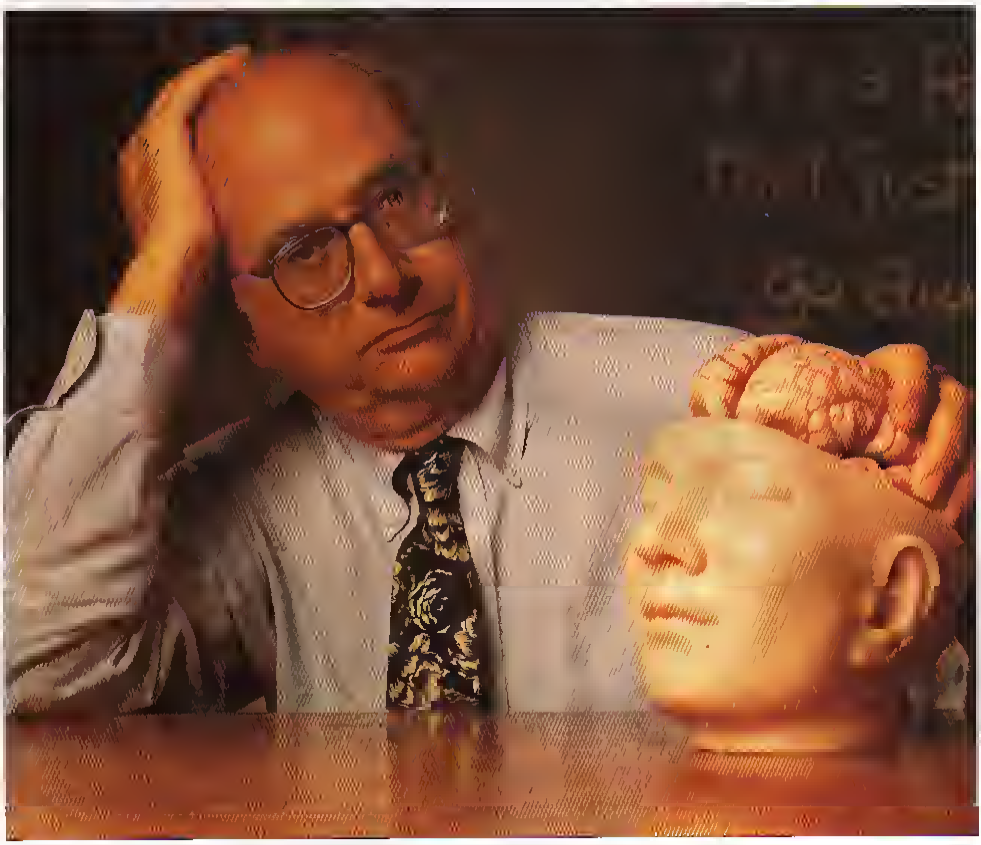

MICHAEL GAZZANIGA

"THE LEFT HEMISPHERE: DON'T LEAVE HOME WITHOUT IT." DRAWING FROM THE LEFT SIDE OF THE BRAIN, A NOTED NEUROSCIENTIST DOCUMENTS CONSCIOUSNESS IN ACTION.

PHOTOGRAPHS BY TOM ZIMBEROFF

After all anticonvulsant medication had failed, W. J., 48, elected to have surgery that severed the connections between his cerebral hemispheres in order to contain his epileptic seizures. Caltech graduate student Michael Gazzaniga, 21, armed with primitive testing equipment, was to study the postoperative W. J. The year was 1961, and the field of human split-brain research was born.

Propelled across the country by his passion for a girlfriend in the summer of 1960, within months Gazzaniga fell under the sway of revolutionary neurobiologist Roger Sperry. The future Nobel laureate was then exploring how neural networks develop and are regulated in their growth by innate programs. Sperry asked Gazzaniga to find out what happened when the corpus callosum—the massive tract of nerve fibers that is the communication

cable of the cerebral hemispheres—was surgically sectioned.

Doing neuroscience in the 1960s generally involved working with animals or grossly brain-damaged humans. But W. J. was special. Despite the seizures, his brain appeared normal, so his response to the surgery was a total surprise. Driving to W. J.'s home for weekly tests, Gazzaniga found that after W. J.'s callosal connections had been severed, the right hemisphere no longer knew of the left's workings—and vice versa. Each cortical hemisphere, it seemed, had an independent existence. "So big deal," a psychologist friend cried to Gazzaniga. "Now instead of figuring out one mind, you give me two! This is an advance?" But Gazzaniga's and Sperry's research on split-brain patients would illuminate not only the structure of the cortex, but the nature of human perception and cognition.

After 25 years of research, Gazzaniga subscribes to the mainstream view that brain architecture has evolved so that many mental systems can function simultaneously. But he alone among neuroscientists conceives of a network of brain regions within that confederacy that constitutes "the interpreter." This left-hemisphere system, he suggests, makes inferences about cause and effect and about past, present, and future; hypothesizes; forms beliefs; fantasizes—is uniquely human.

Born and raised in California, Gazzaniga balked at telling his father that he wouldn't follow him into medicine. Graduated from Dartmouth in 1961, he received his Ph.D. from Caltech in psychobiology in 1964. In 1969, he taught at New York University Graduate School, then Cornell University Medical College where he founded the Cognitive Neuroscience Institute in 1982 and wrote his first book for the nonscientist, *The Social Brain*. In 1988, returning to a professorship at Dartmouth, he founded the *Journal of Cognitive Neuroscience*.

Gazzaniga's own brain is a social one. Listening to colleagues, admiring other forms of intellectual energies, and sharing ideas (as well as restaurants) excites him. Coming from a large Italian family, he has six children of his own. *Nature's Mind* grew out of an intellectual summit meeting of ten people from different fields (including physics and immunology) at which Gazzaniga modestly says he "fetched espresso and took notes."

But back in his office, he drew together evolutionary biology, genetics, and immunology to form a new theory of the mind's inborn potential. The human brain's complex capacities for higher functions such as language, abstract reasoning, and computation derive from millions of years of evolutionary selection. What we consider learning, he writes, is the brain's picking and choosing from inherent pathways which are laid down by genetic programs. "While the environment may shape the way in which any given organism develops," he says, "it shapes it only as far as preexisting capacities in that organism allow. Thus, the environment *selects* from the built-in options; it does not modify them." Within the framework of selection theory, Gazzaniga is forging his own view of consciousness. "We are born conscious, and there's no getting rid of it." "I find it almost hilarious to look in the mirror," he says. "Looking back at me is a fifty-year-old person . . . who also feels twelve."

Diane Connors met with Gazzaniga at Dartmouth as *Nature's Mind* was being conceived and new computers in his lab were printing maps of the cerebral cortex. Gazzaniga has moved again, back to California. (Perhaps the Mississippi River is his geographic corpus callosum.) Now at the University of California at Davis, he met with *Omni* staff writer Kathleen Stein in the new building that houses his Center for Neuroscience.

—Diane Connors

Omni: What did split-brain patients tell you about how the cerebral hemi-

JOB:
Director, Center for Neuroscience, Professor of Neurology and Psychology, University of California, Davis

ON CONSCIOUSNESS:
"It's a feeling one that never seems to disappear."

ON UNCONSCIOUSNESS:
"Let's face it, ninety-nine percent of what our brain does is not available to us in terms of consciousness. Certainly the cortex is doing all kinds of out-of-consciousness computations."

ON INTELLIGENCE:
"It's a function of specialized systems that represent activity of local circuits, and most of them are in your left hemisphere, the hemisphere of choice by Mother Nature."

POPULAR BOOKS WRITTEN:
Nature's Mind (1992)
Mind Matters (1988)
The Social Brain (1985)

"PEOPLE ASK, 'WHY ARE YOU TAKING THE MYSTERIES OUT OF LIFE?' IT SEEMS TO ME ONE WANTS TO KNOW WHAT A SPECIES DOES, WHAT IT REALLY MEANS. KNOWING DOESN'T MAKE YOU ANY LESS A VICTIM OF LIFE OR ENJOYING IT."

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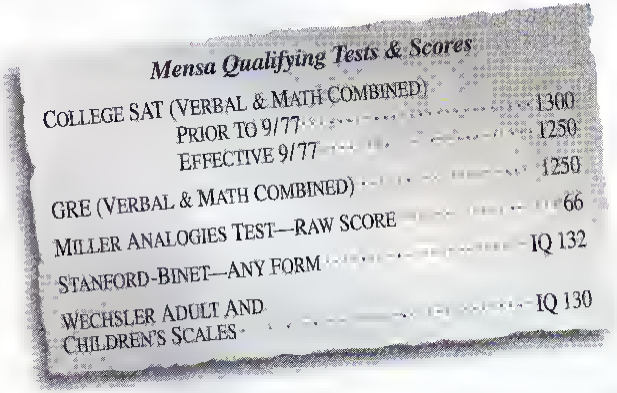

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spheres differ from each other?

Gazzaniga: My first quick take on them in 1961 was that one side of the brain did something the other side didn't know about. It was astonishing to see, this big disconnection from one side to another. Then came the second wave. Each hemisphere has specialties. Beyond a shadow of a doubt, the left, which does the heavy-duty thought—problem solving—remains the dominant language and speech center. The right specializes in some spatial recognition tasks and some "nonsense" tactile skills. But then people applied words like *gestalt, holistic,* and *artistic*. Sperry used it, so did others. And it took off. All of a sudden, dilettantes could act like neurobiologists. 'Well, the part of the brain that does this, and the part that does that . . . ' You couldn't lose with it.

Now, some *thing* in the right brain does recognize upright but not upside-down faces. An evolutionary chip in there is sort of saying, "Boy, be quick to respond to an upright face." On the other hand, the left hemisphere had a hell of a time with the task, which suggests lateralization is very old.

Most right hemispheres lack language. Nature sort of stuck language in the left brain. But when there is an accident and nature puts language in the right hemisphere, you can ask, "How does having this language structure enable the brain to go beyond what it was?" Well, the right hemisphere doesn't get a hell of a lot smarter with language. This suggests that something else in the left hemisphere is responsible for its superior cognition—is doing the heavy computing—and language just reports out those results. Look at Alzheimer's disease. A person in its early stages can read a paper and speak in coherent sentences, but ask them to solve a simple problem and there's nothing there.

Omni: Can the right hemisphere comprehend relationships?

Gazzaniga: Ask patients to figure out a causal relationship between words, they're a disaster in the right hemisphere. They not only can't talk to you, they can't think. The right hemisphere can solve simple problems through its associative networks, but it can't then use that information. It doesn't really see causal relationships. That's why we think this interpreter we've seen exclusively in the left hemisphere is part of our human automatic reflex to see relationships and therefore make interpretations about the world.

The two sides of the brain are like the smart and the dumb kid in class. The dumb kid defers to the smart kid and never learns. Disconnecting the hemispheres shows you how dumb the dumb kid is.

Omni: Is there any point to developing exercises for "strengthening" the right hemisphere? At the bookstore, I saw the umpteenth printing of *Drawing on the Right Side of the Brain*.

Gazzaniga: No! We're referring here to cognitive aspects of thinking and perception. In a normal brain, left and right are a connected system, and it's the system that's solving the problem. The techniques argued for in that book have been around in art for years. Stripped of all the little brain patter, it helps people sketch better.

Omni: What about the right hemisphere's alleged artistic abilities?

Gazzaniga: Let me put an end to this once and for all! Here's a stack of drawings by one of our split-brain patients with his right hand, left hemisphere. [He shows brightly painted, meticulously drawn ink sketches of antique cars.] He does these entirely from memory. Here's a Thunderbird, there's a Mustang—this from the hemisphere that's not supposed to be able to draw. He can't do this with his right hemisphere.

Omni: What about feelings? Do the two sides deal with distinct emotions?

Gazzaniga: No. In exploring the question, "How does the left brain deal with behavior that you can produce from the right brain?" we arrived at the idea of the left-brain interpreter. In a lab setting, you tell the right brain to go for a walk. As the split-brain patient gets up and starts walking, you say, "Hey, where are you going?" Now you're talking to the left brain, and it says, "I'm going for a soda." The left brain is looking at the fact that you're doing something and has got to come up with an explanation that makes sense. It does that routinely.

For various perturbed emotional states—whether anxiety, depression, euphoria, or panic attack—the interpreter must figure out why there's been a change in mood. Here's the model. Something gets turned on in the brain, an endogenous event, there's a felt mood; the brain constructs a theory, the theory becomes part of that person's psychology. The interpreter sits on top of all these subsystems that control real mood and behaviors. Modern therapy wants to turn that mood state around before the interpreter gets in to rethink relationships, childhood, and everything around—reinterprets the world and paints it black. So this model has enormous implications for understanding disturbed states of mind and for

treating mental disease

Omni: If the left hemisphere is damaged in a way that knocks out the interpreter, and the right is intact, what's the resulting defect?

Gazzaniga: These patients are no longer members of our species.

Omni: What is the raison d'être for the right hemisphere then? Why bother with one?

Gazzaniga: It does manage sensory motor control for the entire left half of the body. The right hemisphere also seems to specialize in bilaterally monitoring attention. I like to call it the brain's sentry. This left hemisphere is talking, "Blah, blah, blah," but, well, who's watching the store? Say you're driving on the freeway and suddenly something flashes off to the side. Something neural should be monitoring that threat while you're weaving your tail about. The right hemisphere is specialized for that. It's a big job.

We've done some studies on memory. Elizabeth Phelps, now at Yale, showed split-brain patients a story and then tested each hemisphere. If normal people are asked two hours later to recognize parts of the story, we tend to recall the parts of the plot that were there but also throw in others that weren't there but that seem plausible. Our split-brain patients show that the right hemisphere doesn't do that. It says, "Nah, those parts weren't there. That didn't happen." The right hemisphere has a sort of "veridical" memory. It doesn't embellish on life's experiences. It hands you back what you hand it.

Omni: Where in the brain does the interpreter reside?

Gazzaniga: In the left hemisphere. Beyond that, you start playing a chase game. It's location may vary from person to person. Most devastating neurological diseases where people cannot think and do problem solving come from lesions of the middle cerebral artery. So the interpreter should be somewhere in there along the distribution of the middle cerebral artery. Autistic children, who never build a theory of the mind either about themselves or you, don't make inferences, so it's been suggested that their interpreters are sick. PET studies of autistics often indicate a hypometabolism in that same region. So the notion develops that many clinical pathologies are in part diseases of the interpreter.

Omni: Is the interpreter involved in logical thought processes?

Gazzaniga: The hemisphere that doesn't have it is lousy at making inferences—real lousy. The interpretive mechanism seems to be deeply tied to the capacity to make inferences—to figure out beyond the moment what's going on and why it just occurred.

Omni: Is the interpreter the artist, looking recursively at its own fantasies, making reality out of inner visions?

Gazzaniga: Or is artistic skill coming from some other system? Does it pour out of the artist, and if you ask him after it's done, he cooks up some story about why it all occurred? Or both? An art magazine once called me about a story on de Kooning, who was suffering from Alzheimer's. His art just went to hell when he started to dement. So there's got to be a rational, cognitive component in art, because if you lose it, your art gets lost, too.

Omni: Does the interpreter function as a mythmaker about self and reality? Can we equate it with *mind* as it's known—or not known—on the street?

Gazzaniga: In finishing *Nature's Mind*, this idea just jumped out of my head. Consciousness is the feeling about specialized cognitive processes.

When talking about consciousness, do you mean the ability to state Maxwell's equations? What you mean—and philosophers have known this for years—is the feeling about a skill that accompanies doing it: seeing, hearing, running, computing Maxwell's equations. A human is a collection of these specialized capacities, these adaptations, and the associated feelings about these capacities. Consciousness is not something that pops up out of a vast computational cortex. It's the come-along feelings about all these skills and things we do all the time. People can recognize that they have a feeling—fear, happiness, and so on. That's what consciousness is: nothing more, nothing less.

The interpreter is building fancy constructs along with the emotional dynamics, so there is a constant pounding of consciousness all day. How do you feel? What is your mood? Is a mood a summing of all feelings about these specialized abilities? Maybe.

With my $600-dollar Japanese camera, I take a picture of that meadow. The camera has better vision than I do, but does it have a feeling about the aesthetics of that view? It doesn't. I have this system that does vision in my big cortex back here. We're a collection of these systems and feelings that we're moving back and forth all day, minute to minute, second to second.

Omni: What's the survival value of a system that constantly assigns feeling to experience and perception?

Gazzaniga: You could start playing the adaptation game. If you didn't have

these associated feelings, you could get very nihilistic very quickly

Omni: There are people who do find life to be emotionally flat.

Gazzaniga: Yeah, and they're the ones who shoot themselves. Everybody's worried about the mechanism of consciousness. But what's the mechanism for why we *want* to survive? Consciousness is an instinct! You don't wake up and learn it, right? It's *there*. From day one. Like survival.

Omni: What we can biologically feel obviously limits consciousness. So how much free will do we have?

Gazzaniga: That's a whole different ball game. People in brain science do not yet understand that we're not a centrally organized computer that invents our behavior. Thousands of units up there throw in their thoughts and actions every second. Do they act in a unified way? Maybe; maybe not. If not, then the free-will question becomes strained. Nonetheless, I've always thought that a person and a society work a hell of a lot better in believing there is free will. I don't want to live in a society that doesn't think it exists. Free will is a hell of a useful concept.

Omni: What about the influence of subliminal phenomena or things like learning tapes that teach you to speak Turkish while you're asleep?

Gazzaniga: That's the only way to learn it. Ha ha. Subliminal phenomena are real and can pop up and trigger behaviors which we then overinterpret. Most of the time, though, we don't. We've got a unified world out there, information comes in, we make sense of it, store it, and everything's fine. But what if suddenly there's an endogenous neurochemical problem and chemically things are not fine for four weeks in a row? You create a theory for why things aren't fine, and then you spin yourself off into a major depression. That reveals how powerful the interpreter is. But most of the time, it's just working on normal, straightforward data, comes up with normal, straightforward theories about what the world's like.

Omni: The corpus callosum is the basis of your work. Describe it.

Gazzaniga: With more than 200 million neurons, it's a huge structure allowing for communication between the hemispheres. Animal studies were the first work showing how crucial the corpus callosum might be for the human condition. We now know the human system is remarkably specific. Each part of the corpus callosum carries discrete information—we can't take any old information and push it across any old neural network. The kind of information that transfers corresponds to particular areas in the callosum. Particular areas do particular things. But there's variation, a particular area may do a different thing for Mr. Jones than for Mr. Smith. There's variation in the way individual brains are organized. But once you're looking at the brain, you can begin to understand where that brain sends that particular information.

Omni: This relates to your studies with the wink, blink, and smile.

Gazzaniga: Disconnected, the hemispheres are observed to see what each does to control facial posture. When you ask for voluntary control of facial musculature—"Please smile"—the left hemisphere produces a facial posture, and the lower half of the face responds. We found that the left hemisphere controls voluntary behavior more efficiently to the right side of the face than the right hemisphere to the left side of the face. So you get these funny, bizarre little asymmetries.

But in spontaneous, as opposed to voluntary, smiling, which uses a different neurologic delivery system, the response is completely symmetrical. People engage in conversation, and something strikes them as amusing. Their smile looks quite different than when it operates under a voluntary system. Actors know that a voluntary smile is kind of strained because the muscles respond in a different way. When they want something spontaneous, they tell themselves a joke so that their smile is fuller, has a dimension of emotionality.

Omni: Why a separate control center for these voluntary facial movements?

Gazzaniga: Basically, I don't know. But maybe you wouldn't want two controllers up there. Sometimes you want one who says, "I'd really like to look this guy in the face and frown, but politically it's disadvantageous, so I'm going to smile." But other times you want to frown and don't want systems controlling that. The realm of voluntary responses has to be evaluated by the left hemisphere, the one that does the heavy-duty thinking. So the executive system, the one that says "Go ahead and smile," is in the left hemisphere.

Omni: Does information travel across the callosum equally in both directions?

Gazzaniga: That's the standard line—"homotopic" connections. A fiber representing a part of the cortex in point A finds the same zone more or less in B, the other cortex. Then B sends a fiber back to A, giving you a symmetrical pattern. These fibers supposedly represent 80 to 90 percent of the callosum. New findings suggest that some parts of the callosum make heterotopic connec-

"Trust me, once you get used to them, you won't know you have them on."

tions. But our understanding of how that works isn't in. If you cut at X, you may stop auditory transmission; at Y, touch, and at Z, you'll definitely stop vision from transferring. As you move anteriorly, the mysteries deepen as to what's happening. One problem is the nature of the testing. If the stimulus in the experiment is tactile, auditory or visual, if the appropriate part of the callosum is connected, the information immediately becomes represented bilaterally. Any effect you might have noticed has been neutralized by the fact that both sides know what the problem is.

Yet it's remarkable how alternate pathways aren't called upon. A surgeon goes and cuts the callosum; he's cutting along, cutting along, and he gets to the back. MRI shows he may have missed something. Then we try to test what's getting across and define more precisely what is integrated in the remaining fibers. Some of our science builds on the misfakes of surgeons.

Omni: Your recent book, *Nature's Mind*, explores the issue of nature (selection) versus nurture (instruction) in learning and behavior. Why do you think learning is mainly selection?

Gazzaniga: Niels Jerne first raised this key issue in a classic paper. How much does the organism respond to a stimulus from the environment, or does the environment merely select something the organism already has? The classic demonstration of instruction supposedly came from immunology. Before Jerne, people thought that once a foreign substance called an antigen invaded the body, an antibody was formed against that particular stimulus. They assumed the antigen instructed the body how to build an antibody specific to it.

It's clear that's not how it works. You have all the antibodies you'll ever have right now. While a stimulus comes in, it *selects* the antibody with the best fit. That antibody then begins to mutate to make a better and better fit. There's no instruction, no folding of a molecule to match the structure of the challenging antigen. The big new idea was that there is, in fact, nothing new.

Then evolutionary biologists said, "Well, that's what evolution is." The example they give is of a million white moths on a white wall. Birds go by and they don't see the white moths. But some painter then paints the wall gray, and the white moths get eaten up. A year later, all the moths are gray. The simple-minded notion is that the moths learned they'd better turn gray, so they adapted and changed. That's not what happened. Most of the white moths were dead, but 10 percent of them were gray, and they were spared, and they multiplied, becoming the gray majority.

Can this same model work for the nervous system? In fact, you and I experience very little instruction in life. All we're doing when we think we're learning is sorting through the millions of circuits and patterns in the brain to find the one that best fits the challenge from the environment. It is the biology of preference. You have circuits that prefer X, Y and Z. That's what's guiding your motivational states. Things are built in; the environment triggers circuits; you respond.

The fun thing will be to see if you can pin down how selection determines what connections are necessary for the adult brain to function. Look at the visual system. The brain must remain plastic for stereoscopic vision to occur, because the wiring can't be set until the adult head size is set. At that point, millions of neurons know to do their final tuning. But how do they find each other? The brain seems to make use of itself to guide its own development. As a neural net grows and begins to process information, these activities trigger gene expression in cells supporting it. Impulses of a particular pattern affect

"This may turn out to be the most conservative court to date."

how DNA in growing neurons is expressed, which ultimately controls development. So is the brain intelligently guiding its own growth?

Omni: If neural pathways are biologically predetermined, you're suggesting a new definition of learning.

Gazzaniga: To some extent. What appears to be learned is really the ordering of preexisting strategies, knowledge systems that can be applied. How can I learn the word for *apple* if it's not actually new information to the brain? The French or Japanese learn something else for that same object in space. It may be that in speech learning, what each organism does in its local environment is order speech sounds, agreed upon sound-to-meaning associations, and very automatically without any instruction at all from the environment. All elements for learning the word *apple* were there and were reordered to fit this challenge from the environment.

You're sitting there struggling with something, going over the data, developing a conception of what it means. From the outside, it looks like you're taking instruction from the environment and then solving problems, getting answers. On the inside, however, you're constantly running through repertoires of circuits. Your circuits *see* how to deal with that data and present it, as it were, to your own consciousness. Procrastination may just be a covering strategy for the fact that the right circuits haven't been called up yet.

Omni: How can a brain that seems to have finished its evolution 40,000 years ago in caves in the wild possibly be adaptive to electronic, postnuclear, twenty-first-century reality?

Gazzaniga: Break down those so-called modern events into primitives. Eating a lousy meal at 30,000 feet isn't a hell of a lot different from eating a lousy meal in the Pleistocene. On the other hand, there are things our brains were not adapted for. I can show you certain "impossible" geometric figures, things we never see in our three-dimensional world, that your brain will not compute. Same with some nonsense words. There are many things we're just lousy at. Recognizing that you can understand the variation in competence within the species. Most mortals don't grasp vast areas of mathematics and physics. You can train yourself until you're blue in the face, and you still won't get it. And the person next to you will say, 'Oh yeah, I know exactly what that's all about.'

Omni: What new equipment are you now using?

Gazzaniga: We're big on the brain mapper. Take an MR scan and put it in the computer. Say you've got a stroke patient who shows a deficit. The goal has always been to locate the lesion that has the greatest effect on the behavior and then accurately describe it. Until recently, that description hasn't been too accurate. This new computer, mapping very specifically, targets which part of the brain is down, then pinpoints the critical tissue within that area.

After doing MRs of normals, we've begun to measure the size of cortical brain regions within each hemisphere, so we can ask questions like, "Are twin brains more alike than unrelated peoples? Are normal brains in some measure different from schizophrenics?" We've developed a new cortical tool box, as it were. Everyone wants to normalize the brain for a PET scan, CT scan, so they can make their first approximation. Yet every brain is different. You say a lesion in the right parietal section, but if you look underneath it, the crucial area may be somewhere else, and a wide variety of behaviors may be affected. You also see lesions that are causing no disruption, because that person's critical area is somewhere else.

Somebody says, "X brain area is responsible for language and speech." Wrong! I can show you another person whose X is teeny and has an asymmetry over in the occipital lobe instead. So you say, "Well, the occipital-lobe asymmetry means they have better image processing." For the next patient that area is teeny, but he's got a great image-processing capacity. It we take our data and average them, we build an idealized brain that doesn't exist. We have 13 real brains, real surface-area measurements, and they're different in everybody. They're more alike in monozygotic twins.

Omni: Where is your work going?

Gazzaniga: Well, the first answer is that that's an improper question. I've never run my lab by saying, "We've got ten years and we're going to be doing these experiments to get such and such right." We run a multidisciplinary lab, because my philosophy is there's no agreed way to crack open the mind/brain, to understand how the brain enables any kind of conscious experience. I might be examining how the brain controls attention. Meanwhile, another part of the lab is looking into amnesia. Someone else sees a disassociation in a patient that's theoretically rich and begins to spend time looking at it. No one set of tools is the exclusive way to go. If you have the organizational skills to keep a number of approaches going, then it's more fun. Besides, I like going to work every day not knowing what I'm going to do. ☒

HISTORY

CONTINUED FROM PAGE 64

ade which gave it birth, "the Sixties." From Haight-Ashbury to Cambridge, otherwise normal citizens subjected themselves to a massive, uncontrolled experiment in random dosing of LSD, psilocybin, mescaline, THC (the active ingredient in marijuana and hashish), and other hallucinogens. And in the 1980s, "designer drugs" made their debut.

After the way large segments of disaffected young Americans in the 1960s and 1970s combined their fondness for hallucinogens with political activism, America's ambivalent relationship to mind altering drugs came to a head. In the popular view, hallucinogens and psychotomimetic (literally "psychosis-imitating") drugs loosed the bonds of convention, led a whole generation to question the foundations of social reality, and threatened bedrock American values.

The fallout from this clash of views has hobbled brain-mind research that would otherwise use a most promising tool for exploring human perceptual activities. Chemicals like psilocybin, LSD, mescaline, and MDMA are now listed alongside heroin as controlled substances on the DEA's Schedule I drugs with a very high abuse potential and no accepted medical use. This continues to make research that uses the drugs on humans next to impossible, restricting it to rats and monkeys. As Alexander Shulgin says, "Rats and monkeys may very well have mystical encounters, but so far, they haven't found a way to tell us about them." ☒

CREDITS

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ANTIMATTER

UFO UPDATE:

Thanks to *glasnost*, Russia's secret UFO groups can now collaborate with colleagues in the United States

Paul Stonehill was just eight years old when he met the retired pilot who would change his life. While flying over the Russian arctic, the pilot told Stonehill he had seen a disk-shaped craft following his plane so closely that his crew opened fire. Intrigued, the youngster began a lifelong quest to learn about UFOs, especially those sighted over his homeland of Kiev.

After emigrating to the United States as a teen, Stonehill kept in touch with other Russians interested in the Soviet-banned study of UFOlogy by smuggling messages through friends. Now a 34-year-old executive and naturalized U.S. citizen, Stonehill says his networking has put him in touch with scientists, military personnel, and UFO witnesses and investigators all over the former USSR. In fact, thanks to *glasnost* and his recently established Russian UFOlogy Research Center in Tarzana, California, Stonehill now openly acts as liaison between UFOlogy contacts in Russia and the new Commonwealth of Independent States and counterparts in the United States. "I want to provide Americans with a true picture of UFOlogy in the former Soviet Union," Stonehill comments, "and I want to help my Russian colleagues discern between tabloid UFOlogy and serious research."

Toward that end, Stonehill reviews hundreds of Russian UFO cases a year, calling some 60 percent "genuine, backed by witnesses and hard facts." In fact, piecing together information from his Russian contacts, Stonehill says he's come up with evidence that UFOlogy was a focus of the former Soviet regime. For instance, when a large UFO allegedly plummeted to Earth outside the city of Omsk in the late 1980s, the military reportedly moved the wreckage to Moscow. "Soviet academics have confirmed that it was taken to five secret state research sites," Stonehill insists. "My sources say the Soviet government conducted secret research based on the technology devised from this crash." Based on research by underground Soviet UFOlogists such as Anatoly Cistratav, Stonehill now also suspects there must have been some joint U.S.-Soviet programs aimed at developing the so-called Star Wars technology.

Meanwhile, when it comes to fostering communication between Russian and American UFOlogists, Stonehill isn't alone. Former NASA experimental psychologist Richard Haines of Los Altos, California, recently founded the Joint USA-CIS (Commonwealth of Independent States) Aerial Anomaly Federation. The Federation, including more than 160 groups throughout the United States and the former Soviet Union, will sponsor yearly meetings, translate UFO documents, and encourage collaborative scientific research into UFOs. Haines is also studying the difference between alien abductions reported in the United States and the former USSR. After hypnotizing a number of Russians in their native language, Haines has concluded that the "stories are basically the same over there, except that Russians tend to describe aliens taller than those in the West."

James Oberg, an expert on the Soviet space program and pundit on the UFO scene in the former USSR, however, takes a dim view of UFOlogy as practiced in Russia and the Commonwealth of Independent States. "They're often weirder than the weirdest American group," he comments, "because they've been living in an information vacuum for so long."

Stonehill, predictably, disagrees. Russian UFOlogists need help, not criticism, he states. A case in point: Russian researchers don't even have access to equipment for analyzing a film purported to depict a UFO hovering near Odessa last year. "Russian UFOlogists need state-of-the-art research tools," Stonehill concludes. "They need more visits from their Western colleagues and fewer debunkers on their backs."—*SHERRY BAKER*

ANTIMATTER

THE S-SHAPED FUTURE

Trained as a physicist, Theodore Modis doesn't believe in consulting crystal balls. But he does think he can glimpse the future—and it's shaped like an S.

Scientists have long noted that graphs tracing how an animal species flourishes and declines in its environment are S-shaped, says Modis, a management consultant for Digital Equipment Corporation in Geneva and author of *Predictions* (Simon & Schuster). "The S-shaped curve is the mathematical solution to the law that says growth must be proportional to the space remaining for it to grow into," he explains.

By plotting this natural growth and consulting its winding pattern, Modis asserts, you can predict the number of rabbits to thrive in a yard, the economy, the spread of AIDS. You can even graph the output of a creative individual, says Modis, with a bell-shaped pattern revealing a beginning, maturity, and decline. "Mozart," shown above, "may have died at 35 because he had already exhausted his potential."

After studying comparable S-shaped curves created by past disease outbreaks, Modis predicts AIDS will follow the same pattern and decline before an effective treatment is found. "Society feels the threat of a disease and fights back," Modis says. "The disease begins phasing out, and when you get above the halfway point on the S-curve, a drug or vaccine is developed."

The S-shaped curve is applicable to so many subjects because there's an unexplained equilibrium behind life, Modis contends—a "cosmic heartbeat" that brings change about every fifty-six years."—Sherry Baker

TROUBLE IN TAOS

To some, it's a low, rumbling noise like a truck or a train engine. To others, it's a continuous hum that usually occurs at night. But whatever it is, this low noise at the very threshold of human audibility is driving scores of New Mexicans batty.

Dona Banas, a lifelong Albuquerque resident, first heard the hum in October 1989. "At first it gave me headaches and kept me awake," she says. "There hasn't been a night that I haven't heard it since it first began."

According to Albuquerque Water Department electronics technician James Garner, "I've heard the hum everywhere from San Diego to Arizona to northern New Mexico." In 1989 and 1990, Garner used ultrasensitive vibration detectors to prove that Water Department equipment wasn't causing the sound. Garner then used the same equipment to conduct sophisticated tests of his own. His conclusion: The noise is caused by seismic slips, or small earth movements, along fault lines.

The trouble with that theory, says Joe Mullins, chairman of the University of New Mexico's Department of Mechanical Engineering, is that "people are hearing the sound in Fort Worth, Texas, an area that's near neither the mountains nor seismic activity." Still, Mullins isn't ready to rule out anything—not quite yet.

To investigate further, Mullins now heads up a Federal Task Force comprised of scientists from the University of New Mexico, the United States Air Force, and Sandia and Los Alamos national laboratories. "We assembled a large group of highly sensitive seismic, electromagnetic, and acoustical instruments," says Mullins, "including some from Sandia and Los Alamos developed for

nuclear-verification work, to measure the sound. We're in the midst of analyzing our findings now. We're also bringing in University of New Mexico physicians to investigate why some people hear the sound and others just don't. At the very least," he continues, "we hope to show that this is a real phenomenon."

According to Mullins, studies of a similar phenomenon conducted in the early 1970s in Great Britain attributed the British hum, in part, to an accumulation of industrial noise coming from the surrounding environment. "If we find that's the case here," he says, "then the sound is just going to get worse."

Luckily, some people have already learned to cope with the noise. "I used to play nature tapes to block out the hum," says Banas. "Now I'm just used to it."—Anita Baskin

THE CONTINUOUS HUM, AT THE THRESHOLD OF HUMAN AUDIBILITY, IS DRIVING SCORES OF NEW MEXICANS ABSOLUTELY BATTY.

FROZEN-BODY BAN

It's a common fantasy: You're frozen after death in hopes of reanimation—and perhaps rejuvenation—later on. But if the government of British Columbia has its way, citizens of that Canadian province may never realize this dream.

"We haven't prohibited cryonics research," explains Paul Snickars, Registrar of Cemeteries and Funeral Services for British Columbia. "But we've prohibited British Columbians from *selling* any arrangement for the storage of human remains based on cryonics. Cryonics is unproven. We've heard of people paying up to five thousand dollars for cryonics services with no hope of realizing anything on that investment."

But Ben Best, newsletter editor for the Ontario-based Cryonics Society of Canada, says the government rules are vague. "There are no cryonics facilities in Canada," he says, "so our local funeral directors and medical personnel must cooperate with cryonics organizations in the United States." This poses a particular problem in British Columbia, where legal constraints on such cooperation are ill-defined. Adds Best, who has himself arranged to be frozen at death, "It's easy to predict future technologies. But they can never be proven for sure."

The solution? One small change in the language of the law, Best asserts, would help his compatriots in British Columbia pursue their dreams. "The law says someone can't sell cryonics procedures with the expectation of reanimation," he explains. "The Cryonics Society would like the law changed to read that one can't sell cryonics procedures with the *guarantee* of reanimation. In fact, cryonics contracts already state that the technology is unproven. I think people should decide for themselves whether or not they want to take the risk."—Anita Baskin

NOTES

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what I mean even as I write out what I think I mean—'meaning' is like a yellow flashing light. Blinking on and off it is present and then it is absent. The Native American chants, 'There are only perspectives, there is no reality beyond our interpretations.'

Focus 15: 'The world of time and space is a projection,' Monroe says. We are going to enter, he tells us, "no time." Enter "no time" and the past becomes the experiential moment, while the future unfolds and becomes present reality. Monroe guides us as we enter an alternate universe. On the edge of time and space, the child I once was appears as if he had just stepped out of a faded black-and-white Brownie photograph and takes my left hand. Out of an unknown time, an image rends a veil, taps his silver-tipped ebony cane, and walks toward me. "Who are you?" I ask. He introduces himself as "dead man with cane." "Are you what I will become after I'm dead?" I ask. He takes my right hand, and the three of us sit down and talk to each other. Actually, "dead man" does the talking. The boy and I are silent. He talks about continuums, completions, and wrap-ups. When I do pose questions to each of them, the questions dissolve in the act of asking. They are irrelevant.

Journal entry: *The old man with the cool cane seemed as real as the boy I once was. Though distinct and separate and with what seems like independent wills, the three of us are the same person. Or we represent the same person. The old man tells me he's come from the future where a Spanish hacienda, walls draped with El Grecos, Wyeths, and Cimabues, has already been constructed. He's come, he says, to banish misfortune. And I am grateful. In fact, it seems as if I'd just stumbled upon the meaning of the word "gratitude"—and discovered a thing in the act of identifying with it. But I'm troubled. I'm not sure how much weight to give the imaginary realm. I feel like I'm making everything up—the old man is just a product of my imagination. Am I going to spend the week shadowboxing with my own psychic material? Maybe. What if, after my experience at Monroe, I've only discovered the imaginative side—a rich, complex and visual "knowing"? Immersed this week in an imaginary "unreal world," I look at the "real world" and feel detached. I wonder if either world is really "real." Breakfast talk: ESP, clairvoyance, channeling. I get the shivers.*

Focus 21 is the equivalent of deep delta sleep, but you're fully awake and conscious. According to Monroe, Focus 21 is the bridge between physical and nonphysical reality. I climb up through the levels—Focus 10, 12, 15—and step onto the bridge. I "look out" and "see" a vast, immense Otherness. And then I'm riding the dolphin over the curvature of the earth, and together we shoot past Mars, Jupiter, Saturn, and out, beyond Pluto.

My body literally began to convulse—joints pulsating, muscles in spasm—as if I were being administered electric-shock therapy. One surge of energy after another moved through me. I heard voices, saw lights and colors, shapes and forms. In 21, we threw questions into blank spaces and listened for a response. Who am I? Where and who was I before I entered this physical body? What is my purpose for this existence in physical matter? What action can I now take to best serve this purpose? What is the content of the most important message that I can receive and understand at this point in *my* existence? The 'answers' were audible but enigmatic. Who was speaking? How do I interpret the answers? I don't know. Later, I picked up a paper written by F. Holmes Atwater, director of the Brain Lab: "Brain waves are more than just indicators of discrete states of consciousness. They represent the electrochemical environment through which perceived reality is manifest."

Perceived reality. For a week we knocked on doors, our own doors of perception, our belief systems—what we say is real or possible, what we dismiss as ridiculous, impossible. Some of us traveled out of our bodies on tours of the known universe—the coveted OOB. I didn't. Others encountered "entities" out there, beyond the known. I may have. Many of us engaged in heroic battles with our left brains. I did. Most of us opened worn steamer trunks and rummaged about in old memories. And each time I opened the trunk, I was rewarded. In the darkness of the monk's cell, I asked questions which I have continued to ask, questions which I seem to need to ask. What are world outlooks—whether religious, ethical, or political, and how do they function for us? Are they allusions to reality that *must* be interpreted to discover the reality behind the allusions? Do we create allusions to reality because we must tell ourselves stories to make sense of our lives—in order to get out of bed every morning? Bleak, very bleak view. Whatever the answer, the making of world

"There's another panel of wetlands experts here to see you, Mr. Vice President."

views may be eternal. From the Babylonian and Greek epics to the biomedical and cyberfantasies of today, we have created and recreated narratives, ideologies, and world views.

"When you start on your journey to Ithaca," the Alexandrian poet Cavafy wrote, "then pray that the road is long, full of adventure, full of knowledge." Ithaca: legendary island home of the wanderer Odysseus and, for me, mythical end-place where I will shed my physical body. Many of us will reach the isle when we are old, some of us will cast anchor sooner than we had anticipated, most of us rarely stop and ponder what's on the other side, beyond the gateway to Ithaca—unless we're obligated by variables or glitches the unexpected. "Always keep Ithaca fixed in your mind," Cavafy wrote. "To arrive there is your ultimate goal. And if you find her poor, Ithaca has not defrauded you. With the great wisdom you have gained with so much experience you must surely have understood by then what Ithacas mean." I am trying to understand what Ithacas mean. Not because it's a neat idea, a philosophical curiosity, but because I must. I am trying, as I recall my experiences, to gather up whatever bits and pieces of wisdom I have gained along the way. I want to say, I have not been defrauded, nor have I defrauded myself.

During the months following my experience at Monroe, I have pictured myself sailing into the port called Ithaca and, for the first time, the hold my fears have had, have loosened—if even just a bit. And I've mulled the dolphin's message ("The wind, Nicodemus, the wind") from the gospel of John, chapter 3: "That which is born of the flesh is flesh, and that which is born of the Spirit is spirit. The wind blows where it wishes, and you hear the sound of it but do not know where it comes from and where it is going, so is everyone who is born of the Spirit." The dolphin gave me a gift: Born of flesh, I have locked myself in flesh, suspicious of things I cannot "see." After my brief sojourn at the Institute, however, I know I have the capacity to "see" beyond flesh or physical reality—a simple barber's basin—into the wishes and whims of the wind as it blows. I can "see" the Shield of Mambrino. Paradoxically, I laugh as I say with Nicodemus, "How can these things be?"

The Institute's programs include Gateway Voyage Guidelines, Lifeline, and Hemi-Sync 2000. For further information, write to Helen Warring, The Monroe Institute, Route 1, Box 175, Faber, Virginia 22938, (804) 361-1252.

MEFISTO IN ONYX

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so badly, Rudy, you can never know . . . not just for me or the career or for the idea of justice or to avenge all those people he'd killed, but just the thought of him out there on the street with those blue eyes, so blue, never stopped looking at me from the moment the trial began . . . the *thought* of him on the loose drove me to whip that case like a howling dog. I *had* to put him away!"

"But you overcame your fear."

She didn't like the edge of ridicule on the blade of that remark. "That's right. I finally 'overcame my fear' and I agreed to go see him."

"And you saw him."

"Yes."

"And he didn't know shit about no other killings, right?"

"Yes."

"But he talked a good talk. And his eyes was blue, so blue."

"Yes, you asshole."

I chuckled. Everybody is somebody's fool.

"Now let me ask you this—very carefully—so you don't hit me again: the moment you discovered he'd been shuckin' you, lyin', that he *didn't* have this long, unsolved crime roster to tick off, why didn't you get up, load your attaché case, and hit the bricks?"

Her answer was simple. He begged me to stay a while.

"That's it? He *begged* you?"

"Rudy, he has no one. He's *never* had anyone." She looked at me as if I were made of stone, some basalt thing, an onyx statue, a figure carved out of melanite, soot and ashes fused into a monolith. She feared she could not, in no way, no matter how piteously or bravely she phrased it, penetrate my rocky surface.

Then she said a thing that I never wanted to hear.

"Rudy . . ."

Then she said a thing I could never have imagined she'd say. Never in a million years.

"Rudy . . ."

Then she said the most awful thing she could say to me, even more awful than that she was in love with a serial killer.

"Rudy . . . go inside . . . read my mind . . . I need you to know, I need you to understand . . . Rudy . . ."

The look on her face killed my heart.

I tried to say no, oh god no, not that, please no, not that. Don't ask me to do that, please *please*. I don't want to go inside, we mean so much to each other, I don't *want* to know your landscape. Don't make me feel filthy, I'm no peeping-tom. I've *never* spied on you, never stolen a look when you were coming out of the shower, or undressing, or when you were being sexy . . . I never invaded your privacy. I wouldn't *do* a thing like that . . . we're friends. I don't need to know it all. I don't *want* to go in there. I can go inside anyone, and it's always awful . . . please don't make me see things in there I might not like, you're my friend, please don't steal that from me . . ."

"Rudy, *please*. Do it."

Oh jeezusjeezusjeezus, again, she said it again!

We sat there. And we sat there. And we sat there longer. I said, hoarsely in fear, "Can't you just . . . just *tell* me?"

Her eyes looked at stone. A man of stone. And she tempted me to do what I could do casually, tempted me the way Faust was tempted by Mefisto, Mephistopheles, Mefistofele, Mephostopilis. Black rock Dr. Faustus, possessor of magical mind-reading powers, tempted by thick, lustrous eyelashes and violet eyes and a break in the voice and an imploring movement of hand to face and a tilt of the head that was pitiable and the begging word *please* and all the guilt that lay between us that was mine alone. The seven chief demons. Of whom Mefisto was the one "not loving the light."

I knew it was the end of our friendship. But she left me nowhere to run. Mefisto in onyx.

So I jaunted into her landscape.

I stayed in there less than ten seconds. I didn't want to know everything I could know, and I definitely wanted to know *nothing* about how she really thought of me. I couldn't have borne seeing a caricature of a bug-eyed, shuffling, thick-lipped darkie in there. Mandingo man. Steppin' Porchmonkey Rudy Pair.

Oh god, what was I thinking!

Nothing in there like that. Nothing! Ally wouldn't *have* anything like that in there. I was going nuts, going absolutely fucking crazy, in there, back out in less than ten seconds. I want to block it, kill it, void it, waste it, empty it, reject it, squeeze it, darken it, obscure it, wipe it, do away with it like if never happened. Like the moment you walk in on your momma and poppa and catch them fucking, and you want never to have known that.

But at least I understood.

In there, in Allison Roche's landscape, I saw how her heart had responded to this man she called Spanky, not Henry Lake Spanning. She did not call

him in there, by the name of a monster, she called him a honey's name. I didn't know if he was innocent or not, but *she* knew he was innocent. At first she had responded to just talking with him about being brought up in an orphanage and she was able to relate to his stories of being used and treated like chattel, and how they had stripped him of his dignity, and made him afraid all the time. She knew what that was like. And how he'd always been on his own. The running away. The being captured like a wild thing, and put in this home or that lockup or the orphanage "for his own good." Washing stone steps with a tin bucket full of gray water, with a horsehair brush and a bar of lye soap, till the tender folds of skin between the fingers were furiously red and hurt so much you couldn't make a fist.

She tried to tell me how her heart had responded, with a language that has never been invented to do the job. I saw as much as I needed, there in that secret landscape, to know that Spanning had led a miserable life, but that somehow he'd managed to become a decent human being. And it showed through enough when she was face to face with him, talking to him without the witness box between them, without the adversarial thing, without the tension of the courtroom and the gallery and those parasite creeps from the tabloids sneaking around taking pictures of him, that she identified with his pain. Hers had been not the same, but similar of a kind, if not of identical intensity.

She came to know him a little.

And came back to see him again. Human compassion. In a moment of human weakness.

Until, finally, she began examining everything she had worked up as evidence, trying to see it from *his* point of view using *his* explanations of circumstantiality. And there were inconsistencies. Now she saw them. Now she did not turn her prosecuting attorney's mind from them, recasting them in a way that would railroad Spanning, now she gave him just the barest possibility of truth. And the case did not seem as incontestable.

By that time, she had to admit to herself, she had fallen in love with him. The gentle quality could not be faked. she'd known fraudulent kindness in her time.

I left her mind gratefully. But at least I understood.

"Now?" she asked.

Yes, now. Now I understood. And the fractured glass in her voice told me. Her face told me. The way she parted her lips in expectation, waiting for me to reveal what my magic journey had conveyed by way of truth. Her palm against her cheek. All that told me. And I said, "Yes."

Then, silence, between us.

After a while she said, "I didn't feel anything."

I shrugged. "Nothing to feel. I was in for a few seconds, that's all."

"You didn't see everything?"

"No."

"Because you didn't want to?"

"Because . . ."

She smiled. "I understand, Rudy."

Oh, do you? Do you really? That's just fine. And I heard me say, "You made it with him yet?

I could have torn off her arm; it would've hurt less.

"That's the second time today you've asked me that kind of question. I didn't like it much the first time, and I like it less *this* time."

"You're the one wanted me to go into your head. I didn't buy no ticket for the trip."

"Well, you were in there. Didn't you look around enough to find out?"

"I didn't look for that."

"What a chickenshit, wheedling, lousy and *cowardly*—"

"I haven't heard an answer, Counselor. Kindly restrict your answers to a simple yes or no."

"Don't be ridiculous! He's on Death Row!"

"There are ways."

"How would *you* know?"

"I had a friend. Up at Pelican Bay, north of San Francisco."

"That's San Quentin."

"That's what it is, all right."

"You never mentioned 'a friend' at San Quentin."

"I never mentioned a lotta shit. That don't mean I don't know it."

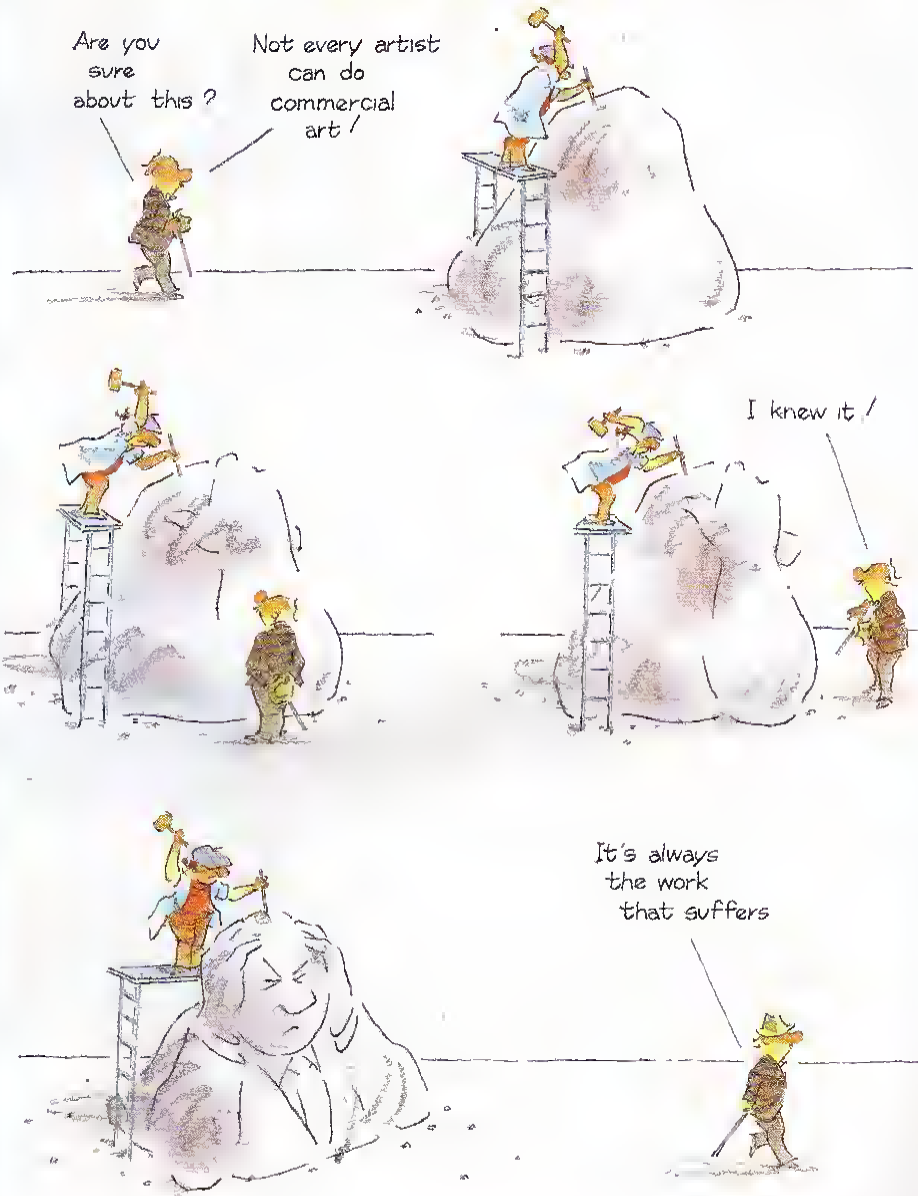
We sat silently. We're fighting, I thought. Not make-believe dissin' some movie we'd seen and disagreed about, this was nasty. Bone nasty and memorable. No one ever forgets this kind of fight. I waited. She didn't say anything more, and I got no straight answer, but I was pretty sure Henry Lake Spanning had gone all the way with her. I felt a twinge of emotion I didn't even want to look at, much less analyze, dissect, and name. *Let it be*, I thought. Eleven years. Once, just once. *Let it just lie there and get old and withered and die a proper death like all ugly thoughts.*

"Okay. So I go on down to Atmore," I said. "I suppose you mean in the very near future, since he's supposed to bake in four days. Sometime very soon, like today."

She nodded.

I said, "And how do I get in? Law student? Reporter? Tag along as Larry

The Artist


Are you sure about this ?
Not every artist can do commercial art /
I knew it /
It's always the work that suffers

Borlan's new law clerk? Or do I go in with you? What am I, friend of the family, representative of the Alabama State Department of Corrections, maybe you could set me up as an inmate's rep from 'Project Hope'"

"I can do better than that," she said. The smile. "Much."

"Yeah. I'll just bet you can. Why does that worry me?"

Still with the smile, she hoisted the Atlas onto her lap. She unlocked it, took out a small manila envelope, unsealed but clasped, and slid it across the table to me. I pried open the clasp and shook out the contents.

Clever. Very clever. And already made up, with my photo where necessary, admission dates stamped for tomorrow morning, Thursday, absolutely authentic and foolproof.

"Let me guess," I said, "Thursday mornings, the inmates of Death Row have access to their attorneys?"

"On Death Row, family visitation Monday and Friday. Henry has no family. Attorney visitations Wednesdays and Thursdays, but I couldn't count on today. It took me a couple of days to get through to you."

"I've been busy."

"... but inmates consult with their counsel on Wednesday and Thursday mornings."

I tapped the papers and plastic cards. "This is very sharp. I notice my name and my handsome visage already here, already sealed in plastic. How long have you had these ready?"

"Couple of days."

"What if I'd continued to say no?"

She didn't answer. She just got that look again.

"One last thing," I said. And I leaned in very close, so she would make no mistake that I was dead serious. "Time grows short. Today's Wednesday. Tomorrow's Thursday. They throw those computer-controlled twin switches Saturday night, midnight. What if I jaunt into him and find out you're right, that he's absolutely innocent? What then? They going to listen to me? Fiercely high-verbal black boy with the magic mind-read power?"

"I don't think so. Then what happens, Ally?"

"Leave that to me." Her face was hard. "As you said, there are ways. There are roads and routes and even lightning bolts, if you know where to shop. The power of the judiciary. An election year coming up. Favors to be called in."

I said, "And secrets to be wafted under sensitive noses?"

"You just come back and tell me Spanky's telling the truth," and she

smiled as I started to laugh, "and I'll worry about the world one minute after midnight Sunday morning."

I got up and slid the papers back into the envelope, and put the envelope under my arm. I looked down at her and I smiled as gently as I could, and I said, "Assure me that you haven't stacked the deck by telling Spanning I can read minds."

"I wouldn't do that."

"Tell me."

"I haven't told him you can read minds."

"You're lying."

"Did you ?"

"Didn't have to. I can see it in your face, Ally."

"Would it matter if he knew?"

"Not a bit. I can read the sonofabitch cold or hot, with or without. Three seconds inside and I'll know if he did it all, if he did part of it, if he did none of it."

"I think I love him, Rudy."

"You told me that."

"But I wouldn't set you up. I need to know . . . that's why I'm asking you to do it."

I didn't answer. I just smiled at her. She'd told him. He'd know I was coming. But that was terrific. If she hadn't alerted him, I'd have asked her to call and let him know. The more aware he'd be, the easier to scorch his landscape.

I'm a fast study, king of the quick learners: vulgate Latin in a week, standard apothecary's pharmacopoeia in three days, Fender bass on a weekend, Atlanta Falcons' play book in an hour, and, in a moment of human weakness, what it feels like to have a very crampy, heavy-flow menstrual period, two minutes flat.

So fast, in fact, that the more somebody tries to hide the boiling pits of guilt and the crucified bodies of shame, the faster I adapt to their landscape. Like a man taking a polygraph test gets nervous, starts to sweat, ups the galvanic skin response, tries to duck and dodge, gets himself hinky and more hinky and hinkyer till his upper lip could water a truck garden, the more he tries to hide from me . . . the more he reveals . . . the deeper inside I can go.

There is an African saying. *Death comes without the thumping of drums.*

I have no idea why that one came back to me just then.

Last thing you expect from a prison administration is a fine sense of humor. But they got one at the Holman facility.

They had the bloody monster dressed like a virgin.

White duck pants, white short sleeve shirt buttoned up to the neck, white socks. Pair of brown ankle-high brogans with crepe soles, probably neoprene, but they didn't clash with the pale, virginal apparition that came through the security door with a large, black brother in Alabama Prison Authority uniform holding onto his right elbow.

Didn't clash, those work shoes, and didn't make much of a tap on the white tile floor. It was as if he floated. Oh yes, I said to myself, oh yes indeed. I could see how this messianic figure could wow even as tough a cookie as Ally. *Oh my, yes.*

Fortunately, it was raining outside.

Otherwise, sunlight streaming through the glass, he'd no doubt have a halo. I'd have lost it. Right there, a laughing jag would *not* have ceased. Fortunately, it was raining like a sonofabitch.

Which hadn't made the drive down from Clanton a possible entry on any deathbed list of Greatest Terrific Moments in My Life. Sheets of aluminum water, thick as misery, like a neverending shower curtain that I could drive through for an eternity and never really penetrate. I went into the ditch off the I-65 half a dozen times. Why I never plowed down and buried myself up to the axles in the sucking goo running those furrows, never be something I'll understand.

> "Last thing you expect from a prison administration is a fine sense of humor. But they got one at the Holman facility."

But each time I skidded off the Interstate, even the twice I did a complete three-sixty and nearly rolled the old Fairlane I'd borrowed from John the C. Hepworth, even then I just kept digging, slewed like an epileptic seizure, went sideways and climbed right up the slippery grass and weeds and running, sucking red Alabama goo, right back onto that long black anvil pounded by rain as hard as roofing nails. I took it then, as I take it now, to be a sign that Destiny was determined the mere heavens and earth would not be permitted to fuck me around. I had a date to keep, and Destiny was on top of things.

Even so, even living charmed, which was clear to me even so, when I got about five miles north of Atmore, I took the 57 exit off the I-65 and a left onto 21, and pulled in at the Best Western. It wasn't my intention to stay overnight that far south—though I knew a young woman with excellent teeth down in Mobile—but the rain was just hammering and all I wanted was to get this thing done and go fall asleep. A drive that long, humping something as lame as that Fairlane, hunched forward to scope the rain . . . with Spanning in front of me . . . all I desired was surcease. A touch of the old oblivion.

I checked in, stood under the shower for half an hour, changed into the three-piece suit I'd brought along, and phoned the front desk for directions to the Holman facility.

Driving there, a sweet moment happened for me. It was the last sweet moment for a long time thereafter, and I remember it now as if it were still happening. I cling to it.

In May, and on into early June, the Yellow Lady's Slipper blossoms. In the forests and the woodland bogs, and often on some otherwise undistinguished slope or hillside, the yellow and purple orchids suddenly appear.

I was driving. There was a brief stop in the rain. Like the eye of a hurricane. One moment sheets of water, and the next, absolute silence before the crickets and frogs and birds started complaining, and darkness on all sides, just the idiot staring beams of my headlights poking into nothingness, and cool as a well between the drops of rain, and I was driving. And suddenly, the window rolled down so I wouldn't fall asleep, so I could stick my head out when my eyes started to close, suddenly I smelled the delicate perfume of the sweet May-blossoming Lady's Slipper. Off to my left, off in the dark somewhere on a patch of hilly ground, or deep in a stand of invisible trees. *Cypripedium calceolus* was making the night world beautiful with its fragrance.

I neither slowed, nor tried to hold back the tears.

I just drove, feeling sorry for myself, for no good reason I could name.

Way, way down—almost to the corner of the Florida panhandle, about three hours south of the last truly imperial barbecue in that part of the world, in Birmingham—I made my way to Holman. If you've never been inside the joint, what I'm about to say will resonate about as clearly as Chaucer to one of the gentle Tasaday.

The stones call out.

That institution for the betterment of the human race, the Organized Church, has a name for it. From the fine folks at Catholicism, Lutheranism, Baptism, Judaism, Islamism, Druidism . . . Ismism . . . the ones who brought you Torquemada, several spicy varieties of Inquisition, original sin, holy war, sectarian violence, and something called "pro-lifers" who bomb and maim and kill . . . comes the catchy phrase Damned Places.

Rolls off the tongue like *God's On Our Side*, don't it?

Damned Places.

As we say in Latin, the *situs* of malevolent shit. The *venue* of evil happenings. Locations forever existing under a black cloud, like residing in a rooming house run by Jesse Helms or Strom Thurmond. The big slams are like that. Joliet. Dannemora, Attica, Rahway State in Jersey, that hellhole down in Louisiana called Angola, old Folsom—not the new one, the old Folsom—Q and Ossining. Only people who read about it call it 'Sing Sing.' Inside, the cons call it Ossining. The Ohio State pen in Columbus. Leavenworth, Kansas. The ones they talk about among themselves when they talk about doing hard time. In there, in those ancient structures mortared with guilt and depravity and no respect for human life and just plain meanness on both sides, cons and screws, in there where the walls and floors have absorbed all the pain and loneliness of a million men and women for decades . . . in there, the stones call out.

Damned places. You can feel it when you walk through the gates and go through the metal detectors and empty your pockets on counters and open your briefcase so that thick fingers can rumple the papers. You feel it. The moaning and thrashing, and men biting holes in their own wrists so they'll bleed to death.

And I felt it worse than anyone else.

I blocked out as much as I could. I tried to hold on to the memory of the scent of orchids in the night. The last thing I wanted was to jaunt into somebody's landscape at random. Go inside and find out what he had done, what had *really* put him here, not just what they'd got him for. And I'm not talking about Spanning. I'm talking about every one of them. Every guy who had kicked to death his girl friend because she brought him Bratwurst instead of spicy Cajun sausage. Every pale, wormy Bible-reciting psycho who had stolen, buttfucked, and sliced up an altar boy in the name of secret voices that told him to g'wan *do* it! Every amoral druggie who'd shot a pensioner for her food stamps. If I let down for a second, if I didn't keep that shield up, I'd be tempted to send out a scintilla and touch one of them. In a moment of human weakness.

So I followed the trusty to the Warden's office, where his secretary checked my papers, and the little plastic cards with my face encased in them, and she kept looking down at the face, and up at my face, and down at my face, and up at the face in front of her, and when she couldn't restrain herself a second longer she said, "We've been expecting you, Mr Pairis. Uh. Do you *really* work for the President of the United States?'

I smiled at her. "We go bowling together."

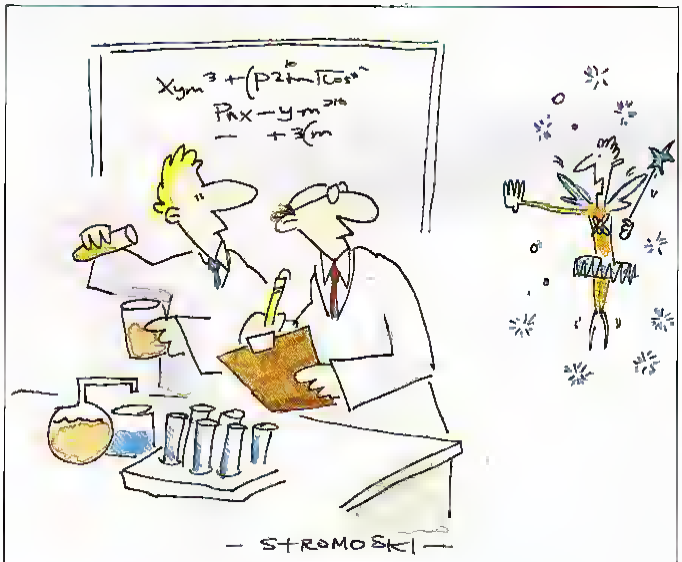
She took that highly, and offered to walk me to the conference room where I'd meet Henry Lake Spanning. I thanked her the way a well-mannered gentleman of color thanks a Civil Servant who can make life easier or more difficult, and I followed her along corridors and in and out of guarded steel-riveted doorways, through Administration and the segregation room and the main hall to the brown-paneled, stained walnut, white tile over cement floored, roll-out security windowed, white draperied, drop ceiling with 2' acoustical Celotex squared conference room, where a Security Officer met us. She bid me fond adieu, not yet fully satisfied that such a one as I had come, that morning, on Air Force One, straight from a 7-10 split with the President of the United States.

It was a big room.

I sat down at the conference table, about twelve feet long and four feet wide, highly polished walnut, maybe oak. Straight back chairs, metal tubing with a light yellow upholstered cushion. Everything quiet, except for the sound of matrimonial rice being dumped on a connubial tin roof. The rain had not slacked off. Out there on the I-65 some luck-lost bastard was being sucked down into red death.

"He'll be here," the Security Officer said.

"That's good," I replied. I had no idea why he'd tell me that, seeing as how it was the reason I was there in the first place. I imagined him to be the kind of guy you dread sitting in front of, at the movies, because he always explains everything to his date. Like a *bracero* laborer with a valid green card interpreting a Woody Allen movie line-by-line to his illegal-alien cousin Humberto, three weeks under the wire from Matamoros. Like one of a pair of Beltone-



"Do not be afraid . . . I am the cold fusion fairy."

wearing octogenarians on the loose from a rest home for a wild Saturday afternoon at the mall, plonked down in the third level multiplex one of them describing whose ass Clint Eastwood is about to kick, and why. All at the top of her voice.

'Seen any good movies lately?" I asked him.

He didn't get a chance to answer, and I didn't jaunt inside to find out, because at that moment the steel door at the far end of the conference room opened, and another Security Officer poked his head in, and called across to Officer Let-Me-State-the-Obvious, "Dead man walking!'

Officer Self-Evident nodded to him, the other head poked back out, the door slammed, and my companion said, 'When we bring one down from Death Row, he's gotta walk through the Ad Building and Segregation and the Main Hall. So everything's locked down. Every man's inside. It takes some time, y'know."

I thanked him.

"Is it true you work for the President, yeah?" He asked it so politely I decided to give him a straight answer, and to hell with all the phony credentials Ally had worked up. "Yeah," I said, 'we're on the same *bocce* ball team.'

"Izzat so?" he said, fascinated by sports stats.

I was on the verge of explaining that the President was, in actuality, of Italian descent, when I heard the sound of the key turning in the security door, and it opened outward, and in came this messianic apparition in white, being led by a guard who was seven feet in any direction.

Henry Lake Spanning, sans halo, hands and feet shackled, with the chains gold-welded into a wide anodized steel belt, shuffled toward me, and his neoprene soles made no disturbing cacophony on the white tiles.

I watched him come the long way across the room, and he watched me right back. I thought to myself, *Yeah, she told him I can read minds. Well, let's see which method you use to try and keep me out of the landscape.* But I couldn't tell from the outside of him, not just by the way he shuffled and looked, if he had fucked Ally. But I knew it had to've been. Somehow. Even in the big lockup. Even here.

He stopped right across from me, with his hands on the back of the chair, and he didn't say a word, just gave me the nicest smile I'd ever gotten from anyone, even my momma. *Oh, yes,* I thought, *oh my goodness, yes.* Henry Lake Spanning was either the most masterfully charismatic person I'd ever met, or so good at the charm con that he could sell a slashed throat to a strangler.

"You can leave him," I said to the great black behemoth brother.

'Can't do that, sir."

"I'll take full responsibility."

"Sorry, sir. I was told someone had to be right here in the room with you and him, all the time."

I looked at the one who had waited with me. "That mean you, too?"

He shook his head. "Just one of us, I guess."

I frowned. "I need absolute privacy. What would happen if I were this man's attorney of record? Wouldn't you have to leave us alone? Privileged communication, right?"

They looked at each other, this pair of Security Officers, and they looked back at me, and they said nothing. All of a sudden Mr. Plain-as-the-Nose-on-Your-Face had nothing valuable to offer, and the sequoia with biceps "had his orders."

"Henry Lake Spanning was either the most charismatic person I'd ever met, or so good at the charm con that he could sell a slashed throat to a strangler."

"They tell you who I work for? They tell you who it was sent me here to talk to this man?" Recourse to authority often works. They mumbled yessir yessir a couple of times each, but their faces stayed right on the mark of *sorry, sir, but we're not supposed to leave anybody alone with this man.* It wouldn't have mattered if they'd believed I'd flown in on Jehovah One.

So I said to myself *fuckit* I said to myself, and I slipped into their thoughts, and it didn't take much rearranging to get the phone wires restrung and the underground cables rerouted and the pressure on their bladders something fierce.

"On the other hand . . ." the first one said.

"I suppose we could . . ." the giant said.

And in a matter of maybe a minute and a half one of them was entirely gone, and the great one was standing outside the steel door, his back filling the double-pane chickenwire-imbedded security window. He effectively sealed off the one entrance or exit to or from the conference room, like the three hundred Spartans facing the tens of thousands of Xerxes's army at the Hot Gates.

Henry Lake Spanning stood silently watching me.

'Sit down,' I said. "Make yourself comfortable."

He pulled out the chair, came around, and sat down.

"Pull it closer to the table," I said.

He had some difficulty, hands shackled that way, but he grabbed the leading edge of the seat and scraped forward till his stomach was touching the table.

He was a handsome guy, even for a white man. Nice nose, strong cheekbones, eyes the color of that water in your toilet when you toss in a tablet of 2000 Flushes. Very nice looking man. He gave me the creeps.

If Dracula had looked like Shirley Temple, no one would've driven a stake through his heart. If Harry Truman had looked like Freddy Krueger, he would never have beaten Tom Dewey at the polls. Joe Stalin and Saddam Hussein looked like sweet, avuncular friends of the family, really nice looking, kindly guys—who just incidentally happened to slaughter millions of men, women, and children. Abe Lincoln looked like an axe murderer, but he had a heart as big as Guatemala.

Henry Lake Spanning had the sort of face you'd trust immediately if you saw it in a tv commercial. Men would like to go fishing with him, women would like to squeeze his buns. Grannies would hug him on sight, kids would follow him straight into the mouth of an open oven. If he could play the piccolo, rats would gavotte around his shoes.

What saps we are. Beauty is only skin deep. You can't judge a book by its cover. Cleanliness is next to godliness. Dress for success. What saps we are.

So what did that make my pal, Allison Roche?

And why the hell didn't I just slip into his thoughts and check out the landscape? Why was I stalling?

Because I was scared of him.

This was fifty-six verified gruesome, disgusting murders, sitting forty-eight inches away from me, looking straight at me with blue eyes and soft, gently blond hair. Neither Harry nor Dewey would've had a prayer.

So why was I scared of him? Because, that's why.

This was damned foolishness. I had

all the weaponry, he was shackled, and I didn't for a second believe he was what Ally *thought* he was. Innocent. Hell, they'd caught him, literally, redhanded. Bloody to the armpits, fer chrissakes. Innocent, my ass! *Okay, Rudy,* I thought, *get in there and take a look around.* But I didn't. I waited for him to say something.

He smiled tentatively, a gentle and nervous little smile, and he said, 'Ally asked me to see you. Thank you for coming.'

I looked *at* him, buf not *into* him.

He seemed upset that he d inconvenienced me. 'But I don't think you can do me any good, not in just three days.'

"You scared, Spanning?'

His lips trembled. "Yes I am, Mr. Pairis. I'm about as scared as a man can be." His eyes were moist.

"Probably gives you some insight into how your victims felt, whaddaya think?'

He didn't answer. His eyes were moisf.

After a moment just looking at me, he scraped back his chair and stood up. 'Thank you for coming, sir. I'm sorry Ally imposed on your time." He turned and started to walk away. I jaunted into his landscape.

Oh my god, I thought. He was innocent.

Never done any of it. None of it. Absolutely no doubt, not a shadow of a doubt. Ally had been right. I saw every bit of that landscape in there: every fold and crease, every bolt hole and rat run, every gully and arroyo, all of his past, back and back and back to his birth in Lewistown, Montana, near Great Falls, thirty-six years ago, every day of his life right up to the minute they arrested him leaning over that disemboweled cleaning woman the real killer had tossed into the dumpster.

I saw every second of his landscape, and I saw him coming out of the Winn-Dixie in Huntsville, pushing a cart filled with grocery bags of food for the weekend. And I saw him wheeling it around the parking lot toward the dumpster area overflowing with broken-down cardboard boxes and fruit crates. And I heard the cry for help from one of those dumpsters, and I saw Henry Lake Spanning stop and look around, not sure he'd heard anything at all. Then I saw him start to go to his car, parked right there at the edge of the lot beside the wall because it was a Friday evening and everyone was stocking up for the weekend, and there weren t any spaces out front; and the cry for help, weaker this time, as pathetic as a crippled kitten; and Henry Lake, Spanning stopped cold, and he looked around, and we *both* saw the bloody hand raise itself above the level of the open dumpster's filthy green steel side. And I saw him desert his groceries without a thought to their cost, or that someone might run off with them if he left them unattended, or that he only had eleven dollars left in his checking account, so if those groceries were snagged by someone he wouldn't be eating for the next few days . . . and I watched him rush to the dumpster and look into the crap filling it . . . and I felt his nausea at the sight of that poor woman, what was left of her . . . and I was with him as he crawled up onto the dumpster and dropped inside to do what he could for that mass of shredded and pulped flesh.

And I cried with him as she gasped, with a bubble of blood that burst in the open ruin of her throat, and she died. But though *I* heard the scream of someone coming around the corner, Spanning did not, and so he was still there, holding the poor mass of stripped skin and black bloody clothing, when the cops screeched into the parking lot. And only *then,* innocenf of anything but decency and rare human compassion, did Henry Lake Spanning begin to understand what it must look like to middle-aged *hausfraus* sneaking around dumpsters to pilfer cardboard boxes, who see what they think is a man murdering an old woman.

I was with him, there in the landscape within his mind, as he ran and ran and dodged and dodged. Until they caught him in Decatur, seven miles from the body of Gunilla Ascher. But they had him, and they had positive identification, from the dumpster in Huntsville, and all the rest of it was circumstantial, gussied up by bedridden, recovering Charlie Whilborg and the staff in Ally's office. It looked good on paper—so good thaf Ally had brought him down on twenty-nine-*cum*-fifty-six counts of murder in the vilesf extreme.

But it was all bullshit.

The killer was still out there.

Henry Lake Spanning, who looked like a nice, decent guy was exactly that. A nice, decent, goodhearted, but most of all *innocent* guy.

You could fool juries and polygraphs and judges and social workers and psychiatrists and your mommy and your daddy, but you could *not* fool Rudy Pairis, who travels regularly to the place of dark where you can go but not return.

They were going to burn an innocent man in three days.

I had to do something about it.

Not just for Ally, though that was reason enough, but for this man who

thought he was doomed, and was frightened but didn't have to take no shit from a wiseguy like me.

"Mr. Spanning," I called after him.

He didn't stop.

"Please," I said. He stopped shuffling, the chains making their little charm bracelet sounds, but he didn't turn around.

"I believe Ally is right, sir," I said. "I believe they caught the wrong man, and I believe all the time you've served is wrong, and I believe you ought not die."

Then he turned slowly and stared at me with the look of a dog that has been taunted with a bone. His voice was barely a whisper. "And why is that, Mr. Pairis? Why is it that you believe me when nobody else but Ally and my attorney believed me?"

I didn't say what I was thinking. What I was thinking was that I'd been *in* there, and I *knew* he was innocent. And more than that, I knew that he truly loved my pal Allison Roche.

And there wasn't much I wouldn't do for Ally.

So what I said was: "I know you're innocent because I know who's guilty."

His lips parted. It wasn't one of those big moves where someone's mouth flops open in astonishment; it was just a parting of the lips. But he was startled; I knew that as I knew the poor sonotabitch had suffered too long already.

He came shuffling back to me, and sat down.

"Don't make fun, Mr. Pairis. Please. I'm what you said, I'm scared. I don't want to die, and I surely don't want to die with the world thinking I did those . . . those things."

"Makin' no fun, captain. I know who ought to burn for all those murders. Not six states, but eleven. Not fifty-six dead, but an even seventy. Three of them little girls in a day nursery, and the woman watching them, too."

He stared at me. There was horror on his face. I know that look real good. I've seen it at least seventy times.

"I know you're innocent, cap'n, because *I'm* the man they want. *I'm* the guy who put your ass in here."

In a moment of human weakness I saw it all. What I had packed off to live in that place of dark where you can go but not return. The wall-safe in my drawing-room. The four-foot thick walled crypt encased in concrete and sunk a mile deep into solid granite. The vault whose composite laminate walls of judiciously sloped extremely thick blends of steel and plastic, the equivalent of six hundred to seven hundred mm of homogeneous depth protection approached the maximum toughness and hardness of crystalliron, that iron grown with perfect crystal structure and carefully controlled quantities of impurities that in a modern combat tank can shrug off a hollow charge warhead like a spaniel shaking himself dry. The Chinese puzzle box. The hidden chamber. The labyrinth. The maze of the mind where I'd sent all seventy to die, over and over and over, so I wouldn't hear their screams, or see the ropes of bloody tendon, or stare into the pulped sockets where their pleading eyes had been.

When I had walked into that prison, I'd been buttoned up totally. I was safe and secure. I knew nothing, remembered nothing, suspected nothing.

But when I walked into Henry Lake Spanning's landscape, and I could not lie to myself that he was the one, I felt

> "His lips parted. It wasn't one of those big moves where someone's mouth flops open in astonishment; it was just a parting of the lips."

the earth crack. I felt the tremors and the upheavals, and the fissures started at my feet and ran to the horizon, and the lava boiled up and began to flow. And the steel walls melted, and the concrete turned to dust, and the barriers dissolved; and I looked at the face of the monster.

No wonder I had such nausea when Ally had told me about this or that slaughter ostensibly perpetrated by Henry Lake Spanning, the man she was prosecuting on twenty-nine counts of murders I had committed. No wonder I could picture all the details when she would talk to me about the barest description of the murder site. No wonder I fought so hard against coming to Holman.

In there, in his mind, his landscape open to me. I saw the love he had for Allison Roche, for my pal and buddy with whom I had once, just once . . .

Don't try tellin' me that the Power of Love can open the fissures. I don't want to hear that shit. I'm telling *you* that it was a combination, a buncha things that split me open, and possibly maybe one of those things was what I saw between them.

I don't know that much. I'm a quick study, but this was in an instant. A crack of fate. A moment of human weakness. That's what I'd told myself in the part of me that ventured to the place of dark that I'd done what I'd done in moments of human weakness.

And it was those moments, not my "gift," and not my blackness, that had made me the loser, the monster, the liar that I am.

In the first moment of realization, I couldn't believe it. Not me, not good old Rudy. Not likeable Rudy Pairis never done no one but hisself wrong his whole life.

In the next second I went wild with anger, furious at the disgusting thing that lived on one side of my split brain. Wanted to tear a hole through my face and yank the killing thing out, wet and putrescent, and squeeze it into pulp.

In the next second I was nauseated, actually wanted to fall down and puke, seeing every moment of what I had done, unshaded, unhidden, naked to this Rudy Pairis who was decent and reasonable and law-abiding, even if such a Rudy was little better than a well-educated fuckup. But not a killer . . . I wanted to puke.

Then, finally, I accepted what I could not deny.

For me, never again, would I slide through the night with the scent of the blossoming Yellow Lady's Slipper. I recognized that perfume now.

It was the odor that rises from a human body cut wide open, like a mouth making a big, dark yawn.

The other Rudy Pairis had come home at last.

They didn't have half a minute's worry. I sat down at a little wooden writing table in an interrogation room in the Jefferson County D.A.'s offices, and I made up a graph with the names and dates and locations. Names of as many of the seventy as I actually knew. (A lot of them had just been on the road, or in a men's toilet, or taking a bath, or lounging in the back row of a movie, or getting some cash from an ATM, or just sitting around doing nothing but waiting for me to come along and open them up, and maybe have a drink off them, or maybe just something to snack on . . . down the road.) Dates were easy, because I've got a good memory for dates. And the places where they'd find the ones they didn't know about, the fourteen with exactly the same m.o. as the other fifty-six, not

to mention the old-style rip-and-pull can opener I'd used on that little Catholic bead-counter Gunilla Whatsername, who did Hail Mary this and Sweef Blessed Jesus that all the time I was opening her up even at the last, when I held up parts of her insides for her to look at, and tried to get her to lick them, but she died first Not half a minute's worry for the State of Alabama All in one swell foop they corrected a tragic miscarriage of justice knobbled a maniac killer, solved fourteen more murders than they'd counted on (in five additional states, which made the police departments of those five additional states extremely pleased with the law enforcement agencies of the Sovereign State of Alabama) and made first spot on the evening news on all three major networks not to mention CNN, for the better part of a week Knocked the Middle East right out of the box Neither Harry Truman nor Tom Dewey would've had a prayer

Ally went into seclusion of course Took off and went somewhere down on the Florida coast I heard But after the trial and the verdict, and Spanning being released and me going inside and all like that well oo-poppa-dow as they used to say it was all reordered properly *Sat cito si sat bene*, in Latin: "It is done quickly enough if it is done well " A favorite saying of Cato The Elder Cato

And all I asked, all I begged for, was that Ally and Henry Lake Spanning who loved each other and deserved each other, and who I had almost fucked up royally, that the two of them would be there when they jammed my weary black butt into that new electric chair at Holman

Please come I begged them

Don't let me die alone Not even a shit like me Don't make me cross over into that place of dark, where you can go, but not return—without the face of a friend Even a former friend And as for you, captain, well hell didn t I save your life so you could enjoy the company of the woman you love? Least you can do Come on now be there or be square!

I don t know if Spanning talked her into accepting the invite, or if it was the other way around, but one day about a week prior to the event of cooking up a mess of fried Rudy Pairis the warden stopped by my commodious accommodations on Death Row and gave me to understand that if it would be SRO for the barbecue, which meant Ally my pal and her boy friend the former resident of the Row where now I dwelt in durance vile

The things a guy'll do for love

Yeah, that was the key Why would a very smart operator who had gotten away with it, all the way free and clear, why would such a smart operator suddenly pull one of those hokey courtroom "I did it, I did it!" routines, and as good as strap himself into the electric chair?

Once I only went to bed with her once

The things a guy ll do for love

When they brought me into the death chamber from the holding cell where I'd spent the night before and all that day, where I'd had my last meal (which had been a hot roast beef sandwich, double meat on white toast with very crisp french fries, and hot brown country gravy poured over the whole thing, apple sauce, and a bowl of Concord grapes) where a representative of the Holy Roman Empire had tried to make amends for destroying most of the

> "I tried hitting it with a bolt of pure blue lightning mental power, but that wasn't how mixing in other people's minds worked"

gods beliefs, and cultures of my black forebears, they held me between Security Officers, neither one of whom had been in attendance when I'd visited Henry Lake Spanning at this very same correctional facility slightly more than a year before

It hadn t been a bad year Lots of rest, caught up on my reading finally got around to Proust and Langston Hughes I'm ashamed to admit so late in the game, lost some weight, worked out regularly, gave up cheese and dropped my cholesterol count Ain't nothin' to it just to do it

Even took a jaunt or two or ten, every now and awhile It didn f matter none I wasn't going anywhere, neither were they I d done worse than the worst of them, hadn't I confessed to it? So there wasn't a lot that could ice me after I'd copped to it and released all seventy of them out of my unconscious where they'd been rotting in shallow graves for years No big thang, Cuz

Brought me in, strapped me in, plugged me in

I looked through the glass at the witnesses

There sat Ally and Spanning, front row center Best seats in the house All eyes and crying watching, not believing everything had come to this trying to figure out when and how and in what way it had all gone down without her knowing anything at all about it And Henry Lake Spanning sitting close beside her, their hands locked in her lap True love

I locked eyes with Spanning

I jaunted into his landscape

No, I *didn't*

I *tried* to, and couldn't squirm through Thirty years or less since I was five or six, I'd been doing it, without hindrance, all alone in the world the only person who could do this listen in on the landscape trick and for the first time I was stopped Absolutely no fuckin' entrance I went wild! I tried running at it full-tilt and hit something khaki-colored like beach sand and only slightly giving not hard but resilient Exactly like being inside a ten-foot-high fifty-foot-diameter paper bag, like a big shopping bag from a supermarket that stiff butcher's paper kind of bag, and that color, like being inside a bag that size, running straight at it thinking you're going to bust through and being thrown back Not hard not like bouncing on a trampoline just shunted aside like the fuzz from a dandelion hitting a glass door Unimportant Khaki-colored and not particularly bothered

I tried hitting it with a bolt of pure blue lightning mental power, like someone out of a Marvel comic, but that wasn't how mixing in other people s minds works You don't think yourself in with a psychic battering-ram That's the kind of arrant foolishness you hear spouted by unattractive people on public access cable channels, talking about The Power of Love and The Power of the Mind and the ever-popular toe-tapping Power of a Positive Thought Bullshit I don t be home to *that* folly!

I tried picturing myself in there, but that didn t work, either I tried blanking my mind and drifting across but it was pointless And at that moment it occurred to me that I didn t really know *how* I jaunted I just did it One moment I was snug in the privacy of my own head, and the next I was over there in someone else s landscape It was instantaneous, like teleportation, which also is an impossibility, like telepathy

But now strapped into the chair, and them getting ready to put the leather mask over my face so the witnesses wouldn t have to see the smoke coming out of my eye-sockets and the little

sparks as my nose hairs burned when it was urgent that I get into the thoughts and landscape of Henry Lake Spanning, I was shut out completely. And right *then* that moment, I was scared.

Presto, without my even opening up to him, there he was, inside my head.

He had jaunted into *my* landscape.

'You had a nice roast beef sandwich, I see.'

His voice was a lot stronger than it had been when I'd come down to see him a year ago. A *lot* stronger inside my mind.

"Yes, Rudy, I'm what you knew probably existed somewhere. Another one. A shrike." He paused. "I see you call it 'jaunting in the landscape.' I just called myself a shrike. A butcherbird. One name's as good as another. Strange, isn't it, all these years, and we never met anyone else? There *must* be others, but I think—now I can't prove this, I have no real data, it's just a wild idea I've had for years and years—I think they don't know they can do it."

He stared at me across the landscape, those wonderful blue eyes of his, the ones Ally had fallen in love with, hardly blinking.

"Why didn't you let me know before this?"

He smiled sadly. "Ah, Rudy, Rudy, Rudy, Rudy, you poor benighted pickaninny.

'Because I needed to suck you in, kid. I needed to put out a bear trap, and let it snap closed on your scrawny leg, and send you over. Here, let me clear the atmosphere in here . . ." And he wiped away all the manipulation he had worked on me, way back a year ago, when he had so easily covered his own true thoughts, his past, his life, the real panorama of what went on inside his landscape—like bypassing a surveillance camera with a looped tape that continues to show a placid scene while the joint is being actively burgled—and when he convinced me not only that he was innocent, but that the real killer was someone who had blocked the hideous slaughters from his conscious mind and had lived an otherwise exemplary life. He wandered around my landscape—and all of this in a second or two, because time has no duration in the landscape, like the hours you can spend in a dream that are just thirty seconds long in the real world, just before you wake up—and he swept away all the false memories and suggestions, the logical structure of sequential events that he had planted that would dovetail with my actual existence, my true memories, altered and warped and rearranged so I would believe that I had done all seventy of those ghastly murders . . . so that I'd believe, in a moment of horrible realization, that I was the demented psychopath who had ranged state to state, leaving piles of ripped flesh at every stop. Blocked it all, submerged it all, sublimated it all, me. Good old Rudy Parris, who never killed anybody. I'd been the patsy he was waiting for.

"There, now, kiddo. See what it's really like?

You didn't do a thing.

"Pure as the driven snow, nigger. That's the truth. And what a find you were. Never even suspected there was another like me, till Ally came to interview me after Decatur. But there you were, big and black as a Great White Hope, right there in her mind. Isn't she fine. Parris? Isn't she something to take a knife to? Something to split open like a nice piece of fruit warmed in a summer sunshine field. Let all the steam rise off her . . . maybe have a picnic . . .'

He stopped.

'I wanted her right from the first moment I saw her.

"Now, you know, I could've done it sloppy, just been a shrike to Ally, that first time she came to the holding cell to interview me—just jump into her, that was my plan. But what a noise that Spanning in the cell would have made, yelling it wasn't a man, it was a woman, not Spanning, but Deputy D.A. Allison Roche . . . too much noise, too many

complications. But I *could* have done it, jumped into her. Or a guard, and then slice her at my leisure, stalk her, find her, let her steam.

"You look distressed, Mr. Rudy Parris. Why's that? Because you're going to die in my place? Because I could have taken you over at any time, and didn't? Because after all this time of your miserable, wasted, lousy life you finally find someone like you, and we don't even have the convenience of a chat? Well, that's sad, that's really sad, kiddo. But you didn't have a chance."

"You're stronger than me. You kept me out," I said.

He chuckled.

"Stronger? Is that all you think it is? Stronger? You still don't get it, do you?" His face, then, grew terrible. "You don't even understand now, right now that I've cleaned it all away and you can *see* what I did to you, do you?

"Do you think I stayed in a jail cell and went through that trial, all of that, because I couldn't do anything about it? You poor jig slob. I could have jumped like a shrike any time I wanted to. But the first time I met your Ally I saw *you*."

I cringed. "And you waited . . . ? For me, you spent all that time in prison just to get to me . . . ?"

"At the moment when you couldn't do anything about it, at the moment you couldn't shout, 'I've been taken over by someone else. I'm Rudy Parris here inside this Henry Lake Spanning body, help me, help me!' Why stir up noise when all I had to do was bide my time, wait a bit, wait for Ally, and let Ally go for you."

I felt like a drowning turkey, standing idiotically in the rain, head tilted up, mouth open, water pouring in. "You can . . . leave the mind . . . leave the body . . . go out . . . jaunt, jump permanently . . . ?"

Spanning sniggered like a schoolyard bully.

"You stayed in jail three years just to get *me*?"

He smirked. Smarter than thou.

"Three years? You think that's some big deal to me? You don't think I could have someone like you running around, do you? Someone who can 'jaunt' as I do? The only other shrike I've ever encountered. You think I wouldn't sit in here and wait for you to come to me?"

"But three *years* . . . "

"You're what, Rudy . . . thirty-one, is it? Yes, I can see that. Thirty-one. You've never jumped like a shrike. You've just entered, jaunted, gone into the landscapes, and never understood that it's more than reading minds. You can change domiciles, black boy. You can move out of a house in a bad neighborhood—such as strapped into the electric chair—and take up residence in a brand spanking new housing complex of million-and-a-half-buck condos, like Ally.

"But you have to have a place for the other one to go, don't you?" I said it just flat, no tone, no color to it at all. I didn't even think of the place of dark, where you can go . . .

"Who do you think I am, Rudy? Just who the hell do you think I was when I started, when I learned how to shrike, how to jaunt, what I'm telling you now about changing residences? You wouldn't know my first address. I go a long way back.

"But I can give you a few of my more famous addresses. Gilles de Rais, France, 1440; Vlad Tepes, Romania, 1462; Elizabeth Bathory, Hungary, 1611; Catherine DeShayes, France, 1680; Jack the Ripper, London, 1888; Henri Desire Landru, France, 1915; Albert Fish, New York City, 1934; Ed Gein, Plainfield, Wisconsin, 1954; Myra Hindley, Manchester, 1963; Albert DeSalvo, Boston, 1964; Charles Manson, Los Angeles, 1969; John Wayne Gacy, Norwood Park Township, Illinois, 1977.

"Oh, but how I do go on. And on. And on and on and on. Rudy, my little porch monkey. That's what I do. I go on. And on and on. Shrike will nest where it chooses. If not in your beloved Allison Roche, then in the cheesy fucked-up black boy, Rudy Parris. But don't you think that's a waste, kiddo? Spending however much time I might have to spend in your socially unacceptable body, when Henry Lake Spanning is such a handsome devil? Why should I have just switched with you when Ally lured you to me, because all it would've done is get you screeching and howling that you weren't Spanning, you were this nigger son who'd had his head stolen . . . and then you might have manipulated some guards or the Warden . . .

"Well, you see what I mean, don't you?

"But now that the mask is securely in place, and now that the electrodes are attached to your head and your left leg, and now that the Warden has his hand on the switch, well, you'd better get ready to do a lot of drooling."

And he turned around to jaunt back out of me, and I closed the perimeter. He tried to jaunt, tried to leap back to his own mind, but I had him in a fist. Just that easy. Materialized a fist, and turned him to face me.

"I may not know all *those* names,

Spanky my brother, but I do know Winnie Ruth Judd and Charlie Starkweather and Richard Specht and Sirhan Sirhan and Jeffrey Dahmer ... what colossal egotism you got ... makes you blind, makes you think you're the only one, even when you find out there's someone else, you can't get past it. What makes you think I didn't know what you can do? What makes you think I didn't let you do it, and sit here waiting for you like you sat there waiting for me, till this moment when you can't do shit about it?

"You so goddam stuck on yourself, Spankyhead, you never give it the barest that someone else is a faster draw than you.

"Know what your trouble is, Captain? You're old, you're *real* old, maybe hundreds of years who gives a damn old. That don't count for shit, old man. You're old, but you never got smart. You're just mediocre at what you do.

"You moved from address to address. You didn't have to be Son of Sam or Cain slayin' Abel, or whoever the fuck you been ... you could've been Moses or Galileo or George Washington Carver or Harriet Tubman or Sojourner Truth or Mark Twain or Joe Louis. You could've been Alexander Hamilton and helped found the Manumission Society in New York. You could've discovered radium, carved Mount Rushmore, carried a baby out of a burning building. But you got old real fast, and you never got any smarter. You didn't need to, did you, Spanky? You had it all to yourself, all this 'shrike' shit, just jaunt here and jaunt there, and bite off someone's hand or face like the old, tired, boring, repetitious no-imagination stupid shit that you are.

"Yeah, you got me good when I came here to see your landscape. You got Ally wired up good. And she suckered me in, probably not even knowing she was doing it ... you must've looked in her head and found just the right technique to get her to make me come within reach. Good, m'man, you were excellent. But I had a year to torture myself. A year to sit here and think about it. About how many people I'd killed, and how sick it made me, and little by little I found my way through it.

"Because ... and here's the big difference 'tween us, dummy.

"I unraveled what was going on ... it took time, but I learned. Understand, asshole? *I* learn! *You* don't.

"There's an old Japanese saying—I got lots of these, Henry, m'man—I read a whole lot—and what it says is, 'Do not fall into the error of the artisan who boasts of twenty years experience in his craft while in fact he has had only one year of experience—twenty times.'"

Then I grinned back at him.

"Fuck you, sucker," I said, just as the Warden threw the switch and I jaunted out of there and into the landscape and mind of Henry Lake Spanning.

I sat there getting oriented for a second. It was the first time I'd done more than a jaunt ... this was ... *shrike*, but then Ally beside me gave a little sob for her old pal, Rudy Parris, who was baking like a Maine lobster, smoke coming out from under the black cloth that covered my, his, face, and I heard the vestigial scream of what had been Henry Lake Spanning and thousands of other monsters, all of them burning, out there on the far horizon of my new landscape, and I put my arm around her and drew her close, and put my face into her shoulder and hugged her to me, and I heard the scream go on and on for the longest time. I think it was a long time, and finally it was just wind ... and then gone ... and I came up from Ally's shoulder, and I could barely speak.

"Shhh, honey, it's okay," I murmured. "He's gone where he can make right for his mistakes. No pain. Quiet, a real quiet place, and all alone forever. And cool there. And dark."

I was ready to stop failing at everything, and blaming everything. Having fessed up to love, having decided it was time to grow up and be an adult—not just a very quick study, who learned fast, extremely fast, a lot faster than anybody could imagine an orphan like me could learn, than *any*body could imagine—I hugged her with the intention that Henry Lake Spanning would love Allison Roche more powerfully, more responsibly, than anyone had ever loved anyone in the history of the world. I was ready to stop failing at everything.

And it would be a whole lot easier as a white boy with great big blue eyes.

Because—get on this now—all my wasted years didn't have as much to do with blackness or racism or being overqualified or being unlucky or being highverbal or even the curse of my "gift" of jaunting, as they did with one single truth I learned waiting in there, inside my own landscape, waiting for Spanning to come and gloat.

I have always been one of those miserable guys who *couldn't get out of his own way*.

Which meant I could, at last, stop feeling sorry for that poor nigger, Rudy Parris. Except, maybe, in a moment of human weakness. ⊠

This story, for Bob Bloch, because I promised

OMNI AT 15:
What do the numbers hold for us this year?

By Scot Morris

In ancient Hebrew, a proper written form of the name of Jehovah was a Y and an H (right, below), reading from right to left. Since the same symbols served as numbers, and Y = 10 and H = 5, they also designated the number 15. Thus, the Kabbalists, ancient Jewish mystics, considered 15 a very holy number.

Omni's bond with the number 15 is truly cosmic. *Omni* and October both begin with O, the 15th letter. Add the first five integers, 1 + 2 + 3 + 4 + 5, and you get 15. Multiply the first five prime numbers, 2 × 3 × 5 × 7 × 11, and you get 2,310, a re-arrangement of our logo (right, center).

If you add the sums of the digits of the divisors of 15, you come up with 15. Its divisors are 1, 3, 5, and 15; the digits' sums are 1, 3, 5, and 6, respectively. Fifteen is the *only* number with this property. Furthermore, if you take any number, add the sums of the digits of its divisors, and keep repeating this operation on each subsequent result, you will always end up with 15.

Here's a quiz for our 15th anniversary. How does 15 relate to the following?

1. Boxing, snooker, and Rugby
2. P, KY, and 1111
3. Eleven + two = twelve + one. Not only do the *numbers* add up correctly, but the *words* on each side of the equals sign are anagrams of each other. It's the only known anagram equation in English. Lee Sallows has found two in Spanish, and, incredibly, they both sum up to 15. What are they?
4. How many 15s are in the following story?

Martin Luther King, Jr., and five others met in San Diego. "I pay my taxes on time and I vote. I want to serve on the U.N. Security Council," King said. Andy Warhol drove in from Salt Lake City, and in Las Vegas, he picked up Billy Crystal, who brought an appropriate gift. "Pat Buchanan is no presidential descendent," said Francis Scott Key, who saluted the flag. Julius Caesar, who brought all of his ancestors back to his great-grandparents, said, "I coordinated a flight from Angola yesterday, and I'm adjusting in degrees to this new time zone." Then Long John Silver sang a song, and they all shook hands.

ANSWERS

1. There are 15 rounds in a championship boxing match, 15 balls in the starting rack of snooker, and 15 players on a Rugby team.
2. Phosphorus (P) is the 15th element, Kentucky (KY) was the 15th state, and 1111 is 15 in binary numbers.
3. Uno + catorce = cuatro + once (1 + 14 = 4 + 11), dos + trece = tres + doce (2 + 13 = 3 + 12).
4. (1) Martin Luther King, Jr., was born on January 15. (2) Tax day is April 15. (3) The Fifteenth Amendment gave Black males the right to vote. (4) The U.N. Security Council has 15 members. (5) Andy Warhol said everyone would be famous for 15 minutes. (6) Crystal is the traditional gift for a 15th anniversary. (7) Highway I-15 links Salt Lake City, Las Vegas, and San Diego. (8) James Buchanan, the 15th president, was a bachelor. (9) The flag that Francis Scott Key saw during the War of 1812 had 15 stripes. (10) Julius Caesar was killed on March 15. (11) A four-generation family tree has 15 members—oneself, two parents, four grandparents, and eight great-grandparents. (12) The coordinates of 15 degrees east and 15 degrees south meet in Angola. (13) There are 15 degrees of arc in an international time zone. (14) Silver's pirates sang, "Fifteen men on a Dead Man's Chest—Yo-ho-ho, and a bottle of rum!" in Robert Louis Stevenson's *Treasure Island*. (15) If each of six people shakes hands with all of the others, there will be 15 handshakes all around. (16) Since there are fifteen 15s in the story, that makes 16 in all.

Numerological thanks to Monte Zerger, Dan Shine, and Max Maven. OO

LAST WORD

THE SMARTNESS EXPERIMENT
When megadosing goes awry

By Stan Sinberg

Day 1 Billings Krupp, and I have decided to undergo an experiment to increase human intelligence For the next two weeks we will take megadoses of various 'smart drugs' to determine if it is really possible to significantly expand our intellects Marcus will be our control subject He will remain his same, stupid self

Day 2 The drugs are already having an effect! Billings shows up with the *New York Times* and the *Wall Street Journal* because he now suspects that everything in the *Weekly World News* isn't true Krupp writes an open letter to Carl Sagan, completely destroying his theories "How do you know there are billions and billions of stars—have you ever counted them?" We are extremely proud of Krupp

Day 3 The three of us discuss ways to cash in on our increased brain power Krupp suggests starting a magazine for smart-drug users *Musclehead*, with fold-outs of brain builders in thoughtful positions Billings thinks it would be more profitable making a video *Pumping Cortex* I begin to test my theory that if you go back and forth enough between rival electronics stores promising to undercut each other, you can get everything for free! Later we combine our brain power and send telepathic messages to Marcus to test whether we can force him to do our bidding

Day 4 Krupp has developed a major crush on Sally Jessy Raphael I have amazing insight that the commercial with the actor that isn't a doctor but plays one on TV is stupid! Billings goes on *Jeopardy!* and wins $167,000 but loses it all in "Final Jeopardy" when he fails to answer the question "What dry cleaners do when they martinize"

Day 5 A horrible mistake has led to our first breakthrough! We found Krupp's daughter Claire age 4 next to an open bottle of Megabrain 3000 While watching *The McLaughlin Group* Claire asks, 'Why are these discussion shows always dominated by conservative white men?' Clearly the drugs are having an effect! Distraught from his *Jeopardy!* loss, Billings announces his intention to leave the world of humans and commune with nature

Day 6 After a night of smart drinking, Krupp is pulled over for speeding The officer asks Krupp to walk a straight line Krupp explains that because of the curvature of the earth, there *is no such thing* as a straight line and therefore he can't do it We spend the night in jail and tell Krupp from now on no smart drinking before he drives

Day 7 Krupp and I have a fight I announce my theory of "Simpsonity" To cartoon characters, we appear animated He tries to wrestle my pills away from me Billings has returned Apparently hiking in the mountains has given him the idea to set up a chain of wilderness podiatrist booths Every few miles a backpacker can stop along the trail and get a foot massage from a licensed podiatrist To show his determination, Billings announces that henceforth he will be known as Paul Bunion

Day 8 A *setback!* Claire's teacher tells us that all the four year olds in prekindergarten class are watching *The McLaughlin Group* and asking the same question about talk shows and conservative white men

Day 9 Wearing a swimsuit and making strange clicking noises Billings darts out of the office What adventure is he on this time? we wonder

Day 10 Krupp suffers massive depression when he realizes that the woman he's been calling for months on the 900 number may not actually be the one he saw in the ad

Day 11 Billings has been found! A report on television announced that a school of dolphins and a man swimming prevented a boat from capsizing and rescued 16 people

Day 12 Krupp's brilliant new theory that black holes are actually cosmic gunshot holes caused by interstellar gang war is overshadowed by terrible news Billings has drowned! His brain became too heavy, and he was pulled under Official cause of death "being too smart for his own good"

Day 13 Due to the news about Billings we have decided to terminate our experiment one day early Despite some startling successes, we now realize that it's sheer folly to try to increase human intelligence Watching *Studs*, Marcus smiles, "I knew that.' Startled, we settle back and gaze on the hot-looking babes Tomorrow, we agree we start working on our bodies ∞

Stan Sinberg says that smart drugs have made him more intelligent, but his former girlfriend very strongly disagrees.