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8 MYSTICAL SHORT STORIES

THE SECRET LIVES AND DREAMS OF ABORIGINES

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OMNI®

VOL 9 NO 9 JUNE 1987

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The competitor sets his goal, tenaciously striving to achieve it no matter how difficult the challenge. Success becomes so tantalizingly close it's palpable. Clärk Dunbar, based in California's Silicon Valley, photographed our cover. The Gold Hand With Bubbles

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FIRST WORD

By Loret Miller Ruppe

"Surely we can devote ourselves to dealing with the problem of feeding the world. The world is crying out for our help. We must respond with caring, compassion, creativity, and currency."

A profound challenge confronts the world. How do we "end hunger" as we approach the twenty-first century? The future to do so seem to be within our grasp, yet every day nearly 40,000 children die from preventable causes.

We must never accept the notion that starvation, hunger, and widespread malnutrition are permanent conditions. Inequitable availability of food is a man-made situation, not some quirk of nature. We can begin to address hunger by first acknowledging that the means to alleviate the suffering is at our disposal and then accepting our responsibility to share some of our prosperity.

The Live Aid and Band Aid events united millions of concerned people around the globe simultaneously and demonstrated every individual's ability to make significant contributions to the battle against hunger. We cannot simply wait for pathetic legions of emaciated faces to peer out at us from our television screens before we respond—and then do so only out of shame, guilt, and pity.

The farmers, foresters, and fishermen in the developing world, with whom the Peace Corps and a host of international aid organizations have worked for decades, need no such sympathy. Instead they need technical training, access to appropriate technologies, and confidence that the personnel and services we provide will be sustained over the long term. Long-term, community-based programs are the only hope for reversing the decline in per capita food production that has led to hunger and starvation.

To transform such goals into realities, we must teach agronomy, plant trees, vaccinate livestock, introduce new production techniques, dig fish ponds, and train nutritionists. We must challenge our universities to commit their best and brightest minds to attacking the vexing causes of hunger. We must rescue our senior citizens from retirement to put their diverse skills to work in food production programs. And we must encourage corporate America to devote more of its managerial talents and a greater share of its financial resources to the battle against hunger.

A new effort that embodies first rate technical expertise and hope for progress is the African Food Systems Initiative (AFSI). A ten-year collaborative program sponsored by the Peace Corps, the AFSI will assist up to 12 African nations in their struggle to halt the decline in per capita food production and to attain self sustaining food systems. The program, begun in 1986 in three pilot countries (Mali, Niger, and Lesotho), combines a long-term commitment of resources and personnel with integration of extensionists objectives and job roles that focus on the small farmer.

How will we know if we are making serious progress in fighting hunger and generating self-sufficiency? We can evaluate our efforts in terms of numbers of wells, farms, and nurseries established. We can measure agricultural advances through "institution building"—an increasingly effective crop-extension program in Paraguay, a new national fisheries office in Burundi, East Africa, and a thriving 4-H Club in Ecuador. We can even count conditions that no longer exist. In Mali, for instance, many children suffered from night blindness due to a lack of vitamin A. In recent years, the introduction of home gardens has supplied these children with the dark-green leafy vegetables they need to ward off vitamin A deficiency.

The real agricultural progress comes not directly from those providing assistance but from the farmers and fishermen themselves who are transformed into masters of their own destinies. CARE and the Peace Corps, among others, have helped farmers and their husbands—more than 80 percent of the farmers in sub-Saharan Africa are women—preserve future fuel and establish planting projects.

It is painfully clear, however, that no single entity can make a serious challenge to world hunger on its own. In this time of austerity, programs fighting hunger can attain their full potential impact only if coordinated with an international collaborative effort. The U.S. Agency for International Development (USAID), for example, devotes more than half of its development-assistance budget to increasing food production and improving food consumption. UNICEF, Save the Children Federation, CARE, and Catholic Relief Services (CRS) are just some of the private organizations that USAID funds. The U.S. Congress has for years provided food assistance to CRS and CARE for their work around the world through the Food for Peace program. CARE, the Peace Corps, UNICEF, CRS, and USAID are working energetically on primary health care, emphasizing the promotion of breast feeding, backyard gardening, infant growth monitoring, and oral rehydration therapy (a simple yet lifesaving remedy for dehydration due to diarrhea, which kills 4 million children each year).

There can no longer be any excuse for neglect. The interdependence of our world demands all our attention, all our technical resources, and the creative energies of the best minds America has to offer. If we can land a man on the moon, develop the most complicated supercomputers, deploy rockets, and encircle the globe with sophisticated satellites, surely we can devote our imagination and a minuscule portion of our resources to deal with the problem of feeding the world. The world is crying out for our help, and we must respond with caring, compassion, creativity, and currency. OD

Loret Miller Ruppe is the director of the United States Peace Corps.

CONTRIBUTORS

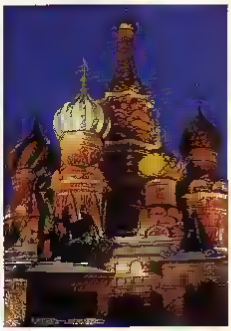
OMNIBUS

KEETON

REEL ILLUSIONS

COX

THE VISITATION



JUNK

Every story begins long before pen is put to paper. Inspired by someone's words or actions a question is posed, curiosity satisfied. And when an individual sheds new light on a subject it may alter our view of the world. Such is the case with this month's interview (page 80). While visiting Australia to promote her book *Woman of Tomorrow*, *Omni* president *Kathy Keeton* met aborigine Eric Willmot. An educator, inventor, filmmaker and novelist, Willmot is a man of two worlds—with one foot in his aboriginal culture, the other in white society. He believes Australia's native peoples can teach us a great deal about human evolution. "The common misconception is that the aborigines are backward primitives on the way to extinction," Keeton comments. "But they are a unique people, and it's important that we know more about them in order to learn more about our own origins."

The initial idea for a story can be broad—a writer is interested in, say, Russian science. Or it can be specific. Why have 44 Americans won Nobel prizes in physics, compared with only seven Russians, when the Russians always seem to have the upper hand? Sometimes reporters may wonder about the repercussions of recent developments in Russian physics. That curiosity was the inspiration for "UNK: The Accelerator That Couldn't Shoot Straight," by *Robert Crease* and *Charles Mann* (page 63).

Other story ideas, however, are just thinly veiled excuses for personal gain, like "A Night at the Movies" (page 44). *Omni* editor *Patrice Adcroft* simply wanted a date with director David Lynch. As a journalist, the most discreet way to meet him would be to write a story about him. But being absorbed in *Omni* Adcroft doesn't have the time to write much of anything beyond business letters, memos and copious notes scrawled in the margins of her editors' manuscripts. So she decided to ask several directors—including Lynch, of course—to devise future film treatments for *Omni*.

She turned the idea over to associate editor *Murray Cox*, who coordinated the project. His team included contributing editor *Marion Long*—with her seemingly inexhaustible resources—and editorial assistant *Mary Salinger Glucksman*. What movie, Long asked the directors, would you most like to make? And what future technologies would you use in it to expand your art?

Though the directors were enthusiastic about the project, a few expressed concern that another filmmaker might steal their concepts. The final result includes creative input from Susan Seidelman, Michael Douglas, Mel Brooks, John Sayles, Richard Attenborough, John Schlesinger—and, yes, David Lynch. There are screen credits and a synopsis for each twenty-first century film, as well as interviews with each director and with critics Gene Siskel and Roger Ebert.

It's likely that the special effects created by George Lucas's company, Industrial Light and Magic, will play a major role in shaping future movies. And the pictorial "Reel Illusions" (page 70) displays the work of this band of innovators, who are responsible for such wonders as Elliott and E.T. flying past the moon on a bike, Luke Skywalker and Princess Leia racing through the woods on speeder bikes and Indiana Jones narrowly escaping being squashed by a giant stone ball.

Every story, of course, requires an angle—a particular voice—and that's what makes each story different. You can, for example, give eight science-fiction authors a single topic, and they will produce eight unique stories, as in "The Visitation and Other Divine Encounters" (page 54). Fiction editor *Ellen Datlow* commissioned six short religious tales from such masterful storytellers as *Connie Willis*, *Greg Bear*, *Roger Zelazny* and *Michael Bishop*. A seventh was later recommended by one of the initial group," recalls Datlow, who edited *The Fifth Omni Book of Science Fiction* (Zebra). "And in the middle of the project, another story just appeared on my desk."

We wonder if the appearance of that eighth story had anything to do with a higher authority's influence. If so, that same authority might dabble some more in *Omni* affairs and deliver David Lynch to our editor's office.

LETTERS

COMMUNICATIONS

Spacefarers

I'm impressed with Hugh Downs's editorial on the space program [First Word, March 1987]. I am sending copies to "people of influence" in case they missed the article. Other readers should do the same.

David Alan Wright
New Britain, CT

Spin

The fifth force may have been discovered already ["May the Force Be With You," March 1987]. It appears to be a biological force, a kind of spin field around the body. The amplitude of the force is partly a function of the geomagnetic field activity. Several researchers have built instruments that verify this.

Buryl Payne, Ph.D.
PsychoPhysics Labs
Plymouth, MA

Congratulations on the superb article describing Ephraim Fischbach and the "fifth force." As a high-school physics and chemistry teacher, I have followed the reports in the various science magazines but none of them reported on the phenomenon as insightfully as you did. I look forward to sharing this article with my current physics students.

Frank Lock
Lemon Bay High School
Englewood, FL

Mericle Worker

William C. Mericle's article on the Rorschach test [Last Word, March 1987] was preposterous, humiliating, and long overdue. But I wonder if Mericle has the guts to tackle Freud's little-known fear of ferns or Carl Jung's habit of playing with his food in public? I crave more of this kick-ass type of writing.

Allan J. Grise
Orlando, FL

The Horse's Mouth

Someone once said that one of Walt Disney's great achievements was to show that animals have lives of their own, with their own trials and moments of happiness. Halvor Christensen's comments in "The Truth About Black Beauty" [Continuum, March 1987] are twisted. His anthropomorphic dog laments dying "uselessly" in a pound instead of "usefully" in a lab. Such values are abysmal.

Isn't it ironic that scientists, with all their degrees and knowledge, are threatened by vulnerable little creatures like Bambi and the judgments of children who are honest enough to display compassion?

Jerry Cimisi
Southampton, NY

A Miller's Tale

Diane Connors's interview with Alice Miller [March 1987] was outstanding. I've been a fan of Miller's for several years and have been concerned that so few people know her work. Her insights offer hope to adults who were abused as children, giving them a chance to end the vicious cycle of becoming abusive parents themselves.

Jacqueline Knapp
New York

I have never read a more profound examination of child abuse and its consequences than the interview with Alice Miller. It's interesting to note that both Stalin and Hitler had abusive fathers. And the Marquis de Sade was brought up in a church-run boarding school where the monks beat the boys.

But Miller carries some ideas to the point of absurdity. She claims that *all* violence results from childhood abuse. What about violence done in the name of self-defense? What are you supposed to do when someone is going to kill you?

Mark Oller
Falls Church, VA

I am a classic example of the abused child as described by Alice Miller. I felt so relieved when I read the interview because I finally found someone who understands my trauma. I hope more people become aware of the destructiveness of child abuse. Miller is uncovering just the tip of the iceberg.

Name Withheld
Lexington Park, MD

DAYDREAM BELIEVERS

FORUM

Susanna Cuyler, a crafts expert is owner of B Rugged in Highland Park, New Jersey and author of *The High Pile Rug Book* (Harper & Row). She participated in the first Australian Fabrics Conference in Melbourne. Below is a selection from her notebooks concerning art, aborigines, and dreaming.

The white peoples are so very young compared with the Australian aborigines, who have their dreamtime (see the Eric Willmot interview beginning on page 80). The myths of the dreaming" are more than 10 000 years old, twice the age of the Greek myths of Zeus on Mount Olympus. If the aborigine time span were a day, then the Europeans only arrived at aborigine lands—and took them over with gunpowder—just before midnight. It is our civilization's fifty-ninth minute (plus how many seconds?). To survive, we must learn about time, the necessity of peace and dreaming.

One night during the time I was studying the techniques of aborigine loop-and-twist basketry, the images in a dream had border designs of loops, twists, spirals. Like scrolls on a medieval manuscript, the border designs connected the dream's scenes, now forgotten. The very fact of dream borders—those were the first, and there have been none since—seems to do with the pleasures of sitting on the ground, making baskets all day.

I appreciate how the aborigines' barren landscape is made spiritual by patterns of kinship. Ancestors are embodied in trees, rocks; spirits are evident in birds, animals, and fish. All this dispels the loneliness of the vast, sunbaked outback. I picture their forebears traveling on bamboo rafts from South India through the Indonesian islands, moving on when volcanoes frightened them. At last they reached Australia, where bamboo didn't grow. They couldn't raft back. Australia had to become their home.

I amaze a young aborigine girl in our group by taking out my contact lenses—my eyes are blue, then dark green. But the lenses lose all novelty after I've taken one out and put it back in three times.

While on a topless beach at Sandringham, near Melbourne, it occurs to me that maternity is too "mammalian." I dream I'm the mother of lots of children of varying ages, sizes, races. We are walking, silhouetted on a hill, a small, private United Nations. My husband, a scientist, believes in the probability of a nuclear disaster within the next three years. Part of the extinction pattern of animals—giant kangaroos, for example—is to cease breeding because of climatic changes. Apparently, desert women here stop menstruating during droughts.

In our workshop, in the midst of whatever we are doing, the aborigines periodically get up and leave. Never a word of explanation. "Time has different components for them," anthropologist Alan West explains. These breaks are not to stretch or get a bite to eat. No simple change of pace, but a profound absence. It is exactly as if they who were giving the party left it. When they return, we are the new guests, and a new party begins.

Pleasures kaleidoscope into the immersion of days doing just craft work. No anxieties about getting started, whereas at home, I procrastinate over designs, I have to "get into the mood." There, part of my resistance is a reflection of our society's prejudice that crafts are boring, simpleminded, something to do when there's nothing better. But aborigines and craftspeople the world over know the spaciness of simple, repetitive handiwork, wherein the mind goes free, beyond anxiety's bounds of success or failure. Doing it bypasses the anticipatory part of the brain that prefers to ponder.

Spirits are evident in birds, animals, trees

I dream I'm inside a vast canyon. At a certain distance from me, there is a ceremony going on with songs and dances. I don't move toward it. I am fixated by doing something with a fish. I look in admiration at its scales. Am I cooking? I wake up just as the party is over. I feel immensely satisfied.

One day I hear the myth of the Rainbow Serpent, a great creator spirit who made the rivers. I remember that the only thing I cherished from freshman geology is the fact that meandering, serpentine rivers mean the river is either very, very young or very, very old.

European Stone Age cave artists depicted the animals they wanted to kill to eat, or that they feared. Often these animals on the cave walls were repeatedly pierced with arrows. Effigies. Why? In prehistory, as the weather fluctuated between the frigid and the tropical, Europe had great migrations of animals. But Australia simply got warmer and drier. Along the cave walls, aborigines emphasized not animals but the contours of rock; they deepened holes, rounded out protuberances. High on cliffs, women painted men with large genitalia erect to their chins that could be seen for miles. Wish fulfillment.

Hunters did portray the animals they wanted to eat, and perhaps their "X-ray" style evolved to show the bones they wished to have as trophies—teeth for necklaces, small bones for additional body ornaments. Other wishes were expressed in art. Aborigine rain dances included incising lines into a boulder to make it bleed—i.e., rain.

As an adolescent I was entranced with

the African Bushman's "He is a dream dreaming us." And in college I studied Eastern religion and learned that there is only Buddha: all else is a dream, an illusion. Now as I find out bits and pieces of the aborigines' crafts and beliefs, I want their earth colors to penetrate my dreams. At the University of Melbourne at the premiere of a movie about aborigine women gathering materials for their basketry, I sit next to two of the movie's stars to see their reactions to themselves in 16mm cool. After the movie, a group of us walk around the campus. It's the first meeting for most of us, and what stands out is this one aborigine woman's walk. It's very sexy, but what is most fantastic is that it bespeaks absolute ancestral assurance of place.

In my dream I have an impediment in my nose and leave the room with a nosebleed. When I come back to the small group at a theater-dinner party, I look down and there's blood splattered all over my shirt. (I had recently seen pictures of aborigine men with goose feathers stuck to their bodies with blood.) I decide to be natural about my bloody shirt. I want terribly to seduce a twenty-year-old man (he resembles a college boyfriend) who's walking behind us, but how? And suddenly I decide that it's better to record the boy's songs than to try to love him. The dream changes abruptly. There's a question of keys. I don't need a key—I have one. "You need two, in case of loss." We have been circling, have made a complete circuit.

When I wake up, I am reminded of the circles of many aborigine rock paintings. These apparently were symbols of territorial intent, marking, perhaps, the memory of early ancestral routes around the circular coast. What I feel is heartwarming, genuine love, as if I had been with the old boyfriend.

With the aborigines there is often silence as we all work. When someone speaks, it's to accompany the showing of a completed project. Everybody responds enthusiastically to the pride, the self-esteem that has been expressed. But usually we drift with the rhythms of our hands, our eyes, and the object. If we're thinking at all, it's usually associative, comparing this work with other aspects of our lives as farmers, artists, craftspeople.

When I start realizing that this will end—that we will all separate, the aborigines will leave Melbourne, and there will be no more peaceful tranquility of just doing crafts—I dream. In my dream we have no money. We're traveling and have come to the place where old men have dragged off the young girls for sex. We try to find some young men to make friends with. It's all anxiety. We were on the wrong train, going in the wrong direction, and now we're in the wrong place, festering with loneliness. I sit myself down in an empty square, like a spider in a cobweb of brown baggage. Then along come a bustling market scene and a pig. Members of the crowd push one another and hassle over how much the pig is worth; everything turns noisy, the colors are horrid. In a frenzy we leave, start to run, and by running feel strong again.

The European cavepeople ceased their painting when they began farming. Cultivation is toil from dawn to dusk; there is too much fatigue to stay awake to paint or sing, dance, tell stories, even watch the stars. The aborigine has the time. Aborigines mourn a death for weeks. They may mutilate themselves, but they also make sand paintings, tree carvings. They grieve for death with dances portraying incidents from the life of the deceased.

We have too few rituals concerning death. Our grief is almost totally confusing. We need time. We certainly need to examine our dreams. As soon as I wake up, I note in a few words the dreams I remember. The next step is to begin interpreting them, making links between them and recent events. These links can provide access to the subconscious.

I make rugs and I rock-climb, so often my dreams have a top-view perspective. After an especially vigorous climb, the top-view perspective again comes into play in my dream. A rust-colored pinnacle in the sun is narrow enough to climb with my arms around it. My legs are like a frog's as they go up the sides, but my head is snug in the warmth of the rock. Only at the very top can I rest comfortably and look around 360 degrees at the sky, the landscape. I populate the surroundings with dancing below. It has been the exertion of climbing that has erased any anxieties, and now on the top of my pinnacle I can choose to look in any direction. But I watch the dancers dance again and again, and climb down to watch them more closely. When I get down, the party is all boys, and they are boxing like kangaroos. I join some women sitting on the sidelines, and we make baskets from half-reclining positions. One older woman says, "Pity agitates the heart."

In *Within a Budding Grove* Marcel Proust said "Like those craftsmen those players who, instead of making a fuss and asking for what they cannot have, content themselves with the instrument that comes to their hand, the artist might say of anything, no matter what, that it would serve his purpose." I hear a chorus of craftspeople singing to me. "Leave crafts in a societal trough—better off there." In near secrecy, let craftspeople fructify, bearing more and more crafted objects until their houses and the houses of friends are full of the handmade. Then the engineers of war will say, "Gosh, they don't even have built-in obsolescence. There can be no commercial equivalency."

Back home, I'm so fit, so strong, my running shoes chew up the road. But it's staggering how two days of modern travel can wipe out a strong body. Typing these notes, keys down to a digital sprung noise on the computer, I think *With computers all is exactitude, there is no room for approximation. Where are its arts without any approximation?*

With anxiety, I always dream that I'm obliged to go back and finish school—even though I've been to college. With frustration, my dreams become comprehensively visual. For example, I go over an elegant town house, inspect every room, and approve its decoration. I look for where my rooms should be.

I'm awake. In a straight upward fantasy I conjure up an aborigine drifting around me in my tiny study above my white-walled studio. Loneliness is a seemingly bottomless pit. I pour my experience down. After a sensation of endlessly dropping a pail loaded with grits, the bottom comes up imperceptibly.

The aboriginal myths of the dreaming originated more than 10 000 years ago

FOWL PLAY

EARTH

By Catherine Caufield

Wardens af the Kesterson Reservoir National Wildlife Refuge in California's San Joaquin Valley first suspected in 1982 that something was seriously wrong As one of a dwindling number of wetlands on the Pacific Flyway the Kesterson wetlands attracted hundreds of thousands of birds—such as ducks geese, stilt avocets and coots—looking for food and a place to breed In addition, the marshes provided a home for many species of fish and smaller animals By 1982 all buf one of the native fish species had myste riously disappeared from the sanctuary The next spring many chicks were born dead or horribly deformed—with no eyes no legs or with brains bursting from their skulls

Biologists soon pinpointed the culprit as selenium, an element necessary to human nutrition in small amounts buf toxic in larger quantities In late 1984 Kesterson was declared a toxic-waste dump Workers there are required to wear protective clothing and masks The federal Fish and Wildlife Service employs 'hazers' to rove the polluted marsh and scare away thousands of birds with loud noises A wildlife habitat supervisor at Kesterson, Pete Blake describes the eerie situation "When you walk into a marsh you expect to hear birds singing and frogs croaking When you go into Kesterson, you don't hear that The sound isn't there"

The Bureau of Reclamation a federal agency dumped the selenium into Kesterson It was helping local farmers get rid of their used irrigation water from 42,000 acres of agricultural land Normally irrigation water that is not evaporated or used by fhe crops drains deep into the subsoil and eventually into local streams and rivers But most of the farmland on the west side of the San Joaquin Valley rests on top of an impermeable layer of clay that prevents the wastewater from draining away Eventually the water will rise into the root zone, suffocate the crops and destroy the productive capacity of the land To prevent this from happening some farmers installed plastic pipes under ground to carry away their excess water The bureau built a concrete channel to take the drain water to Kesterson Donald Swain recently retired as head of the San Joaquin Valley Drainage Program Planning and Evaluation Section says, "If we had discharged the drainage water into the estuary the way we originally planned it could have been even worse before we recognized the problem"

Neither the farmers nor the bureau took into account how polluted the wastewater would be Any irrigation runoff is polluted with salts and trace elements But in the western San Joaquin Valley the soil is cursed with unusually high levels of potentially toxic substances It has been known for many centuries that intensive irrigation leaches such substances ouf of the soil So not only would the trapped wafer suffocate crops it could poison them as well Simply draining the water away—as Kesterson demonstrates—can also poison the larger environment

As a temporary solution, the "Kesterson farms" are now saving their polluted water mixing it with fresh water and reusing it Until recently other farms with artificial drains discharged around 60,000 acre-feet (one acre-foot equals 326 000 gallons) of wasfewater each year into fhe Grassland marshes, a duck hunter's paradise just south of Kesterson—almost ten times the amount of waste-water dumped into Kesterson annually Those marshes are so contaminated with selenium that the state department of health has warned people not to eat locally caught waterfowl This water is now dumped into the San Joaquin River the San Joaquin River drains into the California Aqueduct from which Los Angeles gets a portion of its drinking water Alarmed by this fact, the state senate last year commissioned the University of California Energy and Resources Group, in Berkeley to study the quality of drinking water in Southern California John Harte, principal investigator for the study says, "Our research showed that about half of the aqueduct water exported fo Southern California originates in the San Joaquin River Since the San Joaquin contributes significantly fo the aqueduct, it is vital that the quality of the San Joaquin water not be allowed to deteriorate"

Pristine wetlands may soon be wastelands

At least 1 million acres of the western San Joaquin Valley will need artificial drainage Thousands of acres are already floating on a poisonous underground lake Potentially foxic levels of selenium have been found in alfalta corn sugar beets and cattle raised in these areas

Gerald Johns, chairman of the San Joaquin River Basin Technical Committee points out fhat no one is quite sure how much selenium is toxic and how it works its way through the environment In 1983 Kesterson's water had concentrations of 200 to 400 parts per billion of selenium But scientists have observed says Johns that waterfowl eating aquatic plants with substantially lower levels of selenium can show adverse effects similar to those at Kesterson because the plants absorb high concentrations of selenium

There are no legal limits on fhe amount of agricultural pollutants that farmers are permitted to dump into California's rivers The Central Valley Regional Water

CONTINUED ON PAGE 118

ASLEEP IN THE COSMOS

SPACE

By Steve Nadis

On the first flight of the space shuttle Mission Control ran a test during the second night when both crew members were fast asleep. Alarms went off on the console, and in reply one groggy astronaut threw a switch—the wrong one—before going back to sleep. The next day he had little memory of the exchange between Mission Control and himself.

"It was like going into someone's bedroom at three in the morning," explains Curt Graeber, a psychologist at the NASA Ames Research Center. Fortunately, nothing happened to the orbiter, but one could argue that in space there should be a split-shift schedule so that one alert crew member is on duty at any time. Despite the fact that NASA hopes to have humans on a space station for periods of three months or longer by the Nineties, the space agency "really hasn't planned adequately for long-term space travel," comments Harvard Medical School professor of physiology Dr. Martin Moore-Ede, another expert concerned about the problem. In a study of sleep and performance of airline crews on overnight flights crossing many time zones, he has already documented some of the risks of not respecting our need for sleep. In one survey of 30 pilots, copilots, and navigators, he found that they often had to fight to stay awake and actually nodded off an average of 32 times per month. There were even occasions when everyone in the cockpit dozed off at the same time, as happened on one transcontinental flight to Los Angeles. The plane drifted 100 miles out over the Pacific before the ground crew was able to rouse the pilots with chimes.

In space the question of getting the right kind of sleep can be critical for other reasons. There, work should be scheduled to let a crew perform at its optimal level. It costs an estimated $100,000 per hour to keep an individual in space, and if someone is working at only half of his or her peak efficiency, that's $50,000 per hour wasted.

Crews can get by with disrupted sleep for a week, the typical length of a shuttle flight, says Moore-Ede. "But on longer-duration flights a host of problems have yet to be addressed. And almost all of NASA's research efforts have gone into engineering hardware and other systems—but very little into life sciences."

Frank Sulzman, NASA's chief of biomedical research, admits that there is no organized program looking at crew schedules, sleep physiology, and human circadian rhythms in space. "We devote most of our resources to areas where we know there is a potential problem, such as motion sickness, bone deterioration, muscle atrophy, and cardiovascular disorders," he says. "We don't know if there is a problem with sleep in space."

Yet Charles Fuller, a professor of physiology at the University of California, Davis, has heard from many astronauts that they did not sleep as deeply and were more easily aroused while dozing in weightlessness. Astronauts can sleep floating freely in their spacecraft, but they risk bumping into things. For this reason they use a "sleep restraint system," a sleeping bag they attach to the wall.

There are questions about when to sleep and what will happen to the circadian rhythm when a human is removed from the normal 24-hour cycle of day and night. Typically, spacecraft orbit the earth every 90 minutes, so astronauts, in a sense, experience 90-minute days. Should their natural biological clocks be allowed to drift from Earth time?

Some answers have been suggested by the Soviets' experience in space. The Russians are better versed in long-term spaceflight than we are. Their first space station, for example, was launched into orbit in April 1971. Soviet missions also last much longer than American missions, with the longest one to date running nearly eight months.

On some of the Soviet missions, sleep has been a real problem. During a 211-day mission on the space station *Salyut 7* in 1982, the crew had particular difficulty sleeping during the early and middle stages of the flight. "[I] thought about home, the flight, friends, work," said one cosmonaut. "I should have slept at least a little while, but couldn't," complained another.

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Perchance to dream. How much sack time will future astronauts need on long space trips?

THE TRUTH ABOUT PIRATES

EXPLORATIONS

By Bill Lawren

At first glance the Cape Cod warehouse with its bright lights, thrumming fans and antiseptically clean concrete floors, looks like anything but a pirate's lair. But to Ken Kinkor, a soft-spoken, friendly man who may be the world's only practicing "piratologist," the place is a treasure trove worthy of the best of Blackbeard. Immersed in the neat rows of saltwater tanks and covered with lumpy, 270-year-old crusts of rock, hardened mud, and dead barnacles lies a fascinating collection of objects that come straight from the armoire of the *Whydah*, the only documented pirate ship ever to be successfully salvaged.

For the past several years Kinkor and his associates at Maritime Explorations Inc., a privately owned salvaging company in Chatham, Massachusetts, have been analyzing the *Whydah*'s contents, which include everything from cannons to rum bottles. As the researchers do so, a richly detailed and in many ways surprising picture of life under the skull and crossbones is emerging.

"Most people's image of pirates is that of semibarbarian cutthroats who killed and maimed and gave no quarter," says Kinkor. "But our findings, along with other research, may revise that image."

Rather than a gang of bloodthirsty thieves kept in line by a tyrannical and equally bloodthirsty captain, Kinkor thinks the crewmen of the *Whydah* were part of an egalitarian and democratic society whose members took great pains to *avoid* shedding their victims' blood.

A thin, bearded Midwesterner who likes to wear his watch outside his shirtsleeve, Kinkor attributes his interest in pirates to a great-aunt who read *Treasure Island* to him when he was five. From that point on, Kinkor was hooked. As a kid he read everything he could get his hands on about pirates, and later, as a graduate student at Illinois State University, he specialized in pirate history. His unique interest and his impeccable research eventually put him in contact with his present boss, Maritime Explorations owner Barry Clifford.

As a boy growing up on Cape Cod, Clifford, himself a talented historical researcher, had heard what amounted to a storybook's worth of local tales about the pirate ship *Whydah*. Like Kinkor, he knew that the ship had been built and operated as a slaving vessel but had been jumped and captured near the Bahamas in 1717 by the pirate captain "Black Sam" Bellamy. Three months later, after robbing a small fortune's worth of money and merchandise from a string of merchant ships along the American coast, the *Whydah* ran into a sandbar off the Cape Cod port of Wellfleet and sank within sight of the shore. Bellamy and all but seven of his crew were drowned.

Knowing that the *Whydah*'s holds were full of loot, salvagers went looking for it as soon as the storm had passed, but without success. Others continued looking for the next 200 years, but the fine sand on the Cape Cod bottom had swallowed the remains of the wreck so completely that all attempts failed. Then in the late 1970's Clifford—whose use of modern magnetic detectors called magnetometers had helped him salvage a number of other wrecks—decided to take a stab at finding the *Whydah*. A year of patient, foot-by-foot searching through the bay waters turned up seven old shipwrecks but no *Whydah*. Finally, in 1982, Clifford's shipboard magnetometer located yet another wreck. On the first day of excavation, ten feet under the sandy bottom, Clifford's divers hit the jackpot: more than $1 million worth of gold coins from the hold's. The coins, which were Clifford's to keep, kindled the interest of investors. Today his company is rich. But for Clifford, these coins are only a means to an end. "The real treasure here," he says, "is the archaeology."

Clifford invited Kinkor to help analyze the ship's artifacts. Now a virtual fixture in Clifford's warehouse-laboratory, Kinkor cheerfully admits to being "like a kid in a toy shop." As he steers a visitor from tank to tank, he proudly shows off some of those 270-year-old "toys," including a pair of hand-carved brass seals that illiterate pirates used to "sign" documents, and a jarful of carefully cleaned lead

Scrutiny of the bounty: An aquatic excavation is changing our view of pirate life

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LIFE SEARCH

STARS

By Eleanor Smith

Sometime in the Nineties a robot spacecraft will ease into orbit a few hundred miles above Mars. On a prearranged command a hatch will open and a small fleet of projectiles each about the size of a large garbage can, will shoot out and tumble down toward the planet's surface. As each projectile crash-lands, it will break in two. The front half will fall away and send a probe deep into the Martian permafrost. Over the ensuing months each of these robots, called penetrators, will transmit data to Earth. From the data, scientists hope will come an answer to the question, Did ancient life exist on Mars?

Assuming all goes as planned, several penetrators will crash on the surface of Mars before the end of the century. And if Christopher McKay, Rocco Mancinelli and Robert Wharton have their way, the penetrators will give us information on the exobiology (non-Earth life) of Mars. McKay and Mancinelli both work at NASA's Ames Research Center in Mountain View, California—McKay as a planetary scientist and Mancinelli as a microbial biologist. Wharton is a former NASA biologist now at the University of Nevada.

What they hope to discover is the presence of chemical precursors of life on Mars. That would add weight to their theory that microscopic life could have evolved on Mars a long, long time ago.

The penetrators are the key components of a proposed Mars Network Mission, so called because NASA envisions the collection of machines as constituting a network of unmanned monitoring stations. Scheduled to visit Mars sometime in the late Nineties, the Mars Network Mission will be the first U.S. spacecraft to touch down on the planet since Project Viking in 1976.

Viking's 2,000 photographs of the red planet revealed tall volcanic peaks and channels apparently carved by water. This suggests to McKay and his colleagues that primitive life forms could have evolved sometime in the past. "The channels say that there was once liquid water on the surface of Mars," explains McKay, a tall, bearded, and intense astrophysicist. "The volcanoes say that there was volcanic activity putting out gases and possibly creating a warm atmosphere."

In fact, early Mars resembled early Earth, McKay and colleagues contend. (And they mean *early*—about 3.8 billion to 3 billion years ago.) During that period Earth was blanketed by a thick hydrogen, nitrogen, and carbon dioxide atmosphere and was covered by a liquid known as the primordial soup. Out of this soup sprang bacteria and other single-celled organisms. Around the same time, they believe, it may have had its own warm, thick carbon dioxide atmosphere, and rivers and lakes.

We know there was life on Earth then because we've found fossils of microscopic life from 3.5 billion years ago," McKay says. "Because life was already evolving on Earth, it's logical to ask, What happened on Mars during this period?"

In future missions, NASA's exobiologists want to search for organic compounds in, and bring back samples from, Valles Marineris, a 3,000-mile-long network of canyons near Mars' equator.

"In certain canyons," McKay explains, "there is sediment at the bottom. Geologists say the sediment was put down by lakes, because of how smooth and flat it appears. If anything were alive on Mars three or four billion years ago, some of it would have been in that water. It would have settled to the bottom and been buried in the sediment."

Watch out, Mars. Here come the penetrators.

Not everyone thinks that looking for evidence of primordial life on Mars is a promising endeavor. Dr. Bruce Murray, a California Institute of Technology geologist and noted Mars expert, thinks that the odds of finding organic compounds on Mars are slim. "Impacts from meteorites would have churned up most of the planet's surface," he says, exposing any biological material to the sun's destructive UV rays and the oxidizing peroxides on the surface. "It's unlikely that by drilling down a few meters, one would find any chemical evidence of life."

That's not to say we shouldn't try. In anticipation of the Mars Network and later missions to Mars, McKay, Wharton, and Mancinelli have been busy designing experiments and instruments to find fossils and other "signatures" of ancient life on Mars. For example, McKay and Wharton pay frequent visits to Antarctica to explore partially frozen lakes. By studying the sediments at the bottom of the Antarctic lakes—Earth's closest counterparts to Martian paleolakes—they can develop ways of looking for traces of life in similar sediments on Mars.

By going to Mars, McKay argues, we may also find clues to the origin of life on Earth. Scientists understand the process by which simple chemical molecules became the prebiological soup. And evolution from single-celled organisms to multicellular organisms and on up to humans is also understood. But, McKay explains, "we still don't know how you go from the soup to life. It's that little step in the middle, which occurred 3.8 billion years ago, that we don't know."

On Mars, two thirds of the planet's surface has remained unchanged in 3.8 billion years. So if life ever evolved on Mars, its remnants are probably still buried somewhere beneath its crust.

CONTINUUM

PHYSICS, HOLLYWOOD STYLE

In the movie *Star Wars* a fighter from the fleet of the evil Darth Vader comes zooming at tremendous speed directly toward the creaking outmanned craft of Han Solo and Luke Skywalker. But somehow just when all seems lost Han manages to hit the onrushing enemy with a last-second salvo of deadly missiles. Like a target in a video game, the black starfighter explodes then falls harmlessly away.

Cut! yells physicist Jack Weyland.

Violates the laws of conservation of momentum!' he says with a sniff. Vader's ship already has considerable momentum as it's coming at Han and Luke, and I doubt that the momentum of their missile would be great enough to just cancel it out. So the enemy ship might blow up, but the pieces would keep right on coming. In other words, if *Star Wars* director George Lucas had gotten his physics right, Han and Luke would have been destroyed by the shrapnel of their own success.

Hollywood has had a tough time getting anything past Jack Weyland. In fact the physicist who teaches at South Dakota School of Mines and Technology, has become something of a self-appointed scientific censor, using the rules and rulers of physics to give science-fiction directors like Lucas a series of swift raps on the knuckles. Weyland's concern is that movieland's often blithe disregard for immutable natural laws can 'lead the unwary into false concepts about physics.

If you listen to Weyland there's plenty to worry about. You may remember, for example, the awesome sounds of *Star Wars* battles: the whizzing starfighters, the roaring rockets, the exuberant explosions. Well, sorry, says Jack. Space being a near vacuum, has no medium by which to conduct sound, so all those battles should have been fought in spectacular silence. There's a similar problem for the gleaming laser swords that were wielded so brilliantly by Vader and his good-guy enemy Obi-Wan Kenobi. Unless there's a lot of dust or fog in the air to scatter their light, Weyland warns, laser beams simply can't be seen from the side.

Then there's the scene in *Superman I* when Lois Lane falls off the roof of a Metropolis skyscraper, only to be rescued by our Kent-ish hero who catches her about ten floors down. But *noooooooo* says Weyland. Having already fallen that far, being caught by the Man of Steel would have squashed Lois just as flat as if she'd actually hit the sidewalk. Gravity is gravity, after all, and hard is hard. And those penetrating X-ray eyes? "If Superman's eyes are actually beaming X rays *out*," Weyland wants to know, "then how can the results possibly get back to his brain?"

All this analysis began when Weyland was still in college. He was watching an otherwise forgettable war flick in which a submarine cruising in Arctic waters is suddenly crippled by huge ice chunks that had supposedly broken off an iceberg. Infuriated, Weyland leapt to his feet in the crowded theater and started yelling, "Ice floats! Ice floats!' The gambit got such a big laugh, Weyland says, that it 'gave me a feeling of power.'

Thus empowered, Weyland went on to make systematic studies of scores of SF and adventure films. My kids love it," he says, "when I tell them we're going to rent a dozen movies and spend the whole day watching them." He's worked up a lecture complete with video clips that he's used to galvanize audiences ranging from the august graybeards of the American Physical Society to an auditorium full of reform-school juvenile delinquents.

Very few films have escaped the heat of Weyland's blasts. He recalls a James Bond movie, for example, in which one of the characters is killed by falling into an open vat of liquid helium. "Real liquid helium,' he reminds us, "is stored at four degrees above absolute zero, and it's very expensive. If you had a vat of it, you certainly wouldn't leave it open to the atmosphere, because it would evaporate in nothing flat."

Despite his disparaging comments, Weyland does have some noticeable soft spots. *Star Trek*, for example, escapes relatively unscathed. "I don't get mad at them," he says, "and I don't know why. But somehow their stunts just roll over me." (He's not happy, though, about all those people being beamed up. "Every time you did that," he says, 'you'd be creating more energy than an H-bomb explosion.') He found the busted-valve premise of *The China Syndrome* quite realistic—'The Russians at Chernobyl', he says, "would certainly agree that that could happen'—and he has high praise for *2001*'s 'enchanting beauty.'

In the end, in fact, Weyland remains a confirmed fan of the SF flicks. "I love George Lucas's movies," he says. "I've seen some of them ten times." (Lucas, by the way, refuses to comment on Weyland's critiques.) 'And really," he concludes, 'I don't want any of them to be more true to life. I think that if they were, they'd be awfully dull."—*BILL LAWREN*

CONTINUUM

BLACKBOARD SCREECH

Ever wonder why almost everyone shivers at the sound of a fingernail being scraped across a blackboard? A team of researchers at Northwestern University in Evanston, Illinois, has recently completed a sophisticated acoustic analysis of the sound and has come up with a surprising question: Could blackboard screech be an evolutionary artifact older than man himself?

"More than ninety percent of people," says psychologist Randolph Blake, "react to the sound of fingernails on a blackboard by cringing and feeling uncomfortable. The automatic, almost visceral reaction to this sound made us wonder whether it mimics some naturally occurring, innately aversive event. To search for that event, Blake and colleagues D. Lynn Halpern and James Hillenbrand first used a spectrogram to develop an acoustic voiceprint of the sound of a garden rake being dragged across a piece of slate—a sound that Blake calls "acoustically indistinguishable" from blackboard screech.

When they compared that voiceprint with a spectrogram of warning cries issued by macaque monkeys, the two sounds bore a very close resemblance. The researchers report: "Our findings," Blake says, "suggest our behavior is an instinct we inherited from our primate ancestors. The human brain obviously still registers a strong vestigial response to this chilling sound."

—Bill Lawren

We react to the sound very much like a garden rake across slate.

WOMEN WHO DO

You'd like him to ask you out, and you've been sending all the right signals, but he remains either hopelessly oblivious to you or painfully shy. What to do?

"Go ahead and ask," advises psychologist Charlene Muehlenhard of Texas A&M University. "Men will overwhelmingly say yes if they're attracted."

Muehlenhard and her co-researcher Teresa Scardino played videotapes of conversations between a young man and woman for 309 college males. Half the time she asked him to go to a movie, half the time she didn't. Her intelligence was also varied. "The woman who asked for a date," says Muehlenhard, "was rated as kinder, warmer, and less selfish than the woman who did not ask for a date. Men were very receptive.

Should a woman make the first move? Most men, research indicates, will say yes, especially if the woman is smart.

One stereotype remains, however. The woman who asked was seen as more sexually active. But this effect is countered when she is also seen as intelligent.

In fact, women need never hide their intelligence. "The intelligent woman was rated as more likable, kind, and considerate." She was clearly the woman the men preferred, despite claims that intelligent women deflate a man's ego.

"By behaving intelligently, a woman seems able to reap the advantages of being able to ask a man for a date without the disadvantages of his thinking she wants sex more than she really does," Muehlenhard says.

But women still find asking difficult. Only about 3 percent of college women in the survey would ask men for dates, "even though ninety-five percent of men say yes if they like her, and men seem to like women who do."

—Vincent Bozzi

"God made everything out of nothing, but the nothingness shows through."

—Paul Valery

"Growth for the sake of growth is the ideology of the cancer cell."

—Edward Abbey

DEATH BY INSOMNIA

It was the most gruesome chronicle of insomnia ever to appear in a medical journal—or anywhere else for that matter. It was the story of a middle-aged industrial manager who suddenly began to lose sleep, whose ever-worsening insomnia responded to no known treatment and who died within a year in a state of total exhaustion.

By the third month of his illness the patient could sleep for only one hour a night, and even this paltry amount of sleep was disturbed by vivid dreams that made him rise from his bed and give a military salute. His other symptoms included impotence, severe fatigue, amnesia, and finally a lung infection that could not be controlled by antibiotics.

The patient lived and died in Italy, where he was treated by sleep experts at the University of Bologna. But his brain was autopsied by neuropathologist Pierluigi Gambetti of Case Western Reserve University in Cleveland. "I found a lesion in the thalamus," Dr. Gambetti says. Indeed, as he and his colleagues reported in *The New England Journal of Medicine*, 85 to 95 percent of the neurons in two parts of this region of the brain had been destroyed.

The doctors learned of four relatives who were similarly affected by insomnia. One was a sister whose autopsied brain showed she had apparently died of the same strange malady.

On the weight of the evi-

Brain lesions may be one cause of lethal insomnia

dence, Gambetti and the other doctors believe they have identified a fatal familial insomnia caused by degeneration of the thalamus. The next step of their research is to establish the identity of the disease and to name it—as well as the gene responsible for its transmission.

Commenting on the case, Manfred L. Karnovsky of Harvard Medical School said that this heritable condition might likely contribute to a better understanding of normal sleep. The thalamus's long-disputed role in sleep, for example, seems on the verge of clarification.

—Dava Sobel

RECYCLED BLOOD

Despite assurances that sophisticated screening tests have made the nation's blood supplies safer than ever, many surgery patients still worry about contracting AIDS and other infections from blood transfusions. But a new transfusion technique being implemented in several hospitals across the country is helping to eliminate those fears—at least among heart surgery patients.

Called the cardiotomy reservoir chest drainage system, the autotransfusion method recovers a patient's own blood during surgery and when postoperative bleeding occurs, and then recycles it back into his or her body.

Originally developed by West German physician Johan Wenger in 1977, the technique has been pioneered in this country for the past two years at Fairfax Hospital in Falls Church, Virginia. Drainage tubes placed in the open-heart-surgery patient's chest begin collecting blood from hemorrhaging during surgery. The blood is drawn through tubes into a reservoir, filtered of any blood clots, and then returned to the patient's body by an intravenous pump, explains Aaron Hill, Fairfax Hospital's chief perfusionist who oversees the procedure.

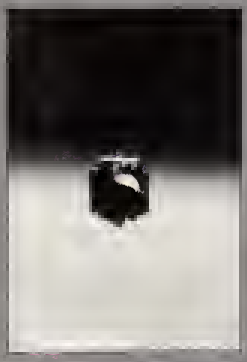
According to Hill, the cardiotomy reservoir chest drainage system greatly reduces complications following transfusions. Hepatitis and other diseases can be transmitted through transfusions; they are not picked up on screening tests one hundred percent of the time. In addition, people can have allergic reactions to foreign proteins from blood received from someone else. But the chances of reacting badly to your own blood are incredibly low."

Although it's presently being used only following heart surgery, Hill says the procedure is applicable to other chest operations in which there is bleeding into the thoracic cavity. "The chest is a sterile part of the body. But the abdomen is different because of the bacteria there. So I'm not sure how often the technique will ever be used in kidney or abdominal surgery."

—Sherry Baker

A new blood transfusion device eliminates the worry about AIDS and other infections by giving a patient's own blood back to him.

CONTINUUM



PAINT SHOWERS IN ORBIT

Pity the poor satellite: condemned to whirl about the earth in monotonous perpetuity, all but naked to the onslaughts of sun, solar wind, and stray radiation, easy prey for zipping meteorites. Now comes a pair of astronomers from the University of Washington to add a final insult to this litany of injuries. Seems that in at least one satellite the most common form of wound was caused not by any of the above but by chips of flying paint that peeled off other satellites.

M. R. Lawrence and D. E. Brownlee looked at four aluminum panels recovered from the *Solar Maximum Mission* satellite. In its four years in orbit, they found, *Solar Max* had been pinged by space debris at least 331 times. But when they looked closely at the microscopic craters left by these collisions, they found that only 20 of them contained the magnesium, iron, nickel, and other elements that are the fingerprints of a meteorite. Most of the remaining craters showed traces of titanium, zinc, and silicon—typical ingredients, says Brownlee, of the type of thermal control paint used on spacecraft. Apparently, ultraviolet radiation and the earth's oxygen plasma erode these paints, and when they peel, they pour, eventually forming an intermittent shower that chips away at other satellites.

Is the paint shower dangerous? Not in this size range, says Brownlee, although he notes that even tiny paint particles could damage a delicate optical instrument like an orbiting telescope. He also recalls an early shuttle flight in which the windshield of the spacecraft was pitted by a piece of flying paint. "There was no hazard," says Brownlee, "but NASA did feel it was prudent to replace the windshield." —Bill Lawren

BIRTH PATROL

A warning to free-choice advocates on vacation in Romania: Don't raise your voices in favor of abortion. In the first place, the Romanians have already heard it and have listened so well in fact, that the country's abortion rate—approximately three abortions for every live birth—is the highest in Europe. In the second place, Romanian strongman Nicolae Ceauşescu has decided to do something about it, and when Ceauşescu talks, his country listens.

Not content with mandatory monthly medical exams for married women—those found pregnant who do not deliver a child within nine months can be imprisoned—Ceauşescu has inaugurated "birth squads," teams of Communist Party functionaries and police agents who visit married women at home to ask why they aren't busy conceiving. These "surveys" are much more than gentle prods. Childless couples who cannot produce a medical excuse for their childlessness can be subjected to severe tax penalties.

How does Ceauşescu justify this? The fetus, "he says, "is the socialist property of the entire society. Giving birth is a patriotic duty that is decisive for the fate of the country. Those who refuse to have children are deserters, fleeing from the laws of our national continuity."

—Bill Lawren

Want a baby? If you live in Romania, you'd better want one. Pregnant women who do not deliver a child can be imprisoned.

"The scientist has no corner on wisdom or morality."
—David Krech

WALLPAPER IN SPACE

We already know that the space station will draw on the latest in high-tech advances: superfast computers, orbital maneuvering vehicles, remote manipulator arms. But what about the simple, everyday technology needed to run the station? Who's going to throw out the trash?

So far, there's no definite design for a garbage disposal system. "We know trash is a big problem in space, but we don't know exactly what form [trash disposal] will take," says Frances Mount of NASA. "In the U.S. space program we don't throw trash out. The Russians jettison their trash."

And garbage disposal is only one basic issue that could affect the happiness and productivity of crews in the space station. In fact, in a study conducted for NASA by Lockheed, more

than 100 such problems were identified These aren't life-and death issues says Mount the technical monitor's representative for the study "If they re not resolved it doesn t mean we won't be sending people to a space station On the other hand, it the issues aren t solved life in the space station may not be so pleasant

For instance one of the issues raised in the study is noise The shuttle is very noisy but shuttle flights are short-term So how much noise will be acceptable to the space station s residents who will be in orbit for 90 days at a shot? The question has yet to be answered

Even the decor of the space station presents problems What color should the walls be? What kind of lighting is necessary? How much, if at all should space-station residents be able to change the decor or personalize their living quarters? Mount for one, would like to see a type of adhesive-backed wallpaper Crew members could then put up whatever color or design they wanted in their personal quarters When their tour of duty was over they d simply peel off the wallpaper

No one expects to have the answers to these questions anytime soon—but the Lockheed study at least serves as a guide for the companies that will design the space station says Mount And later this year another NASA study will set definite noise light and other standards for the entire manned space program

—Devera Pine

NASA scientists have already worried about computers and manipulator arms in their space station. But what about the really important things, such as decor, color scheme and wallpaper?

DRUNKEN PEANUTS

A Department of Agriculture chemist has devised a sort of sobriety test for peanuts a huge cash crop in states like Georgia Alabama and North Carolina that can be ruined by an alcohol content that rises when the nuts are dried or cured under extremely hot or unseasonably low temperatures The process, called anaerobic respiration gives the peanuts a bitter taste

For some reason their cell structure changes and they begin to ferment at temperatures above ninety-five or below thirty-two degrees Fahrenheit, says Harold E Pattee a researcher at the government's agricultural research station at North Carolina State University in Raleigh

Before Pattee used a diode sensor that works like a smoke detector to sniff out alcohol vapors manufacturers had to rely on taste tests Now four food-processing companies are in the midst of a series of tests of the Pattee detector

Pattee hopes eventually to have his invention which sells for $725 installed in all 2 000 peanut-buying stations in the country

—George Nobbe

Peanuts have a sobriety problem when too hot or cold

CONTINUUM

The next scary threat in space may not be a voracious alien but an airborne bacterium. Microorganisms like bacteria take well to weightlessness, and some bacteria grow faster in space

NEW MENACE IN ZERO G

The astronauts in the orbiting space station are attacked by a mysterious alien—airborne invisible deadly. No weapon known to man is powerful enough to stop the silent invaders: they colonize the entire station, wiping out its inhabitants in the process.

This farfetched story could conceivably happen. Just substitute the word *bacteria* for *mysterious alien*.

Microorganisms like bacteria, it seems, take well to weightlessness. An experiment carried out on the Spacelab mission by Horst-Dieter Menningmann, professor of microbiology at the University of Frankfurt in Germany, showed that some bacteria can grow faster in space than they do back on Earth. Considering that the human immune system may not work as well in space and that some bacteria become more resistant to antibiotics, you could have the makings of a real problem.

There is, however, another side to this picture, says Menningmann. Fast-growing space bacteria could also be used to recycle the air and water of a space station, or to help manufacture various substances in space.

Menningmann isn't sure exactly why bacteria have such a quirky response to weightlessness, but he speculates that it may be due to the effect of radiation in space. Future experiments on the shuttle will tell for sure.

—Devera Pine

HYSTERECTOMY SCANDAL

Up to 80 percent of the more than 650,000 hysterectomies performed yearly are unnecessary and amount to little more than female castration, according to Dr. Vicki Hufnagel, a surgeon whose strong views have not exactly endeared her to the largely male medical fraternity in Los Angeles.

There *are* alternatives, she insists, adding that only in the case of cancer is removal of the uterus really mandatory. She calls the 90-year-old procedure—the most common one performed on women in the Western world—obsolete, adding, "It's easier for a surgeon to chop something out than to take the time, patience, and creativity to rebuild and reconstruct the uterus."

And that is precisely what she does, using microsurgery techniques, ultrasound, lasers, and sophisticated plastic surgery at Beverly Hills Medical Center, where she has performed more than 100 such operations. They have been very successful, she adds, with few of the major complications that often accompany hysterectomies.

Needless surgery subjects many women to a childless future

such as early menopause, early osteoporosis increased cardiovascular disease, and loss of sexual function "

She calls her technique female reconstructive surgery and though her patients come from as far away as Australia, she admits that hers is an uphill battle because "the medical profession, both male and female has been taught for years that hysterectomies are a solution to everything from fibroid tumors to cramps, especially in women over thirty-five '

—George Nobbe

LUNAR CONCRETE

Will the streets of America one day be paved with made-on the moon concrete? It's possible now that an Illinois researcher has made concrete out of 40 grams of lunar soil

T-D Lin, the principal research engineer for Construction Technology Laboratories Inc , formerly a division of the Portland Cement Association used the moon soil to make a one inch concrete cube and three minislabs each the size of a stick of chewing gum The soil served as aggregate in the concrete (Concrete is a mixture of cement, water, and aggregate—usually gravel)

Results? The samples held up well in strength tests—in fact they proved to be comparable to high-quality concrete made on Earth That may be due to the fact that unlike some earthbound aggregate the lunar aggregate contained no organic material Plus, the lunar soil bonded well to the other ingredients

Because it s also theoretically possible to produce water from lunar soil, Lin foresees the day when concrete will be made on the moon His next step looking at producing water and cement (a fine powder that on Earth is made from silica and limestone) from lunar soil —Devera Pine

"Space isn't remote at all It's only an hour s drive away if your car could go straight upwards '

—Sir Fred Hoyle

"The closest a person ever comes to perfection is when they fill out a job application form '

—Stanley J Randall

"No race can prosper until it learns that there is as much dignity in tilling the field as in writing a poem

—Booker T Washington

BEEFING UP LAMB

An experimental new ingredient for animal feed holds promise of changing the way lambs and beef cattle grow—making their meat more plentiful and much lower in fat

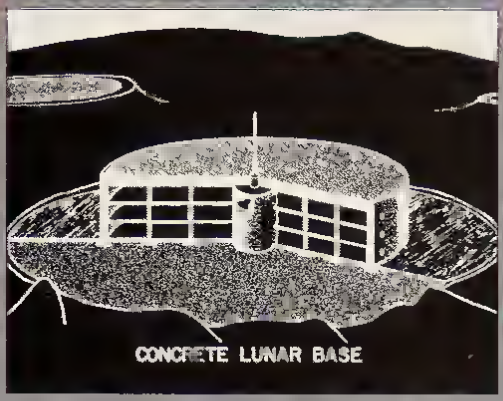
The dietary supplement called cimaterol could dramatically increase the efficiency of meat production *and* satisfy the cravings of health-conscious Americans for low-fat foods

In experiments at Cornell University a dash of cimaterol (about 1 ounce for every 100 000 ounces of standard feed) in the diet of lambs reduced the amount of fat in their bodies by 30 to 66 percent and increased the amount of muscle by 20 to 30 percent. What s more the animals remained healthy and did not grow any larger than normal

"We've set a new bench mark says Cornell animal scientist Donald H Beer mann, who conducted the experiments "Genetic selection didn't move us this far toward improving efficiency and composition"

Indeed Beermann explains genetic selection which involves the breeding of animals for certain desired characteristics sometimes backfires For example attempts in the late Sixties and early Seventies to breed hogs with less fat and more muscle yielded svelte but overexcitable pigs with porcine stress syndrome ' Strange environments upset these animals so much that a number of them actually died of aggravation en route to the slaughterhouse

Cimaterol, however, seems to have only a temporary effect on the animals heart rates and related functions It was derived from a group of substances related to adrenaline and developed as a dietary supplement by American Cyanamid Company —Dava Sobel



Someday concrete may be made on the moon Concrete made with lunar soil proved as strong as any concrete made on Earth

Now sheep are reducing their fat and putting on muscle

CONTINUUM

CHOCOLATE ROBOT

A chocolate-decorating robot has recently been developed by a British company for a West German machine manufacturer The two firms have spenf several years developing a machine vision system to guide a piping nozzle thaf can deco rate as many as 60 pieces of chocolafe per minute as fhey slide down a conveyer belt on their way to their boxed packages

The one-armed robotic system was developed for Otto Haensel Machine Company, Inc by A J Cronshaw among others at PA Technology in Cambridge England The robot is capable of recognizing and discarding misshapen chocolafes stuck together as well as oversize or undersize pieces all fhe bane of the packager

The system according to Cronshaw consists of a TV monitor hooked into a microcomputer that is programmed to the needs of hazelnut slices rum marzipan, mandarin truffles lumpy nut or fruit-filled pieces and even continental cups 'If s highly cost effective and laborsaving in a labor-inten sive industry,' says the Englishman

It would be nice to have but difficult to justify counters one American manufacturer, referring fo a price tag for the robot that is so far a closely guarded secref in a closemouthed industry Some $150 000 per arm is a sound estimate with any producer worth his nougat filling needing some ten machines It all depends on production needs Many mass manufacturers use enrobers and shell-molded pieces that would not lend themselves to robotics

Says Sam Bruce, Haensel's man in Toronfo We are talking to money people in the United States In many cases they don t need a robot they need a mechanical system So far the chocolate robot is now widely used only in Europe

—George Nobbe

The art of medicine consists in amusing the patient while nature cures the disease '

—Voltaire

Of 20 coin tosses how many should you be able to predict by chance alone? Psychic believers oddly enough said 79

PSYCHOKINESIS: JUST BAD MATH?

People who believe in the paranormal are probably not nuts just a little rusty in the math departmenf

After finding that most people believe in parapsychology, psychologists Tom Trosclanko and Susan Blackmore of the University of Bristol set ouf to discover why They began by asking 100 medical students questions about probability

'The believers performed fairly badly ' Trosclanko says They were more likely fo believe for example, thaf a coin would be biased if it came up heads three out of four times or that if a coin came up heads four times in a row fhe next time it would probably come up tails

To see how the believers and skeptics would really do in a coin toss, the researchers rigged a computer to show a flipping coin that would randomly stop on heads or tails when the subjects pushed a button They were told when to try for heads or tails

The believers were con vinced they were 'controlling' the computer When asked how many of the 20 fosses they would have gotten by chance alone, the average response was 79 rafher than 10 the correct answer which fhe nonbelievers usually offered "If people think they would be getting eight right by chance, and they see themselves getting ten right they might think they re doing something clever ' Trosclanko says

For these poor mathematicians says the psychologist beliet in fhe paranormal is "continuously reintorced even when it has no basis in fact —Vincent Bozzi

No person should be denied equal rights because of the shape of her skin

—Pat Paulsen

"Drop the question what tomorrow may bring, and count as profit every day that Fate allows you '

—Horace

"The joy of living, its beauty is all bound up in the fact that life can surprise you '

—Frank Herbert

ARTICLE

A NIGHT AT THE MOVIES

You're invited to a private screening of Hollywood's greatest minds. Come as you are

BY MARION LONG

Mel Brooks, Richard Attenborough, Michael Douglas, Susan Seidelman, David Lynch, John Sayles, John Schlesinger. They're all accomplished film directors of this century. You know that already. You are, however, probably wondering why they're featured in *Omni*. What you're about to read is the result of a unique project. Contributing editor Marion Long tracked down these giants of film in editing rooms, on sets, and in postproduction facilities around the globe and asked them to provide us with treatments of films they would like to do in the future. Everything that you read is theirs: titles, plots, stars, and comments.

So race ahead to the next century, say the year 2001. It's a cool evening in early June, and you're going to the Metropolis Deco-Plex for a night of entertainment. Because you'll be able to choose many movies at one complex, robots, prepared to describe each movie and give a sense of the plot, the time period, the cast, and the crew, will welcome you. Features will be presented on hemispheric screens in Dolby Showscan, and most theaters will be equipped with Sensavision. As you wait for the movie of your choice, you'll browse through the shops, perhaps to pick up a script of the movie you're about to see or to sip a metabolically balanced beverage in a high-tech café. Maybe you'll stop at a refreshment stand and sample the rich variety of snacks, including 25 flavors of popcorn, Mars bars (direct from the red planet), and vegetable shish kebabs.

A robot announces that the feature presentations, showcasing seven directors from the latter half of the twentieth century, are about to begin. Get your popcorn, settle back, and join us on this voyage into the future of film. (If you're unhappy with the film's ending and wish to redirect it, interactive video versions are available.)

PHOTOGRAPH BY ELLE SCHUSTER

THEATER ONE

A David Lynch Film *Ronnie Rocket*

Starring Harry Dean Stanton, Brad Dourif, John Nance, Dean Stockwell, Isabella Rossellini

Music Angelo Badalamenti

Cinematographer Freddie Francis *(The Elephant Man, Dune, The French Lieutenant's Woman)*

Sound engineer Alan Splet *(The Black Stallion, Eraserhead)*

Genre Absurdist comedy

Time That's for you to judge

Sample dialogue "Life is a doughnut."

Setting Hoboken, New Jersey, a small industrial town retaining much of its twentieth-century flavor. The atmosphere is very dark. The film was shot mostly at night.

Synopsis In this film-noir comedy about electricity, the main character, Ronnie Rocket, has 60-cycle alternating current running through his body. Ronnie's about three and a half feet tall, with lots of physical problems, though nobody's quite sure of their cause. He wears a red wig in a pompadour style and has acne. His age somewhere between sixteen and sixty.

The film is set in two dark industrial worlds; it's up to you to decide which is real and which isn't. Lynch contrasts this slice-of-life drama with surreal images and bizarre mutations. Cinematographer Francis' smoke-filled frames heighten the sense of the natural world.

Lynch Dreams

I love things that are absurd. They are very real to me. This is a world of confusion and imbalance, and I don't think it's going to change. If there is one artist that I feel could be my brother, it's Franz Kafka. I'd love to put his story "The Metamorphosis" on screen. His stories involve surreal events, and I love the combination of the real and surreal.

When making a film, you have to be true to your ideas, because they are bigger than you are. Once you get inside an idea, once you step into that world, you discover its rules. You had better follow them, or the audience will know you're not being honest. And following those rules may mean producing strange images or disturbing ideas. But you must go inside that world and work inside that dream. It's a magical phenomenon. You don't know what's going to happen. You may even find a source for your next five films.

There are lines I feel I would like to cross over sometime in the next century, even if only to see what would happen. For me, such a line would be wacko comedy. And although I really like people—I like what they think about and what they worry about—I wouldn't mind making a film about sheep. I'd have to meet a lot more of them, though.

What I'm drawing right now: I want to include in this film. I'm interested in things that are almost like smoke—ethereal, transparent. (These effects are hard to get in paint, which is kind of opaque, but with conte crayons or pastels, the effect I want just happens perfectly.) I want to create a mood—an atmosphere that acts like a magnet—so that you feel something and you float into the drama.

Omni: How will you use special effects in this film?

Lynch: I learned from working on *Dune* that what is done in front of the camera is much more successful optically than what happens later. In *Eraserhead*, for instance, almost all the effects were done in front of the camera. What you see is what you get. By lifting things out of the natural environment, I portray them in a very imaginative, intensified kind of state, like the greenery, blood-red roses and white picket fence in *Blue Velvet*. Everything seems hectic and heightened, but it's all organic, and that's the way I want to keep doing things.

OSCAR 2001

It's March 9, 2001, and the world awaits the seventy-third annual Academy Awards, hosted by Stanley Kubrick. The week-long extravaganza is broadcast live from the Dorothy Chandler Pavilion.

Breaking all tradition, *Omni* has obtained exclusive permission from Price Waterhouse to announce several winners in advance. This year's first production number features Kubrick's pal Hal doing a rendition of "Daisy, Daisy," as the Rockettes perform synchronized space swimming. The highlight of the week will be the cryogenic revival of Walt Disney. He will receive, for the second time, the Irving G. Thawlberg Award for lifetime achievement.

Several new categories will be announced this year, including best performance by an alien in a leading role, best art direction by a computer, and best holography. *The Jetsons* will receive the award for best off-Earth art direction and set design. Michael Douglas will receive this year's award for best interactive film. (The award for best effort in a sequel will go to Sylvester Stallone for *Rocky XV: Rocky Fights His Clone*.)

In a startling departure from academy form, Sally Field declined this year's best-actress award in advance, saying, "I don't like you anymore."

In a stunning finale every Oscar winner dead or alive will march onstage and sing "There's No Business Like Show Business," led by an electronic Ethel Merman.

This year's nominees for best film include *Ronnie Rocket*, *Eight Men Out*, *Virgin Kisses*, *Hadrian VII*, *She Stoops to Conquer*, *Thomas Paine*, and *Yankee Doodle Sweetheart*.

Th-th-th-that's all, folks. See you next year, when computer-interactive processes still in development will bring Max Headroom in person into your home.—Mary Salinger Glucksman

Directors' credits: Seidelman: Smithereens, Desperately Seeking Susan, Making Mr. Right. *Lynch:* Eraserhead, The Elephant Man, Dune, Blue Velvet. *Attenborough:* A Bridge Too Far, Gandhi, A Chorus Line. *Sayles:* Return of the Secaucus Seven, Baby, It's You, The Brother from Another Planet. *Schlesinger:* Midnight Cowboy, Marathon Man, The Falcon and the Snowman. *Brooks:* The Producers, Blazing Saddles, Young Frankenstein. *Douglas produced:* One Flew Over the Cuckoo's Nest, The China Syndrome, Romancing the Stone.

Omni: Why is music so important to you?

Lynch: I got into film through painting, and as a painter I'd make up sounds in my head to create a mood for a painting. Sound is superimportant—much more powerful than most people realize. It is the magic ingredient—the bending and shaping of the sound to produce textures that alternately complement and contrast with the tone and texture of the rest of the film. For example, the wind in *Eraserhead* gave the film a science-fiction feeling, and the roar of the machinery in *Elephant Man* worked against the reserved feeling of the rest of the film.

I think the new equipment sounds too electronic, too clean and plastic. It turns me off. But I haven't had a chance to fiddle with the latest machines. I'm not saying I won't use technology in the future. The speed is fantastic, and if it can sound organic, I'd love to mix the old and the new together. In the future, films will have to achieve an artistic shape that remains satisfying time and again. The question won't be who is in the film or what the plot is, but the way it looks, the way it sounds. Film can tell a story, but it can also turn itself into a symphony of visuals and sounds working together to create a powerful experience and put you in a new place. Once that happens, the audience really will want the experience. If I knew how to do it now, I'd be doing it.

THEATER TWO

A John Sayles Film: *Eight Men Out*

Music: Electronically re-created blues and jazz performances by King Oliver and Louis Armstrong

Cinematographer: Garrett Brown (inventor of the Steadicam and Skycam)

Genre: Sports drama

Time: 1919

Settings: Chicago and Cincinnati

Synopsis: In 1919 eight members of the Chicago White Sox were charged with accepting payoffs from gamblers and deliberately throwing the World Series to the Cincinnati Reds. Sayles focuses on the "Black Sox" scandal and the eight players involved, moving from the fix itself through the Series, trial, and aftermath. Using the most sophisticated movie cameras and shooting techniques available, Sayles takes the classic sports film to new heights. For the first time in movie history the audience gets a sense of what it's like to play each position—to feel the blinding speed of a fastball and the thump of the ball as it's caught at home plate. But, more dramatically, Sayles projects the audience into the minds of the main characters (Lefty Williams, Eddie Cicotte, "Shoeless" Joe Jackson, Chick Gandil, and Buck Weaver).

Sayles on Sayles: I want to re-create the world of 1919 in as highly sophisticated a manner as possible, conveying technically and dramatically the kind of skill and ability it takes to play baseball the way these guys played. To get the audience inside the heads of the players—to get deeply into their psychology but still have an entertaining movie—is very difficult to accomplish. I just have to get better at what I'm doing.

I hope recent advances in technology help in filming this story. As film stock gets faster, night scenes should be psychologically more like the way we perceive darkness and less like the old day for night—an accepted cliche. There's a couple of process shots I'd love to get in this film. If this is the future and anything goes, I'd love to re-create what happened in Times Square. As you know, they didn't have TV in 1919. They didn't even have direct hookup radio. A kind of crystal set transmitted the sound of the person in your vicinity who was announcing the game. The announcer simply watched a ticker tape and re-created the game for the radio audience. At the top of the Old New York Times Tower in Times Square was a huge mock-up board of the World Series game—a baseball diamond with bases. Men on scaffolds with long poles would hear the ticker-tape report of, say, somebody reaching first base, and they would move the cardboard cutout of the player to first and await the next report. Thousands upon thousands upon thousands of people stood around in Times Square watching the game, looking up at the board.

Omni: Tell us about your future.

Sayles: What interests me about the future is not the future itself or the technology of the future but what people are going to do in the future. I'm interested in what is going to happen next. In the last fifty to one hundred years, especially in this country, traditional culture has been dying out—in some places slowly, in other places fairly quickly. What will people do to replace that traditional culture?

There aren't any particular modes of existence I feel more impelled to examine than others. I'm interested in both insiders and outsiders, in different cultures and subcultures and in their interaction.

In some ways the future looks difficult. Being on the fringe of the industry is like living in a very small hut during an earthquake. When there's any kind of rumble, your hut gets shaken up the most. The two most important factors that will determine whether alternative, non-Hollywood movies get made are distribution and exhibition. I hope that independent theater owners can hold out. There used to be more than one hundred rep houses around the country. Because the movies they showed are available on videocassettes, only a handful are left—a change that happened very, very rapidly.

On the other hand, the videocassette offers new possibilities. If costs are kept down, movies could become like the publishing industry of ten years ago, not the monopolistic publishing industry of today. That is, you'll be able to make a movie that is the equivalent of a kind of difficult first novel: get it "published" in a limited edition at selected video stores, and make enough money to finance another half-million-dollar movie.

THEATER THREE

A Susan Seidelman Film: *Yankee Doodle Sweetheart*

Starring: Marilyn Monroe, Robert De Niro, Debra Winger, Jimmy Stewart

Genre: War movie

Time: Late twentieth century

Setting: War-torn Central America

Synopsis: Seidelman electronically re-creates Marilyn Monroe. The sex goddess of the Fifties plays a showgirl off to the front lines of a war on a Bob Hope USO tour. In sharp contrast to Monroe's innocence and naïveté stands Debra Winger, a military nurse acutely aware of the horrors of war. But this is Monroe's story—her coming-of-awareness. Robert De Niro, a Marine sergeant deadened to human emotion, wants one thing: the showgirl. So does his friend, a young recruit, played by a computer-simulated Jimmy Stewart. Monroe falls in love with—you'll have to see the film.

Seidelman Says: What interests me as a possibility for the future is to take the various film genres and see them through a female perspective. There are lots of genres, and I like the idea of taking formulas and turning them around a bit. *Desperately Seeking Susan* was a genre film, a screwball comedy using a corny device of amnesia. But the movie wasn't about amnesia or stolen goods; it was a story about contrasting life-styles.

In a way, I guess I'm a sociologist. I'm interested in patterns of behavior and different modes of existence. I'm fascinated by modern life, how we talk, think, and live. And I love it when different elements come together and clash—when worlds collide. Modern life is increasingly fascinating to me because the times change at such a rapid rate. It's weird because in the past, change seemed to take so long. If you look at the Middle Ages, it seems that three hundred years are whomped together at a time. But today, the Seventies already are seen nostalgically. I see people who are just ten years younger than I am, whose life experiences and the way they view the world are totally different from the way I view it.

Omni: How will this film differ from other war movies?

Seidelman: There will be more detail. In

fact, I notice a greater attention to detail in films directed by women. I don't know if it's a stereotype or not, but it's said that when men do a picture about war, they portray it with sweeping strokes. I tend to view the world in details and hope that the details say things larger than themselves or represent bigger things.

Casting also is really important. In painting, the colors you choose determine the outcome. I want to work with actors who have something interesting about them as people, something that fits the character. I like a bit of the actor's persona to come through in the character. I also like to cast against type and to work with unknowns. I know a butcher on Prince Street in New York who's got a great face and an interesting personality. I'd like to work with him someday.

Omni: How do technological breakthroughs fit in with your general philosophy of filmmaking?

Seidelman: One of the things that excites me most about the idea of making films in the future is the chance to use technology to reach the humanity of the characters, to make the characters more interesting, rather than simply using technology for technical flash—to enable a character to engage in laser fights.

In the movie *Making Mr. Right*, John Malkovich plays two different characters. I wanted his characters to be believable and psychologically involving. I didn't want the film to look like *The Patty Duke Show*, with the actor simultaneously appearing on both sides of the screen and a pole running down the middle to hide the matte line.

I used motion-controlled cameras, computer-controlled cameras, and computer image processing to bring the two characters together without being limited to "over the shoulder" or "split screen" shots. You can do moving shots with an actor and have the same actor in the frame twice with the camera moving at the same time.

I'm really fascinated by some of the techniques I've seen used in rock videos or in TV shows like *Pee Wee's Playhouse*. Strangely enough, these techniques aren't being used in film. When I think about how I could use new equipment to relate the story or make the character more believable, wonderful ideas open up. Also, interactive video hasn't really been tapped yet. People haven't figured out how to use it in a real dramatic context yet. The technique could involve the viewer more and make a story really work.

Omni: Is it becoming harder for directors to experiment?

Seidelman: In Hollywood today you're only as good as your last movie. People look at the last film you directed and decide whether they like you. If they don't, they move on to whoever is the "flavor of the week." It's a real problem. If you experiment a bit, you'll flop sometimes. That's okay. Hopefully, you've grown, at least you've tried something new. But the times we live in don't lend themselves to much experimentation. There's a cultural insecurity caused by so much rapid change. Directors and actors don't want to disappoint their audiences. And films are very expensive to make. The videocassette has already influenced the industry, and we must adjust to the fact that people are saying, "I'll wait until that movie comes out on video." The movies I go to see are the ones that, for whatever reasons, I think I have to see on a big screen. Theaters will have to become like Radio City Music Hall or a Ziegfeld theater, a place to see shows, spectacles. As for what's ahead, I know my films will be tied to the concerns of my particular generation. I also would like to have my own production company, primarily because of the cost of filmmaking. To have control

CONTINUED ON PAGE 100

SISKEL ON EBERT—EBERT ON SISKEL

Omni: What do you hope disappears from movies in the next century?

Roger Ebert: Chase scenes.

Gene Siskel: Mad slashers.

Ebert: Dead teenagers.

Siskel: Horny teenagers. The garbage in films will always be there. In the last few years, though, it's been overwhelming. But it will still exist in the future, and we'll still be complaining. I suppose the focus shouldn't be on changing the dummies or the blockheads but on freeing up both the resources and the venues for viewing the work of the artists. Let the geniuses free, and let their films be financed and seen. That's probably the best thing I've said in some time. I hadn't thought of that before. I should operate that way in my own life—ignore the dumbbells.

I think we're coming out of a trough. I became a film critic at a very hot time, in the late Sixties and early Seventies. From 1967 to 1975, young American directors tried to make the great American movie. *Bonnie and Clyde*, *The Graduate*, *Five Easy Pieces*, *Easy Rider*, the *Godfather* films. That period ended with Martin Scorsese's *Taxi Driver*. The critical fulcrum was *Jaws*, which drew big, repeat, and young business. The phenomenon was reinforced with the *Star Wars* films, beginning in the summer of 1977. Suddenly, the executives were assigned to find what were called "breakthrough" films—films that would break through the one-hundred-million-dollar mark at the box office. A huge box-office hit ran the studio for a year and covered a whole year's worth of mist. Kiss.

Once this mentality captured the fancy of Hollywood, a whole bunch of people were trying to make the great American hit instead of trying to make the great American movie. A new way of thinking evolved, a focus on the audience. It's a television mentality—to rope in the greatest number of people to watch the commercials. And then the business really got sick in the Eighties, with the mad-slasher and the horny-teen films.

Omni: How will the fierce competition between television and the movies work out in the future?

Ebert: We will have high-definition, wide-screen television sets and a push-button dialing system to order the movie you want at the time you want it. You'll not go to a video store but instead order a movie on demand and then pay for it. Videocassette tapes as we know them now will be obsolete both for showing prerecorded movies and for recording movies. People will record films on 8mm and will play them back using laser disk/CD technology.

I also am very, very excited by the fact that before long, alternative films will penetrate the entire country. Today seventy-five percent of the gross for a typical art film in America comes from as few as six—six—different theaters in six different cities. Ninety percent of the American motion-picture marketplace never shows art films. With this revolution in delivery and distribution, anyone, in any size town or hamlet, will see the movies he or she wants to see. It will be the same as it's always been with books. You can be a hermit and still read any author you choose.

Omni: Are movies likely to get better or worse between now and 2000?

Siskel: Better. How much better? I don't know. But we are coming out of a down cycle. I think we reached a bottom in the last few years—not necessarily the bottom, but certainly a bottom. And when things get really bad, that's when the seeds of rebellion are planted. The word is out: it's script, script, script that matters. I thought Steven Spielberg's speech at the Academy Awards saying that we have to return to our romance with the word was very well-intentioned. What's important is a director with a personal vision, and not the stars or an agent with a client list trying to package a film.

Isn't it a coincidence that even with

CONTINUED FROM PAGE 96

FICTION

THE VISITATION
AND OTHER DIVINE ENCOUNTERS

Nine fantasists unleash their imaginations to explore the mysterious nature of God and the effects of our religious beliefs

The Trinity arrived in Rebecca Sandia's backyard, under a blossoming almond tree, in the early hours of Easter morning. She watched it appear as she sipped tea on her back porch. Because of the peace radiating from the three images—a lion, a lamb, and a dove—she did not feel alarm or even much concern. She was not an overtly religious person, but she experienced considerable relief at having a major question—the existence of a God—answered in the affirmative. The Trinity approached her table on hooves, paws, and wings;

PAINTING BY ERNST FUCHS

and this, she knew, expressed the ultimate assurance and humility of God—that He should not require her to approach Him.

"Good morning," she said. The lamb nuzzled her leg affectionately. "An especially significant morning for you, is it not?" The lamb bleated and spun its tail. "I am so pleased you have chosen me, though I wonder why."

The lion spoke with a voice like a typhoon confined in a barrel.

"Once each year on this date we reveal the Craft of Godhead to a selected human. Seldom are the humans chosen from My formal houses of worship, for I have found them almost universally unable to comprehend the Mystery. They have preconceived ideas and cannot remove the blinds from their eyes."

Rebecca Sandra felt a brief frisson then, but the dove rubbed its breast feathers against her hand where it lay on the table. "I have never been a strong believer," she said, "though I have always had hopes."

"That is why you were chosen," the dove sang, its voice as dulcet as a summer's evening breeze. The lamb cavorted about the grass, and Rebecca's heart was filled with gladness watching it, for she remembered it had gone through hard times not long ago.

"I have asked only one thing of My creations," the lion said, "that once a year I find some individual capable of understanding the Mystery. Each year I have chosen the most likely individual and appeared to speak and enthuse. And each year I have chosen correctly and found understanding and allowed the world to continue. And so it will be until My creation is fulfilled."

"But I am a scientist," Rebecca said, concerned by the lion's words. "I am enchanted by the creation more than the God. I am buried in the world and not the spirit."

"I have spun the world out of My spirit," the dove sang. "Each particle is as one of my feathers, each event a note in my song."

"Then I am joyful," Rebecca said, "for that I understand. I have often thought of you as a scientist performing experiments."

"Then you do not understand," the lion said. "For I seek not to comprehend My creation but to know MySelf."

"Then is it wrong for me to be a scientist?" Rebecca asked. "Should I be a priest or a theologian, to help You understand YourSelf?"

"No, for I have made your kind as so many mirrors that you may see each other, and there are no finer mirrors than scientists who are so hard and bright. Priests and theologians, as I have said, shroud their brightness with mists for their own comfort and sense of well-being."

"Then I am still concerned," Rebecca said, "for I would like the world to ultimately be kind and nurturing. Though as a scientist I see that it is not, that it is cruel and harsh and demanding."

"What is pain?" the lion asked, lifting one paw to show a triangle marked by thorns. "It is transitory, and suffering is the moisture of My breath."

"I don't understand," Rebecca said, shivering.

"Among My names are disease and disaster, and My hand lies on every pockmark and blotch and boil, and My limbs move beneath every hurricane and earthquake. Yet you still seek to love Me. Do you not comprehend?"

"No," Rebecca said, her face pale, for the world's particles seemed to lose some of their stability at that moment. "How can it be that You love us?"

"If I had made all things comfortable and sweet, then you would not be driven to examine Me and know My motives. You would dance and sing and withdraw into your pleasures."

"Then I understand," Rebecca said. "For it is the work of a scientist to know the world and control it, and we are often driven by the urge to prevent misery. Through our knowledge we see You more clearly."

"I see MySelves more clearly through you."

"Then I can love You and cherish You, knowing that ultimately You are concerned for us."

The world swayed, and Rebecca was sore afraid, for the peace of the lamb had faded, and the lion glowed red as coals. "Whom are you closest to," the lion asked, its voice deeper than thunder, "your enemies or your lovers? Whom do you scrutinize more thoroughly?"

Rebecca thought of her enemies and her lovers, and she was not sure.

"In front of your enemies you are always watchful, and with your lovers you may relax and close your eyes."

"Then I understand," Rebecca said. "For this might be a kind of war, and after the war is over, we may come together, former enemies, and celebrate the peace—"

The sky became black as ink. The blossoms of the almond tree fell, and she saw, within the branches, that the almonds would be bitter this year.

"In peace the former enemies would close their eyes," the lion said, "and sleep together peacefully."

"Then we must be enemies forever?"

"For I am a zealous God. I am zealous of your eyes and your ears, which I gave you that you might avoid the agonies I visit upon you. I am zealous of your mind, which I made wary and facile, that you might always be thinking and planning ways to improve upon this world."

"Then I understand," Rebecca said fearfully, her voice breaking, "that all our lives we must fight against you, and—but when we die?"

The lamb scampered about the yard, but the lion reached out with a paw and laid the lamb out on the grass with its back broken. "*This is the Mystery*," the lion roared, consuming the lamb, leaving only a splash of blood steaming on the ground.

Rebecca leaped from her chair, horrified, and held out her hands to fend off the prowling beast. "I understand!" she screamed. "You are a *selfish* God, and Your creation is a toy You can mangle at will! You do not love, you do not care, you are cold and cruel!"

The lion sat to lick its chops. "And?" it asked menacingly.

Rebecca's face flushed. She felt a sudden anger. "Then I am better than You," she said quietly, "for I can love and feel compassion. How wrong we have been to send our prayers to You!"

"And?" the lion asked with a growl.

"There is much we can teach You!" she said. "For You do not know how to love or respect Your creation, or YourSelf! You are a wild beast, and it is our job to tame You and train You."

"Such dangerous knowledge," the lion said. The dove landed among the hairs of its mane. "Catch Me if you can," the dove sang. For an instant the Trinity shed its symbolic forms and revealed its true Self—a thing beyond ugliness or beauty, a vast cyclic thing of no humanity whatsoever, dark and horribly young—and that truth reduced Rebecca to hysterics.

Then the Trinity vanished, and the world continued for another year.

But Rebecca was never the same again, for she had understood, and by her grace we have lived this added time.—*Greg Bear*

"The lion roared, consuming the lamb, leaving only a splash of blood steaming on the ground. Rebecca leaped from her chair and held out her hands to fend off the prowling beast."

HIDE AND SEEK

It had been a long, demanding task. For a whole decade he had never left the library where he worked, filling up one page after another, piling them up, rereading them a few months later, slowly creating a colossal universe of mathematics into which he, and he alone, might voyage. Partway through the tenth year he perceived the dim outline of the result. The ultimate equation. The unsurpassable solution. Mathematical proof of the existence of God.

He had had to take every factor into account, build an exact theoretical model of the cosmos, combine a million coordinates, tie them into tidy bundles, set light to them, and weigh their ashes. But now—

now he knew the ultimate equation he was writing it down he was proving it So extremely simple was it that it covered only about a thousand pages He toiled for twenty hours a day Three months of this exhausting labor saw his work complete the supreme achievement of the human spirit He inscribed the final line fondly shaped the final symbol, scrawled a dash across the bottom of the page and wondered whether to add THE END in capitals

Then the Voice spoke to him almighty majestic overwhelming resounding from everywhere and nowhere Terrified he leapt to his feet

"Good!" said the Voice "You have found Me Now it's your turn to hide I shall count to a million A million years that is

"Don't try to cheat!"—*Gérard Klein*

From La Loi du Talion (*Éditions Laffont, 1973) Translated by John Brunner English version copyright © 1976 1985 Brunner Fact & Fiction Ltd*

GOD'S HOUR

Tillery always dropped in at the Twelfth Street Tavern to watch *God's Hour*

In the United States the earthly emissaries of the Deity had chosen CBS to broadcast the program Watching it at eight o'clock (EST) every Thursday evening on the network of the disembodied eye was mandatory, so it always had a one-hundred-percent share of the ratings for its time slot The other commercial and cable networks simply went off the air for that hour

Tillery a convicted child murderer eased his way through the crowd in the Twelfth Street Tavern keeping his elbows in and perfunctorily apologizing to anyone he bumped A man already at the bar politely insisted that he take his stool Tillery murmured a listless thanks, climbed up on the stool called for a beer and turned his ashen eyes on the magnesium-bright screen mounted like an oversize mirror behind the bar

"I can't stand television" said the burly man sitting next to him "I'd rather dig ditches than watch most of the garbage they try to cram down our throats, but I *love* this program I mean, I out-and-out *love* it I wouldn't miss it for five nights in a Hollywood harem"

"You die if you miss it," Tillery said

"Well there's that" the burly man admitted "but it's not the clincher I mean, I always feel spiritually cleansed—inwardly refreshed, you know As a kid I wasn't a churchgoer, but in the three years the Deity's been on, well, it's made me appreciate the rejuvenating aspects of weekly worship"

Tillery sipping his beer, gave the jerk a stare that shut him down as effectively as a slap

After the first thirty-six-episode season of *God's Hour* broadcasts (followed apparently, by a summer of reruns), every detention center in the world had released its inmates That was how Tillery had escaped a life sentence for sexually brutalizing and killing, ten years before the first *God's Hour*, a snotty little Chicano twerp in El Paso So yes, the program had neutered even his old antisocial tendencies

Tillery was glad to be out, he watched *God's Hour* faithfully, he was walking the straight and narrow—but unlike the meathead next to him, he *hated* the Thursday-evening broadcast For one thing, after the program all that you could recall of it was its commercials The regular sponsors were Coca-Cola, Chevrolet, Oscar Mayer Franks, and Sara Lee Kitchens whose colorful spots came on at roughly twelve-minute intervals, lucid little cheerleading sessions in the telecast's phosphor-dot ocean of hypnopedagogical vagueness During the spaces between the commercials you gazed blankly at the ineffably shining face of God mindlessly imbibing Glory No one knew *exactly* what these minutes consisted of though because memory failed, and it was technically impossible to videotape or by any other means reproduce a *God's Hour* episode

Thursday was the evening of mandatory viewing—primarily said the Deity's earthly emissaries (most of them persons of great wealth and/or political influence called to service by apocalyptic dreams) because more folks were naturally at home on Thursday than on the weekend and because God had no wish to alienate the rabbis priests ministers and other responsible clergy who passed their collection plates on Friday Saturday or Sunday

The CBS eye took shape on the screen a Coca-Cola spot briefly effervesced and a scary hieratic glow filled the tavern Everyone fell silent Eyeballs glazed brains blanked out and Tillery—resisting the irresistible—heaved a sigh that shuddered through his wiry chest Caught in an even bigger than usual Thursday night crowd he was still somehow alone with his God and an angry corner of his mind fought like crazy against the unasked-for pairing Only not quite overcome by the mother of pearl images flooding him from the screen Why did all the shits around him submit so docilely to this celestial brainwashing? You might have to park your heinie on a stool to watch it but who but God said you had to surrender even your last deep down scrap of personal identity to the autocratic First Farter's television show?

No one that's who

Absolutely no one who *counted*

A Chevrolet commercial interrupted the hypnotizing blarney of the show's opening segment Tillery drained his beer and asked for another as the turkeys around him shook themselves to life again mumbled incoherently hurried to get their own refills Whereupon the ad for a Nova was suddenly displaced by a nova of Godlight that plunged nearly everyone back into grinning stupefaction Tillery's teeth were on edge though and an angel observing him would have seen a face locked in a resentful rictus

Since the first telecast wars had ceased crime had vanished terrorism had halted and even petty disagreements had become a passion of the past The Supreme Being still permitted accidents natural disasters and inexplicable terminal ill

a resumption of broadcast Godliness with the familiar earsplitting warning buzzer Everyone else made it too but some of the poor jokers had to finish watching with their legs crossed And then it was over and the second highest rated program in the land (probably because of its strong lead-in) a show about hard-boiled cops retraining as nursery-school teachers, came on Most of the tavern's clientele either turned away from the screen with their beers or filed out into the winter darkness Tillery being one of those who opted to go A cozy glow suffused him, but his apartment was empty and in the morning he'd be back at his job as a foam-extrusion operator for an insulation firm on the outskirts of town Happy happy

Someone at the Twelfth Street Tavern's door bumped him

It was the lard-ass who'd been sitting beside him at the bar He patted Tillery on the shoulder "Say, fella, I'm sorry, really sorry Will ya forgive me? Can ya huh?"

"Yeah" Tillery mumbled "Sure

"Wasn't tonight's show great?" the jerk continued "I mean, wasn't it just about the best and most uplifting episode in the whole ever-lovin' series so far?"

Tillery stepped back from the man "Don't press your luck" he said Then he eased himself sideways through the door—out into the God-pervaded night

—Michael Bishop

QUEST'S END

The deed is done And done pretty well, I might add

The princess lies dead on the floor of my cave, amid the strewn bones of centuries' worth of heroes, wizards, princes, princesses dwarfs, and elves, and the fragments of nine broken swords committed to their task—another possible reign of sweetness and joy I've clipped before its bud might unfold

I run the rasps of my tongue across my fangs, savoring the acrid taste

The last hero is twisted at an impossible angle in the corner his magic blade shattered It was the tenth and final one of that brood of evil piercers forged an age ago by the minions of Light to account for my master and those such as myself who serve him How delicious! The ring I guard remains in the jeweled cask within the niche at my back

Pieces of their faithful dwarf companion are strewn along the passageway I can see the small hand that still holds the ax Had the little man actually thought he could reach me or do me harm with that pathetic weapon?

Only the old wizard still draws breath But I have shattered his staff and scattered his power down ways of darkness I have granted him a few moments more that I might mock him and see him die cursing the powers he had served

"Do you hear me Lortan?" I ask

"Yes Bactor" he answers weakly from where he fell his back against the wall to my left legs thrust at crazy angles Then "Why do I still live?" he asks

"For a bit of terminal amusement wearer of the Light If you will curse all that is good and beautiful and true and noble I will give you a quick death

"No thanks," he answers

"Why not? You have failed as did the nine before you You were the last It is over The good guys lose ten to nothing

He does not respond so I goad him further "And your hero—Eric Broadthew, or whatever you call him—didn't even touch me with that weapon The last one at least caught me a good one across the shoulder before I dismembered him

We were the worst of the lot you faced? he inquires

"Oh I wouldn't go that far" I say But you were hardly the best "

"Humor a defeated old man and tell me Who was the best?"

I chuckle "Easily done" I answer "Gloring, of the Second Kingdom He came so close to killing me that it was beautiful The arc of his blade Dammer came down like a bolt from the heavens The muscles of his arms rippled like the tides of the sea He glowed with the sweat of his exertions He cursed me so wondrously it was like a poem I stood transfixed Barely only barely did I stop him, and it took all of my dark magic rather than the strength of my body Verily it was Gloring and Dammerung who were the greatest "

"Alas, poor Eric could not beat an act like that "

"No, nor any other I have encountered And now my lord Glaum's reign will never end, for the Darkness has vanquished the Light There are no more to be raised up against us "

"Of the broken weapons that I see on the floor," he says, "tell me which is the blade Dammer and where the bones of Gloring lie, that I might see where our brightest hope fell "

"You talk too much, old man It is time to end this conversation "

"But I see only nine hilts amid the ruin "

I extend my claws and rear to strike him But he holds me, by no magic but by a single statement

"You have not yet won."

"How can you say that, when you are the last?"

"You lied," he continues, "when you said that your lord's reign will never end, that the Darkness has vanquished the Light You do not see your own weakness "

"I have no weakness, wizard "

Through the gloom I see his smile

"Very well," I say then "You do not have to curse goodness, truth, beauty, and nobility as the price of a quick death Just tell me of the weakness that you see "

"I have always considered the benefits of a quick death to be somewhat marginal " he replies

"Tell me that I may protect myself against its exploitation "

The insolent old man has the audacity to laugh I resolve to make his death a slow thing regardless

"I will tell you," he says "and you will still be unable to guard against it I see now that you will die when you know love "

I stamp my foot and roar

"Love? Love? Your mind is as broken as the rest of you, to accuse me of such a foul failing! Love!"

My laughter rings about the cave as I decapitate him and roll his head back along the passageway, slinging it by the beard My sides ache from the strain of laughing

After a time I pick up someone's leg and begin munching on it Rather tough Must have been the hero's

My lord Glaum, always and future ruler of the world, enters that evening wearing his defiled garment of Light to admire my work to congratulate me on ages well spent He gives me a cunningly wrought timepiece of gold with my name engraved upon it, to reward my faithful service

"Bactor, my lovely," he asks after a time "why is it that I behold the remains of only nine of the weapons of Light when all of the heroes have fallen?"

I chuckle "There are only nine here " I explain "The other is up that side corridor That hero made a different entrance than the others and I stopped him there He was a cunning one

"I wish to see it for myself

"Of course, my lord Follow me "

I lead him up the sideway I hear him draw a breath as I halt before the niche

"This one is whole!" he hisses "The man stands intact the blade unbroken!"

I laugh again "But harmless lord Now and forever This one I bound by magic rather than rending him with the strength of my body I come here to admire him on occasion He is the best He came very close to destroying me "

"Fool!" he cries "A spell can be broken! And I see that it is Gloring and Dammerung! We must finish them now to assure our triumph!

He reaches for the death wand in its case upon his belt

I turn again and regard the point of that blade I had halted but an inch from my breast when my spell froze all motion and left its grinning wielder a statue of judgment and execution forever delayed Dammerung's edge is finer than that of any leaf its point the nearest approach that matter might make to infinity

I hear my master "Move away Bactor "

And I hear another voice—my own—shout the words that break the spell The

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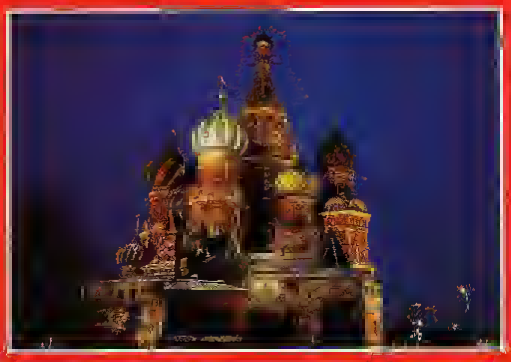
ARTICLE

UNK



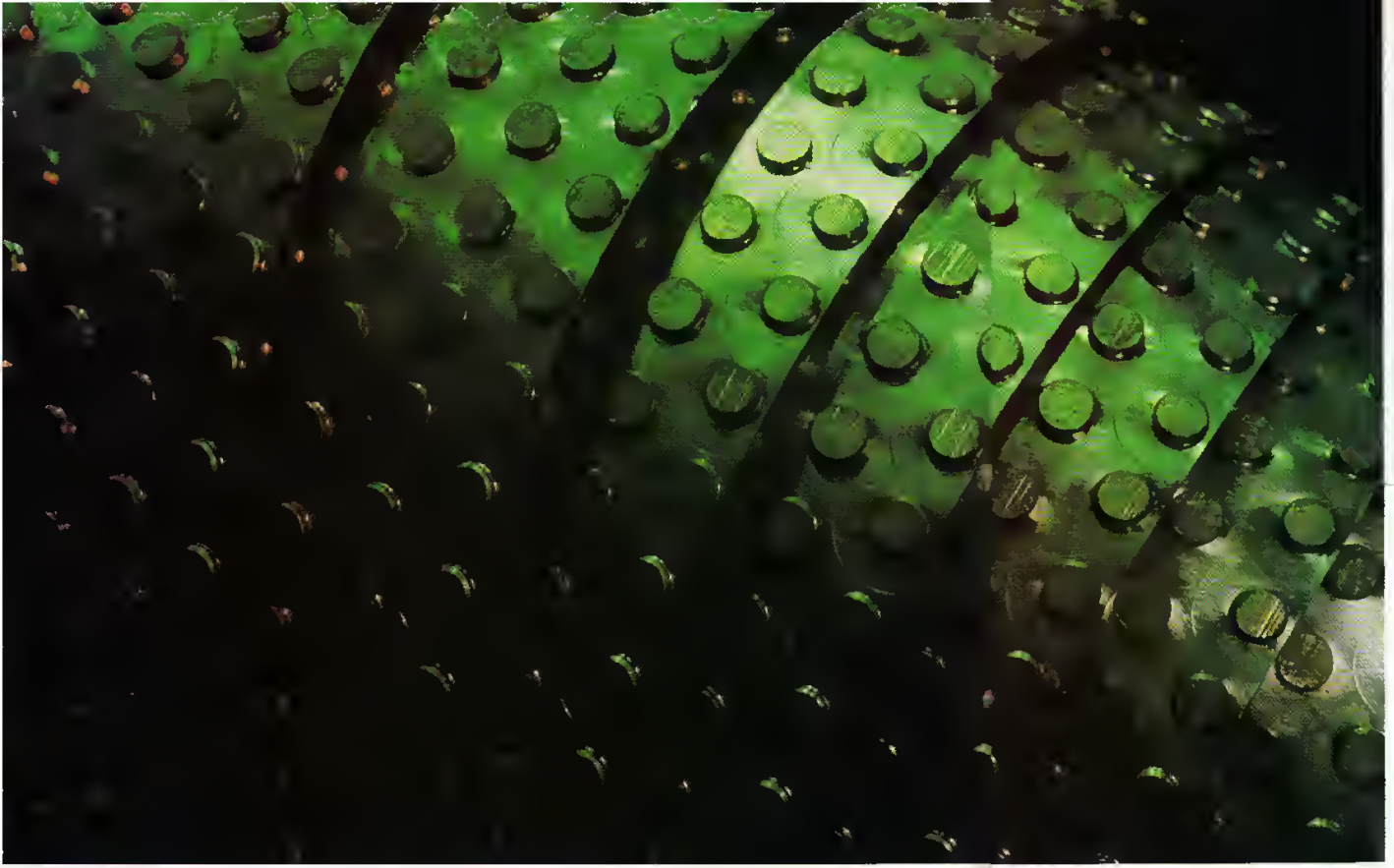
THE ACCELERATOR THAT COULDN'T SHOOT STRAIGHT

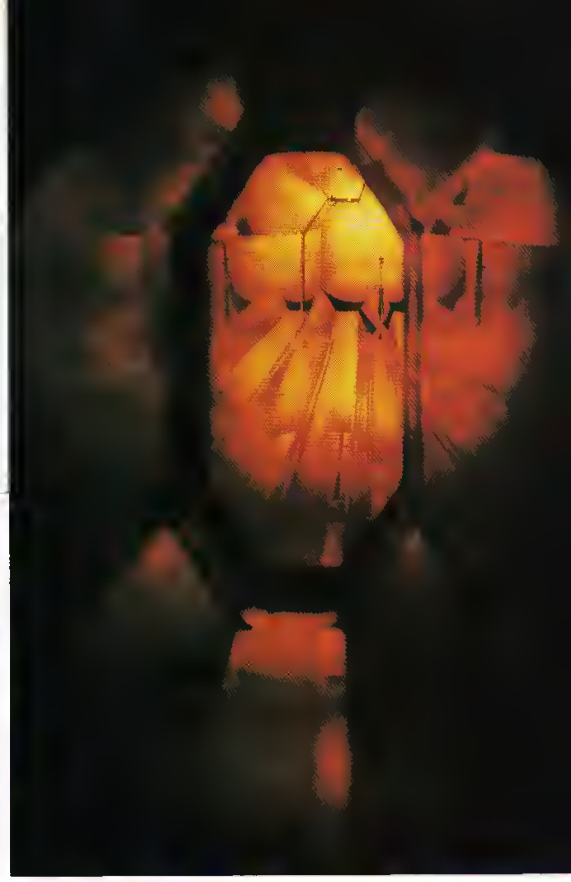
BY ROBERT P CREASE AND CHARLES C MANN

Ever notice that practically every article about the Soviet Union has a Russian joke in it? This story is about Russian science but it s no exception The joke goes like this

A Pole sees a Russian staggering toward him with two huge obviously heavy suitcases Despite the suitcases the Pole asks the Russian what time t is The Russian puts down his bags, glad to be relieved momentarily of his burden and pulls out a beautiful digital watch covered with dials and switches It s 10 47 02 the temperature is 21 4 degrees the sun will rise at 5 32 tomorrow morning Jupiter is now in the sixth house of Saturn and the next bus leaves in fifteen minutes

The Pole is staggered He s





never seen a watch like this. "Where'd you get that?" he asks. "Switzerland?"

"Switzerland—ha!" snorts the Russian, a little offended. "This is pure one hundred percent Soviet technology!"

"What's in the suitcases?" the Pole asks as the Russian shoulders his huge load.

"The batteries."

Like that watch, Soviet science and technology has its good points . . . and its not-so-good points. The Russians built the first working nuclear power plant . . . and Chernobyl. Soviet science brought the world *Sputnik*, the first satellite, and *Vostok*, the first manned spacecraft, but never made it to the moon. The Moscow subway system costs kopecks to ride, handles 8 million passengers a day, is the world's best. It also took 50 years to build.

Now—and here we come to the subject of this article—the Soviet Union is building the most powerful atom smasher on the planet. Known as UNK, the Russian acronym for accelerator storage center, the big machine has already caused alarm in the West. *The New York Times* described UNK in a front-page article as a threat to American dominance in science. And Senior Policy Analyst Paul Hursy, of the White House Office of Science and Technology Policy, says, "Having the lead accelerator brings with it eminence in high-energy physics. UNK will become state-of-the-art in a few years and will eventually surpass anything the United States has." As we found out on a recent trip to the Soviet Union, Hursy and the *Times* are right about UNK. But they are forgetting something.

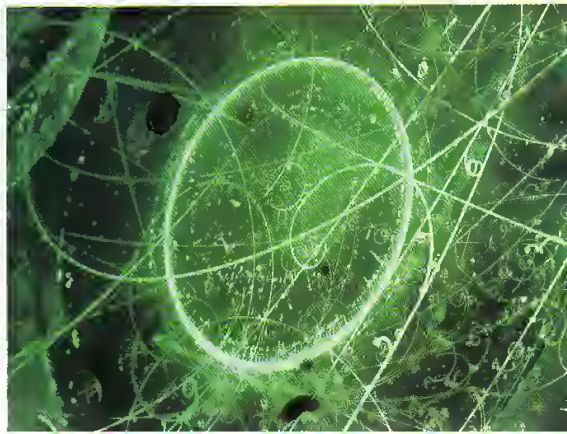
They're forgetting about the batteries.

The Russians do the same things that everybody else does, but they do them differently. Not necessarily better or worse. Just differently.

Soviet particle physicists, like their colleagues in the West, study elementary particles, the tiniest bits of matter in existence. And like their colleagues in the West, the Russians have come up with only one way to perform experiments on these subatomic entities: Slam them into one another as hard as possible. The machines that do this are called particle accelerators—atom smashers. Unscientific as the procedure may sound, scientists have learned a lot about the universe by doing it. Over half a century, experimental physicists around the globe have built bigger and bigger machines that smash together electrons, protons, and their brethren with more and more energy.

In the West there's a law of particle physics that goes like this: He who gets there fastest with the mostest usually gets the Nobel prize. You build a bigger, stronger accelerator, and you discover new things. Fundamental things. *Surprising* things.

So, one would think, when the Russians succeed in finishing UNK, the most powerful accelerator ever built, they will be poised to make new, fundamental surpris-



The stuff of which atom smashers are made. Bottom right: bubble chamber with particle tracks. Top right: channel in which subatomic particles are accelerated. Above: copper strips which are used to cool the bubble chamber.

ing discoveries. Discoveries that might shake the Western lead in physics.

So one would think. Except that in the Soviet Union, things are a little different. Three times before, the USSR had the most powerful accelerator in the world. Three times before, American scientists, journalists, and government officials warned that this country was in danger of losing its supremacy in physics.

And three times before, the USSR discovered . . . nothing. They've made many technical innovations and performed a lot of good, solid measurements, but in terms of discoveries—pulse-quickening, colleague-stunning discoveries—well, they didn't *score*, as Americans like to say.

And therein lies a fale.

And once you hear it, you'll know why Soviet physicists are a little sensitive to questions about UNK's performance. And why it's been called the accelerator that can't shoot straight.

The earliest accelerators were built in the early Thirties by English and American physicists. They were small gizmos and not terribly powerful. The first U.S. machine, built by Ernest O. Lawrence of the University of California at Berkeley, was smaller than a baby's head and spat out particles with less zap than a chunk of uranium. Although Lawrence won the Nobel in 1939 for his accelerator work, he had tremendous trouble persuading universities and governments to pay for his ever-growing machines. In any case, that kind of research was stopped by the war, when physicists spent their time on radars and atom bombs.

The Russians did things a little differently. Stalin was slow to pick up on the idea of particle accelerators, but when he did, he stuck with it. Leon Lederman, the director of the big Fermilab complex (home of America's biggest accelerator) outside Chicago, knew Artem I. Alikhanian, one of Russia's first accelerator builders. "I once asked him," Lederman says, " 'So what did you do during the war?' He said, 'I was in the siege of Leningrad.' I said, 'That's awful! What did you do?' He said, 'Design accelerators. Four hours a day I carried water, but the rest of the time I spent in a quiet basement designing accelerators.' Can you imagine? Even during the siege of Leningrad, the Soviets thought it was important for him to design accelerators!" "The American attitude is different. When there's a crisis, funding agencies tend to say 'Cut the accelerators.' For a while, the Navy funded accelerators through the Office of Naval Research. We used to say 'The Navy does two things: paint battleships and build accelerators.' Well, in a crisis, the Navy paints battleships."

After Hiroshima, Lawrence and other American physicists had less trouble persuading the government to pay for their machines. Accelerators were basic tools for physicists, and physicists had won the war with the bomb; so funding accelerators seemed the route to making new military advances and preserving this country's national security.

Meanwhile, Alikhanian built his accelerator at the Central Institute for Nuclear Research, near the town of Novgorod about 70 miles north of Moscow. An authentic marvel of technology, it was more powerful than the biggest accelerator in the West. Switched on in 1949, it smashed particles with 36,000 times the force of Lawrence's original machine. Soviet scientists were justifiably proud.

There was just one catch. They couldn't tell anybody about it. The USSR has a mania for secrecy, and the big new machine was secret. Top secret. Ultrasecret. Send-to-Siberia secret. Physicists in the institute couldn't even publish their experiments openly. If they made an earth-shattering discovery, nobody outside Novgorod would know. The situation was infuriating for Alikhanian and his colleagues. Fortunately, the joke runs, the Soviet system had a solution. It made sure no discoveries would be made. How? Well . . . it has to do with the batteries.

When particles collide in a particle accelerator, pieces fly all over the place. Special equipment is used to track the pieces, and these detectors, as physicists call

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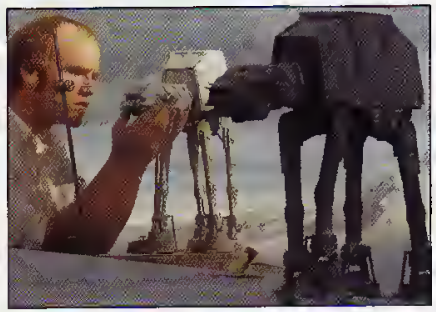


REEL ILLUSIONS

This page: miniature models of the snow walkers (middle and top rows) and the spacecraft from the *Star Wars* saga (bottom left). Bottom right: An actor riding a speeder bike in *Return of the Jedi* was filmed in front of a blue screen; the forest in the final scene was filmed separately. Composites are made with miniatures and other elements, as in this scene from 1983's *Return of the Jedi* (facing page).

Puppets spring to life, odd aircraft whiz through the ether or plunge into the deepest forests at ungodly speeds, bicycles fly and kitchen paraphernalia are flung about by poltergeists.

Without the efforts of one group of artists and technicians these special moments from such classic movies as *Poltergeist*, *E.T. The Extraterrestrial* and the *Star Wars* saga might never have been executed. There was a time when major studios supported their own special effects shops, staffed with masters of the art. But effects shops were phased out as the studios went from self-contained production centers to mere soundstages. By the time George Lucas was making *Star Wars* in the Seventies, no studio had a special effects facility. He had to create his own ministudio—Industrial Light and Magic (ILM)—to do the work.

If there were one word to describe how ILM performs its tricks, the word would be *miniaturization*. By filming on a small scale, ILM can make E.T. and Elliott appear to fly on a bike past the moon. Luke and Leia chase storm troopers through a redwood forest on a speeder bike, and a family haunted by poltergeists see their tract house implode into a black hole.

Miniatures have been used in moviemaking before, but with *Star Wars*, space hardware was given character for the first time. The ships looked space worn, with holes and dents.

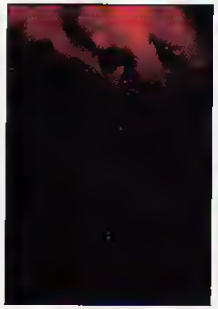
Much of the artwork and many of the sets used in special effects do not look as good as they do in the films. ILM's models, however, are amazing in their detail. Even on very close inspection, one tends to see more than is ever apparent on the screen; each model is an important character in the film.

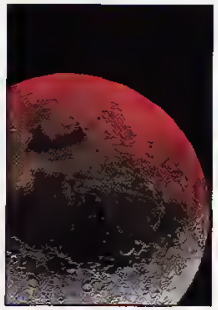
The opening ten minutes of *Raiders of the Lost Ark* impart a powerful sense of visual design. The camera glides through a dark jungle, giving shadowy glimpses of the forbidding environment. We move into an ancient tomb, scramble to dodge darts, and see the hero dangle over a deep pit. He's finally chased by a giant stone ball, only to dive into the midst of a threatening tribe of natives. This is followed by a classic chase on foot, and an airplane getaway. Words can't describe the excitement evoked by these images, developed under the direction of Steven Spielberg.

Scenes like this are no accident. All the special moments have been carefully planned. Spielberg does not just dream up amazing scenes on location. Like George Lucas, he is highly conscious of what he's doing cinematically.

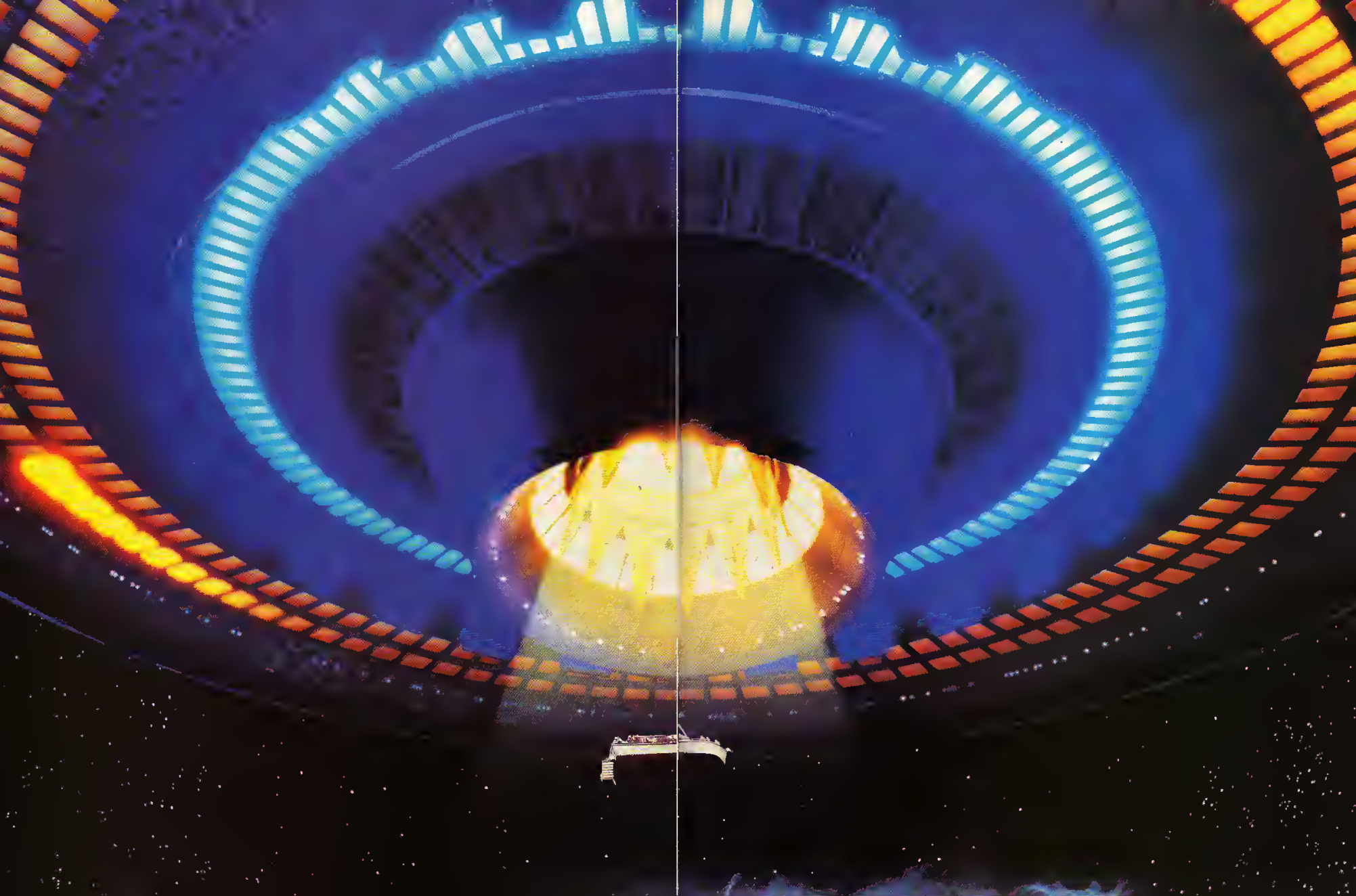
The term *special effects* tends to evoke images of starships racing through space and of ghosts hovering in the air. Special effects are also used in places where few suspect they have been applied. Matte paintings—realistic paintings made to be shot separately then added to live-action scenes—have replaced real but expensive scenery; miniatures have been used to cut costs of vehicle use or of set construction. Imaginative filmmakers use special effects to expand the possibilities of their medium.

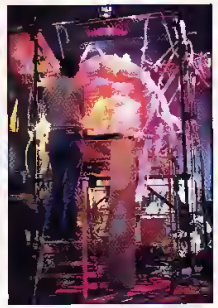
The artists and managers of ILM realize they are part of an industry that is being rapidly transformed by modern technology in order to keep its place as a leader in special effects, Lucasfilm Ltd. (George Lucas's production company) must continue to develop new methods of creating effects as well as new uses for these effects.





Previous pages: Stop-motion photography was used to bring the walkers to life in *The Empire Strikes Back*. This entails filming an inanimate object one frame at a time, gradually moving the object between separate exposures. Optical-effects specialists then combine all the elements to create a finished scene. This page: four of the elements that went into the final shot for *Star Trek II: The Wrath of Khan* (bottom right). Facing page: a composite shot of the final space battle in *Return of the Jedi*. Next page: The spaceship from *Cocoon* hovers above as it draws up a boatload of waiting senior citizens.





ILM's models ere renowned for their carefully wrought detail. Each becomes e well-defined character. This page, top right: original tiny clay model of the *Poltergeist* monster. Middle right: Rubber miniature of the poltergeist is set in e water tank to meke its hoir fleat. Tap left: final filmed versien. Middle left, bottom right: *Poltergeist*'s esophageal entrance to the otherworld. Bottom left: The film's finale—on impleding suburban home—was achieved using e miniature copy of the house. Crew members used e strong vacuum end wires to draw the model into a large, black funnel. Facing page: Elliott end E.T. sail past the moan.

The next big jump in technology is taking place as the computer manipulates images that exist only in digitized memory, and paints those images directly onto film This permits the filmmaker to do such things as create an object from new perspectives directed by the operator's "joystick ' much as is done with video games

As it happens effects for some television commercials and even a few films have already been generated by digital means Quite often though we see them as tasteless station-break logos or spinning titles for a television program

For the time being digitized images are impractical for anything but short special effects sequences and TV commercials The situation is changing however, and with the intensive work at Lucasfilm Computer Division and many other research facilities around the world breakthroughs in the technique are inevitable

Though early research in laser scanning will have applications in the special effects field the most significant applications will be seen in the final exhibition of films Imagine a day when a film can be 'projected' by laser beam in your local theater The "film need not be shipped in print form but will be transmitted by satellite A new *Star Wars* film could be exhibited in thousands of theaters simultaneously all over the world Its laser images would be sharper than traditional images The potential is enormous —Thomas G Smith

Adapted from Industrial Light and Magic The Art of Special Effects *by Thomas G Smith Copyright © 1986 Lucasfilm Ltd (LFL) Reprinted by permission of Ballantine Books a division of Random House Inc*

As at home in "the dreaming" as he is in sophisticated Sydney, this aborigine inventor, filmmaker, educator, and novelist intends to awaken the world to the visions and splendor of the ancient Australians

INTERVIEW

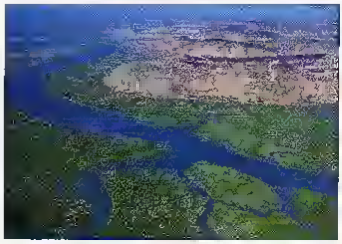
ERIC WILLMOT

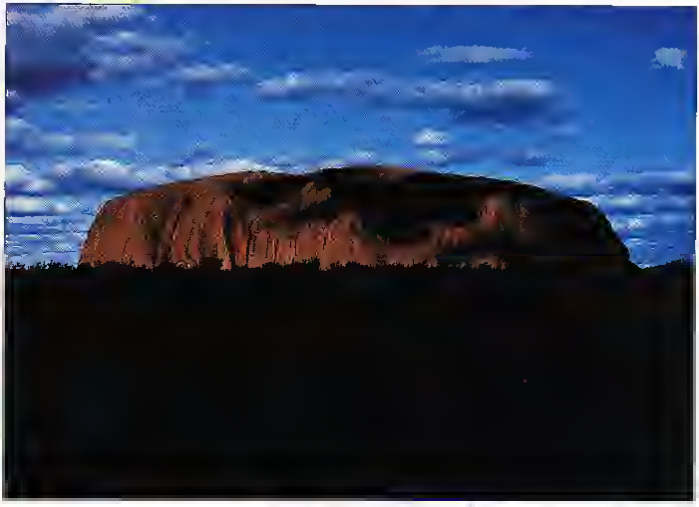
In 1956 when Eric Willmot was a twenty-year-old trail hand and rodeo rider, a horse fell on him in a rodeo accident mangling his leg badly enough to put him in the hospital for 18 months and forever change the course of his life. "It's a great place to study," says Willmot, now professor of education and head of the School of Education at James Cook University in northern Queensland, Australia. And with the help of a teacher to whom it did not matter that Willmot was an aborigine, study he did. In eight months he applied his then rudimentary skills at reading and writing with enough tenacity to earn a university scholarship to study science—and to gain entrée into white Australian society. It is a world where, he estimates, no more than 20 or 30 native Australians ("And that's a lot") have gained acceptance.

From his present position as educator, inventor, writer, filmmaker, and man in two worlds, Willmot is not only a pathfinder for his own people but a leader for white

PHOTOGRAPH BY KATHY KEETON

"Dreamtime lasted a long time, a forever within a forever. Before, all life forms on Earth were there but remained undifferentiated."





Australians as well. He is informing both peoples about the place aborigines rightfully occupy in the continent's ancient history and its modern epoch, a place they have been denied for 200 years.

Willmot was born in Queensland of mixed-race parents. Of the Mandandanji people on his mother's side, he is Waka with a little French flavoring from a great-grandfather on his father's side. Until his accident Willmot lived "a bush sort of life, a cowboy life"—riding in rodeos, working as a drover—or trail hand—taking part in the last transcontinental cattle drives from Kimberley in the northwest to Sydney in the southeast. "I have seen most of the center of Australia from the back of a horse," says Willmot, "and it has given me a sense and a value about this continent. 'Waltzing Matilda' has real meaning for me."

Willmot was, by his own account, always cognizant of the aborigines condition. Neither counted in the census nor recognized as citizens, native Australians were outcasts in the land that had belonged to them since the dawn of humankind. And that land, from which they derived their spiritual being, had been simply overrun by the British since 1788, when they landed on the eastern coast.

Before his accident Willmot "didn't think there was any way out." It was while pursuing his several degrees in mathematics and in education that he first discovered that a folk legend he had grown up with was, in fact, history. In contemporary aborigine lore there existed tales of a fierce fighter, Pemulwuy, skilled in eluding and defeating the British military. "Pemulwuy wasn't in any of the history books," says Willmot, "but when I went to the sources—the English soldiers' journals are full of him. They were fighting for their lives!" Pemulwuy led a resistance against the British from 1790 to 1802. He was finally shot and beheaded, and his head was shipped back to England to prove that he was really dead. "After Pemulwuy's death," Willmot says, "the back of the resistance was broken." Decimated by war, loss of its land, and diseases for which native Australians had no natural immunity, aboriginal society crumbled. People believed the race would become extinct.

For almost 100 years the aborigines floundered. But slowly some "special people" began to emerge. One was Charles Perkins, who became head of the Department of Aboriginal Affairs and the force behind Australia's Freedom Rides, which led to the granting of citizenship to the continent's native people in 1967. Willmot later served for a year as Perkins's deputy.

In 1971 Willmot set up an "enclave" system of alternative education, one that would offer aboriginal people a chance to successfully complete a university degree program. Today the largest example of that system is the school Willmot heads at James Cook University. Willmot also became the first non-European principal of Australia's Institute for Aboriginal Studies. And he made a documentary film on the ancient trade routes that once linked all the early peoples. "I decided I wanted to make a film about old Australia," he says, "so I asked somebody what she would want to know. And she said, 'What the shopping was like then.'" His first novel will be published soon in Australia. Called *Pemulwuy*, it's about the actual man, the hero whose name is not only missing from all the white Australian history books but is also glaringly absent from Robert Hughes's *The Fatal Shore*, a current best-selling account of the founding of modern Australia. Willmot has read Hughes's work—quite a good rendition of what is understood to have

Clockwise from top left: Rainbow Serpent created the rivers; Ayers Rock; X-ray rock art of major female ancestor spirits; turtle painting.

happened from the European viewpoint.'

Pemulwuy, on the other hand, 'is what we saw happen.' And what happened in Pemulwuy's time 'is every bit as important as what happened at Wounded Knee.' The novel is Willmot's attempt not only to bring the historical man to life but to change the view of Australia toward its beginnings to an outlook that is more in line with the way the United States sees its origins. 'Americans don't pretend nothing nasty happened with the native Americans,' he says 'and that they didn't wage war.' Willmot intends that this peculiarly sinister Australian pretense— this conspiracy of silence — be dropped. Particularly in 1988, 200 years after the British occupation, 'so that *all* Australians can hold up their heads.' And if the novel doesn't accomplish that? Well, it's a damn good yarn anyway.'

Eric Willmot was interviewed by *Omni* president Kathy Keeton, who spent three weeks touring Australia last fall.

Omni: You're a man who, in your own words, is 'a bit overenthusiastic in condemnation of anthropologists.'

Willmot: Anthropologists have done a lot of bloody damage as the result of their gurulike obsession with sorcery and sex. White anthropologists working in Australia would make an excellent story for *Penthouse*, not *Omni*. Most of their damned books reveal their incredible ignorance—they don't even know about spiritual connectedness [the central idea of aboriginal religion]. And many suffer from what we call a Lawrence affliction. You can almost see the white robes swirling after them in the wind and sand. People who can't really handle their own society often wish to save someone else's: missionaries, mercenaries, and misfits—all afflictions of aboriginal Australia and aboriginal society.

Omni: How would you characterize relations today between white Australians and aboriginal people?

Willmot: A piece of social psychology research done in 1984 by a government commissioned organization showed that about twenty-five percent of white Australians are strongly supportive of aboriginal issues. A second twenty-five percent have disastrous relations with aborigines and bitterly oppose any legislation to help them. Many in this group could be called rednecks. The remaining fifty percent sit in the middle. These middle Australians are softly prejudiced and are swayed either way without too much trouble. It was this group that was most affected by the Western Mining Company's 'marvelously' successful campaign against abongine land rights. Middle Australia is a kind of "ordinary Oz"; they believe they live in a lucky country, and when anything goes wrong with it, they'll blame anyone. So if somebody tells them the aborigines are causing their economic problems, they usually believe it quite well.

Omni: Does this refusal to acknowledge aboriginal sovereignty over the land date back to the arrival of the British?

Willmot: Aboriginal society views land as the source of spirituality and certainly as a source of genesis in the spiritual sense. Therefore aborigines are very, very concerned with the land. As soon as the British arrived, they determined to pursue a policy that was termed *terra nullius*. They essentially refused to recognize that specific aboriginal peoples occupied specific lands. Oh, they recognized that there were some people wandering around here, but they didn't regard them as occupying the land, rather as perhaps using it or visiting it or something. This policy led to the destruction of aboriginal society.

As time wore on, it became clear that *terra nullius* was total bullshit. Aboriginal people owned this continent and lived in precisely bounded areas of it. Aboriginal society in Australia really amounted to a community of protonations, each having its own language and cultural aspects that distinguished one group from another. They shared a common religious system, though, from one side of the continent to the other.

White Australians have lived with the lie of *terra nullius* for nearly two centuries—and they still cling to it. Even this present Labor government refuses to discuss not only modern aboriginal sovereignty but ancient sovereignty, for God's sake! And that's incredible. It's a problem that will not go away, because if you try to run a nation in which there is doubt about title to land, the whole equity business falls to bits.

In both America and Canada, either wars were fought and land was taken by conquest, or else treaties were signed. So there was always some acknowledgment of the Indians' ancient sovereignty. Before the last election, Reagan was asked how he would deal with the land-tax problems involving the Navahos. He said, 'I will deal with them government to government,' meaning that the United States government recognizes that Navaho lands are run by a form of local ethnic government.

There has never been anything like that in Australia. White Australians have steadfastly refused to draw up and sign any form of land settlement. The aboriginal leader Billy Fergusen proposed such a settlement in 1938. Modern aborigines proposed a treaty called Makarrata in the Seventies. This is a problem for future generations, indeed. It will grow worse generation by generation. The whites refuse to deal with it; they are very foolish.

Omni: Haven't whites also pretended the war they fought with Pemulwuy and the Eora people never happened?

Willmot: The original white settlers neither fought for the land nor bought it, but simply occupied it, pretending clear through the twelve-year war with Pemulwuy that the aborigines had never existed. This war ended in 1805, after Pemulwuy was finally beheaded, when his son Tedbury was captured and imprisoned. Many Irish po

litical prisoners had joined with Pemulwuy in his campaigns, and after Tedbury's death they mounted a revolt. They stood up to the British at Vinegar Hill [in Sydney] but, lacking any of Pemulwuy's military genius, were cut to pieces. It was a massacre. And it was hidden from Australians—white and black—for almost one hundred and eighty years. More than a century ago people living in that area of Sydney wanted their post office renamed Vinegar Hill. That request was scorned by the government. Not until 1983 did the present Wren government in New South Wales celebrate the event on Vinegar Hill. It is this conspiracy of silence—on top of the unending refusal to recognize the existence of *any* important Australia before the British, to acknowledge a world of nations that owned and occupied every square meter of this continent that most gets up the noses of modern aboriginal people!

Omni: Beyond these very real grievances over land rights and historical acknowledgment, don't aborigines feel very uncomfortable with Western economics, both in practice and philosophy?

Willmot: Most certainly, because the aboriginal economic system involves very special and complex ideas of beholdenness. Commercial transactions might be carried out in three ways. The first involves simple, no-debt transactions. I give you something, you give me something. Either money or goods might be exchanged, but because the things exchanged are equal in value, the transaction leaves neither of us in debt. The second sort is the acquittable-debt exchange. We make an exchange, but one of us can't pay for all of it at once. So we agree on the value of the thing, on the method of paying the balance, and on the fact that the debt will be acquitted at some time. Now, I might put a deposit on a hot dog, and it may take me till next week before I can pay for it.

Now the third kind of transaction is the nonacquittable debt. This sort of exchange occurs when I send you a birthday card. You become beholden to me because even if you send one back, that doesn't discharge your debt to me. It simply places me in debt to you—so now we're locked into a debt system. No society on Earth has taken this system to such extraordinary lengths as the aborigines did. Debts could be developed over years and could be inherited. The accounting system, being based on the traditional aboriginal kinship system, would act very much against the acquisition of material wealth—because nothing had specific value in the exchange. Everything had value only insofar as it serviced the debts between people or groups of people. There were all sorts of names for these debts.

Suppose I were a young, commercially minded lad, living a thousand years ago, who arrived at a large trading center in south Australia with a handful of a particular sap from the rain forest of north Queensland. This natural plastic was useful in binding stone heads to spear tips. If I needed a special ocher for ceremonial purposes, I wouldn't just go and say, "Weigh up my sap and your ocher so we can make an exchange." I would hang around—aboriginal people are quite good at hanging around—reading the scene until I saw who the heavies were in this mob. Then I'd make a gift of my sap. If anyone were mad enough to accept it, they'd create with me a *muerbok*, a word meaning "debt" in the Northern Territory. They might give me nothing, so I'd go back empty-handed. But when I returned next time, even if I had nothing, they'd be duty bound to service that debt, so they'd give me something. This form of trade was the essence of traditional Australian economy.

The basic European will typically offer you things—cigarettes, chocolates. That's bad etiquette. The aborigine regards it as terrible manners, since you're asking—or bludgeoning—someone into a debt situation with you, which you have no right to do. In aboriginal society you ask someone for something you want, indicating that you're quite happy to indebt yourself to him.

What all aborigines find most difficult to accept in the modern world is this tendency to treat the resources of nature as

something to exploit. To despoil or take from nature is to create debts with her. And nature on this continent, aborigines have learned, will demand payment in ways often brutal and far-reaching. Europeans are learning the hard way that Australia's a bloody difficult place to deal with. Despite all the Europeans' intentions, nature has forced them to live in a narrow little urban archipelago along the east and south coasts. Seventy-five percent of the continent still remains the emptiest habitable place on Earth, with a population of less than one person per ten square kilometers.

Omni: Do aboriginal people continue to practice special ancient rites of passage?

Willmot: You should remember that aboriginal culture was always changing, dynamic. And I've seen evidence of change within these ceremonies from when I was a child to now. Elemental societies tend to mark men to show the arrival of manhood. Women are marked by nature with menstruation. The two major male puberty rites were circumcision, commonplace throughout the world, and subincision, which certainly is not. The subincision ceremony has very distant and uncertain origins. It produces an enlargement of the front end of the penis, a wide flat-looking thing with a passage or cut ending about halfway down the penis. The result of subincision curiously makes the penis look like that of a marsupial, which is naturally subincised. Perhaps, being the lone placental mammal in a marsupial world, you need to try to reflect the animals and resonate with life around them. Some people argue that it was something of a birth control device, but I don't believe that. It was a purely religious device, and it's connected intimately with the shape and appearance of the marsupial penis.

These very serious religious ceremonies came from the desert centers, from peoples like the Walbiri, Pintubi, Aranda, and Pitjantjatjara. Around the coasts and softer places of the country, the puberty ceremonies weren't so fierce or bloodthirsty. When Europeans arrived, circumcision spread over most of Australia. While subincision is still relatively rare, I did hear of one white doctor—from another—who, wanting to be part of those desert people's groups, had himself subincised. In the process he got himself quite seriously infected. Give it a few more thousand years and I think these ceremonies will have slowly worked their way around the coast.

But these ceremonies are only indicators of something more important—the total "religiousization" of a society.

Omni: Were the basic roles of male and female in traditional aborigine society very different from those in modern societies?

Willmot: In traditional society, aboriginal women contributed some seventy percent to the economy. They gathered virtually all the vegetable foods and hunted smaller animals like opossums, lizards, birds, and fish. Men tended to hunt larger creatures, like kangaroos, which ranged over long distances. That's not to say that men didn't also sometimes hunt smaller game, and women large ones.

In contemporary Western society when boys or girls go out looking for a mate, they really have to look—and do battle with one another for that mate. In the modern world's mating game, both male and female do the choosing. In old Australia, men were heavily selected by women. And women were guaranteed everything: sustenance, affection, and a social father for their children. Men were guaranteed nothing. A man could go a lifetime without finding a mate, but women always knew they would have a mate; society demanded it.

There was a strange, almost esoteric approach to the mating game. The kinship system could be laid out almost like a map. A man could find his spot in the constellation or pattern of things, and somewhere in the pattern there was a female or number of females who might be related to him in a proprietary way. He could expect to find a mate from among them. His relations would negotiate with the relations of his possible mates. Such marriages might well be arranged with the "spouse" as yet unconceived! A betrothal agreement—as there were no actual marriage ceremonies—could mean that a man had a mother-in-law bestowed on him when this mother-in-law herself was not yet married. (And she might never give birth to any daughters!) Yet this unfortunate fellow was left with a lifetime of beholdenness to this woman and had to practice special avoidance relationships. He could never look at or talk to her directly—only through a third party. In some groups the young man avoided even her shadow or footprints! And yet he constantly had to provide the mother-in-law with gifts and look after her. She might have the daughter of his dreams—and she might not!

Very young women were often beslowed upon much older men. And men, in general, were expected to remain celibate for thirty years or more. A woman might be married to two or three men in succession, whereas a man might have several wives at once. This maximized gene-pool mixing, as might a promiscuous, free-love society where the promiscuity is highly organized and controlled.

Only in middle life and old age did women achieve status, and achieve it through roles they might play relating to marriage, religious ceremonies or through their connection to a powerful mate with whom they might develop a long-lasting relationship. Men had much more status when they were younger, but this was never guaranteed into old age. These old societies guaranteed men nothing.

Omni: What about children's guarantees?

Willmot: Illegitimacy was impossible. No matter how a woman managed to get pregnant, she always had a social father for her child, one who took great pride in her children. These societies constructed practical systems making it impossible for a child to be hurt in any way by relationships between adults. The systems were strict, with all sorts of penalties for those not abiding by them. Although promiscuity was common, the system ensured that its costs were borne only by those engaged in it—not by their offspring. In Western society today, it's largely the children who suffer the consequences of adult promiscuity. It's obviously not possible today to construct a system anything like these aboriginal societies. Even so, modern aboriginal society at least tries to create a situation where each child is born into an extended family and is guaranteed some important adult relationship in life.

Romantic love in traditional Australian society was not an important aspect, although among young men and women it was no different than it is in any other human society—basically sex driven. But I have observed older men and women in wonderful, long-lasting love relationships that seemed powerful all their lives. Aborigines were far more concerned with the way people got on together than they were with romance. They believed that people the same age shouldn't marry, to avoid bringing into their relationship common problems. Because an older woman and a younger man, or vice versa, tended to mix problems of different generations, there was less conflict within the marriage. This is a reasonable idea, one probably worth pursuing in modern society.

Omni: What distinguishes traditional aborigine religion from all others?

Willmot: It differs sharply from Christianity—and most world religions for that matter—in the fact that aborigines deny spiritual singularity. They don't believe personality is contained entirely within the spiritual part. Hence they have no concept of soul. Aborigines believe that human beings are made up of a spiritual and a mortal part, and that the personality is contained in the synthesis of these parts. When death destroys this construct, the mortal part degrades into the earth. The spiritual part persists. It doesn't contain the human personality, so there's no basis for a god of retribution or reward, or for heaven or hell.

Why, then, do aborigines lacking a concept of a hereafter behave in an ethical way? Because their spiritual and temporal domains are so directly connected—more closely than for any other people on Earth—so connected that any heaven or hell you might go through happens during your temporal life span. At death the goal is to

drive the spirit back to its source the land It joins with and becomes part of the spiritual component of land From this component or source child spirits are reborn—a kind of reincarnation but very different say from the Buddhist view

Physical paternity is denied Not that aborigines did not see a connection between sexual intercourse and conception Rather, it was thought that there was no simple connection It was believed that intercourse prepared a woman for conception but conception itself was an 'act of protoplasm' within the woman's body being infected by a child spirit from the land

This belief in the land has caused lots of difficulties On the one hand, it completely eradicated wars of land aggrandizement It was pointless to take someone else's land, because you couldn't reproduce yourself from anything but your own land When the British drove groups from their lands and onto others', however the aborigines became not only economic but spiritual refugees Then great trauma beset these people, and they just plain stopped having children They believed it was too dangerous to reproduce on others' spiritual lands, and they were able to exert tremendous psychic control over their body functions

Omni The 'dreamtime' is a distinctly aboriginal concept of the birth of the world and evolution Can you tell us about it?

Willmot Aborigines believe in a system or process of creation They think that the earth was always here, that it was formed from some primordial process in the universe but that it was in a sleeping state The initial act of creation was to wake up the entire earth—but partially—from this pretime of total sleep The period following this awakening is known as the dreamtime It lasted a long time—a forever within a forever Before dreamtime, all the life forms found on Earth today were there but remained undifferentiated dreamtime began the process of differentiation The earliest part of dreamtime was brought on by the Transcendental Creator which existed since the beginning of time This entity which all aborigine people know often takes the temporal form of the rainbow and is referred to as the Rainbow Serpent

In the first part of dreamtime the Rainbow Serpent awakened the earth and awakened such dreamtime creatures as 'kangaroo man,' 'seagull man,' or 'eel man' These giant, mystical beings were not half-man, half-beast combinations like say the minotaur of ancient Greece They were rather 'precreatures' that contained the principal elements or essences of say both man and kangaroo During this time these creatures had adventures and, in the process of those adventures and heroic deeds, brought about the next stages of dreamtime Dreamtime is also the work of the species creators or subcreators who in journeying throughout the land left their essences and the dreamtime creatures behind them at various places where they camped or where an event took place They rounded off the soul of the landscape you could say, and all the creatures in it Thus the forms of the landscape animals, and plant life as we know it were created These places—caves, water holes, trees, boulders—are full of essences or spirit

The wandering spirits and the process of differentiation they left behind formed a mark or trail that lies within the spiritual essence of the land This trail is referred to as the dreaming A person who says he belongs to the honey-ant dreaming means that his group of people and perhaps the honey ants were awakened at some related time and in some related form This dreaming is essentially retained and reflected within the spiritual essence of the land although the person and the honey ants may be quite differentiated and ordinary today The dreamtime came to an end with the reality of contemporary nowness or the temporal domain that we live in today (Some say dreamtime ended sharply

> *"Australia's a kind of singularity of nature. From what we find in the earth here, we can read things about the beginnings of the planet, solar system, and universe itself."*

others maintain it merged slowly into reality) But the dreaming connection is ever present When a traditional aboriginal man or woman walks through the land, he or she walks through a spiritual place it's real on one side, in one way you look at it, but in the other way it always contains the spiritual essence of the dreamtime That is your dreaming

Omni Haven't the Rainbow Serpent and other spiritual beings continued to change their sex even to this day?

Willmot Gender in aboriginal language is more complex than in English Australian languages—perhaps the oldest living languages—are complicated Latin-like things and sometimes genders don't convey the actual sex of things so directly as the simple pidgin In any case, the Transcendental Creator itself assumes sometimes a male, sometimes a female form It tends to be male in the far north and female in the south—but not in the usual sense of male and female The moon is commonly represented as male across the northern part of the continent, but along the east coast it is generally female The sun is sometimes male sometimes female But the evening star is always said to have an essential femininity Even on the east coast where I've never heard the creation story of women, the evening star is female Some of the species creators, such as the Djankawu Sisters are also female

Omni Aren't species creators held to be responsible for creating certain sacred sites, such as Ayers Rock and Orroroo?

Willmot Yes, when the species creators as I mentioned, passed through the land, giving it and its creatures their present form at the end of the dreamtime, their passage also created sites that commemorate that creative period Orroroo is such an important site because it is a key marker of one of the major journeys of these spirits through that part of the country now known as New South Wales Actually it is no more sacred than Katatjuta or the Olgas, which are outcroppings of rock quite similar in appearance to Ayers Rock

In the last century or two Australia has changed dramatically, with the forests being cut down or burned, and cattle and sheep being introduced Many of these sacred sites are actually quite small and are marked only by paintings or their special shape or appearance So today only those sites with enduringly spectacular geological and geographical features have become well-known Orroroo and Ayers Rock are only two of such sites

Omni Isn't the aborigines deeply spiritual involvement with land and nature documented by an elaborate form of rock art?

Willmot Aboriginal rock art represents the greatest assemblage of ancient human art on Earth it exceeds by a thousandfold anything else It is the equivalent—or more—of archaeological scripts and hieroglyphics found in other old civilizations But it was not always like this The very early art from the Northern Territory which dates back perhaps fifty thousand years, resembles art from the caves of Altamira in Spain and Lascaux in France This art is very naturalistic and often speaks of animals that are long extinct, and gives us some idea of their appearance

Probably around the time of the first aboriginal skeletal remains around forty thousand years ago aborigines became interested in religion (The first religious disposal of a body on Earth was at Lake Mungo When this Mungo Lady died her body was covered in red ocher and ceremonially cremated The remaining skeletal material was carefully broken and placed in a small conical pit) European art of the same period or earlier depicts economically important things—like the animals they ate The aborigines, however were already on to things spiritual—things human and beyond human And they painted them on the rock faces of this whole continent This art is mystical, religious, and speaks the mind of the first people to concern themselves with the nature of humans

Early aborigine art fused painting with literacy Desert paintings and those from the north can actually be read This art is

actually much closer to Chinese character literacy than to alphabet literacy. It transcribes ideas into markings on stone or bark. Peripatetic art, consisting mainly of rock engravings, is found throughout the country, including Tasmania. But it's mysterious: even modern aboriginal scholars can say very little about it. Some of it has strange similarities to art seen elsewhere—most similar perhaps, to that found in parts of South America.

Australia is a kind of singularity of nature. So from what we find in the earth of this continent, we can read things about the beginnings of the earth, the solar system, and perhaps the universe itself. The records left behind by the early human inhabitants of this continent are somewhat similar to nature's own records. This history of both the natural earth and its human inhabitants, this ancient Australian art, is written in and on stone. But it is an imperfect literacy, and one that may take many centuries to fully understand.

Omni: What is aboriginal mythology about?

Willmot: Aboriginal mythology serves two purposes. Sometimes it's a record of the very distant past, but it is more commonly a way this society conveys first to itself and then to the world, the complex nature of its workings—the way its people are or ought to be. The historical significance is evident in a myth telling of islands of ice near Tasmania. This myth arose during the last ice age, when Tasmania was largely glacial and there were large icebergs close to the continent. Another myth tells of volcanoes near Victoria, volcanoes that haven't been volcanoes for fifteen or twenty thousand years. In central Australia there was a persistent myth about the bones of a large animal preserved in a dried-up salt bed. Eventually archaeologists had a look, and sure enough, they found the bones of the diprotodon. This, the largest marsupial that ever lived, died out about six thousand years ago. Very recently in north Queensland, a large painting—identified as a diprotodon—was found on a cave roof. It looks as we'd expect one to, and certainly the toes are those of a diprotodon; but the leg structure looks different. One wonders if it were a diprotodon or a close relative. And there's a cave painting in the Northern Territory of another relative of the diprotodon, an animal that's known to have been extinct for at least eight thousand years.

The point about these myths and paintings we're discovering is that they indicate quite clearly that the world, which for the aborigines today is largely mythological, was once a very real world, and these animals were food animals, a source of the aboriginal economy.

Like the imperfect literacy of the stone faces, aborigine mythology is terribly wrought with symbolism. Such symbolism is cross-related, layered with meanings designed to convey special things to special people. The best I can do is give you some idea of its antiquity. I fear the traditions of ancient scholarship will not be preserved in sufficient purity that we will ever know all the things these myths can tell us.

Omni: White anthropologists have traditionally explained the development of old Australian culture in terms of the continent's isolation from European technology. Is this something of a simplification?

Willmot: Two major things caused old Australia to be the way it was when the rest of the world came calling. The first is explained by the colors aboriginal people use to paint their world: reds, yellows, whites, blacks. These earth pigments come from minerals like aluminum, iron, nickel and chromium. But these metals are the most difficult to extract from their ores. Only modern technology can do it, so the aborigines made no metallurgical discoveries of these minerals—beyond the pigments' use in art. Accidental discoveries of copper would have been much simpler, because copper reduces easily from its ore in pottery kilns. But aborigine art reveals a glaring lack of the blues and greens that come from copper. So the aborigines had no metal whatsoever. And without the discovery and use of metal, technology as we know it could never proceed.

"Recently scholars thought humans hadn't been here for more than forty thousand years. But an opalized skull found in New South Wales is probably sixty thousand years old."

The second factor shaping old aborigine society was a peculiar policy that demanded that you maximize affluence for the minimum level of technology. For instance, when the British arrived they noted the aborigines' interest in fishing lines and hooks. Yet recent archaeological digs show that less than a thousand years ago, aboriginal people were using fishing lines made of kangaroo sinews and hooks carefully wrought from shells. But clearly something happened to make them see that this technology was less efficient for fishing than that of the 'simpler' multiple-pronged spear. So the line-and-hook technology was discarded by the aborigines.

When the British arrived, the average aborigine worked about five hours a day and was fat, brown and happy. The average Britisher, however, would have been lucky to make ends meet in fifteen hours, even with sending his kids into the coal mines. The British, and Western society in general, you see, have a policy completely opposite that of the aborigines. The West maximizes the use of any technology, no matter what the cost to society. These two factors, plus the intensely religious nature of society, made old Australia what it was.

Omni: When and how did the first humans get to Australia?

Willmot: Until recently, most scholars thought that humans hadn't been here for more than forty thousand years, although an opalized skull found in northern New South Wales is probably at least sixty thousand years old. Bone preserves well only in special circumstances. Tools found later on, however, now indicate that aboriginal occupation of this continent is more than a hundred thousand years old.

Until fifteen thousand years ago, New Guinea was part of Australia and was indeed inhabited by Australian aborigines. Melanesian habitation of those islands is quite a recent event, by comparison. Yet in spite of the fact that tides were much lower during the last ice age than they are today, Australia has never been joined to any other large landmass by any sort of land bridge. The only way people could have gotten here was by an extensive sea voyage.

How they got here, nobody knows. But it was an extraordinarily long time ago. Unlike the mythologies of the Pacific Islanders, old Australian mythology is virtually without migration myths. The only possible mythic reference is that at least one species creator is said to have come from the sea during the dreamtime. And whatever happened, it happened in the dreamtime, whenever that was. Aboriginal scholars today take the view that however humanity came to be in this place, this continent is where the people of old Australia became *fully* human. This indicates that aborigines may have arrived in Australia in a form preceding that of *Homo sapiens*.

Omni: Doesn't that suggest that aborigine fossils could have immense import for understanding human evolution?

Willmot: Absolutely! *Homo sapiens* has always been thought to have evolved somewhere in Africa and then migrated north to Europe and south to Australia. Remains of modern humans found in Australia, however, are at least ten thousand years older than any found elsewhere. So it's quite possible that the final step in human evolution took place in the isolation of Australia.

Two subspecies of man lived in Australia in the distant past. One, commonly known as the Cow Swamp people, was very similar to the European Neanderthals. The so-called Mungo people, however, were far more gracile than even Cro-Magnon man. Modern, fully descendant aborigines are probably a mix of these two groups. The likelihood of a very old find in Australia, particularly one relating *Homo sapiens* to *Homo erectus*, is fairly high. Even more important is the fact that the relationship between the two may be much clearer here than anywhere else. *Homo erectus* definitely existed in Asia, but until recently there's been no evidence of *Homo erectus*

in Australia. That opalized skull that I mentioned before, which was found by archaeologist Allan Thorn, could prove to be the first piece of solid evidence for *Homo erectus* in Australia.

Omni: Hasn't there been great controversy recently about whether bone specimens housed at the University of Melbourne should be returned to the aborigines?

Willmot: Archaeologists and physical anthropologists have bitterly opposed aboriginal demands that these bones be returned for reburial. Very recent remains, the so-called Crather Collection in Tasmania, are simply the product of grave robbery. A most appalling affair, because the robbers were living relations of those skeletons. These remains have been returned and buried again in the traditional manner.

Aboriginal people, much more sensibly than white scholars, have finally concluded that very old fossil remains, such as the Mungo Lady or the Cow Swamp people, are the prime evidence of aboriginal existence and so should never be destroyed. Recently the National Museum of Australia, which has a statutory aboriginal advisory committee, decided that if aboriginal people demand skeletal remains be returned, then they should be returned. Let aboriginals bear the responsibility for the future—both for the value these remains may have for their own scholars, and the value to the world of science. This is something that's always been missing in Australia—that aboriginal people be allowed to practice being really part of the modern human race. A deal with the local aboriginal community has also been made concerning the remains in the Victoria museum collection, so I think the issue is passing.

Omni: Wasn't the separation of Tasmania from the Australian continent fairly recent?

Willmot: Tasmania became an island roughly eight thousand years ago. Prior to that, the technology of those living there was similar to that of the peoples of Victoria. They made clothes from hides carefully sewn with bone needles, used *womerah*, or spear throwers, and ground flour from seed. Tasmanians appear physically different from mainlanders, but I think that's only because of their isolation. And let's face it, their isolation was a dramatic thing.

We know the tides took perhaps a thousand years to rise to present levels, but parts of Australia, because of its flatness, experienced even small tidal rises as cataclysmic events. For instance, in a single generation the sea would have penetrated the land a kilometer in the northern parts. A child taken from Tasmania by his parents across Bass Strait to visit his relations in Victoria would, as an adult, be isolated forever from the rest of the known world. Tasmania, I believe, did not regress; it rather carefully adapted its culture to a form its people needed to survive on this southernmost isolated island.

Omni: Did the old Australians massacre white explorers, as did Melanesian peoples?

Willmot: Australians were just not interested in Europeans. Captain Cook, the famous navigator who mapped the east coast of Australia, said himself that when he made offerings—the usual gifts of technology such as steel tools—the aborigines unrolled them, examined them carefully, rolled them back up, and returned them to Cook. He had nothing of value for them. The unwanted technology was a most unwanted debt.

Aboriginal people had most probably had two thousand years' experience with seafaring adventurers. The Macassins from Indonesia not only visited the land but set up quite elaborate facilities in north Australia to process trepangs or *bêches-de-mer* [sea cucumbers]. The first clearly reported attack was on one of Cook's boats. But I fear that Cook tired on the people first. Or perhaps they threw the first spear—they were frightened, unsure people. Who really knows what happened? But these contacts were sporadic and trivial—certainly nothing like the response that met Europeans when they attempted to invade the lands of the Melanesians and Polynesians. Those were societies like the British, based on warrior elites. Australia never had them. Pemulwuy was perhaps Australia's first warrior, the Rainbow Warrior.

Omni: Have extremes of climate and geography led aborigines to evolve distinctive pro-survival physical characteristics?

Willmot: Some aborigines have physical abilities allowing them to live in the desert or tropics better than Europeans. Desert aborigines have high intercellular interstices [spaces between the cells] that facilitate water retention. And almost all aborigines have a higher melanin content in the skin than whites, which protects them from ultraviolet rays. But all animals that evolved in the tropics, including hominids, probably have dark skins. Because you really don't need a black skin in Australia, the melanin is very poorly fixed in aborigines, and aboriginal people lose their color very quickly. Within two crosses with Europeans, we can have quite fair skins. I've seen Tasmanian aborigines with blond hair and blue eyes, whereas when you cross Europeans with Africans, Melanesians or Polynesians, you sometimes get brown babies for six generations.

Omni: Haven't the aborigines been exceptionally hard hit by alcoholism?

Willmot: Charles Perkins, an eminent aborigine, is currently leading a massive campaign against alcohol in New South Wales. Many aborigine communities there have introduced laws banning alcohol within their boundaries. I'm not sure I support prohibition, because the alcoholism is a symptom of a deeper malaise. As a symptom of distress, of dispossession, of depression, alcoholism—as well as excessive tobacco smoking and other drug taking—is characteristic of all cultures of poverty.

I've no doubt that the Europeans themselves had a very bad time with alcohol a long time ago. Alcohol is very new for Aus-

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EXPLORATIONS

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cannon shot, showing that each ball had been left with an untrimmed "tail." When fired, he explains, this tail makes "a hell of a screech. If you were a Joe Blow merchant captain and had twenty eight of these buggers screaming at you, it would definitely encourage you to surrender."

In addition, the *Whydah* fired tumbling "bar shot," designed not for killing people but for ripping holes in sails.

Kinkor interprets this unusual ammunition as evidence that psychological warfare was a good deal more important for the pirates than actual violence. "These guys were businessmen," he explains. "They knew that if they got the reputation for viciousness, the crews they attacked would put up that much more resistance." Instead, the pirates put on a show of force to encourage their opponents to surrender.

For Kinkor, though, the most gratifying objects are those that help confirm his impression of pirate society as democratic and egalitarian. The brass "signature" seals, for instance, are fascinating finds, for they were used to sign the ship's "articles"—a set of seagoing constitutional rights that guaranteed each crew member a prescribed share of the loot. In fact, Kinkor says, the articles even provided for distribution of that share to the crewman's family if he were to be killed or incapacitated before collecting.

As a matter of fact, Kinkor says, the *Whydah* pirates may have gone even further in the direction of modern liberalism. Court testimony by the wreck's survivors indicates that when Bellamy captured the ship, one of his first acts was to free the black slaves aboard and to "adopt" 25 of them as pirate crewmen, each entitled to an equal say in shipboard proceedings and an equal share of the loot. "Not only were the pirates democratic," Kinkor concludes, "they were, in an incidental way, purveyors of social justice."

For Kinkor, Clifford, and the rest of the Maritime Explorations scientists, these findings are extremely gratifying. They are further encouraged by the admiration and keen interest of the academic community, which views the artifacts as invaluable clues to the truth about pirate life.

But Clifford and Kinkor's work has just started. The wreck of the *Whydah* is strewn over an area that they now estimate to be almost 100,000 square feet. Only 2 percent of that area has been excavated thus far. Clifford estimates that it will take as long as five years to do the rest.

In the meantime, as Kinkor and friends slowly recover, clean, and restore the *Whydah*'s archaeological treasures, new information turns up at a measured but satisfying pace. "It's a jigsaw puzzle down there," says Kinkor, referring to the sandy bottom under which most of the *Whydah* still lies. "Each new bit of evidence we find puts one more piece in place." OMNI

"If even a portion of the facts about UFO sightings is suppressed, the truth will never emerge."

ANTI MATTER

UFO UPDATE

I was as skeptical as the next fellow about unidentified flying objects. My legal training required evidence to prove the existence of UFOs. None was forthcoming except for the typical tabloid headlines: "WAS SEXUALLY ASSAULTED BY MARTIAN" found at supermarket checkout counters. But what was laughable has now become serious. Solid evidence does exist to erase this skepticism. Before this evidence emerged I believed the Air Force, the Central Intelligence Agency and every other government agency that insisted UFOs were a myth would have continued to accept this government pronouncement for ever had it not been for the passage of the Freedom of Information Act (FOIA). Congress enacted this law because it felt that the government was keeping too many facts from public inspection. This concern was certainly justified. Thanks to the FOIA we now know that Uncle Sam has been sitting on evidence that UFOs *do* exist and that very substantial people have seen them.

The most revealing information is found in Air Intelligence Division Study (AIDS) 203. Following are some of the references found within:

- White Sands, New Mexico, June 29, 1947. Three scientists sighted a large, wingless disc or sphere moving horizontally.
- Portland, Oregon, July 7, 1947. Five police officers sighted a varying number of similar discs flying over different sections of the city.
- Andrews Field, Maryland, November 18, 1948. Reserve pilots Lieutenant Kenwood Jackson, Lieutenant Glen Stalker and Lieutenant Henry Combs encountered a lighted UFO circling at 17,000 feet. They described the object as an oblong ball with a light, no wings and no exhaust flame. If I could still doubt the sanity or sobriety of the observers already mentioned an inspection of Air Intelligence Report 1R 83-55, dated October 15, 1955 would have to be the convincer. The report was compiled after interviews with Senator Richard Russell of Georgia, then chairman of the Armed Forces Committee of the Senate, Lieutenant Colonel E. V. Hathaway, a staff officer assigned to the committee, and Reuben Efron, a committee consultant. On October 1, 1955 at 7:10 p.m., after departing by train from the USSR, *all three* observed two flying discs taking off almost vertically—one minute apart.

What we ultimately seek in the courts is the truth. If even a portion of the facts is suppressed, the truth will not emerge. How could I or any judge reach a proper decision on the issue of UFOs when the testimony of responsible and credible witnesses has never been heard?

We have now heard the other side of the case. We had been led to believe that only charlatans, drunks, fools or psychopaths observed the phenomenon. We now know that many of those witnesses were responsible, credible and respected people, most of whom were technologically trained. We now have reason to consider the subject of UFOs in light of strong evidence heretofore suppressed. *HOWARD E. GOLDFLUSS, Acting Justice, Supreme Court, State of New York, and author of the book* The Judgment

DEATH REHEARSAL

Devastated by a diagnosis of terminal lung cancer the man suffered a serious emotional collapse His own death had never crossed his consciousness before " says Alexander Levitan a Findley Minnesota, internist, oncologist and hypnother apist After the diagnosis he fell apart totally and became obsessed with dying Levi tan was able to relieve the man's paralyzing anxiety however with visualization techniques that allowed the patient to "see' what death would be like

Levitan who has con ducted 'death rehearsals' for dozens of critically ill pa- tients explains that hypnosis can be used to project people forward in time to the moment of death The patient describes the images he sees meanwhile relating how he feels—if he's afraid, if there is any pain what the people around him are feeling and even who visits his body at the funeral home

According to Levitan death is frequently described in the same terms used by people who have reported near death, or out of body experiences Some feel the self merging into a more universal awareness and feel a sense of familiarity " he says 'Some talk of looking down as though they were separating from their bodies

Levitan assists the patients by offering a positive re- sponse to the visualized scenes ' I don't lie to them, but I help interpret what they are visualizing in a positive upbeat way " Levitan notes "For example if a mother 'sees her children crying after she is dead I can point out that it s only natural because she is leaving them but that her memory and influ- ence will always be with the youngsters "

Levitan claims that patients typically respond to the death rehearsal with a sense of comfort and relief "It helps them accept death as a desirable biological out come,' he says We are dying from the moment we are born, but it doesn't have to be something we fear '

Levitan notes that death rehearsals have changed his own view of mortality ' I would grieve if I had to die now he says "But I feel comfortable about death I m convinced it isn't an unpleas ant event at all

—Sherry Baker

"The days are gone when a man was allowed to die in peace and dignity in his own home "

—Elisabeth Kubler-Ross

GIANT HAIR BALL

Anyone who owns a cat has probably seen the animal choking because of hair balls which form internally as a result of the feline's grooming habits But in Iran recently doctors discovered a huge *human* hair ball in a woman's stomach

The twenty year old patient was rushed to Alavi Hospital in Shiraz for removal of what was believed to be a large cancerous growth that was threatening her life and endangering her pregnancy

But when surgeon Ibrahim Shademan removed the mass, he found instead of a malignancy a solid ball of hair weighing 4 4 pounds

How did the mass form? Doctors learned the woman continually chewed and swallowed her own hair—a habit she had developed in childhood

According to Birmingham Alabama gastroenterologist Christopher Truss the Iran hair ball was unusually large But smaller versions have been found from time to time in nervous women who chew or suck on their hair These hair balls technically referred to as trichobezoars take years to build up Truss says and can be mistaken for tumors on X rays

Unlike cats, who usually vomit or cough up the excess hair they swallow human eaters are faced with more serious consequences If human hair balls are left untreated they can erode the wall of the stomach and lead to a bleeding ulcer,' Truss warns They can also obstruct the stomach block it off and even be fatal

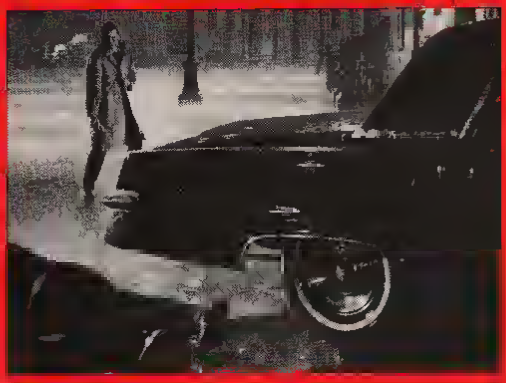
Sherry Baker

NIGHT TERRORS

If you commit acts of murder, violence or mayhem while asleep, says British psychiatrist Peter Fenwick you might be able to get off scot free

The murderous acts according to Fenwick occur during episodes of a bizarre sleep disorder known as night terror Unlike sleepwalkers the victims of night terrors show intense emotional involvement in their dreams which typically include sensations of falling choking or being attacked Those in the grip of an episode may scream sit up walk or assault a sleeping partner Typically they recall little upon waking

One such episode was the highlight of a recent murder trial in Great Britain The defendant apparently had dreamed Japanese soldiers were chasing him in his sleep—and in the ensuing struggle he strangled one of them The murdered soldier however turned out to be his wife The court accepted the plea of not guilty due to sane automatism and set the man free



Psychiatrist Ernest Hartmann author of *The Nightmare The Psychology and Biology of Terrifying Dreams* has studied a similar case in the United States Under stress and the influence of alcohol he says a Massachusetts man pulled off the road to sleep, only to start his car up again turn around during a night terror and drive down the road in the wrong direction Three people were killed

Under Massachusetts law Hartmann says this episode fit the definition of insanity The person did not know what he was doing and did not know the difference between right and wrong The man was convicted but Hartmann thinks that if he had not had alcohol in his blood he might have been found innocent

As for Fenwick he hopes the law in Great Britain will be changed For most other violent automatic acts carried out in an organic confusional state there is a mandatory referral to a hospital usually a secure one. The difference seems illogical and suggests that the law on automatism needs revision

Paul McCarthy

"Extreme terror gives us back the gestures of our childhood

Chazal

[illegible]

The latest group to brave the Congolese swamp in search o the creature called Mokele M bembe has returned empty handed The mysterious animal said to be a living example of a sauropod dinosaur has been reported by local people for the past 30 years

The recent expedition led by former British Army private Bill Gibbons was plagued with troubles from the start All four members of the group were arrested upon their arrival in the Congo and any government employee endorsing their mission was expelled from office The group finally received permission to proceed only after paying thousands of dollars worth of bribes And en route to the animal's alleged lake home they trekked through swamps filled with poisonous snakes and tribes of Pygmy head hunters

According to Gibbons one advantage was his red hair and beard which caused the swamp people to treat him like a god "They were very friendly to me he says They made me their man of the people and offered me presidency of the lake after a special ceremony

He was sanguine about his failure to glimpse the monster "We did discover what seems to be a new species of monkey and brought a head back for study, he says We now believe that the Mokele M'bembe has moved from the lake but still lives in the lake region

Indeed Gibbons's failure to find the dinosaur has not diminished his belief that it exists We tracked down a pastor who had seen one immediately in front of him " Gibbons says "He described it as the size of two forest elephants with a long neck and tail reddish brown skin and a combiike frill on the back There is no question that a small population of these unknown aquatic creatures does reside in the area. It is only a matter of time before someone discovers irrefutable proof "

Gibbons would like it to be him But the next chance may go to University of Chicago biologist Roy Mackal who has probed the swamps of the Congo I search of Mokele M bembe twice before Mackal says he has been accumulating funds and plans an expedition for February 1988 Gibbons himself plans to go back in 1990 as a missionary—partly to eliminate some of the red tape he says and partly because he was born again during his first journey to the Congolese swamp Jenny Randles

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As spread thighs are to the libertine, flights of migratory birds to the ornithologist the working part of his tool bit to the production machinist so was the letter V to young Stencil "

Thomas Pynchon

[illegible]

On Wednesday nights Jehremy Stockwell holds a "channeling class in his apartment on Manhattan s Upper West Side On this

icular evening a young woman with blond hair in workout garb kicks things off for a dozen yuppie peers

I m beautiful sensual and brilliant she says I m a wonderful mother a talented writer a gifted psychic m a money magnet!

Clearly this is not a seance for bereaved widows hoping to speak with spirits from beyond Instead it is a sign that the tired Spiritualist religion may after all be changing with the times

Most Spiritualist churches I know are filled with lovely people and very outdated practices says Stockwell who is a member of the F rst Universal Spiritualist Church of New York City and has been a channel for guides from the spirit world all his life " Seances often devolve into parlor games with mediums dragging out one dead relative after the next The way my guides have explained it to me though, is that Spiritualism and indeed all religions are undergoing dramatic pressures and changes In order for it to survive it must offer the services and understanding that people need

These days he notes those needs are best met by casual channeling groups—and by spirits like Jonathan As the lights went down and the candles flared during one recent meeting of the Wednesday group Jonathan seemed to settle in Stockwell's body Pay heed to world affairs Jonathan/ Stockwell told the group "And practice making your own predictions about the global state of affairs "

"In these troubled times Stockwell says Spiritualism has a more important function than to say that Aunt Millie and Uncle Jack are still around and send you their love " Tracy Cochran

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No matter how slow the film Spirit always stands still long enough for the photographer It has chosen

Minor White

AT THE MOVIES

CONTINUED FROM PAGE 52

artistically over what you want to do and say, you have to control how you make the movie—and that means control over the budget, casting, location.

THEATER FOUR

A Michael Douglas Film. *Virgin Kisses*
Genre: Thriller
Time: Late twentieth century
Setting: Los Angeles
Synopsis: Lust destroys a Beverly Hills psychiatrist's life in this film about sexual obsession. He's got it made: a thriving practice, the right wife, a well-ordered moral life. One day a strange woman walks into his office. She's not very pretty; she's not a great seductress, but something about her makes him lose control. He becomes obsessed with her, and his life starts to fall apart. He begins to break his own moral and ethical codes until he loses everything he's worked for.

A Son Also Rises. One of the most interesting possibilities for the future will be interactive movies, in which the audience will redirect the story line. I'd like to make a suspenseful, interactive film and fulfill a personal desire of mine: to play a really grim, bad character—a murderer, maybe. I've played so many morally righteous, humane guys. Villains usually fascinate audiences because they are just so out there. In this film I really would be bent. Or I might play a villain—and this is my father's take on me—who convinces the audience that he's a nice, responsible guy and then changes completely. In the end the audience would choose—to let me go or to off me.

Omni: Does all the discussion about decreasing attention spans worry you?

Douglas: Steven Spielberg spoke very astutely at this year's Academy Awards saying we're going to have to return to story, to the written word. People's reading interests will peak again—and not too far into the future. They'll be more adept at sitting through a complicated story and plot line. The story is crucial in whatever genre you film. I started out in films with a political and social nature, like *One Flew Over the Cuckoo's Nest*; then I did romantic comedies like *Romancing the Stone*. I said I'd never do science fiction, but I did *Starman*. After I filmed *Romancing the Stone*, people said, "You've lost your credibility." But God, I was sent really depressing scripts after *The China Syndrome*. Every cancer story in the world must have made its way to me. Actors and producers should try different roles, different movies. What's important is to be open to the story.

Omni: Any comments on the future?

Douglas: There'll be a wider spectrum of films in the future. The film industry will be less centralized, more personalized, allowing for a larger selection of films. In the near future, the industry will move beyond the New York–Los Angeles axis. The old joke that everyone dreams of being a screenwriter will come true. With the advent and quality of Super 8 video, has more lineage resolution than celluloid. As costs continue to decrease, more people will have the opportunity to tell their personal stories, and film will have a greater sociological impact. And I think movie theaters themselves will be influenced by computers and Showscan, offering special experiences and technological advances to people who want to go out of their homes for entertainment.

THEATER FIVE

A John Schlesinger Film. *Hadrian VII*
Starring: Dustin Hoffman
Screenwriter: Charles Wood (*Help!*, *How I Won the War*, *Tumbledown*, *Cuba*)
Genre: Historical drama
Time: 1903
Setting: London
Synopsis: Dustin Hoffman is stunning in Schlesinger's many-layered re-creation of the life of the turn-of-the-century—that's the nineteenth century—writer Frederick William Rolfe. An extremely difficult man, the smallish, graying Rolfe failed as a writer. Rejected twice for the priesthood, he eventually withdrew into a world of fantasy. Britain's maverick director focuses on one of the fantasies Rolfe wrote out as a sort of novel. He becomes the first British pope. The audience travels with Rolfe from his real-life Spartan room into an imaginary land where he dons the full vestments of the papal office and sits on a throne surrounded by members of the Sacred College, Swiss guards and an entourage of cardinals in full purple. As Pope Hadrian VII, Rolfe walks among throngs of the faithful in St. Peter's Square. He even changes the world in significant ways. In the end his own delusions invade his fantasy.

Schlesinger: Everybody's Talkin' at Me. For some reason I'm attracted to subjects that exhibit a dark quality—people pushed to the edge of their experience to a crisis point. Portraying people who have failed and live in a world of fantasy is a repetitive theme in my films. The difference between fantasy and the reality behind it fascinates me. I don't mean to say that I'm totally pessimistic—optimistically pessimistic, perhaps that's it. I'd really like to do a film about the country again, an enclosed society, like village life and its darker side. I've dreamed of doing Evelyn Waugh's novel *A Handful of Dust*, about a kindly, civilized man who leaves London and returns to the old family estate, located between the villages of Hetton and Compton Last. His young son dies, and his wife, who is bored with isolated country living, has an affair. The hero attempts to escape from his pain by traveling to the jungles of South Amer-

ica where he falls into the clutches of an insane old man. The hero realizes that his fate is not radically different from what he had encountered in "civilization."

Omni: Any comments on the way you use technological breakthroughs?

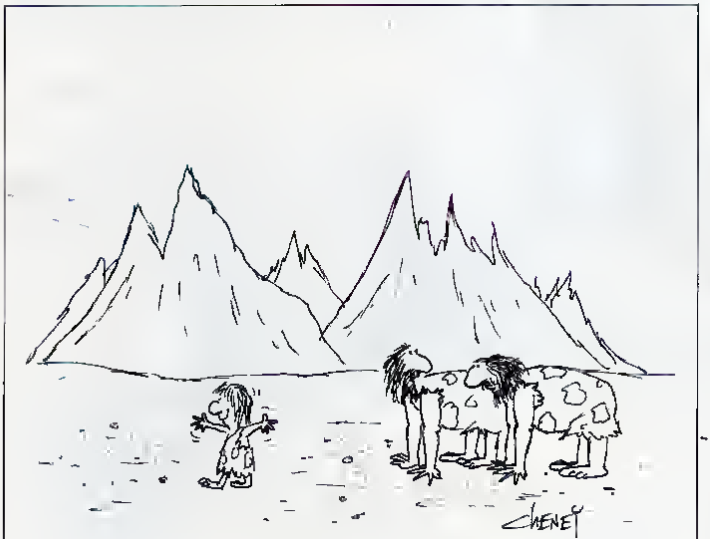
Schlesinger: As a child I was an amateur magician, and the mixture of technical dexterity, illusion, and audience control closely parallels the craft of a filmmaker. An invisible string exists between the screen and the audience. The director pulls it tight, lets it loose, or jerks it backward or forward. It's a matter of movement and fluidity, how you achieve a cunning composition, how you move the camera, how you use clever lens techniques to form a tight framework, and how you edit a film. These things, in a very simple way, propel the emotional content of the story in the film. I like the flexibility that technical improvements in the tools of our trade provide. Film stock is faster, color is better and needs less light.

I recently made a film, *An Englishman Abroad*, in an extremely short period of time. I didn't feel the pressure largely because we were working with sixteen-millimeter, the cameras were smaller, more mobile. There are all sorts of things you can do to sets with computers and computer graphics. I know people already are stripping in backgrounds for television, and I think these techniques may be refined to make the scene very real.

Filming *Hadrian VII* would be a question of how the sets would look. They would change vastly and instantaneously but would be related to the actual environment in which Rolfe lives. I'm not interested, however, in technique for technique's sake but in the human element of filmmaking. I use film for emotional purposes with all the techniques available to me. I hope only that viewing systems improve. Maybe someday we'll see films on our walls beamed from a satellite. But no technological development will replace the experience of going to the cinema and sharing those moments with a lot of people in a darkened room. I regret the passing of the big screen and the large cinema. I hate the way films, on the whole, are exhibited. And it's getting worse, not better. At the present moment I don't see a wonderful era of filmmaking about to explode all over the world. I suppose I was fortunate to have begun in the Sixties, a great period for film. Things are not as optimistic looking today. On the whole, films are very mediocre. No one takes risks. The commercial considerations are enormous. I'm shocked by the lack of money here in England, because we have a vast amount of wonderful talent.

Omni: Do we have a different generation of moviegoers because of television and the video revolution?

Schlesinger: People's attention spans are much shorter, and they are accustomed to seeing things in familiar surroundings. This requires no effort on their part. A world full of people changing channels—and I include myself—is disastrous from the point of view of concentration. We don't allow a film, even when it gets a bit slow, to wash over us; we don't go with it. People want instant gratification. The audience doesn't want to listen very hard for very long, and that's a real problem. They want a film to be sharp, shocking, their attitude seems to be, Get on with the story. On the other hand, the great thing about "the audience" is that it can't be second-guessed. Films that didn't look commercially viable on paper, like *Room With a View* or *Platoon*, are successful. And they are human stories that do not rely simply on technique. Thank God there's always something coming from left field, confounding all the people who want to jump on bandwagons overladen with repetitive ideas.



"He's an exceptionally gifted child."

THEATER SIX

A Mel Brooks Film *She Stoops to Conquer*

Starring: Mel Brooks, Anne Bancroft, Gene Wilder, Dudley Moore, Victoria Tennant

Screenwriter: Mel Brooks

Genre: Satire

Time: Circa 1770

Setting: Surrey, England

Synopsis: This intricately plotted comedy, based on Oliver Goldsmith's classic play, involves a series of misunderstandings that have far-reaching consequences. The fun begins when Marlow (Dudley Moore) mistakes the home of a friend's father for a country inn. Director Brooks plays Squire Hardcastle, with his real-life wife Anne Bancroft posing as the gorgeous Lady Hardcastle.

As the movie moves from farce to high comedy, Gene Wilder steps in as Tony Lumpkin, the country-bumpkin squire who is Lady Hardcastle's son from a previous marriage. Marlow, who is terrified of well-bred women but able to handle "females of another class," mistakes the squire's daughter Kate (Victoria Tennant) for a barmaid. And the fun continues.

Brooks: Past, Present, and Future

Probably the biggest event in the next century will be the war between humanism and machines. People will become more robotic in their thinking, while machines will learn to make love. By the time the twenty-first century rolls around, we will have had our fill of violence and an overabundance of frontal nudity. Straitlaced Victorian attitudes toward sex probably will be back in vogue. But to me, comedy has always been based on behavior, and even though times change, the human animal remains basically the same. So I base my comedy on the eternal verities: greed, lust, blind ambition, laziness, lying, and (occasionally) goodness.

No one becomes a great comic talent,

by the way. You are born with it, and it becomes apparent very early in life. You sharpen and hone your gifts with hard work and dedication, but if you don't have timing to begin with, you'll never achieve it—except maybe for Ronald Reagan.

Omni: Is there a comedy you'd like to make in the future?

Brooks: The only classic genre I have not worked in is the Disneyesque animated film. If I could get the right angle, I'd love to kick the shit out of *Snow White and the Seven Dwarfs!* I also want to re-create the Thirties Busby Berkeley black-and-white musical spectacular. I see myself dancing down a thousand steps and somehow tripping on the last one. It would be fun to cast a thousand beautiful ladies to be balled-up flower buds that open as the camera passes.

Omni: Any device or technique you'd like the film industry to produce?

Brooks: Someone in the industry should invent a new lens that covers what happens in a small area without bowing or bending the image. If such a lens were available, I would work in tight quarters with minilights. It would save on the cost of building sets.

Omni: Will videos replace the movie theater experience?

Brooks: There will always be a film audience: hundreds of people sitting in a theater, eating popcorn, mesmerized by the twenty-foot images that tower above them, their faces bathed in the beautiful white light bouncing off the silver screen. Suddenly they all laugh at once: a glorious explosion. I couldn't live without it.

Omni: Will you ever do a serious film?

Brooks: I want to do a David Lynch unconscious treatment of the secret mind of Adolf Hitler, a Samuel Beckett-ish adventure dealing with unconscious truths. I'd have to find new cinematic devices to unfold the story properly. I'd produce it. Gerald Hirschfeld, who did *Young Frankenstein* and can paint with a camera, would be my cinematographer. Terence Marsh, whose best work has never seen the light of day, would be my set designer. The guy's a genius. And Lynch would be the perfect director. He'd do it in black and white, as he did *Eraserhead*. Hermann Goring and that incredible little snakelike Joseph Goebbels would be represented in some insane, symbolic way—Goebbels based on power and Goring on sexual perversity. Eva Braun would represent the people—the innocent people—swallowing everything, believing a lie, being seduced. It could be an incredible picture.

THEATER SEVEN

A Richard Attenborough Film: *Thomas Paine*

Production Design: Stuart Craig (*The Mission, Greystoke, The Legend of Tarzan, Gandhi*)

Cinematographer: Ronnie Taylor (*High Road to China, Gandhi*)

Sound: Simon Kaye (*Platoon*)

Genre: Historical epic

Time: Late 1700's

Settings: London, Paris, Philadelphia

Synopsis: The director, who won a 1982 Academy Award for *Gandhi* (Best Picture), draws a celluloid portrait of Thomas Paine, one of the most wrongly judged and underestimated philosophical radicals of his time. Born in England in 1737, Paine was in his thirties when he first met Benjamin Franklin in London. Paine went to America to work for the cause of freedom, influencing the Founding Fathers with his brilliant political essays. In 1776 he published *Common Sense*, a defense of the colonist position and the famous pamphlet *The Crisis*, which Washington had read to his soldiers. Attenborough painstakingly brings the man's life to the screen—from Paine's involvement in the American Revolution to his trial for treason in Britain, and his escape to Paris, where he became involved with Danton, Marat, and Robespierre during the French Revolution. Imprisoned in France, he wrote *The Age of Reason*, a critique of orthodox religion. At President Thomas Jefferson's request, Paine was released from prison and returned to America. He died seven years later—poor, sick, and out of public favor.

Attenborough's Magic. I don't know if this movie could ever be done as a single film. The scale is monumental. And certainly the budget would be horrific—seventy-five to eighty million dollars. I don't know if I could persuade any company to agree. The shooting would occur on all the original locations. I haven't any idea about casting. Paine has been drawn by a number of artists. He looks very intense, hawklike—with a high forehead, heavy brow, prominent nose, and serious but soft eyes. There are a number of actors who might portray him. In general, I admire Kevin Kline and Denzel Washington, who is as exciting as Sidney Poitier was twenty years ago.

Also, Alyson Reed is one of the best screen actresses I've ever come across. If there were ever a part in any movie that I was doing that she was even slightly right for, I would bend it and rewrite it in order to put her in the film.

Omni: Do you think future film audiences will be less willing or able to become emotionally engaged by films?

Attenborough: Increasingly audiences are willing and able to tackle subject matter that they must listen to and assimilate, rather than sitting passively gazing at escapist superficial entertainment. But when people are dealing with difficult, absorbing material, the experience demands the movie house, the cinema. There are now—and there will be more and more—subjects that demand the large screen. The stories demand the excitement and emotional involvement of an

audience. People are beginning to recognize that sitting at home with Auntie asking for a cup of tea at the most dramatic moment destroys that moment forever. I think it will be easier to draw people into the theater for important films in the future.

Omni: Will the film industry of the next century return to more politically and socially conscious films?

Attenborough: Film has an important role to play in affecting the way people view political matters. The industry has moved away from such matters in the last ten years. But I think politically and socially engaging films will become important again. Of course that's my hobbyhorse. That's what I love doing. I am a narrative filmmaker, and through narrative form I try and tell stories whose contents are socially, morally—whatever the word is—important to me. I don't write books, I couldn't write to save my life. I don't compose music or paint pictures. I say what I want to say through film.

If I had failed to make *Gandhi*, or if *Gandhi* had been a failure, I probably would have given up directing. I believe fundamentally that film is the most persuasive medium that we've devised. Nothing can compare to film on a worldwide basis. Some two hundred million people saw *Gandhi*. The possibilities for the future for film, in terms of social comment and education, are very great.

Very recently there has been the most extraordinary encounter between Mikhail Gorbachev and Margaret Thatcher, the British prime minister. She is as right wing as your president, and she is saying that her encounters with Gorbachev were more stimulating and more important than any encounters she has ever had in her life. She said she would be prepared to trust anything that Gorbachev said. In one flash the door to artistic exchange is open. I'm sure this openness will affect cinema. Film is going to help break down barriers between nations.

Religious issues may play a bigger role in film in the future. I feel very concerned about that possibility. I become fearful of religious issues because religion can be so divisive. I would be very uncomfortable if films suddenly became one of the principal ways to disseminate forms of religious conviction.

I certainly think that fairly soon we will have a degree of three-dimensionality in a normal cinema projection. That means you'll have at least an element of three-D without having to sit in an auditorium with strange glasses on, as though you were sunbathing.

There is one film I would love to do, if anyone would let me—*The Hunchback of Notre Dame* as a musical. I would star in it. God, I'd give anything up to be able to jump around like Charles Laughton with only one eye and ring those cathedral bells and sing. What a part! What a film that would be!

SISKEL ON EBERT

CONTINUED FROM PAGE 52

budgets soaring out of control in mainstream Hollywood, a whole bunch of independent films were nominated this year for Oscars? I think we're going to get all kinds of strange and wonderful films very soon. We have this David Lynch, who got nominated for an Oscar for *Blue Velvet*. I'm betting we're on the uptake. I just hope the major studios don't gobble up all the theaters—as they are doing right now—so there aren't alternative theaters for non-Hollywood films to be seen in.

Ebert: The cassette and disk revolution will be consolidated within the next fifteen years. That's a key factor to remember. The use of prints will be obsolete. Studios won't send a print to a theater. The movie will be delivered by satellite via high-definition television technology. This will cause a revolution in the economics of motion-picture production because it will be extremely cheap both to film and to distribute a movie. Because a movie will be beamed in for just exactly where and when it is needed, the break-even point will be reduced substantially. I'm sure we'll still have a blockbuster mentality in the future—movies that one hundred million people want to see. But directors will be able to make a movie that one hundred thousand or ten thousand people might see. Directors will be free to experiment and take on more offbeat and personal projects. By the year 2000 or so, a motion picture will cost as much money as it now costs to publish a book or make a phonograph album.

Omni: What technological advances will affect movies in the twenty-first century?

Ebert: I've seen Showscan, the seventy millimeter, sixty-frames-a-second technology developed by Douglas Trumbull. It was the most amazing sight I've ever witnessed on the screen, offering a far more realistic viewing experience than any other technique. Because it doubles the speed of today's movies, you experience incredible physical sensations and feelings. The human nervous system is flooded with information. Showscan is a very significant technology. And the Showscan movie is compatible with television.

Omni: What directors do you most look forward to seeing in the future?

Ebert: I would name just a few. Gregory Nava, who made *El Norte*. Susan Seidelman, whose latest film is *Making Mr. Right*, and Alex Cox, the director of *Sid and Nancy* and *Repo Man*. But I'm talking about young young directors. Among established directors, I will be extremely interested in seeing what Werner Herzog and Martin Scorsese are doing around the year 2000.

Siskel: David Lynch has certainly proved he has extraordinary talent with *Blue Velvet*. He's a very exciting director. Woody Allen is doing just fine, clicking along at one picture a year. Jonathan Demme, director of *Swimming to Cambodia*, is tackling exciting subjects. Milos Forman still takes risks. And Stephen Frears, who did *My Beautiful Laundrette* and has just finished *Prick Up Your Ears*—a marvelous film about the life and death of the playwright Joe Orton—is superbly talented.

Omni: Will there ever be a kind of international trade in movies?

Ebert: With the advent of new, cheaper technology, countries that couldn't afford to make films will begin producing films that express that country's culture. It's really an exciting possibility. As a critic, I see movies from Iran, North Vietnam, China, Morocco, Nigeria. But ninety-five percent of all the movies are made in the United States, Japan, Europe, Australia and India. That means that when large portions of the world's population go to the movies, they see people who don't speak their language or live in their country. This is going to change in a very big way.

Omni: There are predictions that computers and robots will one day be used as actors in films and that computers will synthesize famous deceased film stars to the delight of their fans. What do you think?

Ebert: That will be the day. That sounds like the very last thing in the world I would ever want to see. If in the future the technology does become available, there ought to be a law against it.

Siskel: In terms of technology, we definitely will be seeing interactive movies. I dread the day when I'll be sitting in a theater watching a movie with a remote control on my lap, with lots of other people trying to fight my response or chase me out or whatever. It's a gimmick. See the greatest experience in moviegoing is to submit, if you will, to be subordinate to the film. Submitting to a great film is a delight. I don't need anything more. I don't want to be the director. I want to be the viewer.

Omni: Will Siskel and Ebert be together in the twenty-first century?

Ebert: Actually, I'm planning to collaborate with Susan Seidelman on a computer-generated clone of Gene Siskel. I'm going to program it to be a heck of a nice guy. I'm looking forward to working with that clone for many years.

Omni: Will the show change in any way in the next century?

Ebert: It surely will change once Seidelman gets to Siskel.

Siskel: Okay. I'm going to say something I've been dying to deliver this speech. I don't know whether we'll be doing the show in the year 2000. That would mean the show would have been running twenty-five years. After the show ends, we will go our separate ways socially. We do that now. From time to time we'll connect, maybe via MCI mail, saying, 'Can you believe they're liking this junk?' We were recently on *The Tonight Show* and Carson asked us, "Do you two even like each other?' We gave different answers. But I think otherwise. When my three-year-old daughter sees a picture of Roger and me she says, 'That's your friend Roger.' She knows the truth.

VISITATION

CONTINUED FROM PAGE 61

delicious thrust is completed after millennia of delay.

Then it slides from me in a fountain of my body's juices, and I fall backward.

As the beautiful thing, dripping my life, is turned against Glaum, I glance at its wielder, at the whiteness of his lovely face, teeth clenched within its grin.

—Roger Zelazny

LORD OF HOSTS

When Mr. Lederberg went into ventricular fibrillation, Dr. Janice Greene ordered the nurse to administer lidocaine, felt a sudden grabbing pain in her own chest, and fell to the floor. She left her body and hovered above the ICU team trying to save her. *Autoscopic dissociation brought on by cerebral anoxia,* she thought. She entered a black tunnel, saw a white light, and heard voices calling to her. *Automatic endorphin release in response to oxygen disruption,* she thought. The light and voices faded, and she found herself in the hospital's ICU waiting room. Mr. Lederberg was sitting on a green plastic chair in his hospital gown, holding a Bible. *Flash recalls due to temporal-lobe seizures,* Janice thought, and waited for them to fade, too.

When it didn't, she sat down next to Mr. Lederberg. "That idiot ICU team was so busy working on me they forgot all about you, didn't they?"

"I don't know," he said, clutching the Bible to his chest. "I seemed to leave my body, and then I went into a dark tunnel, and—"

"I know. I know," Janice said. "You're dead."

"Where are we?" he said.

"My guess is that I'm being wheeled into the morgue. It only looks like the ICU waiting room because of random neural stimuli." She looked around at the waiting room. It was dark beyond the door to ICU. "I hate this place," she said. "I always had to come out here and give the patient's family bad news."

"Bad news," Mr. Lederberg said. "And before him shall be gathered all nations: and he shall separate them one from another as a shepherd divideth his sheep from the goats." He opened the Bible. "I found them in here. After you asked me about them. The mitochondria."

"Oh?" Janice said, wishing some other dying synapse would fire. She didn't like Mr. Lederberg any more than she liked the waiting room. It wasn't that she disliked fundamentalists. She realized that dying people would cling to anything. She herself was still hanging on to the stethoscope she had been holding when she died. But Mr. Lederberg was a cellular biologist, and Janice thought he should know better.

"How can you believe man didn't evolve?" she had asked him the day after his heart attack, even though he wasn't being allowed visitors for fear they would say something that might upset him. "Look at cells."

"God created cells," he had said, tapping the Bible. "It's all in here."

Are mitochondria in there, too? Does the Bible explain why God would create a part of the cell with a different DNA and RNA from the rest of it? It's obvious the mitochondria aren't even part of us. They're a prokaryotic cell that swam in at some point in the evolution of the cell and formed a symbiotic relationship with it. I dare you to find even one mention of mitochondria in that Bible."

He had started thumbing through the Bible, looking upset, and two days later he had had another heart attack and died.

Final-stage anoxial guilt, Janice thought. "You found mitochondria in the Bible?" she asked him.

"In Genesis," he said. "'Thus the heavens and the earth were finished, and all the host of them.'

> *"The waiting room began to fade. The door to the ICU yawned blankly, but beside it there was a white light. It became a man in a white robe. He spread his arms out, his hand open."*

"And this host is the mitochondria?"

"Yes. 'They wandered in the wilderness in a solitary way, and he led them forth by the right way, that they might go to a city of habitation.' The city is us. Once I started looking, I found dozens of references. 'Ye are the salt of the earth.' It's true. We couldn't live without them. And when Jesus asks the Gadarene man, 'What is thy name?' he answers, 'Legion.' Don't you see what that means?"

It means that people hang on to hare-brained ideas in death, too, Janice thought. "No. What does it mean?"

"That the Bible wasn't written for us. It was written for them."

"Don't be ridiculous!" she snapped. "I thought God was supposed to be the God of everything."

"The fish of the sea and the fowl of the air and every creeping thing? The mitochondria are in everything."

Janice clutched her stethoscope. Well, then. He's our God, too, because the mitochondria are inside us.

The Bible says that on the day of judgment God will separate the righteous from the unrighteous and throw the unrighteous into everlasting torment. The sheep from the goats. What if the righteous are the mitochondria? They do unto others they love, their neighbors, they give us oxygen.

"And we give them a place to live," Janice said. "It's a symbiotic relationship. They can't live without us. If there is such a thing as eternal life, and God gives it to the mitochondria, he has to give it to us, too. Otherwise, where would they live?"

The waiting room began to fade. The door to ICU still yawned blackly, but beside it there was a white light. "Well, thank goodness!" Janice said.

"'And when you depart out of that house or city, shake off the dust of your feet.'" Mr. Lederberg said.

The white light was blurring his bare legs somehow, making them look like they were shaking. *Spontaneous fading of the memory trace,* Janice thought.

The white light became a man in a white robe. He spread his arms out, his hands open. "In my father's house are many mansions," he said.

Mr. Lederberg backed toward the ICU door. He was looking at his hands. They were shaking, too. No, not shaking. Vibrating, as if every pore, no, every cell were in motion. *You couldn't really see your mitochondria,* Janice thought, *not without an electron microscope.*

Janice looked down at her own hands. *Peptide-generated hallucinations,* she thought desperately. Her mitochondria began to come out.—*Connie Willis*

THE FABLE OF THE FARMER AND FOX

Once, so they say, a certain people received a teacher, no one knew whence. But he seemed kindly and wise, and because he brought knowledge of useful arts as well as voicing high and moral principles they made him welcome, and he came to be considerably admired.

Some of the richer folk, however, jealous that anyone should exert more influence than they, resolved to pose a question to him that he could not answer. On a day they waited for him in the road until he passed by with those who now were his disciples, and one whom they had appointed said to him, "If you believe, as you have often said, that the world was made by forces that are wholly good, how, then, account for sickness and deformity, for misery and death?"

The teacher said, "God loves the whole creation."

"So where is this God you talk about so freely?" they demanded.

"You may find God wheresoever you desire," the teacher said.

"We think little of that," they replied. "Are we to honor the creator of plague, the one who decreed that we must die and make our flesh a meal for worms?"

"Listen," the teacher said, "and I shall show you why."

There was (he said) a farmer, and he loved his land. He dug and sowed his fields, and from them fed his family. On days

when gentlemen a-horseback passed, intent on hunting foxes, he waved his hat and cheered. For he kept chickens, too, and everybody knew that foxes ate them.

One evil year a murrain stole upon the winter mist. He spent that Yuletide alone, his wife had died, and his young children.

All that remained, save frosted vegetables, was a flock of hens chiefed by a weakly rooster.

Still they did furnish eggs. From wood and straw he cobbled coops for broody hens. He raised clutch after clutch, named every chick and coaxed it through its growth, and learned to love them all.

One crisp, fresh day in autumn the hunt rushed by again, and when he checked his coops he found a baby vixen. She had sleek russet fur, bright eyes, and teeth of an amazing sharpness.

Seizing the farmer's finger as though it were her mother's nipple, she whimpered when it gave no milk.

It was his impulse to call back the hounds and toss her to them. Yet she was beautiful, and when he looked into her shining eyes he found his resolution waning. Out of loneliness he bore her to his fireside and gave her an egg he had been saving for his supper. She ate, and lay contentedly beside him. That night he slept well for the first time since his children died.

Time came when eggs would not suffice, and foxes can't make shift with leaves and roots. The vixen snarled from hunger keener than his, and pawed at the chicken coop bars. The farmer pondered long and thought of driving her back to the wild. Well, if he must, he must.

Then came the sound of hunting horns again. He said at length, "If I turn you loose, the hounds will kill you. If I give you my chickens to eat, I'll likely starve. I love these silly birds. I raise from eggs, but maybe that's because I depend on them to keep me alive, not because I've tended them since they were hatched and call them each by name. I cannot say. But do I not eat them when I have to—kill them in sorrow when they're old and pluck and boil them for my own sustentation? So the best I can say is this. I shall not love my chicks the less if you eat them. But if a huntsman sets his hounds to eating *you*, he will love neither you nor them. Come, little vixen! Choose your chicken!"

The vixen spoke. He heard her clearly, and her tone was one of vast surprise.

"Then you *are* God!"

She snatched her gift and ran. It was too heavy. The hounds caught up and tore her limb from limb. When the huntsmen came to boast how they had rid this and other farms of a dangerous fox, they found fifty chickens pecking round a farmer dead of long privation, but with a smile of bliss upon his face.

"We can make nothing of your foolish tale," said they, the rich, who were so jealous of the teacher's influence.

"But we can," said the common folk, and after that they paid no heed to what the

rich sort ordered them to do but ruled their lives after the teaching of him who had so lately been a stranger—*John Brunner*

THE APOTHEOSIS OF ISAAC ROSEN

Truth rests with God alone and a little bit with me—*Jewish Proverb*

God lived for a month in Johnson City New York

His name Holy be He was Isaac Rosen, and he was seventy six years old and on Social Security and a pension His wife, Ruth may she rest in peace, had died three years before and Isaac had hardly been out of the house since. When Ruth was alive they had two Social Security checks to pay the bills, but since her checks were stopped, he barely had enough to live on It was a luxury that he even kept the telephone But Isaac spent most of his time in his chair near the window and counted the cars that passed by

There was a loud rap on the door "It's me, Eunice—let me in I'm early

Isaac opened the door and there stood a dour-faced woman holding a brown bag She was his Meals on Wheels lady She had a nice thing this working for the government "Why don't you come in for a coffee?" Isaac asked greedy for company

"I'm running," she said, but thanks for the invitation

And that was that

He brought the bag back to his chair, took out the food wrapped in foil which he placed on the hand-me-down end table beside him. He smelled the foil package Probably chicken again But smelling that food gave him a daydream He had them sometimes He would just slip back in time It was wonderful. He remembered Ruth how she looked how she smelled and he remembered their passion And then—boom—he would be back in the present In the apartment Alone

Then the phone rang Isaac answered it "Hello"

"May I please speak to God?" It was a young voice *Probably somebody's kid from the neighborhood, playing tricks* Isaac thought

"No," Isaac shouted, and slammed the receiver down on the cradle He got up to make some fresh tea and get some sugar—he still used the cubes which he liked to put between his dentures when he sipped his tea But the phone rang again He answered it "Hello" he said

"Look I'm very sorry to bother you again Could I *please* speak to God?"

"I don't know what kind of a joke you're playing, so leave me alone or I'll call the police"

Just as Isaac was about to slam the phone down, the caller asked, "Is this 777-3386?"

It was but Isaac said "I'm not giving out any information

"Please," the caller said "this isn't a joke I *must* speak to God"

But Isaac hung up the phone *This guy's*

The Artist

a real nut case, he thought. *How could he get my number? Maybe I'm listed as somebody else. Just my rotten luck.* He reached for the telephone book and looked up his name. 'Gevalt!' he said, stunned. There his name was, and beside it he read: 'See God.'

He was shaking as he turned to the G's and read:

God 39 Allen St. JnCy. 777-3386.

So maybe God does work in mysterious ways, Isaac marveled. He looked at the phone directory again. It said he was God. What a responsibility.

Maybe I'm just going crazy, he thought. *Or—God forbid—senile.*

Then the phone rang again. Isaac picked up the receiver.

"Hello, God, *please* don't hang up. I called you before, remember?"

Of course I remember, Isaac said, feeling magnanimous. Finally he had something to *do* with his life. 'Does God forget?'

"No, of course not," the caller sobbed.

Okay, come on, tell me what's the problem, Isaac said.

"I can't find a job. I'm broke, and I'm in the middle of a divorce."

"Don't worry, I'll take care of everything," Isaac said. 'But you—are you Jewish or what?'

"Presbyterian."

'That's okay. Go to church, buy a new suit, call an employment agency, and when you've shaved and showered and have a job, call your wife and tell her you're sorry.'

"I'm sorry?'

"You gonna question *God*?"

"No, sir."

"Good," Isaac said. 'Then everything will be all right. Good-bye and good luck.'

"Thank you, Lord."

Isaac hung up and made himself a cup of tea. He hadn't felt this good in years.

Several days later the phone was ringing off the hook. The word had certainly gotten around. Isaac couldn't complain about being lonely anymore. How could God be lonely? Isaac was a fixer now, a healer, a regular Baal Shem. Maybe a hundred times a day he would say 'Don't worry, I'll take care of everything.' And it worked. The Presbyterian called back to say that he had a job, a haircut, and his family. Good for him. He should live and be well.

Isaac started getting bags of mail. It was like being a movie star, and people were sending him checks. God bless them. Donations. So Isaac opened a checking account and could now afford to take a cab and go to the synagogue. He'd sit with the other men and schmooze and pray. Of course, he didn't tell anyone who he was. He went incognito. He bought a water bed for his back and a carved walking cane made out of cherry. He began to receive mail-order catalogs, which he loved; he would peruse them in between calls.

He got rid of Meals-on-Wheels and had the diner on Main Street deliver his lunch every day.

He even bought an answering machine Isaac felt he shouldn't miss his calls After all, God had to be omniscient, didn't he?

But as the weeks went on the phone never seemed to stop ringing These calls were wearing him out No wonder God didn't make himself known often Everybody took advantage So Isaac began to let the answering machine take his calls even when he was there He told himself that it was his duty and obligation to call every one of his supplicants back but it became such drudgery At first he would listen to all the calls on the machine and then pick out the few that seemed to need his immediate attention Then he found it impossible to use the phone at all *Even God deserves a rest* he told himself

But one night the phone started ringing at three A M The answering machine had filled up and Isaac had forgotten to rewind it He got up from his water bed, which wasn't easy for an old man and picked up the receiver What the hell do you want? Isaac shouted "It's the middle of the night Call me in the morning What do you think I am, a day-and-night store?"

But the caller had hung up before Isaac had finished talking

The next day Isaac awoke with new resolve He was going to answer every single call After all, God only took a rest for one day when he made the entire universe But the phone didn't ring once Isaac sat by the window and waited He drank tepid tea He kept going out to the mailbox to check for letters

There were none

He began to worry He had loused up the job It was bad enough if a Lamed Vuvnik one of the chosen thirty-six holy men who make it worthwhile for God to let mankind go on screwed up But *God* shouldn't screw up

He picked up the telephone directory and nervously checked his listing

But there was no reference to God beside his name

He was Isaac Rosen, old man again

He just sat in the chair drank his tea and looked out the window Neighborhood people passed by but not one looked up or waved He felt completely alone as he had when Ruth had died

And then the phone finally rang

Isaac answered it after the first ring Maybe he was getting a second chance "Hello?

"Is this 777 3386?" It was an unfamiliar nervous-sounding male voice

"That's right," Isaac said "Tell me what's the problem"

"I'm calling to make a deal"

"Look you're talking to God," Isaac said optimistically "This isn't a television show"

"Maybe I've got a wrong number" the caller said

"Did you look it up in the telephone book or what?" Isaac asked

"No I found it written on the wall in a men's room"

"Well what kind of a deal did you want to make anyway?" Isaac asked, curious

"I've got something you want and you can give me *everything* I want"

"What could you have that I would want?" Isaac asked

"My eternal soul" the caller said

Uh oh Isaac thought Look you got the wrong guy I'm not such a terrible person that I would take someone's soul away from him And your situation can't be *that* bad" Isaac said "How about this We'll talk a little You'll feel better I'll help you out And you'll keep your soul for yourself"

So Isaac talked his caller into keeping his soul

Then Isaac made himself a cup of tea. He sighed sat down by the window and read the newspaper But when he came to the personals he saw this advertisement

GOT A PROBLEM? CALL A VUVNIK FOR FREE COUNSELING ANYTIME DAY OR NIGHT 777 3386

"That's *my* number" Isaac said to himself suddenly feeling like a person again

What the hell It might not be so bad to be a Lamed Vuvnik I won't have it so good as I had it before and the pay's probably lousy—no more donations

But it could always be worse

—Jack Dann and Jeanne Van Buren Dann

THY STING

See there's a Catholic a Buddhist, and a Communist They're sitting at a bloody enormous conference table members of their staffs on every side shaven monks in saffron robes Opus Dei operatives gliding suave as barracudas jowly apparatchiks muttering into tiny Japanese discorders and everyone except the Catholic terribly grim and serious

So the Catholic says 'I've got some good news and some bad news' pushing back his satin skullcap and propping his elbows on the table

"Let's hear the good news first Your Holiness," says the Dalai Lama with a little shudder because for months now they've all had their scouts out, ever since James, the brother of Christ, turned up in the Leningrad clinic (if you could believe the Russians about anything, let alone that), and then Mary three days ago in Chile a pious peasant selling tea towels of herself as the Virgin of Guadalupe

The good news is that we've found Him thanks to your Chinese pals '

You know that kind of silence in a room So finally

'I would not have thought *you'd* find that good news,' says the Communist a lean academic type in his thirties, a trace of guttural Georgian in his voice As well as being front-runner for both physics and medicine Nobels for his discovery (though there are whispers) of gravitino-induced intron recovery he's the sole known current reincarnation of Joseph Stalin (there are whispers about that too) a universal genius utterly without fear but not altogether innocent of humor He grins with great pleasure Thin lips and no mustache

"The Pope is a notable ironist" the Tibetan remarks irritably and pushes his round glasses up on his small Mongolian nose "You're sure it's a valid Jesus Christ?'

No doubt about it We've got a ream of validated cross indexed material from His brother and His mother

I hope you don't think it indelicate of me to ask, but who was His uh, "

Mary Mag—'

genetic partner?'

—dalene, of course

Oh You're not surprised?

We've had documents under lock and key for upwards of sixteen centuries ' the Pope says

"How many children at demise?' Stalin asks acutely taking a pocket calculator from the outstretched hand of an assistant

'Unknown We have a primogenitary line revenant from slightly less than one year into His ministry" The Pope gives a rueful chuckle 'He may have been tempted in the desert but evidently He kept His legs crossed until remarkably late in the piece"

The Russian glares scandalized Five years at the close of the nineteenth century in the Tiflis Theological Seminary rises in his blood to darken his face to sharpen a repugnance for blasphemy he learned in that century that lifetime from his doting mother And the Dalai Lama just broods on the Angutarra Nikaya *There is one who having been one becomes many appears and vanishes unhindered he goes through walls he dives in and out of the earth as if it were water*

He sits back in his chair clearly at a loss ' You accept this claim then?

Looks watertight Padmasambhava

Hmm And the bad news?

I withdraw that remark You would certainly consider it in poor taste

' Certainly we have gone beyond taste for good or ill," growls the revenant of J V Dzhugashvili "What is the balance of your news?

"It's the old gag Embarrassing Enough to make you believe in prophecy'

"Gag?

The Pope sighs "The bad news is she's black"

Oh God, cries the Dalai Lama who until three months ago has truly believed himself the lineal descendant of his saintly predecessors and now can't deny that for a hundred generations he's been no greater than a clod in the fields

"Oh God" cries the Dalai Lama who knows his Hegel and his Marx at least as well as the frowning Russian across the ta-

ble from him. "The first time as tragedy," cries the sad little Dalai Lama, "and the second time as farce!"

And there're these other three people see sheltering from the sun under a rag strung on a stick and a length of ratty rope in the middle of an almost motionless sea of human misery in hottest bloody driest darkest Africa. There's a white man, a black man, and a yellow man.

I tell a lie. The yellow man is a swarthy, good-looking fellow from the Beijing Television Centre, a poet who specializes in science reporting. That bit is true. But the white man is actually a nun, and she's not exactly white, being a quadroon from Miami named Sister Concepción Ortiz. And the black man is really a skeletal adolescent girl. The adults argue while she lies perfectly still, flat on her back in the scant shade, eyes huge and passive in a face like a skull.

"Keep your stinking hands off this child," the nun screams. "Bloodsuckers! Liars! Goddamn *creeps*!"

The handsome man is sweating. The ground is foul with sludge, and the sun drives up wavering sheets of heat. Here they all are, poor bastards, twenty or thirty thousand of them and more arriving every day, perishing from thirst and hunger as the wobbling world, God's spinning top, drives the scorched Sahara farther and ever farther into the heartland of Africa, and the appallingly random thunderstorms spill damfuls of useless water into the eroded dust, into the trampled, pissed-in, shat-in mud. We saved her life," he explains patiently, his Yale American classier than Concepcion's.

"Listen, buster, what makes you think *life* is what's important here?" Her arm embraces the filthy, muddy plain of numb, silent, doomed human refuse. "You're trying to kill their *souls*, you bastards."

"You're an educated woman," he begins again. "How can you—?"

"Pitiful! You're pitiful! Reductionist crap! You think that's science?" The child's head is capped with a crown of wires, transmitting gravitino-induced data to a briefcase of microprocessors in the cooler cabin of the Chinese's Toyota, where the intron tech is drowsing. "Why not just cut the top off and stir her brains with a stick?"

"You're defending a paradigm that's dead and gone, Sister. Your trendy holism doesn't have a single valid response to infron recall. So you abuse us wicked Communists for saving a child's life."

Fuck off." She is quite beside herself. "Let me tell you. I've marched against corporations that send their stinking drugs here for festing, and what you're doing is exactly as bad. If it's so safe, get the hell back to the reeducation camps in Taiwan and burn out a few brains there instead." Then Concepcion sits down in the mud, shaking her head and weeping, and holds the black child's hand against her breast.

"Sister, we are taking the child into Addis Ababa under your religious superior's express instructions. I have shown you the documents. Please stand aside and let me get her into the vehicle."

"Those pricks." She clutches the child to her. "You're insane," she tells the man. "Lysenko and all that Commie crap. My God."

"No. You know better than that. The surplus DNA in the genome was not even dreamt of in Lysenko's—"

"You can't inherit someone else's memories," the nun says through gritted teeth. "That's voodoo, not science. There's not enough DNA."

"Quantum nonlocality," the Chinese intones tiredly. "Bell-theorem connectivity. Reverse transcriptase intron coding. You've seen our videodiscs, Concepcion." His tone sharpens. "It's this child, of course. You can swallow popes and birth control and heaven and hell and miracles and virgin births, but you can't face the one fragment of truth that makes it all such a sham."

"Shut up." She puts the child's arm aside and walks toward the Toyota. The journalist follows her, throws open the tailgate. They hear snores.

"She's a reincarnation of Him, Sister, and that's it. We have all the preliminary probes on disk. You've seen the academy's provisional evaluation."

"Bullshit. A phony juggler? A first-century cardsharp? A political opportunist with his hand in the till? You think a fraud like that could create a world faith that's still alive after two thousand years? A user of whores?" She leans against the stinging-hot metal, eyes squinting. "I mean, your own so-called theory doesn't hold up. This is a girl, haven't you noticed? I thought the memories were supposed to be passed down along with the sex chromosome."

"He was special," the journalist says. "He was ... larger than that."

"What?" For the first time, Concepción looks at him and sees a human face. "*You're* a Christian?"

He shrugs. "Help me move her."

"Jesus really fathered a child?"

"How else could His *karman* have passed into the gene pool?"

Concepcion walks back blindly to the small patch of shade. The girl is sitting forward, regarding her. The crown of electronic sensors has been brushed into the mud. The child's gaze is alert, penetrating, and something more. It takes the nun a moment to identify that terrible glee.

"You are both wrong," Jesus tells them and rises to Her feet, floats and bobs above the foul mud like a feather of light. "You are both right. Come, follow Me."

The journalist utters a loud cry and runs for his portapak.

Concepcion's heart clutches. She stumbles, one arm outstretched, mud sucking at her shoes, and rises then, pops free from the embrace of the ruined earth to scamper like a besotted apostle on the wind-whipped surface of an ancient lake in her Savior's unmarked train.

—Damien Broderick

EARTH

CONTINUED FROM PAGE 22

Quality Control Board will decide later this year whether to set standards for selenium, salts, boron, and molybdenum—just four of the 23 most troublesome substances in subsurface drainage.

Four programs have been proposed for disposing of the polluted irrigation water from the farms in the western part of the valley. One approach, suggested by the Bureau of Reclamation, is to dump the wastewater in San Francisco Bay or Monterey Bay. Environmentalists bitterly oppose this plan on both financial and environmental grounds. Another solution is to store it in evaporation ponds on the farms themselves. The farmers find this unsatisfactory. A third is to inject the water into aquifers 5,000 feet underground, an untested technique that may threaten groundwater supplies. The fourth approach is being studied in an unusual cooperative venture between Westlands Water District—the biggest user of irrigation water in the western San Joaquin Valley—and the Environmental Defense Fund—one of the chief critics of existing irrigation policies. It involves removing pollutants from the water and reusing it for irrigation. All these measures have estimated capital costs of hundreds of millions of dollars.

No matter what standards are adopted, there is no practical way of monitoring individuals whose drainage water is polluted. The farmers will have to work together to reduce the amount of polluted water that enters the environment. Unless a safe and economical way is found for farmers to dispose of their contaminated water, several million acres of prime farmland may have to be abandoned.

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Rico
Rico

ACCELERATOR

CONTINUED FROM PAGE 66

them provide the raw data upon which they base their theories. Although the Five-Year Plans had given high priority to accelerator construction, they didn't give high priority to the detectors. A first-rate accelerator with a poor detector is like a beautifully made telescope with a smeared eyepiece—as good as useless.

So the Russians sat there. A huge number of exceedingly intelligent, exceedingly well trained physicists had the best atom smasher in the world but could tell nobody about it and could find nothing with it.

And that was accelerator lead number one. We'll get to the others in a moment.

It's hard to fly the Russian flag in high energy physics," says Lederman. And indeed, their record isn't very impressive. Americans have won 44 of the 118 Nobel prizes in physics, Soviet scientists have won seven. Part of the poor record stems from lingering anti-Soviet prejudices. "There's a systematic bias in the West against acknowledging Soviet physics achievements," prominent theorist Lev Okun says. Another portion is due to the relatively slow communications in and out of the USSR. Some more is due to the fact that Russian strengths lie not in making discoveries but rather in mathematics and theory, and the Nobel is (by the terms of Alfred Nobel's will) supposed to be awarded only for "discoveries."

But part of Russia's poor record in physics stems from the ancient Russian tradition of hospitality.

UNK is under construction outside Serpukhov, a Podunk burg 60 miles south of Moscow. Accelerator labs tend to be set up in such places because there's more space out in the meadows and birch woods for huge pieces of scientific equipment (Fermilab, in Batavia, Illinois, has so much room that a small herd of buffalo is allowed to roam around the premises.) The town itself is 1,000 years old: little winding roads, country railroad station, wizened *babushky*—the works. It has a nice art collection and an Orthodox church that actually holds services, although Westerners aren't necessarily allowed to attend.

The laboratory itself, unfortunately, isn't actually *in* Serpukhov but in Protvino, a brand-new scientific city a few miles away. ("These scientific cities are fashionable in the Soviet Union," says emigre theorist Vladimir Kresin. "They think it's American.") Like the other scientific cities, Protvino was set up in the mid-Fifties on a stretch of woodland by the Protvino River. The area is Chekhov country, the land of dachas and summer estates that Russian writers have been evoking for a couple of centuries. But nobody lives there except scientists, technicians, and their families. Like many laboratories, the architecture is Early Cookie Cutter. It looks like a little slice of modern Moscow," says one physicist.

Visiting scientists get met at the station. If they're lucky, they see Serpukhov on their way to Protvino. Then they get issued a pass, which they have to show whenever they enter a building. In the past these formalities were not enforced, but several years ago Western physicists visiting the lab wrote a letter to Brezhnev about treating dissident scientists. "Since then," says another scientist who has worked there, "they've done things by the book."

Protvino is officially designated as a closed city, and people aren't allowed to say pop off to Moscow for the weekend. Visitors aren't even supposed to go to Serpukhov without permission, and nobody is allowed to go out for a spin. Even if you wanted to, there aren't many cars, and after a few miles you'd get stopped at a checkpoint. The Soviet Union is the Land of No Joyrides. And so things get dull. Very dull.

"You have to be a drunk to survive," says Kresin. "Imagine you live in a city like Protvino. The population is very small. There's one theater. Nothing to watch on TV—there are only two channels, both of which play mostly propaganda. Unless you're a workaholic, what's to do?

"You have only one possibility—to visit your friends. And there's an old Russian tradition of hospitality. If you visit a friend, it's inappropriate to come without a bottle of vodka. And if somebody comes with a bottle of vodka, it's inappropriate not to drink it. And if you do that every day—well, you can imagine!"

The physicists sometimes drink, Kresin says, but the technicians are sometimes sober. In fact, sociologists in the Soviet scientific city of Akademgorodok in Siberia found that an astounding *35 percent* of the city population were alcoholics. In that atmosphere it's hard to keep things going at a peak level. To make the machines work. To believe—really believe—the readings you're getting.

Soviet scientists are very able, and they adapt to the situation. "To get things done you can't be an entirely clean person," says another émigré physicist, who doesn't want to be quoted by name. "It's hard to do everything according to the law. If you want to build an accelerator, you have to bribe people, which is not always easy to do. But you adjust. You learn how to get things done." Soviet scientists work carefully, finagling what they can, triple-checking everything else, and they produce good, solid measurements.

When they can't do that, they relay ideas about innovative equipment and experiments to Western friends. "At one time," Lederman says, "people at the Los Alamos laboratory were working on three ideas that had been pioneered by Soviet physicists [including the tokamak design for fusion reactors—see "Getting Nuked," February 1987]. On one occasion the secretary of energy, who shall remain nameless, came to visit. I'm told he was horrified to learn that we were working on Russian ideas. He had thought that *tokamak* was some sort of American Indian word!"

And that brings us to accelerator leads numbers two and three. Which will in turn take us back to UNK.

"Part of the problem is Russian hospitality. The Soviet Union is the Land of No Joyrides. So things get dull. Very dull. "You have to be a drunk to survive," says theorist Vladimir Kresin."

In 1956 de-Stalinization began, and American physicists were permitted for the first time to visit the Soviet Union. The Russians sprang a surprise on them. A brand-new accelerator, the world's most powerful, was nearing completion at a brand-new scientific city near Novgorod. The accelerator facility was called Dubna, and the gleaming machine itself sat right on the main floor of the main building. (This later proved to be a big problem. Accelerators emit intense radiation when in operation. The practice in the West is to put them underground.) When physicists from the United States saw the Dubna machine for the first time, they marveled at the magnificently polished brass boxes that housed the scintillating material which forms an important part of the detectors. Their own scintillators were merely wrapped in black electrician's tape. What they didn't know was that the Soviets had been forced to build and machine the expensive brass boxes because the Five-Year Plan had forgotten to include tape for the detectors.

This time the Russians openly publicized their world-beating accelerator, as well as their expectation that it would discover new forms of antimatter. When it finally switched on, however, they were considerably more reluctant to advertise that it, too, had detector problems. "It is a very sick machine," remarked American physicist Luis Alvarez after a visit in 1959. "And the doctors will have to twiddle a lot of dials to get it well again."

Dubna did not find anything startling. Worse, a much less powerful machine in Berkeley came online in 1958, and a team of physicists there promptly discovered the antiproton (the antimatter equivalent of a proton), for which they were soon awarded a Nobel prize.

But the Soviets were not to be outdone. In 1967—the fiftieth anniversary of the October Revolution—the USSR, for the third

time switched on the world's most powerful accelerator. The father of UNK, it was the first accelerator built at Serpukhov. Like most modern accelerators, Serpukhov was shaped like a ring a mile around; the particles whirled round and round the circumference, being kicked to greater velocity and higher energy at every lap. The machine was built aboveground and covered with an earthen berm that looked like something from the Mound Builders and shielded the neighborhood from radiation. The best news was that the Soviet Union had finally solved another major problem. Detectors were imported. The Russians offered European physicists a crack at Serpukhov—if they brought along the detectors, as well as ten tons of computers and the gear needed to run them.

With an advanced accelerator and state-of-the-art detectors, the Soviets should have been in the catbird seat. A few years after Serpukhov was commissioned, the world of high-energy physics was convulsed by the sudden possibility that electromagnetism and the weak interaction, a fundamental type of radioactivity that is involved in the shining of the sun, might be shown to be part and parcel of a single phenomenon—totally changing scientists' views of matter and energy. Serpukhov was perfectly equipped to test the new theory.

But the experimental program had been set up before the theoreticians did their work. And in the Soviet Union, you can't change something like that.

"The Russians have a Five Year Plan for everything, even high-energy physics," says one Eastern-bloc researcher. "Flexible reallocation is not possible as it is in the West." And so the scientists at Serpukhov were forced to sit on their hands while their Western colleagues proved the theory right and won the Nobels.

And that was accelerator lead number two and accelerator lead number three.

The centerpiece of Soviet high energy physics is the Institute for Theoretical and Experimental Physics (ITEP) in Moscow. ITEP was founded in 1946 by Alikhanian's brother Abram on what had been a summer estate of Prince Aleksandr Menshikov, Peter the Great's fabulously corrupt prime minister. The institute covers about 150 acres of country that, thanks to Moscow's urban sprawl, is now within the city limits. Surrounded by an imposing wall, the campus is guarded by two black iron gates that open ponderously after visiting automobiles have been thoroughly scrutinized and the identities of all occupants verified. It takes some time to get in and out because the guards do things by the book.

Doing things by the book has its disadvantages. It may mean unnecessary delays. It also has advantages in that once something is finally done, it is done right and it continues operating. Once Russians build a piece of scientific equipment, they get more mileage out of it than Americans do, the United States tends to dismantle its accelerators because they are obsolete by the time the bugs are finally ironed out. All three Russian candidates for the world's most powerful accelerator, for instance, are still working. The early American candidates are mostly collecting dust in the Smithsonian. ITEP's accelerator has been operating at one end of the campus since 1961 and has served as a model for both Serpukhov and UNK. One of the first Soviet nuclear reactors, the ancient heavy-water kind, is still percolating away in the basement of a building at the other end of the institute.

Now, ITEP is perhaps the most important center of theoretical physics in the Soviet Union. Top dog in ITEP is its director, I. V. Chuvilo, an authentic war hero who lost an arm at the age of nineteen in the battle of Stalingrad. And above him—the highest of the high in Soviet physical science, the boys who really push everybody else around—is the Moscow Fire Department.

Obviously you can't have a fire in a place where there's a reactor in one building and an accelerator in the next. Especially if the place is in the middle of Moscow. Because of this, the Moscow Fire Department tends to lean on ITEP. It leans on the scientists with the subtlety one might expect from the Soviet Union that gave the world ... well, the Soviet Union.

"They are all-powerful," says one ITEP experimenter who shall remain nameless. "Even the director is helpless against them. They make rules that you cannot break."

He suddenly jumps up and pounds the low ceiling. "See *this*? The ceiling goes *boinnng*. It is a single thin slab of metal. 'And *this*'? —banging the door. *Boinng*. Another single piece of metal. The scientist is irate.

"It used to be wood, and we had to change it to metal. There is no *reason* for it, except that the fire department had to follow its regulations. This room was closed for one month, and all our computers were down, and all our experiments were stopped. *Why?* Because we had to put in a metal door! One month for a door! Each time they find some little thing, they shut down the building for a month!"

And when there is an *actual* fire, the kind they are *supposed* to do something about, they are *helpless*.

He is referring to the great ITEP three alarmer. What happened was this. Six or seven years ago there was a fire in the accelerator building. The hook-and-ladder brigade rushed to the institute. When they got there, they did things by the book. Before they entered, they hauled out the book of regulations. Regulation number one read something like this: *In case of fire near electrical gear, turn off the juice.* Which they did. They shut off the electricity to the whole compound. Now one recalls that the ITEP entrance is guarded by two huge iron gates that open when visitors show the right I.D. They open electrically. Except when the power is shut off. Then they don't open.

The fire truck sat in front of the gate for

20 minutes while the physicists inside watched their experiments go up in smoke. Eventually somebody figured out what was wrong, but in the meantime a lot of stuff got burned up. Because things get done by the book in the Soviet Union.

UNK has been done in the same way, by the book.

Planning began in the early Sixties, although precisely when, like much else about UNK, is cloaked in secrecy. By 1967, when Serpukhov was switched on, the Soviets already had detailed plans for a successor machine that would be 13 times more powerful—30 times more energy—than the biggest accelerator in the West. These plans were almost immediately translated into English by the Atomic Energy Commission and studied by worried government officials. What they saw was staggering: a ring *twelve and a half miles* around. It was vastly larger than anything physicists had ever dreamed of before. (Fermilab's ring, by comparison, is four miles in circumference.) It would be a monument to Soviet science. It was clearly an attempt to grab the lead in particle physics for at least a decade.

A year later, design-group leader Aleksandr L. Mintz proclaimed the completion of a small prototype that would test the machine's controls and accessories. Just a bit more work, he said, remained to be done before ground could be broken.

That further work, however, was carried out with the speed of the Moscow subway construction. Time passed. In 1972 Fermilab started pumping protons through *its* new accelerator. While less than a fourth the size of UNK, it operated at very high energy—half the designed energy of the proposed Soviet monster. Within four years technological innovations, notably the development of supercooled magnets, made it possible to push the power to truly staggering levels. Fermilab announced plans to double the clout of its accelerator.

The Russians saw their monster being cut down to ordinary proportions before it got beyond the blueprint stage. They were determined once more to build the world's most powerful accelerator, but to do it the Soviet way they would have to account for every detail in advance to make it through the Five Year Plans. But while they froze their design in the Five-Year Plans, Western accelerator techniques kept moving, forcing Soviet scientists back to the drawing board. They found themselves in an impossible dilemma, laboriously planning every nut and bolt of the project while simultaneously trying to incorporate the latest technology. Even so, they kept trying.

Between 1973 and 1975 the Russian design was upgraded and given a name: UNK. Then it was upgraded yet again to include supercooled magnets, which are more powerful and cheaper to operate. At the end, under the able tutelage of Serpukhov director Viktor A. Jarba, UNK was much more powerful than originally designed. Moreover, it was to be a colliding-beam machine, that is, instead of speeding up particles and slamming them into a target, it would slam *two* beams into each other. The difference is the difference between a head-on freeway accident and a car hitting a telephone pole. The head-on is much more violent.

UNK is planned to have four stages. The first is the existing Serpukhov accelerator, the October Revolution fiftieth-anniversary accelerator. We'll call it UNK Ring I. This will shoot its particles into an adjacent second stage—that is, UNK Ring II—which will be an accelerator with about the power of the first Fermilab accelerator. This device, in turn, will inject its particles into yet another ring—UNK Ring III—that will have roughly three times the power of the improved Fermilab accelerator. Finally, scientists plan to build still *another* ring, UNK Ring IV, going with the same energy but in the opposite direction. If all goes as hoped, protons will eventually fly chutes and ladders style from UNK Ring I into UNK Ring II, which will then send half the particles into UNK Ring III and half into UNK Ring IV. In their separate tracks, the protons will whirl about in opposite directions until a computer-activated system sends them smashing into one another.

> *Top dog in ITEP is its director, I. V. Chuvilo, an authentic war hero. And above him—the highest of the high in Soviet physical science—is the Moscow Fire Department.*

At first the USSR hoped to finish the machine before the end of the Eighties. All that remained was a little more design work. But things had to be done by the book.

Time passed. The age of détente ended and started up a little bit again. As UNK's starting date receded into the future, U.S. physicists sympathized with their Soviet colleagues' plight. When they could get visas, Russian physicists would talk with their friends in the hallways at international scientific congresses about UNK's progress. Conversations went like this:

"Hey, what's happening with UNK?"

"Soon, soon." Vague waving of hands. Rolling of eyes.

Unfortunately, Western scientists were facing the same sorts of questions and giving the same sorts of answers. As American accelerators grew bigger, they cost more and were subject to ever more government scrutiny and longer delays. They also stopped working quite so well. Fermilab had terrible trouble before it started operation, and a large machine on Long Island was actually shut down in midconstruction because of problems with its supercooled magnets. Late, poorly built accelerators were not so funny anymore. "We have definitely narrowed the bureaucracy gap," Lederman says. "They're still ahead, but we're catching up fast."

In the beginning of 1986, two decades after the initial design, ground was broken for UNK. Unlike the Europeans and the Americans, who use big tunnel-digging machines to excavate for their accelerators, the Russians must blast out the rock with dynamite. Progress is noisy, uneven and slow. Not too far away a Cookie Cutter factory is being set up to wind miles and miles of wire around the boxcar-shaped magnets. They're likely to have trouble with the electronics. In the past, Western visitors have been asked to bring along pocketfuls of Radio Shack resistors, capacitors, and other electronic stocking stuffers because the Russians' own had been on order since the last Five-Year Plan.

Today, after a full year of work, only about 2 of the 13 miles of tunnel have been dug, and not a single superconducting magnet has been built. UNK Ring III is supposed to be done in 1993. UNK Ring IV hasn't yet received the full go-ahead.

Despite UNK's dilatory past, scientists in the West aren't scoffing. One of the first to express interest in working there, Aki Yokosawa of Argonne National Laboratory, made his intentions clear even before digging began. Yokosawa is the head of a large collaboration at Fermilab, and the Russian track record does not faze him. "The accelerators they've built recently, such as the last Serpukhov machine, have been built on schedule," he says. "Let me put it this way: Their schedule can't be any worse than ours."

Moreover, as Yokosawa points out, there is no Western machine in the works that will beat out UNK. Some U.S. physicists are promoting the idea of a 20-mile multibillion-dollar accelerator called the Superconducting Super Collider (SSC), but no site has yet been chosen, and none will be for at least a year. While President Reagan has included the SSC in his budget, the prospects in Congress for such an expensive project are unclear, to say the least, in the era of deficit reduction.

Therefore—or so U.S. scientists, journalists and government officials warn—UNK, the accelerator that couldn't shoot straight, will end up being top gun in the physics world. The next generation of elementary particles they fear may well bear Soviet names. How would Americans like to hear, they ask, about the discovery of the Lenino? Or the Hero of Socialist Labor-on? Could be. And it would be a sad day for American physics if it happened.

But when evaluating these warning cries, it is well to remember one thing.

The batteries ∞

STAR TECH

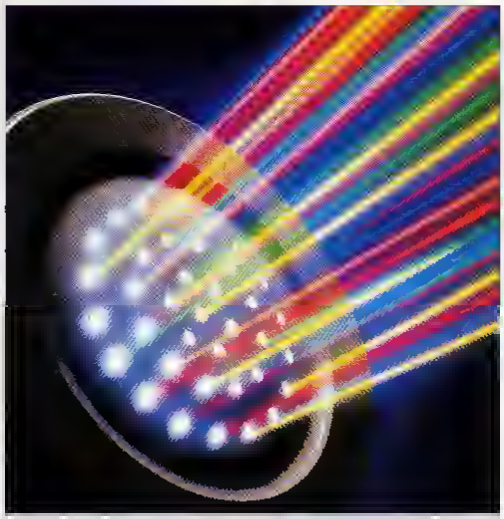
ACCESSING THE FUTURE

MIGHTY MULTIPLEXER

You say you've got a personal computer and a modem and that you want to make an electronic bank deposit and talk to your accountant at the same time? Well, you can't do it, because the modem you use to send the data ties up your phone line. But now a couple of Silicon Valley technocrats have developed a black box that allows you to talk and transmit simultaneously.

Named Victoria—after originator Tom Edrington's twelve-year-old daughter—the multiplexer works by transforming telephone signals from analog to digital, thus capitalizing on the digital signal's greatly enhanced capacity to carry multiple channels. Victoria can give users the equivalent of seven separate telephone lines, two for talking and five for sending computer data. Pacific Bell, which has tested the device in 200 California homes, isn't saying anything definite about price but has asked consumers if they would pay anywhere from $12 to $75 a month as a leasing fee. For many stay-at-home workers, the price may be well worth it. "With one Victoria," says Greg Carse, whose Saratoga, California-based CWA Communications Products, Inc., is developing the prototype, "you can have a residential phone line, a business phone line, and several data transmission lines." —Bill Lawren

Access: For more information, call (408) 374-0807.



WHEN YOUR PAYLOAD ABSOLUTELY, POSITIVELY...

Now that NASA will basically no longer be shuttling commercial payloads to and from orbit, we can expect to see private companies stepping in to do the job. In addition to the big three aerospace companies—General Dynamics, Martin Marietta, and McDonnell Douglas—several smaller firms are venturing into the launching business.

One, American Rocket, plans its first commercial launch by 1988. The rocket of choice, a four-stage expendable launch vehicle named Industrial Launch Vehicle One, or ILV One.

American Rocket is aiming for the small end of the private launching business—payloads of two tons or less that need to be delivered to low Earth orbit. "We want to become the Federal Express of outer space," says company president George A. Koopman. "We want to be in the business of reliably delivering and returning lots of small packages to and from orbit."

Critics, however, point out that the market for small payloads in low Earth orbit is unproved and that small launching companies like Koopman's must scramble for financing. —Devera Pine

Access: It will cost about $8 million to send a two-ton payload to low Earth orbit on ILV One. Contact James Bennett, American Rocket Company, 847 Flynn Road, Camarillo, CA 93010.

THE RUSSIANS' SUPERFILM

If photographic pioneers Mathew Brady and Alfred Stieglitz could be resurrected, they would find the tools of their trade changed beyond recognition. All, that is, but one: the silver iodide emulsion that still constitutes the essential interface between light and film. But now scientists at Moscow's Textile Institute have developed a substitute.

The Soviet team discovered that ferrocene crystals become sensitive to light when combined with certain organic compounds. Although not as "fast" (light sensitive) as traditional, silver-based films, the crystal emulsions are virtually free of the graininess that inevitably shows up when small-format photos are enlarged. Also, they can be used to coat other materials—even glass or plastic—so that photographic images can be printed directly. Perhaps most interesting, the ferrocene-based films can be developed in just ten minutes without water and in normal light, eliminating the need for a darkroom.

All this could be great for photographers. But the ultimate winners may be the textile industry and its consumers. The ferrocene emulsions will allow manufacturers to use stronger dyes on their fabrics, meaning that the life of the colors—and thus of the clothes themselves—will be greatly prolonged. —Bill Lawren

Access: Try calling Moscow.

MALPRACTICE ALERT

One out of five physicians will eventually be named in a malpractice lawsuit, according to Michael Eckstein, president of an unusual company dedicated to helping doctors spot litigious patients

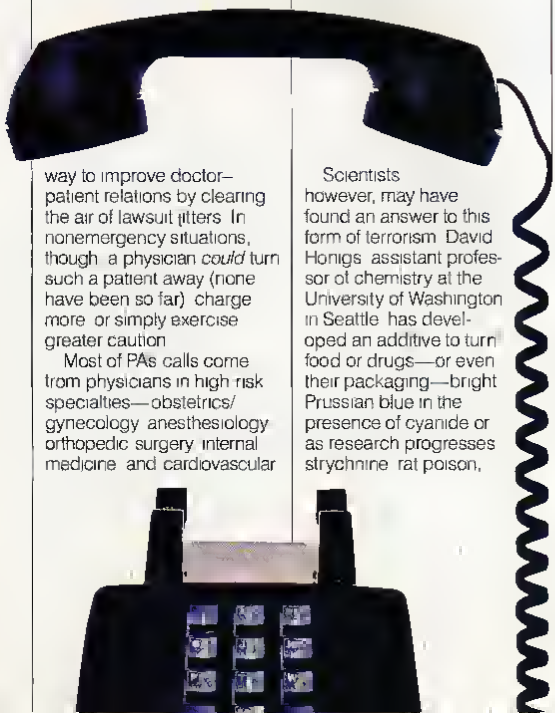
Called Physician's Alert (PA) the Chicago-based computerized service allows its several thousand subscribers in 52 cities to call a toll-free number to learn whether a patient has a history of chronic malpractice suits

PA is not meant to be a blacklist but a way to improve doctor–patient relations by clearing the air of lawsuit jitters In nonemergency situations, though a physician *could* turn such a patient away (none have been so far) charge more or simply exercise greater caution

Most of PA's calls come from physicians in high-risk specialties—obstetrics/gynecology anesthesiology orthopedic surgery internal medicine and cardiovascular medicine—where malpractice insurance premiums average $50 000 per year They also come from the most litigious states—California New York Texas and Florida—which have the most doctors and not coincidentally the most lawyers

—Gregg Levoy

Access Call Physician's Alert at (312) 726 3831



PRUSSIAN BLUE

In a bad week the U S. Food and Drug Administration may receive as many as 50 threats of food or drug tampering

Scientists however, may have found an answer to this form of terrorism David Honigs assistant professor of chemistry at the University of Washington in Seattle has developed an additive to turn food or drugs—or even their packaging—bright Prussian blue in the presence of cyanide or as research progresses strychnine rat poison, mercury acetate or cocaine

This FDA-approved iron compound (ferrous sulfate) is edible and nontoxic though tests still need to be done on the long-term effects of ingesting it Thus major food manufacturers understandably prefer it absorbed into the packaging, which would itself turn Prussian blue (a pigment formulated in Prussia in the late 1700's) and not into the food or drugs themselves So far Honigs (above) has tested milk sugar gelatin mouthwash soups beer and drug capsules and is working on sensors that can detect natural contaminants as well (botulism salmonella and so on) He predicts that products with a dash of ferrous sulfate should be appearing on grocery shelves in a year or so

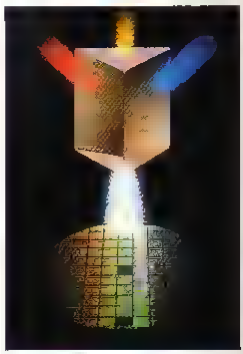
—Gregg Levoy

Access For information call David Honigs at (206) 543-0713

ANTICOPY CHIP

In the world of consumer electronics, it's been the general rule that new technologies and techniques provide the public with better and less expensive products This rule could be broken however if the motion-picture and record industries manage to persuade Congress to adopt their pet piece of technology the so-called anticopy chip

The chip developed at the now defunct CBS



Technology Center is actually a circuit designed to prevent copying from specially encoded recordings The anticopying system could provide the movie and record industries with a way to make a monumental legisla-

tive breakthrough

With this anticopying system many powers in movies and records believe they have found a way to control all home taping off the air a practice they say deprives them of revenues but one that has been upheld by the nation s highest court

Unlike past legislative efforts which called for unpopular taxes on tape and equipment to compensate the movie and record companies a bill mandating anticopy chips in all audio and video recorders would put the immediate burden on the manufacturers

Even if Congress passes legislation that would ultimately limit constituents access to technology the record and movie people have some basic challenges to look forward to Will they be able to make sure that all TV radio and cable programming carries the right encoding? Will the system actually work in real life? Will people figure out ways of circumventing the system?—Marjorie Costello

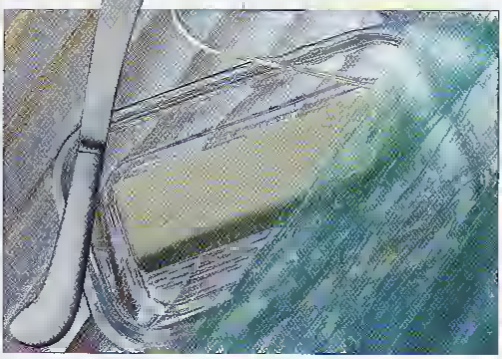
Access To stave off this anticopy movement write to your senators and member of the House of Representa tives today

EGGS WITHOUT CHOLESTEROL

For everyone who loves butter eggs and beef but who can t take all the cholesterol there s now some good news Researchers at the University of Wisconsin and the Phasex Corporation of Massachusetts are using a 100 year old process called

supercritical fluid extraction to remove up to 95 percent of the artery-hardening cholesterol from these delectables They predict that within two years you ll be able to buy the product in the grocery store

The extraction process according to Val Krukonis of Phasex is already



used in Europe to remove caffeine from coffee bittering agents from hops (for use in beer) and oil from spices It uses carbon dioxide combined with the food at specific pressures and temperatures to dissolve the cholesterol Best of all the process doesn t change the appearance, consistency, or taste of butter eggs lard or beef tallow—products researchers have already taste-tested and experimented on Cheese, milk and ice cream are on the way though to suit Congress and the FDA says University of Wisconsin food scientist Robert Bradley the product *names* may have to be changed Butter after all isn t quite butter without all the fat —Gregg Levoy

Access Call the Phasex Corporation (617) 794-8686

ELECTRONIC RETINA

For several years human engineers have been trying to develop an electronic imitation of the human eye Now a group in Japan has come up with an electronic retina that uses sophisticated computer technology to mimic organic vision

The new device reports Shoei Kataoka of Japan s Sharp Corporation uses a computer chip in which a layer of electronic photosensors takes the place of human rods and cones Other silicon layers contain computerlike memories signal transfer gates and logic gates to process visual signals Still deeper in the chip is a tiny computer which performs some of the same processing functions as the vision centers of the human brain Although no one is suggesting that the electronic retina might lead the way to an artificial eye for human use the device says Kataoka might be used as an eye and a brain in a robot."—Bill Lawren

Access Prototypes expected by 1990

J&B PRESENTS QWERTYCRYPT II

Mark Twain not only wrote about adventures, he lived one when he became the first author to use a typewriter for a book manuscript. The typewriter, produced in 1874, was a Remington, and the book was *The Adventures of Tom Sawyer*, published in 1876. What, we wonder, would Mark Twain think now that editors are beginning to ask for material on diskettes!

But even today's computers follow the same keyboard pattern set by that first Remington. The system, known as the QWERTY, is named for the letters in the top row, and it survives periodic attempts to change it.

The message at right shows a Mark Twain quote as it was written by a touch-typist. Unfortunately, he set his hands in the wrong "start" position and didn't realize it until he looked back to the computer screen and saw what he had written.

Can you decode the message?

Look for the solution to this puzzle next month in *Omni*.

z

;ry id nr yjsmlgi; gpt yjr gpp;d/ *niy gpt yjr, yjr trdy pg id

vpi;f mpy divvrrf/z

= =z,stl *yesom

zjrtr

d yp *tstr *vjstsvyrt/

Competition #42
the results of drastic measures

GAMES

By Scot Morris

Last November we demonstrated a number of ways to determine the time of day with a broken watch. Use it as a sundial, take it to the phone and use its stem to dial the "time" number, or bang it on your apartment wall until someone yells, "Hey, cut the racket! It's ___ in the morning!"

We also included such examples of "megameaning" wordplay as 10^2 microphones = 1 megaphone, 10^6 bicycles = 2 megacycles, and 1 millihelen = the amount of beauty necessary to launch 1 ship.

All of this, of course, led to Competition #42, which we dubbed Drastic Measures. Using lateral thinking—the ability to view a subject differently—readers had to create new and clever ways to measure something. The ideas could be serious or silly, as long as they were original. For instance, Alpo dog food costs 38 cents a can, that's more than $2.50 in dog dollars.

Well, the winners have been determined. The grand prize, a Casio 2000 pocket color television. Nine runners up receive $25 each, and all ten get a one-year subscription to *Omni*.

Several readers came up with additional ways to tell the time with our broken watch. Runner-up B. Oppenheim of Berkley, Michigan, submitted several suggestions, including "Try to sell the watch until someone says, 'Hey, this watch is broken. It's not ___ o'clock, it's ___ o'clock', or use the hour hand to tally the tolls as a church bell chimes the hour."

A tiger in your tank is one thing, but how do you know if there's a monster in your local lake? Omni readers racked their brains and came up with some new, clever, and even ridiculous measurements.

GRAND PRIZE-WINNER

A billion dollars of budget deficit = 1 Gramm–Rudman
—Jill Martinson
Wheaton, MD

RUNNERS-UP

6.023×10^{23} alligator pears = Avocado's number
—Karen Bracey Burke, VA

The amount of weight an evangelist carries with the Almighty = Billigrahams
—R. J. Thomas, Syracuse, NY

2 pints = 1 cavort
—Oscar Weigle
Whitestone, NY

Basic unit of laryngitis: the hoarsepower
—Andy Stalf, Plymouth, MA

A unit of celestial brightness that never caught on: the half-sirius
—Scott Martinson
Wheaton, MD

The shortest distance between two jokes: a straight line
—Richard Halasz, Milwaukee

The number of feet in a yard is directly proportional to the success of the barbecue
—Virginia Jelovcich
Union, NJ

Additional runner-up: Louise Jackson, Tiverton, RI (see our megameaning quiz)

HONORABLE MENTION

Bananosecond: the time between slipping on the peel and landing on the pavement
—Jeffrey Day, Memphis

It took some drastic measures to win this competition

Angstrom: a common measure of computer anxiety. 1 angstrom = 1,000 nail-bytes.
—Jud Richland
Washington, DC

Yiddish Thermal Units: temperature measurements of deli foods.
—John Huotari
Zimmerman, MN

The energy burned in a single dance step. 1 pas cal.

A unit of wine dryness at the nineteenth hole. 1 par sec.
—Gary Tutt
Duncanville, TX

2 scraggly game hens = abrasive pheasants.
—Linda Giordano
Florence, AL

Unit of professional-football ineptness: Oiler's constant.
—Joe Scassero
State College, PA

1 mole = 007 secret agents = 25 cagey bees.

Acher: unit of hypochondria, 1 acher = 2 magnums of sham pain.
—Herb Martinson
Wheaton, MD

1 dog pound = 16 ounces of Alpo.
—Robert P. Kinney
Appomattox, VA

6 curses = 1 hexahex.
—Saprina Griffin
Portales, NM

If in the land of the blind the one-eyed man is king, does this make one-eyed jacks wild?
—Robert Krause
Scarsdale, NY

The decibel level of a band in a singles bar = the total number of whats it produces.
—Pascal Portfolio
Huntington Beach, CA

The inertia of an object at rest (its resistance to motion) should be measured in "mobile ohms."
—Peter Shepherd
Waukegan, IL

The enormous alien kept staring at me with her 10^{100} optical sensory organs she had been making goo goly eyes at me all day.
—Stephen E. Childress
Roswell, NM

Resistance to Hare Krishna flower vendors in airports ranges from the simple deca-ohm to the violent kilo-ohm.
—Barbara Price, Las Vegas

The shortest interval of time known: the instant between the traffic signal turning green and the taxi driver behind you blowing his horn.
—Anonymous
East Lansing, MI

3,500 calories = 1 food pound.
—Heidi Mueller
North Arlington, VA

The propensity of a Scottish lake to contain a monster is measured in its Nessness-ness: the inverse ("in-verse," because it rhymes) is Ness lessness.
—B. H. Bailey
Dorset, England

To measure the path of a ghost who haunts your block: calculate the square route of minus one.
—Carol Jackson
Santa Barbara, CA

1 sagan = billions and billions.
—John Brummage
Lindenhurst, NY

The rate at which a disease spreads through a cornfield: the speed of blight.
—Dave Baker
Conyers, GA

When I woke up this winter morning, the weatherman said it was 10 degrees. It was so cold I thought all 10 were in my bedroom.
—Kenn Howard
Pittsburgh

I took a sip of diet cola. It contains one calorie per can. With my luck, I got it.
—Randy Berman, Peoria, IL

I'm neither tall nor small—just Fahrenheit.
—Patrick MacAulay
Grand Rapids

Additional honorable mentions: Janel Mascia, Arlington, VA; Ben Gottlieb, McLean, VA; Chris Boyle, Burke, VA; Valerie Swartz, San Diego; Rex Smith, Tacoma

(See our quiz, next column.)

MEGAMEANING QUIZ

Can you determine the measurement equivalents for these reader entries?

1. 1,000 beers served at a Twins baseball game (Jill Martinson)
2. The ratio of an igloo's circumference to its diameter (Karen Bracey)
3. 2.4 statute miles of intravenous surgical tubing at Yale University Hospital (Louise Jackson)
4. 2,000 pounds of Chinese soup
5. 10^{-5} mouthwashes (4 and 5, Janet Mascia)
6. The speed of a tortoise breaking the sound barrier (Scott Martinson)
7. 8 catfish (L. Giordano)
8. The length of time it takes to sail 220 yards if you're traveling at one nautical mile per hour (Ben Gottlieb)
9. 365 days of drinking low-calorie beer because it's less filling (Joe Scassero)
10. 16.5 feet in the Twilight Zone
11. The force required to accelerate 2.2 pounds of cookies one meter per second (10 and 11, Chris Doyle)
12. 1/2 large intestine
13. 10^{-6} movies (12 and 13, Rex Smith)
14. A thousand pains
15. One word (14 and 15, Valerie Swartz)

ANSWERS

1. 1 Killibrew. 2. Eskimo pi. 3. 1 I.V. league. 4. won ton. 5. 1 microscope. 6. 1 mach turtle. 7. 1 octo-puss. 8. knot furlong. 9. 1 lite year. 10. 1 rod serling. 11. 1 fig newton. 12. 1 semicolon. 13. 1 microfilm. 14. 1 megahertz. 15. 1 millipicture.

INTERVIEW

CONTINUED FROM PAGE 92

tralians—and white Australians as well as aborigines have succumbed to it. Various alcohol rehabilitation programs have been started, but none really work. Alcohol is a marker of human destruction. During the time a society is suffering change, especially destructive change, it will be marked by alcoholism or its equivalent.

Omni: Perkins once said that all societies differ in the way they regard death. What is unique in the aborigine view?

Willmot: For a primitive people, aborigines were exceptionally concerned with ascertaining the specific causes of death. So they often held complex postmortems, especially when a young person or one in the prime of life died. The aborigines were quick to suspect murder even if the person showed no physical signs of harm, such as a spear hole.

The old Australians practiced nothing like voodoo or witchcraft. But because of the close relation in all aspects of aborigine life between the temporal and spiritual domains, they absolutely believed that death can be brought about by psychic pressures—such as "pointing the bone" [believed to be imbued with special power] or "singing" somebody. If someone sings another person to death, well, it's murder. It works! I myself have seen people die of psychic causes. If someone is guilty of singing and causing someone's death—and for it to work, you've got to believe in it—then they're as guilty as when in Western society somebody pulls a gun and blows somebody's brains out or perhaps knowingly infects him or her with a disease.

The aborigine theory of diseases and an aspect of mythology converge right here. Aborigine doctors held that illnesses were the result of the body being infected by some minor irritating spirit. Although you could use chemical devices to control the symptoms, if you really wanted to cure someone you had to get rid of the invading mischievous spiritual influences. The Quinkan spirits of Queensland are actually not spirits of the dead, as is sometimes said, but rather hangovers or relics from the dreamtime that still, in part, inhabit the earth. These mischievous spirits carry on a bit sometimes (as is mentioned in my novel, *Pemulwuy*) inhabiting water holes and causing them to be poisoned.

There are numerous taboos, too, in aboriginal society. Volumes have been written about brother and sister avoidance, mother-in-law avoidance; they're mostly related to structures for avoiding incest. The predominant religious one, which has gone beyond a taboo and become more of an ethic, is the avoidance of using the name of the recently dead.

Omni: Is tourism beneficial to aborigines?

Willmot: Oh, definitely. Tourism has already created in visitors' minds an essentially positive picture of aboriginal society. And it has allowed aboriginals to see people quite different from the Lawrence of Arabia types they've been constantly beset by. Failures within their own societies, these whites were fugitives, looking for a hiding place among gentler societies like the old Australian one.

As I've noted, aborigines are terrified of indebtedness to nature because nature, especially on this continent, exacts a terrible price. If the tourist industry can operate without causing massive degradation of the environment, then it's a very positive thing. We're all tourists at some times in our lives, and aborigines traveling from one end of this continent to the other have always been great tourists. And yet they were not nomads. Instead of living in one spot, trying to rotate crops and animals, they left the crops and animals where they were and refashioned themselves, and these travels through their own lands were very precise.

Omni: What paths are you traveling now?

Willmot: Instead of giving up public life, running a company and pursuing wealth, I still feel the need to involve myself in the affairs of Australia. I can't resist having my fingers in the pie of human destiny. After all, what is more satisfying? I've certainly earned a great deal of money in recent years, but the tax man, who in Australia is nearly as pitiless as nature herself, has had as much of it as I. Australia is not kind to people who fail to go to a lot of trouble to cover their financial tracks. But I value what I do more than wealth. I am what I am, and I'm comfortable with what I am.

Omni: It's not uncommon to portray you as a man between two worlds.

Willmot: I was born between two worlds and will probably always live between them. I am as much at home in the dusty outback as in the cosmopolitan city. I'm an Australian who grew up among the visions and splendors of this vast, flat continent. I'm a kind of outsider, and I understand it. I can't say I perfectly understand white Australia, but I understand it at least as well as most white Australians do. And I certainly understand the aboriginal world.

Omni: Can you give us a vision of what is best and most beautiful in both worlds?

Willmot: All of us contribute to the way we are. Aboriginal societies close to nature develop certain visions of the world. Europeans, driven on by a frenetic energy, develop others. This vision of the universe, of the stars and finding your place among them, of drawing Halley's Comet and at its second-to-last visit being able to actually photograph it, and this time almost bringing back a bucket of it—this is truly the European vision. But there are two other visions that are very much aboriginal. The first is the dreadful specter of Venus—an Earth-like planet devoid of life, a hell place, a consequence of the debt nature may exact if we continue to damage this place. And last is that beautiful vision of a blue planet the astronauts might see on their way back to Earth. This is the aboriginal vision, the place where we began.

SPACE

CONTINUED FROM PAGE 26

One Salyut mission was disrupted after a cosmonaut became nervous and irritable—the result of having taken too many sleeping pills to catch up on lost sleep.

By the end of the flight the cosmonauts were allowed 12 hours a day to sleep rather than the usual eight. The Soviets found their crews had fewer problems when cosmonauts adhered to a normal 24-hour schedule synchronized to Moscow time. (They were awake during Moscow's daylight hours and slept when it was night there.) Problems in the crews' efficiency ensued when work schedules strayed from that.

Not everyone favors a 24-hour day in which every astronaut sleeps at night. Graeber believes it's just not practical. "For economic reasons alone we have to look at the possibility of shift schedules. And what if there is an emergency?" he asks.

What kind of schedule should we use? The U.S. Navy places submarine crews on an 18-hour day; work rotates in three 6-hour shifts. But after investigating this, chronobiology experts found the schedule too grueling. "It would be difficult to devise a schedule that is harder to adapt to," says Dr. Charles Czeisler, director of the Neuroendocrine Lab at Harvard's Brigham and Women's Hospital. "It's the equivalent [in terms of jet lag] of flying to Paris every day," adds Moore-Ede.

He and Czeisler think the problems of scheduling sleep in space are tricky but not insurmountable. They've already devised techniques for helping nuclear-power-plant operators and other workers with 24-hour jobs adapt more smoothly to different shifts. For one thing, they recommend leaving workers on a set shift for at least three weeks, to allow body clocks sufficient time to adjust. For another, they have found that different people are more suited to particular work shifts. Younger people, for example, are more flexible about being moved to later work times.

And one way to keep an astronaut's biological clock on a schedule is to use special lights. Czeisler was able to correct one patient's circadian rhythm by exposing her to four hours of full-spectrum fluorescent lighting each night before bedtime.

Moore-Ede believes the same circadian principles can be applied to astronauts' schedules. But it is something we have to begin working out long before the space station is launched. "You don't want to have to do the experiment in space," he says. "Given the tremendous costs [of getting there], it's crazy to ad-lib." DO

Editors' Note: *Anyone interested in the personal experience of sleeping and working in space can order a copy of a tape diary made by astronaut Jeffrey Hoffman during a 1985 shuttle mission. Send $8.95 (check or money order) for the tape and a paperback diary transcript to Caliban Press, 114 Westview Road, Montclair, NJ 07043.*

LAST WORD

By Mike Wilkins

When the man ordered lunch for himself and his hostage, he found a winsome stuffed bear in the bag with the hamburgers. It was Teddy Rescue, the hostage-negotiator talking bear.

In Detroit recently an unemployed factory worker robbed a bank, panicked, and grabbed the girl in the next booth at a local mall. He locked himself in and demanded a million dollars in small bills in exchange for the life of his hostage.

The authorities' initial attempt to defuse this potentially explosive situation was fruitless. He would talk to no one.

But when the man ordered lunch for himself and his hostage, he found a winsome little stuffed bear in the bag with the hamburgers. It was Teddy Rescue, the hostage-negotiator talking bear. Its sweet voice and gentle ways were enough to calm down the man and to get him to consider his actions in a larger context. After about 20 minutes he surrendered his weapons and came out cuddling the bear in his arms. He is now in prison, where the state has given him another bear programmed to refrain him as a valuable working member of America's new service-based economy.

With its lovable appearance and its programmed ability to negotiate, Teddy Rescue is the latest addition to the police officer's armamentarium," says Stephen Glenn, head of the FBI's hostage crisis training program, or SWAP team. "So many things can go wrong when you use a live negotiator. But who has ever had anything but a hot-chocolate-with-tiny-marshmallows kind of feeling when given a teddy bear?"

At first blush, having a 24-inch-high, inanimate object do the work once handled by skilled professionals appears ludicrous, but on closer examination, just the opposite is true, for several reasons.

First, in any hostage situation, the overriding duty of a negotiator is to keep the situation as calm and tension free as possible. And what is more calming than a furry, fluffy, doe-eyed little guy?

Many "normal" members of society purchase teddy bears as companions, confidants, or just someone to trade hugs with. It's an acceptable way of coping with the hostility and impersonal nature of modern life.

By definition, the social deviant can't cope with his world in an acceptable manner. Using a teddy bear as negotiator brings this coping strategy to him. Teddy Rescue is a (machine-washable) cuddly bundle of plush reassurance. One look into his button eyes, and the psychopath can't help but think that everything's going to be okay, that, yes, there is something to live for after all.

And how could anyone doubt the truth of what Teddy Rescue says with a voice specially synthesized for earnestness? A teddy bear like this would never run off with your boyfriend or girlfriend, run up a huge bill on your phone, or borrow and smash up your car.

Second, for a number of psychological, legal, and practical reasons, most of what a crisis negotiator says is prere-

[illegible] licensed anyway. Thus having a [illegible] deliver a canned message doesn't [illegible] personally affect the content of what he [illegible] to be said. (Teddy Rescue uses a [illegible] computerized tape player. The voice recorded on one channel and [illegible] cues, which coordinate the bear's mouth, eye, and sincere body movements, are on the other.)

And since Teddy would never forget his lines in a stressful situation and would never betray fear or uncertainty in his voice, he is actually preferable to his human counterpart.

Third, a terrorist's expectations aren't as high with a teddy bear. Who is going to ask a stuffed animal for a jet or a phone call from the President and expect to actually get one?

Fourth, in any given hostage situation one can never be sure who should act as negotiator. A recent suicide in St. Louis illustrates this point. A young man was threatening to jump from a building, and the authorities sent up a priest to talk him down. Unbeknownst to them, this confused man had been beaten up ten years before by a gang of unruly Jesuits while he was stoned on PCP. (One suspects this incident may have been at the root of his problems in the first place.) As soon as he caught a glimpse of the Roman collar on his negotiator, off he went, screaming all the way down.

Finally, one must realize that in any negotiating situation there is always the danger of a tragic mishap. If a human negotiator makes the wrong move, he could be killed. A tragic loss. But if a Teddy Rescue gets snuffed, the police can just drive down to the nearest Toys 'R Us and buy a new one.

Teddy's manufacturer, Wonderful Toys, says they are certain to fare well with the new product. But they are not content to rest on their laurels. "We are expanding the Teddy Rescue concept," says Wonderful Toys spokesman Lee Perry. "Right now we have a standard package of the basic bear with a hostage-negotiating tape. Soon to be released is a whole line of accessories, new tapes, and clothing for other markets. For instance, for the export market we're marketing a special Arabic-speaking bear dressed like a Shiite Muslim, and for the domestic market we've got bears that do drug counseling, psychoanalysis, and even one for that awkward moment when a longtime employee needs to be fired."

What's on the drawing boards? "In five years you'll be seeing teddy bears reading the six o'clock news, selling life insurance, and even acting as White House spokesbears," Perry predicts. "They'll be anyplace there is a need for someone to deliver a canned message in a warm and trustworthy manner."

Mike Wilkins is a California-based freelance writer who is never far from his fuzzy friend.