

# ושתח

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SECOND ANNIVERSARY ISSUE  
COLLECTOR'S EDITION

# HUMAN EVOLUTION:

# THE FUTURE

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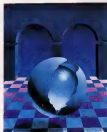
# OMNI

OCTOBER 1980

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The visual effect of *Prin-Jungen* Rogner's cover painting is due to a special daylight fluorescent background that provides the brightness visible in printing. Limited quantities of the cover are available at a special \$5.95 to OMNI Art Department, 909 Third Avenue, New York, NY 10022.

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# CONTRIBUTORS

## OMNIBUS



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DAVID



ROBERT



BOBISAPPO

**E**volution. One hundred twenty-one years after Charles Darwin published his landmark *Origin of Species*, that single word continues either to evoke controversy or to inspire revelation. Hundreds of books devoted to the subject attest to the importance we place on the future course of our own species.

Still not enough has been said. The startling breakthroughs of today alter tomorrow's realities in ways no one has yet imagined. Therefore it seemed appropriate in this, our second-anniversary issue to go ahead and try to get a bearing on destiny. A team of the world's most knowledgeable and most gifted futurists agreed to serve as our guides.

In "Countdown to Habitat One" (page 44) the celebrated science writer John Piffer compares the future of human evolution to the takeoff of a rocket. We have just reached the ignition stage and soon we will propel ourselves rapidly toward the stars. I think a lot about the future," Piffer muses. "The Yale graduate speaks with reasoning enthusiasm. You might as well be an optimist; it's no fun the other way. Originally trained in physics and mathematics, Piffer switched to the more complex "social sciences." I've been shifting to where the problems are," he quipped. Piffer has handled those problems well. *The Emergence of Man* (Harper & Row 1969) will soon appear in its fourth edition (under the title *Emergence*) and its sequel, *The Emergence of Society* continues to engross readers.

David Rorvik, the controversial author of *In His Image: The Cloning of a Man* (Lippincott, 1978), talks about mankind's latest grip on evolution—the ability to engineer one's own future through genetics. In "Re Destinations" (page 68) Rorvik explores the various genetic frontiers, from gene splicing to test-tube fertilization. "We should be hopeful but cautious," Rorvik warns. "We basically have to decide whether the parents outweigh the progress." With a fringe of the muckraker Rorvik asserts, "Scientists undermine the public's ability to grasp these issues." Rorvik began as *Time* magazine's first free-ranging science reporter but he left in 1970 to pursue politically oriented issues. Since then Rorvik's information crusade has taken him on lecture tours all over the world, even to the intellectual backwaters.

Accclaimed television newsmen and commentator Ebert Newman reveals how the English language is evolving even as we speak it. Unfortunately according to Newman, the American way of speaking English has fallen into the hands of disc jockeys and teachers, bureaucrats and electronic computers. Though most purists are exceptionally aware of words, Newman has surfaced as a kind of protector of English usage; his two books on language, *Strictly Speaking: Will America Be the Death of English?* (Bobbs-Merrill, 1974) and *A Civil Tongue* (Bobbs-Merrill, 1976) are national best sellers. Newman has been an NBC correspondent

for 28 years, appearing regularly on *Today*, *Meet the Press*, and *NBC Update: Read, Meet the Press*, beginning on page 88.

James S. Albus, a robot-building scientist working at the National Bureau of Standards, examines the future implications of a robot-based economy in "To Pay for the Future" (page 52). Ray Bradbury, perhaps the best-known science-fiction writer in the world, examines the future of religious concepts in "The God in Science Fiction" (page 108). The inexpressible Isaac Asimov, certainly the world's best-known writer of science fact, offers a Last Word about one slight genetic alteration that could solve all the human problems we find so perplexing (page 194).

Many of these problems become metaphors in C. M. Kornbluth's "The Marching Machine" (page 58), a science-fiction treasure that is as timely now as when it was first published in 1951.

Boris Vallejo, an illustrator who enjoys international acclaim, collaborated with fantasy science fiction and historical writer L. Sprague de Camp to create an alluring pictorial entitled "Noble Savage" (page 118). Vallejo has his superbly crafted oils has almost singlehandedly forged our composite image of the magnificent barbarian (for instance, Conan and Tarzan of the Apes).

Finally of course, there are more predictions, columns, special features and gripping fiction to help us celebrate *Omnibus*'s second birthday. They're all yours to examine, to ponder to enjoy! ☐

JOHN COVATTA  
Editor, *Communications*

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## LETTERS

# COMMUNICATIONS

## Robot Precedent

Ben Bova and Harlan Ellison have just issued *Asimov's* patent suits of robotics following their legal battle with ABC and Paramount. In defending the copyright on their short story "Ballo," which they claimed had been infringed by the ABC/Paramount TV series *Futurama*, they set a precedent. Judge Albert Sorenson ruled that robots have the same status as humans when used as characters in stories and are protected by the copyright laws. This may be the first time robots have ever been legally equated with human beings in any connection. Surely this case will be cited centuries hence when robots seek legal recognition of their "personhood." It is with concern that if the robots subsequently decide to found their own nation, they will choose a steel-wool scouring pad as their national emblem.

Bova and Ellison can be proud.

Ronald R. Lambert

Troy, Mich.

## Some Consolation

I wish to clear up the old question: Which is hotter, heaven or hell? Versa 26 of Chapter 30 of Isaiah defines the energy radiated heavenward by the sun and moon in terms of the amount received by the earth: "Moreover the light from the moon shall be sevenfold as the light from seven days."

Thus, heaven receives from the moon as much energy as the earth does from the sun. If we add to that 48 times ("seven times seven") the earth's solar radiation falling on heaven, we have a total of 50 times the energy we receive from the sun. Using a known absolute temperature of the earth and the Stefan-Boltzmann fourth-power law, we arrive at the determined temperature of heaven—a little less than parallel solar 977°F.

And the temperature of hell? Revelation 21:8 says: "The fearful shall have part in the lake which burns of fire and brimstone." Since brimstone (sulfur) has a boiling point of 803°F, hell must be several degrees cooler. If it were not, it would be a vapor, not a lake. Therefore, heaven is hotter than hell by at least 144°F.

M. E. Eckard

London, England

## Fate the Facts

I was shocked by Drive's decision to use Craig Covatta's essay "Universe Red" as the lead story in the August issue. This is not 1960. You can no longer use the Red Menace as justification for another space race in the 1960s.

Since the late 1960s we have learned that cooperation—not competition—is the most desirable method of space research. Because of the Soviet invasion of Afghanistan, U.S.-Soviet cooperation has cooled. I have the impression that Covatta is exploiting current international tension to enlarge NASA's budget during a presidential election year.

Finally, it is irresponsible to tan anti-Soviet hysteria with rational cooperation is needed for mutual survival.

Brady G. Englett

Austin, Tex.

We're sorry you didn't like Mr. Covatta's report, but we're much sadder that the Soviet Union has less use for "national cooperation" than for killer satellites and military might. And we're sadder of all that many Americans, such as you, refuse to face even the most obvious facts.—Ed.

## In His Image

Sandy Shokocus's letter (July 1980) that suggests cloning Jesus Christ from a cell taken from the Turin Shroud is misleading.

While science might permit this (and I would indeed be interested in knowing what He looked like), I doubt the newly resurrected Jesus would be performing any miracles. Duplication of a human body is a far cry from duplication of a mind. If Mr. Shokocus's proposals were realistic, we could make 100 copies of Albert Einstein and solve all the mysteries of the universe! If Mr. Shokocus could make a carbon copy of Jesus, she would have the body in the flesh, not the spirit.

John F. Wagner

Waterford, Pa.

## Decay of the Dollar

Larry Niven (Last Word, July 1980) overlooked the problem of welfare. The Carter Administration should pay welfare recipients in radioactive money, so providing a physical stimulus for job hunting. This practice would also solve the

CONTINUED ON PAGE 107

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# DIARY OF FORUM

In which the readers, editors, and/or respondents discuss topics arising out of *Omni* and theories and speculation of general interest are brought forth. The views published are not necessarily those of the editors. Letters for publication should be mailed to *Omni* Forum, *Omni* Magazine, 909 Third Avenue, New York, NY 10022.

## An End to Piracy

In response to Stephen Demorest's article on video piracy [*The Arts*, August 1986], I should like to express the opinion of a common video consumer. I own about 20 movies on tape, the titles of which have only just recently left the theaters. Of course, not all of this is legal material, but what choice does the consumer have? I think the major movie companies should release their titles, if not simultaneously with theater releases, then a month or two afterward at least. This would virtually end the problem of piracy for that market. The public would, in turn, be paying better prices and getting a guaranteed product. As for theater owners' complaints, think about this simple fact: Who is going to buy a movie he has not already seen?

David Crou  
Dover, Del.

## Brain Waves in Advertising

A recent article by Bill Wren [*Psychographics*, July 1986] described some of the applications to which brain-wave analysis has been put. While the heretofore of most advertisers to use the technique was mentioned, the article did not explain why this was so. We at J. Walter Thompson Canada conducted research on brain-wave analysis before concluding that we could not make use of the technique at its present stage of development.

A major claim of proponents of brain-wave analysis is that there are differences in the functioning of the brain's hemispheres that can be measured and interpreted in terms of advertising perception and subsequent behavior. Our review of the split-brain literature failed to find evidence that the hemispheres act independently in normal subjects in a

normative environment. Furthermore, most techniques that seek to assess hemispherical activity may provide only crude measures of local excitation rather than gross hemispherical activity. Finally, there is little, if any, research to substantiate the interpretations of brain-wave readings that have been made in commercial tests. Dr. Sidney Werstein collaborated in a recently published experiment (quoted in our research) that failed to find the hemispherical differences that his work is predicated upon.

We conclude that brain-wave scanning is born out of the boresback fad of the early 1970s and may itself pass quickly. Before it can be used effectively by advertisers, it must be more rigorously tested and substantiated.

Bill Katz  
Toronto, Ont.  
Canada

## Apollo Slides

Our client *Movie Newsweek*, which has advertised in *Omni* and many other scientific magazines, is terminating the distribution of the Apollo slides and movies after 20 years.

*Movie Newsweek* does this reluctantly because it is the only source of movies and slides of the moon landing program JPL, MIT, the Smithsonian, and colleges

and universities in more than 50 countries have secured their films from MN.

*Movie Newsweek* would like to offer a slide free to every *Omni* reader if he or she will just send a self-addressed, stamped envelope, or 25 cents, to pay for postage and handling to:

*Movie Newsweek*  
P.O. Box 2568  
Hollywood, CA 90028

Everyone should have this memento of our great scientific achievement.

All of MN's movies and slides have been made from negatives that were supplied to it by NASA. *Movie Newsweek* is the only company that has kept a complete supply of slides and movies of all flights.

Gerry Bonica  
Blake Advertising  
Hollywood, Calif.

## Mutilation Madness

I wholeheartedly disagree with the findings of ex-FBI agent Kenneth Rasmel [*Mutilation Madness*, July 1986]. I lived in Albuquerque, New Mexico, for five years and was constantly exposed to cattle mutilation reports. When I joined Aural Phenomena Research Organization in 1978, I decided to do a little investigating into the phenomenon.

I interviewed three men: a New Mexico State Police officer, a retired scientist and an employee of Sanders Chemical Laboratories. They constituted a three-man investigative team appointed by local authorities to look into the mutilations before the government investigation got started. My questions ranged from dates, numbers, and locations of mutilations to whether there were abnormalities in the mutilated animals before or after their death and whether local flora and fauna were affected in any way by the occurrences.

After the interviews, I found that I had received basically the same answers from all three (the interviews were held separately). My findings are as follows:

- 1) There have been mutilations for many years, possibly since the early 1900s.
- 2) The mutilations are not confined to the states of the Southwest. They have



*Movie Newsweek* is giving away 50% of Apollo

RED ALERT

## EARTH

By Kenneth Brower

**B**etween half a million and 2 million of Earth's plant and animal species will become extinct by the year 2000. Among them will be some human tribes. So predicts the recently released "Global 2000," a report commissioned by President Carter. First scheduled for publication in 1978, the study might have been delayed because its news is so bad.

A few years ago the Bronx Zoo tried to give a shape to extinction. The red symbol—reads the sign beneath a stylized picture of an antelope skull at the entrance—calls attention to endangered species. Look for it around the Bronx Zoo. And think about what it means—the final emptiness of extinction.

We have yet to build anywhere on Earth a zoo big enough to house all the creatures now slated for oblivion. Imagine it. Today's zoological gardens can seem depressingly like prisons, but they would be nothing compared to the nearly endless avenues, moats and bars, the howls, gunshots and trumpets, and the ceaseless caged pacing of those beasts tattooed with red symbols. Your feet would become sore from walking the length of it; your heart would be even more pained.

Of course, some people argue that extinction is not so lamentable. Species come and species go, and have done so since the beginning of life, they point out. Look at the big die-off at the end of the Pleistocene Era. These things happen. Strong animals—and man is unquestionably the strongest—in the niches of weak animals: it's the natural order of things.

It might give these good Darwinians pause to realize that the red symbol now stands beneath the linguistic cages of a number of human tribes. All over the primal subraces of Homo sapiens are regularly becoming extinct. Sometimes lighting, sometimes no longer caring, they lose their grip on the edge and slip into nonexistence.

Nowhere are more of us dying off than in Brazil. In 1998, when Paulo Afonso Cabral first set foot there, the native population of that land, according to estimates, was

between 6 million and 9 million. Today a mere 200,000 Indians survive. There has been an attrition rate of 2 million per century. While part of that die-off has been the result of diseases introduced accidentally, much of it has been—and continues to be—due to genocide. In 1990 there were 230 known tribes of Brazilian Indians. At last count, in 1997, there were 143. There are fewer now in 1980, and by the year "Global 2000" anticipates there are certain to be fewer still.

In this century in Amazonia alone, more than 90 entire peoples have departed from the planet. More than 90 cosmologies have gone, more than 90 world views, more than 80 ways of saying "hello" and "thanks" and "please pass the amadillo."

It is true that all men are brothers; it is also true—as anyone who has lived outside his own culture knows, that we are all alien. The Yanomamo Indians, an endangered tribe living on the Brazilian/Venezuelan border, do not look out of the dark, vaguely Oriental eyes in their painted faces and are the same planet we see, Yanomamo eyes, after millennia of peering into the

muted green of the rain forest and scurrying down the barrels of blowguns, have evolved their own way of seeing. Yanomamo shamans, like the wise men of many Brazilian tribes, use psychedelic drugs. Their visions are far stranger than any in Carlos Castaneda's Don Juan books; for Castaneda's are simply the imaginings of another Westerner like ourselves.

It is odd, or perhaps not odd at all, that as our civilization destroys real societies, real worlds, in Brazil and elsewhere, one of its literary crazes has been the creation of coherent imaginary worlds, complete with their own societies and languages. Our Shakespeares and Tolstons and Le Guins can't produce fictional worlds at the rate at which actual ones are disappearing.

There are signs that our indifference is changing. In the spring of last year a group of people in São Paulo formed the Committee for the Creation of the Yanomamo Indian Park. They are pressing their government to form a 5.4-million-hectare park for that largest of the surviving Brazilian tribes. In Canada the World Council of Indigenous Peoples is in the process of organizing itself. In New York City Survival International, a London-based outfit concerned with tribal peoples all over the world, has been operating out of a small Fifth Avenue office for a year. And in Boston the Anthropology Resource Center serves as an information clearinghouse.

To the social Darwinists among us, the predestined demise of the forest tribes may seem regrettable, just one of those things. These are the dullards who have to "send to know for whom the bell tolls." They need to summon up the imagination to walk through that zoo of red symbols, past all the cages, past the golden teardrop eyes with their vertical pupils, past the kindly anthropoid eyes of the orangutan the "jungle man," as named by the Dyaks of Borneo, past the brown eyes of the Dyaks themselves, endangered, along with the ape, by the relentless logging of Borneo's rain forest, past the Amazonian eyes to the cage on the end, where the eyes peering out ask their own. **DD**



Disappearing Yanomamo signal global loss

# ILLUSORY SOFTWARE

## MIND

By Robin Webster and Leslie Miner

**S**ince advances in robotics and bionics have led to a deeper understanding of how our bodies work, psychologists and computer scientists have long hoped that attempts to create an intelligent machine would help us learn more about the human mind.

Unfortunately, such attempts are blocked by a double barrier. The first is sheer ignorance: we know so little about how our minds work that we can't possibly duplicate the process.

"Right now," says Dr. Richard Gregory of Bristol University's brain and perception unit, "the whole thing is opaque. Suppose you are doing a job and you arrive at a decision. I don't know how an earth you did it. We don't even know how automatic controllers, for example, make decisions. You find in fact that there are big differences among individual controllers."

It is the hope of researchers like Dr. Gregory that by developing primitive thinking machines they may create an analog to the human processes that help to explain it. "It seems to me," Gregory says, "that the whole technique of trying

to make the decision-making process more explicit in a machine, which you can alter at, monitor as the way to approach the problem."

Here, though, researchers meet the second barrier: the fascinating probability that thinking machines, like humans, will be subject to illusion. The more original and creative intelligent machines become, the less reliable their final decisions will be. In fact, the more they seem to reflect our thought processes, the more they mirror the caprice of our judgments.

"I would define illusion as a discrepancy between a description and reality," Gregory explains. "In the case of perception, it is a discrepancy between what you see and what you believe to be the case conceptually."

"The hunch, therefore, is that if a machine is going to show originality and come up with novel solutions, then it is almost certain to be unreliable. This is because it's got to have the facility for getting outside its normal loops of operation. I don't think it can ever have an adequate set of rules to look for a novel

solution. So if you ask a computer to do this, I think you are buying an increased probability of error."

According to Gregory in the future we may have a virtual think tank of artificially intelligent machines supplying us with conceptual information that would otherwise have been beyond our reach. "We will use machines to seek out unknown realms, artificial or otherwise."

To deal with the probability of error, he sees the development of a new science of error. The whole nature of learning and knowledge would change in such a future. Some machines will deal with mundane matters, while others will exist in the fragile world of insight and illusion. In this way, Gregory believes, like the speculation of animals, there will be a speculation of thinking machines.

Machines used in wartime to aid decision making, for example, must have a totally different reaction to information from a novel-writing machine. In the creative machine, illusions would be acceptable, even welcome, but not in the military unit. "Machines used to aid decision making in wartime," Gregory says, "face a totally different level of illusion. Such systems have to detect aircraft and troops in the battle zone at the limits of their capabilities since they must be out of enemy attack range. The need for reliability in these machines is high, yet their decision-making processes are typically based on very inadequate information."

In this circumstance any degree of illusion could be disastrous. So military and creative thinking machines may ultimately become as distinct as generals and poets.

The illusion barrier will slow the evolution of intelligent machines for some time, Gregory feels. "Consider the law if you like. You surely can't have rules for convicting or trying criminals as complex as the situations that people find themselves in, because the rules can't be as diverse as reality. Rules can reflect only a part of reality. As with the law you are absolutely bound to get mismatches with machines."

It will do manage to give machines



The more barriers a thinking machine becomes, the more it will display caprice and illogic.



# SOLAR OPTIONS

## SPACE

By Jerry Gray

**S**pace is where the energy is round-the-clock sunshine. Given our energy problems, you'd think the logical thing to do would be to go up and collect what we need. Yet just how serious Congress and the Department of Energy are about doing so, as this is being written, remains unclear.

The Energy Department and NASA have been studying satellite power systems (SPS) for about three years now working with a prototype developed for them jointly by Boeing Aerospace and Rockwell International. The system would sit in geosynchronous orbit, 35,800 kilometers up, and convert sunlight to power with solar cells; then beam it back to Earth as microwaves. SPS has been described as a major power source for the first decades of the coming century.

The present prototype has elicited several obvious questions about the costs of building and operating such a system, the environmental and medical impacts of microwave-power transmission, and various social and political concerns. In fact, critics have used these uncertainties

to "prove" that SPS can never be competitive with, say, ground-based photovoltaic arrays. As a practical engineer whose business it is to accomplish things that sometimes seem improbable to laymen, I hate the word never!

A number of alternatives to the current concept have been proposed in an attempt to alleviate these concerns, but they may all be nothing but water over the dam. Planners at DOE just cut the \$5.5 million SPS evaluation from their 1991 budget. (The new head of DOE's research section has spent the last 30 years studying fusion-power systems, the chief alternative to the SPS. Can this be coincidence?) And the House of Representatives has refused to reinvest the firm into its budget proposal. The matter is now in the hands of the Senate Appropriations Committee. The chairman of its Subcommittee on Energy and Water is Senator Bennett Johnston, a Louisiana Democrat whose staff is, for no obvious reason, notoriously opposed to SPS development.

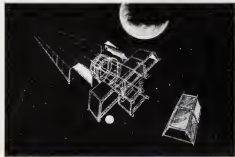
One last hope rests with the Solar Power Satellite Research and Evaluation Bill,

passed some time ago by the House. The bill, which would allocate \$25 million a year to SPS studies, will come under debate in the Senate as this column goes to press. Chance of its passage, however, appear to be slim.

Remember, this whole scheme is far from being another "pie in the sky." All its component technologies have been demonstrated, either experimentally or operatively. We could unquestionably launch a workable SPS if we started the program right away.

But, as history has shown, we could just as easily build the wrong system. There's no sure way to kill promising new technology than to attempt a demonstration too early. Even such a simple and useful device as the domestic solar water heater has been generally rejected by the American public because its very real capabilities were promoted prematurely. The SPS, far more complex and technically advanced, may be in danger of staggering into the same trap. We could capture solar energy in space and return it to Earth. The evaluations contained in Energy's original budget are essential if we are to choose the best of several alternatives. Hundreds of suggestions have been evaluated in more or less detail, but I can outline only a few of the concepts that have a better chance for survival.

The alternative that might change the current prototype evaluation least would be to replace the photovoltaic arrays by solar/thermal-power conversion systems. These would use huge, dish-shaped parabolic mirrors to concentrate sunlight on central absorbers, where it would heat a working fluid, just as conventional fossil-fuel or nuclear-power plants do. The idea is much like the prototype ten-megawatt solar power tower now under construction near Barstow, California. Because it is in the perpetual sunshine of space, however, it requires almost no energy storage facilities. The electricity output of conventional rotating generators would be converted to microwaves, as in the current design, and be transmitted to Earth.



Solar power satellites: More sure than fusion, they could meet our power needs by A.D. 2020.

VIDEO

# THE ARTS

By John Whitney

**J**ohn Whitney, the inventor of the process by which the famous *Star Gate* sequence in 2001: *A Space Odyssey* was produced, is the eminent pioneer in computer graphics as an art form. In this exclusive essay he explains why computer-generated kinetic art, coupled with the video disc, will bring about the next stage in the evolution of artistic expression. Whitney calls it a new culture. Whitney is now writing and illustrating a book, *Digital Harmony—On the Complementarity of Music and Visual Art*, for Blye/McGraw Hill.

Video music is the slick term gaining usage among those involved in the video-disc revolution. It inadequately describes this miracle of technology that combines sight- and sound tracks of microoscopic size and nanosecond efficiency. I hope we find a better name for this fusion of art and music.

I was an early participant in this revolution. I dreamed in video music. I plotted secret fusions and transfusions of the arts. Long ago I began to train underground on

computers for the day when video discs would appear on the marketplace and make this art available for everyone. As musical recordings are now, Nowadays I operate the Andromeda Systems 11/8 computer in my studio, composing works that fuse sight into sound as if they were counterpoints of a single composition. And today the video disc is for me what paperback and publishing in general are for writers—the source of a wide popular distribution by way of video discs' economics and mass production. Three of my compositions are listed in the first *Quadrivision* catalog. Video music on video discs will bring about this inevitable change in art—the beginning of the future integration of an aural and visual art.

What is the theory behind video music? It is common to think of music as two-dimensional. Time is represented by the horizontal lines of the staff and pitch by vertically arrayed symbols—the notes. That is the convention on paper. Yet the perception of music is not two-dimensional. The ears reside at the center of a spherical domain. We hear

from all around. We hear music as patterns of ups and downs, to's and fro's, in a distinctly three-dimensional architectural space—a space that exists vividly within our minds.

The eye, though, is more outwardly oriented. We perceive objects and events outside, at a point that our eyes focus on. Yet the eye is no less perceptive than the ear. The mind's eye shares with the ear the experience of architectural spatial constructions and would perceive them with the same pleasure were they to exist.

But the fact is that until recently these fluid, interior visual edifices hardly existed. The idea of "color organs" that one could play like church organs with all the stained glass dancing occupied minds since Leonardo wrote about it in his notebooks. And twentieth-century abstract art, too, has been a training ground for a visual response to the musical experience. In the mind's eye, architecture-in-motion has always been at the root of our enjoyment of music. Still, there is no universally accepted visual equivalent to music. It should exist, and it soon will. In a few years, I'm sure, we won't call it video music.

Now is architecture a good metaphor for this kind of kinetic visual experience? There is in fact no terminology for the dynamics of visual patterning that stresses the precision and spatial fluidity exhibited in music. Precision is crucial if visual patterns are to dance with the architecture of musical patterns. The image patterns must be as flawless as music patterns. No "wrong notes" allowed. Visual music is technically not that different from sonic music. When a string quartet performs, Newton's laws of mass and the laws of thermodynamics are not suspended. It is simply that it is easier work to modulate air than to move clay or marble around. Although some kinetic artists have tried, none have been able to make a plastic or visual medium imitate music. No one has been able to sculpt time and motion. Of course we dance. But on Earth, with its inertia and gravity, the human body weighs much more, so it can't dance like the sound of a flute.



John Whitney's Pearls—generated on a video graphic system for almost 40 years of today's programming.

## THE ARTS

By Jeff Rovin

**C**hristopher Reeve is the kind of actor whom Hollywood—and science-fiction films—have long needed. Fortright and articulate, he is a man devoted to screen literacy. "It's an attitude that dates back to my childhood," he recalls. "Whenever I had the time, I'd get out a book like Jules Verne's *Twenty Thousand Leagues Under the Sea*. Never a comic book, and rarely TV. I found that reading let me linger on ideas that were worthwhile, think about what's between the lines. Maybe I'm a card-carrying snob, but I don't enjoy a medium that plays down to an audience."

At twenty-eight, Reeve can afford to stay away from films that make him wobble or, as he puts it, that "aren't none too bright." Universally lauded as the man who added brain and sensitivity to the town of Superman, Reeve is one of the industry's most sought-after young performers. Yet neither the wealth he has earned nor his ego-inflating choice of costars and directors has left him self-impressed. "I feel now as I felt when I was making seventy-five bucks a week. Oh! Broadway

that life is too short to go out and do projects that make an intelligent adult cringe, or do work that you don't believe in. The motivation in anyone's life should be to get better at what you do—in my case, to become a better actor. And the way for me to achieve all of these goals is to play psychologically complex roles."

True to his word, Reeve is now starring in *Somewhere in Time*, a delicate little fantasy he selected from the dozens of major parts offered to him after his triumph as the Man of Steel. *Somewhere in Time* allowed me to crawl into a man's head, to nurture what is still emotionally alive in him. It's about a successful man who is half-dead inside—until he sees a portrait of a woman who lived nearly seventy years before. At this point the film becomes a study of how desire can affect someone. He goes to see this woman, travels back in time through a mixture of inducement and suggestion, and creates a period environment around himself so convincing that after three days of trying he just leaves in essence. *Somewhere in Time* is about a man looking for one from the heart

Though Reeve now has the box-office clout that allows him to make a small romantic film when epics are the norm, he has always been something of a maverick. A stage actor since he was fourteen, Reeve segued from the theater to the television soap opera *Love of Life*, "not to pay a few bills, but because I felt I should learn something about the medium." He made his screen debut early in 1978 with the submarine film *Gray Lady Down*.

Admittedly earning "corn flakes instead of Mercedeses" at the time, Reeve nonetheless could not bring himself to consider the lucrative Superman film until he was persuaded that this "macho piece of mythology" would be done without too much pomposity and with a sense of humor. He attached no less stringent standards to Superman II, recently completed, and will stand by them when Superman III goes before the cameras in 1982. In the meantime Reeve is preparing several other motion pictures. Foremost among them is *Trappist*, the story of an MIT computer student who uncovers a huge slush fund that banks are using to influence the fate of Third World nations.

"If anything is a theme with me," says the soft-spoken actor, "it's how people are allowing themselves to be reduced to a subhuman level by the modern world. It's important to go to the moon and farm the oceans. I'm all for that. But the American obsession with comfort and convenience is going to cause our downfall. We're married to material things that make us sedentary and vulnerable. In a general way Superman called for us to take a more vigorous interest in our lives and destiny, doing so in the form of a valentine to an old America that's gotten kind of soft bellied and complacent. More specifically *Trappist* reflects how frightened I am by what corporate computers know about private citizens the world over."

"I like to play people of action," Reeve continues, "people committed to something, whether emotionally or physically, people making strong choices or forcing viewers to face truths about themselves. One of the most interesting things that has happened to me regarding



"Being Superman is not my job!" declares Chris Reeve, who now seeks after more complex roles.

# SPACE AGING

## LIFE

By Bernard Dixon

**S**pace exploration seems to have little in common with geriatrics: the study of diseases that afflict the elderly. While the human race devotes its attention to one set of challenges, however, other seemingly unrelated areas reap unexpected benefits. An unpopular and neglected specialty geriatrics could profit immensely from yet another spinoff of man's newest frontier science.

When *Spacelab* goes into action aboard the space shuttle next year, the crew will be monitored intensively for signs of bone deterioration. Since the earliest Gemini flights, we have known that astronauts' bones become thin and brittle after prolonged weightlessness. These changes are similar to what occurs in old persons suffering from osteoporosis.

This syndrome is caused by gradual loss of both the organic framework of bone and the calcium and phosphorus that bond it together. Osteoporosis makes the elderly much more prone to fractures, particularly in their hipbones. Immobilization of a limb during healing of a fracture is yet another cause of osteoporosis.

But "softening of the bone" is merely one of the degenerative changes that accompany aging.

"Pictureque but inappropriate" is the phrase the *British Medical Journal* (1980 1, 1209) used recently to describe man's body in space. Floating around weightless inside a spacecraft, a human being simply doesn't need appendages. The physiological changes that have been observed under these conditions indicate a steady reduction in limb size. The legs of space dwellers, for example, might well evolve into purposeless masses of protuberant fibres.

The Gemini and Apollo pioneers did not, of course, suffer such a fate. But x-ray studies made on these astronauts, and on those in Soviet Soyuz missions, show a definite loss of bone structure. The effect is apparent even during short periods away from Earth's gravity. According to the *British Medical Journal*'s report, this loss amounts to about four grams of calcium per month. This represents 0.3 percent to 0.4 percent of the body's total calcium. Even more alarming, the loss is most

marked in those vital long bones that support the human frame. Small wonder that this problem will be closely studied during the forthcoming shuttle flights.

Some of the most disturbing evidence obtained so far came from the 84-day *Skylab 4* mission. The heel bones of two of the three crewmen decreased in density, and tactics designed to prevent the disappearance of calcium were ineffective. Neither vigorous exercise nor a special diet had any effect on the rate at which the heel bones deteriorated. Moreover, measurements of the hormones that control bone-producing cells indicated no changes, affording no clues toward possible preventive measures.

But this problem will be solved. When it is, the new knowledge should prove invaluable to clinicians on Earth treating victims of osteoporosis. Already observations on the reversibility of bone changes in astronauts who have returned to Earth have encouraged doctors to make gradual increases in the amount of weight they put upon such patients. Longitudinal stress is apparently important for bones to retain their vitality.

To complicate matters, bone also responds to forces imposed by its muscular attachments. This was why NASA physiologists devised exercise programs for the *Skylab 4* team. But in zero gravity the nerves that control these muscles appear to change, too. This means that the muscular forces applied to an astronaut's bones, even during a vigorous workout, are less than they would be on Earth. The subtle relationship among exercise, nervous activity and the loss of minerals from bone is highly relevant to the management of osteoporosis in old people.

Even if the space program were nonexistent, a solution to osteoporosis would undoubtedly be found—probably later rather than sooner. There is nothing like a new and unprecedented challenge to spur the human intellect on to greater feats. Such is the nature of progress that we must send man into space in order to conquer one of the most common causes of immobility in old people. □



In the weightlessness of space, astronauts' bones deteriorate at an alarming rate.

# MINNESOTA ATTACK

## UFO UPDATE

By James Öberg

**S**erious investigators of UFOs continue to be tantalized. "Believers" have long existed that careful, thorough scientific investigation should establish the reality of UFOs beyond a reasonable doubt. Most believers bought the UFO mythos in the mistaken belief that such research had already been done. Informed skeptics—as opposed to the far more numerous "disbelievers," who simply deny that UFOs merit scientific acceptance—claim with equal confidence that thorough investigations would actually explain UFO reports as prosaic events. They further maintain that a few cases remain unsolved only because thorough research on them has never been attempted.

At last, a UFO case has been thoroughly investigated. The result is confounding to skeptics and disbelievers alike. Something extremely strange seems to have happened, but no single link in the bizarre chain of events is particularly strange in itself. It could all have been just a bold hoax—or one of the most important UFO cases of all time.

This UFO "close encounter" occurred on August 27, 1979, early in the morning, near the town of Warren, Minnesota. A police cruiser driven by thirty-five-year-old Deputy Val Johnson was damaged during an "attack" made by a "bright ball of light." The encounter reportedly left Johnson senseless for 40 minutes. When he regained consciousness, he radioed for help. He realized that his eyes were injured, his car was damaged, and his dashboard clock and his wristwatch were running 14 minutes slow.

Johnson had been routinely patrolling the deserted roads of Marshall County. It was a clear night. Shortly after 1:30 A.M. he noticed a bright light some distance off the road toward a stand of trees. The light did not illuminate the ground or the trees, and so it could have been much closer and could have been moving. As Johnson drove along the highway he tried to triangulate the light; he estimated that it was about three kilometers away and about 120 centimeters off the ground (assuming that it was standing still).

Deputy Johnson, suspecting that

smugglers might be unloading contraband blown across the nearby Canadian border, turned down a road leading closer to the mysterious light. Suddenly the object leaped from where it was to a point directly in front of him. "The light raced toward me with fantastic speed," he recounted. "I heard the sound of glass shattering, and suddenly my car was flooded with a fierce, blinding white light. Then it blacked out."

Broken glass was later found on the highway but Johnson's car had continued along the road for ten more seconds before he slammed on the brakes and skidded to a halt ahead the middle of the road. The engine stalled, and then Johnson sat, slumped against the wheel, for more than half an hour.

A tape recorder at the dispatcher's office preserved Johnson's call for help. The shakiness of his voice is definitely noticeable. "[This is] 407. [calling] 400. Johnson radioed. He received a quick reply: 'Go ahead, 407.' Johnson appealed out his situation in succinct radio code: 'Ten eighty-eight, two twenty five.' This means, 'Officer needs assistance; five miles down Highway 220.' The alarmed dispatcher reassured him: 'Ten four, we'll get someone out there right away.' Johnson later described his experience: 'Something just hit my car. Something attacked my car. I don't know what happened.'

Something had happened, and the police car showed its effects. One headlight was smashed. A small round dent had appeared on the hood. The windshield was shattered. The red plastic filter on a roof lamp had been broken. Two spring-mounted antennas had been bent nearly half over, midway up their length. Curiously the damage seemed to be confined to the driver's side of the car.

Johnson's eyes were very sore. Later news stories related to Johnson's injury as "welder's burns," but these reports were inaccurate. True welder's burns are accompanied by facial sunburn and don't usually cause discomfort until six or seven hours after exposure. They are caused by ultraviolet radiation, which could have pene-



A simple bar camera caught this UFO above the home of George Stock in Passaic, New Jersey.

lated the car's windshield only after it had been shattered. An eye specialist who examined Johnson ten hours after the incident noted that "there was no sign of any disease or damage to the eyes. There was mild conjunctival irritation (for which a medicinal solution was prescribed). The irritation could have been caused by the bright light—or it could have been due to some earlier exposure to a chemical that made every light seem painfully bright."

The story was so intriguing that Allan Hendry, an investigator for the Center for UFO Studies, in Evanston, Illinois, flew to Warren the following day. The thirty-two-year-old Hendry, author of the authoritative UFO Handbook, began a full-scale, first-rate scientific investigation of the midnight "UFO attack."

After ruling out atmospheric phenomena and aircraft, Hendry had an automotive engineer flown in from Detroit to study the police car. The engineer determined that the damage was caused by external "mechanical force" and that there was "no evidence of an unusual heat." The antennas were the most puzzling part. They still were covered by dirt and dead insects, and showed no sign of having been hit by road debris. What kind of air blast could have bent two of them in the middle—while leaving a third untouched—so quickly that they did not simply fold over on the springs at their base?

"That there is a single witness in this case is a noteworthy drawback," Hendry has admitted, but he agrees that Johnson is not "the type of person who would hoax an incident like this. He is a seemingly battle-hardened veteran." The young UFO sleuth adds that similar incidents were reported from all across the Midwest within a few weeks of Johnson's encounter.

His conclusion is essentially inconclusive: "We just don't know what caused the 'attack,' but we have eliminated all the most reasonable possible causes. So it was a 'genuine UFO,' whatever that proves. But it was not nearly so impressive as UFO magazines and newsletters subsequently portrayed it."

Nevertheless, at least one other explanation for this is still plausible: deception. As skeptics soon pointed out, the scientific evidence clearly showed that all the car's damage could have resulted from human action. As one cynic noted, if such damage had occurred outside a pool hall or on a ghetto street, there never would have been the slightest doubt that somebody had vandalized the car. The odd thing about this event was only that it allegedly occurred on a deserted highway.

Philip J. Klass, aviation writer and author of two skeptical books on UFOs, told Orlov that he has charged all of the reported damage and compared it with all possible forces—including those found in science fiction—that might have been involved. Basing his conclusions on the careful research of the Center for UFO

Studies—where he is hardly a favorite character—Klass says that only human action could account for all the circumstances of the case, including the 14 minute discrepancy on the two timepieces. But whose?

Skeptics stress that nothing in the case rules out the possibility that Johnson either concocted the story perhaps to account for damage from some unauthorized use of the official vehicle, or was the innocent victim of someone else's prank. The investigators' failure to eliminate this explanation marks the continued failure of UFO experts to establish the authenticity of their subtypic of special interest.

The uncharacteristically thorough research on this case has been valuable in narrowing the prosaic causes that could account for at least one UFO sighting. It will be difficult to duplicate. This kind of research is expensive. Klass stresses that no extraordinary cause need be invoked to account for this or any other UFO report.

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*◀ A month after Mrs. Kolb moved into the UFO Education Center, her father and husband broke down the door and carried her off. She had them arrested on charges of false imprisonment. ▶*

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has not yet been disproved. But the Minnesota case stands as a fine example of how any such speculation must be documented.

"I would have killed someone if the UFOs had told me to do it." Those words weren't found in some conspiracy magazine. They are from the real-life drama of a UFO cult, a well-meaning young "believer" a pile of laws is against would-be rescuers, and the white knight of cultist "deprogramming," Ted Patrick.

It all began with an ordinary UFO sighting one night in January 1973. Thomas and Susan Kolb, a young couple from Kiel, Wisconsin, saw an orange "blazing light" as large as a house, move slowly across a field near their home.

The Kolbs contacted a local UFO enthusiast, who sent to their home to hear about the case and to tell them about other encounters. They soon joined a study group, the UFO Education Center in Appleton, Wisconsin.

They had unwittingly stumbled on a renegade sect of the old George Adamski cult, originally founded 40 years ago in

California. UFOs played no part in the cult's original dogma, but they were quickly absorbed when they achieved notoriety in the late 1940s. Members of the cult claimed to communicate by telepathy with Orthon, a great scholar living on Venus, who supposedly was a reincarnation of Jesus. The planet Earth the group claimed, was in mortal danger—they didn't specify what it was—and could be saved only if a few selfless people submitted to Orthon's will. Money helped, too.

Thomas Kolb was not very impressed, but Susan swallowed it all. She worked two jobs to help support the group and eventually moved into the headquarters to save money, snatching meals from the refrigerator when she could. In her spare time she did typing, ran the mimeograph machine, and answered the telephone.

"I got to the point where we weren't interested in UFOs anymore," she recalls. "We were completely obsessed with the philosophy of Orthon and with spreading that philosophy."

A month after Mrs. Kolb moved into the UFO Education Center, a rescue party led by her father and husband, broke down the front door and carried her off. She escaped from them and signed complaints of false imprisonment against the men. The charges were eventually dismissed, and the would-be rescuers turned to professional help. Ted Patrick.

Patrick is one of the country's most famous deprogrammers. He specializes in rescuing cultists and reversing their brainwashing, as he considers it. Since his endeavors involve carrying people off and holding them until they recant, Patrick has occasionally run afoul of kidnapping and false imprisonment laws.

Late in October 1977 Patrick went to Wisconsin and took on the job of rescuing Mrs. Kolb from the UFO Education Center. Over a four-day period, for which Thomas's parents paid several thousand dollars, Patrick succeeded in breaking the cult's spell.

In the following months Susan Kolb traveled with Patrick on the lecture circuit, speaking to church groups and TV audiences. She does not particularly want to see any more UFOs.

That first UFO, which started it all back in 1973, turned out to be a neighbor's lighted tractor plowing late at night.

Reputable UFO groups regard the affair of the UFO Education Center with embarrassment now that they realize it was not just another club of harmless crackpots. (There are many, and they should not reflect on responsible UFO associations.)

Such bizarre activities seem to flourish in the absence of reliable information, and they demonstrate the public's intense interest in all aspects of the UFO phenomenon. As in any field where mystical regains, charlatans who promise certainties can prey on naive enthusiasts. ☐

# CONTINUUM

## THE CREATIONISTS' "EQUAL TIME"

**W**e may laugh at the quaintness of the 1925 Monkey Trial in Tennessee, when teacher John T. Scopes was threatened with fine and imprisonment for teaching Darwinian evolution to his high-school students. Yet it wasn't until 1970 that the last anti-evolution laws in our country were wiped off the books. And even then the battle did not end. It goes on today more subtle, and in some ways more bitter, than ever before.

Creationists, who believe that the world and the human race were created out of nothing by some divine fiat, no longer insist on banning every mention of evolution from the classroom. Instead, they pressure school boards to give Creationism "equal time" with evolution in science classes. As a result, in many biology texts the origin of the human species is illustrated by Michelangelo's Adam from the Sistine Chapel's ceiling.

It's a fine piling on, and Genesis is an inspired bit of writing. But isn't biology? To insist that Genesis be inserted into biology texts and to pretend that religious mythology can explain biological phenomena are about equivalent to believing that straw can be woven into gold.

The Creationists claim that scientists themselves still refer to evolution as a "theory", therefore, the scientists themselves don't accept Darwin's ideas as proved. In science, the word theory is used to indicate (as a glance at a dictionary will show) "a systematic statement of principles, a formulation of apparent relationships or underlying principles."

A hypothesis is an unproved idea. A theory, in science, is a structure of logic that brings together many diverse observations and weaves them into an understandable whole. Really powerful theories, such as those of Darwin and Einstein, also predict phenomena that haven't been observed before.

The Creationists retort, "But scientists themselves don't agree on Darwin's theory." True. God forbid that they should.

Science is a process of discovery. Darwin's ideas are some five generations old now. Much new information has been uncovered. Biologists argue about the details of evolutionary processes, just as physicists argue about subnuclear particles. This does not mean that physicists don't believe atoms exist.

Evolution, as described by Darwin and others, is the cornerstone of the biological sciences. No serious scientists dispute

this, even though they will haggle fiercely over minute details.

Recently the concept of "scientific creationism" was raised, with scientists or engineers—usually not biologists—saying that evolution stands at best on shaky intellectual ground.

To prove that Creationism is correct, the Creationists try to find flaws in evolution. This is an intellectual shell game, in which you don't prove your point but instead try to demolish the opposing point of view and then pretend that this proves you are correct. It's like proving that horses have wings by demonstrating that bumblebees can't swim.

So far not one shred of evidence has ever been found to support the Creationist point of view. Not a fingerbone, not a leaf, not a shard of evidence exists. We may have been created by some dotty or other unfathomable force, but there is no evidence whatsoever that it happened in this way. And if it did happen this way, the creating force went to incredible trouble to litter this planet with the evidence of evolution, from dinosaur fossils to homed fowls, from the elegant speciation Darwin found during his voyage on H.M.S. Beagle to the stages of development that a human fetus undergoes during its nine-month gestation.

There is a dark element of catchism thinking among the Creationists. They don't need evidence, because they know they're right. Their mode of thought, straight out of medieval times, leads not to understanding but to acceptance of Authority. Make no mistake about it. Those who are convinced of the truth will never stop merely with demands for "equal time." They inevitably move toward taking political control, just as they inevitably gravitate toward the most conservative positions on issues.

Already the Creationists are using political clout to tamper with biology teaching. Give them the political power and they will outlaw any ideas that they do not agree with. Evolution is merely one of many ideas that these zealots attack.

The preceding paragraph is hypothesis, an unproved idea. We can test this hypothesis in good scientific fashion. Are the Creationists fair-minded people who want only to present conflicting ideas in an equitable, reasonable manner? Ask the next Creationist you meet whether he or she would be willing to have a chapter explaining Darwinian evolution inserted into the Bible alongside Genesis. Then you'll learn what "equal time" really means to them. —BEN BOW

# CONTINUUM

## FIREFLY BOUNTY

Stalking across pastures in summer, legions of young stars bearing butterfly nets collect fireflies and thereby reap bounties paid by chemical companies. The goal: two rare chemicals that cause the firefly's flash and that aid scientists in research.

The largest firefly collector, Sigma Chemical Company, of St. Louis, amassed several million insects this year for which it paid 1 cent apiece. Most of the collectors belong to 4-H clubs, the Boy Scouts, church groups or similar organizations. Some people have been known to net 1,000 insects in an hour.

Sigma capitalizes on the general fascination with fireflies, also known as glow-worms or lightning bugs. Fireflies are cousins of the beetles. Sigma's yellow brochure notes that the insect's flash is a mating signal. Every twilight the males rise from the ground and flash. The female fireflies stay on the ground and flash back at a suitable male. Mating ensues.

Collectors become members of the Sigma Firefly Scientists Club and receive instructions on how to make a net, how to store fireflies in the refrigerator and how to mail them in special cans to the company. Sigma emphasizes that collectors are indispensable. Efforts to grow suitable fireflies in captivity have failed.

The scientific value is considerable. The flash, it seems, occurs in the firefly's tail from the reaction of two



chemicals—luciferin and luciferase—with adenosine triphosphate (ATP), a substance present in all living things. The more ATP the more intense the flash, and the greater the biological activity.

By combining the firefly chemicals with cancer cells or polluted water, scientists can quickly measure the intensity of the flash and thus the rate of cell growth. Researchers have also placed firefly chemicals on rockets to detect life in outer space. The presence of even one quadrillionth of a gram of ATP would cause a small flash, which would be detected by the rocket's instruments.

—Stuart Diamond

"Science cannot solve the ultimate mystery of nature. And that is because, in the last analysis, we ourselves are part of nature and therefore part of the mystery we are trying to solve."

—Max Planck



Fireflies: *Lucifer* (top) and *Photinus* (right) in flight.

## GETAWAY GIVEAWAY

Would you like to win a free trip to outer space? Would you settle for the next best thing? This fall, NASA is giving away Getaway Specialists—five cubic feet of cargo space aboard the space shuttle.

NASA has invited high school students throughout the United States to submit proposals for small, well-intentioned biological and physical science experiments that can be performed in earth orbit. Scientists and educators will review the proposals and select 20 of the most interesting, most imaginative and best conceived. The winners will be awarded Getaway Specialists—each special worth \$10,000.

These student experiments will be scheduled to fly on a space available on board the shuttle. NASA will assist each of the winning students in finding a sponsor and that sponsor will provide technical and financial help in readying the experiment for launch. Come the launch date, the student will be invited to the Kennedy Space Center to watch the shuttle carrying his or her experiment lift off. Then the student must write a final report after the experiment has flown.

NASA points out that it doesn't consider this award to be a contest. The proper name is the Student/Shuttle Involvement Project. Its purpose is to attract and encourage budding young aerospace scientists, using the space shuttle as bait. It's to be an annual affair, even truly including both high school and college students.

If you'd like to involve your students or yourself in the project, write to: The National Science Teachers Association, 1742 Connecticut Avenue, N.W., Washington, DC 20009. —Nick Engler



## ESP AND THE CIA

Psycho spies? Cabals of clairvoyants employed to locate enemy missiles via the astral plane? It seems our own Central Intelligence Agency has pondered—and possibly undertaken—such a scheme.

These strange CIA musings were recently exposed by declassified documents obtained under the Freedom of Information Act by the American Citizens for Honesty in Government, a Washington-based group sponsored by the Church of Scientology.

A twenty-year CIA mind-control operation that experimented with everything from hypnosis and behavior modification to psychoactive drugs and electroshock has been well documented. Less noticed among the esoterica included in the so-called Project Bluebird (later renamed Project Aristotle, still later MKULTRA) was another possible secret weapon: extrasensory perception.

Here is the agency's dream, spelled out in an April 1952 memorandum: "If a number of individuals could be found in the U.S. who have a very high ESP capacity these talented individuals could be assigned to intelligence problems. Such a problem as whether or not the [deleted] had a submarine pen could be attacked by ESP."

Two "promising" studies, one of "potential correlates of ESP" the other of "ESP in animals," are mentioned in a revealing January

1952 document. This paper's author was evidently so confident of the CIA's intention to fund ESP research that he discussed fine points of staffing and salary estimates.

But after the early Fifties CIA documents are mum about ESP and PK (psychokinesis). Perhaps the CIA dropped the idea. But perhaps it actually implemented an ESP cryptocracy and perhaps the documents detailing it are classified. The latter possibility is raised (along with a few eyebrows) by this January



Is the CIA using crystal balls?



Bicycle commuters in New York City. About 4 million Americans live close enough to work (9.7 kilometers) to bike it daily.

1952 statement: "If we are to undertake to push this research as far and as fast as we can, it would be necessary to be exceedingly careful about thorough checking of the undertaking."

The CIA has declined comment—Judith Huppler

Energy Conservation: the Transportation Department has pledged to increase the number of bicycle commuters from half a million today to 2.5 million in 1995. Officials will provide tens of millions of dollars in grants for bike paths, road maintenance, safety programs, theftproof parking facilities and publicity.

Such a program, the department estimates, could save 3.8 million kilowatts of oil per year—enough to heat a million homes and cut annual imported oil costs by \$800 million.

And it won't even take much hardship, the government says. The United States already has 100 million bikes—about the same number as cars. Per capita the American public has twice as many bicycles as the people of Great Britain, France, and Italy and only somewhat less than the Scandinavians.

However, in the United States only 1 percent of commuters use bicycles. Yet about 4 million live close enough to work (9.7 kilometers) to bike it daily, even after one accounts for the physically disabled and subtracts for inclement weather.

"Yes, bicycles are a real form of transportation," says Dr. Willemson, of the Transportation Department. That's what Frenchman Pierre Michaux said when he invented the bicycle in 1861. The only mistakes that early bicycle makers committed were paving the first roads for the bike's pneumatic tires and then building the first cars as a sideline.—S.D.

## BIKE FEVER

The U.S. government recently acknowledged what the rest of the world has known all along: Bicycles can be an important part of a transportation system.

In an official document, "Bicycle Transportation for

# CONTINUUM

## 20/20 SURGERY

More than 1 billion people, nearly a quarter of the earth's population, suffer from myopia—nearsightedness. For centuries the only proven way to correct this has been to wear spectacles or contact lenses.

In Moscow, however, Dr. Svyatoslav Fedorov may have developed a surgical cure for nearsightedness. Dr. Fedorov, director of the Soviet Laboratory of the Eye, has already won medical acclaim as the inventor of the artificial cornea.



Radial keratotomy. To correct myopia, surgeons make small radial cuts in the cornea (left), using a special tool (photo on right).

Myopia is caused by an asymmetry of the eyeball. Fedorov's new procedure, called a radial keratotomy, corrects the impairment.

The procedure takes only five minutes. Fedorov makes a series of small cuts in the cornea, radiating out from the pupil. The depth of these cuts is determined by how nearsighted the patient is.

As the cuts heal, the central portion of the cornea flattens. The curvature of the eye changes, becoming more symmetrical. Within a day after the operation, the

patient may experience an improvement in vision.

How successful is the procedure? It depends on whose reports you read.

Stephen Obstbaum, an ophthalmologist at Mount Sinai School of Medicine in New York, who has worked with Fedorov, says, "The operation has great promise, but it lacks predictability."

The National Advisory Eye Council has issued a warning, saying, "The cure may be worse than the disease." The council is waiting for further proof that the surgery is



effective.

But the Russians claim that 97 percent of Fedorov's patients (approximately 1,500 so far) have had their myopia partly or completely corrected. Recently Fedorov demonstrated his technique in the United States, with similar results. There has been no loss of vision by any of his American or Russian patients. —N.E.

"Science is not a sacred cow. Science is a horse. Don't worship it. Feed it."

—Audrey Eban

## GOLDEN SEWAGE

The ash from the incinerated sewage sludge of Palo Alto, California, contains 32 parts per million of gold, richer in gold content than ore that is being mined in the United States now. If this [sludge] were an ore body, it would be a bonanza," one scientist said.

The gold is discharged into sewers by photo-processing and electronics firms. It typifies an increasingly critical problem: The United States is losing billions of dollars in minerals discarded as industrial wastes.

New minerals are then imported—worsening our country's balance of payments. Moreover, the new material is smelted or refined, using expensive energy—much of which is also imported.

The U.S. General Accounting Office, the congressional watchdog agency, recently reported that more than 10 million tons of valuable materials are thrown away each year by U.S. industries, a significant fraction of which could be recovered. Among the losses: 121,000 tons of copper, worth \$26 million; 112,000 tons of chromium, \$224 million; 215,000 tons of zinc, \$160 million; 650,000 tons of aluminum, \$689 million; 8.6 million tons of iron, \$660 million; 7,400 tons of nickel, \$30 million; and 32,000 tons of lead, \$15 million.

The United States imports more than half its aluminum and nickel. It gets much of its chromium from the USSR.



Recovering aluminum from waste: \$669 million a year.

and the Republic of South Africa. By 1985, the United States will import more than half its iron and lead if the present wasteful trends continue.

The GAO urged more widespread education on recovery technology, subsidies for companies that can't afford the best processes, and removal of tax breaks that encourage some firms to use virgin ore. While the agency said U.S. industries are doing a "fair" job recovering minerals, other countries—for instance, Japan—are doing better.—S.G.

"For the world is like an olive press, and men are constantly under pressure. If you are the drops of the oil you are carried away through the sewer; but if you are the oil, you remain in the vessel."

—St. Augustine

## MEMORY ON THE ROCKS

There are occasions when being marginally under the influence of alcohol can be



Also reveling with orange juice and vodka: Strange results

advantageous. This is the conclusion reached by psychologist Geoff Lowe, of Hull University in England, who has been conducting studies of the effects of relatively modest amounts of liquor on learning.

He showed 32 student volunteers a simplified street map and asked them to memorize a set of 19 instructions to help people follow a route from A to B. Before the session he'd given half the learners two glasses of vodka with orange juice; the others were given only orange juice. In general, both the alcoholized and the nonalcoholized groups learned the street directions equally quickly.

The next day, however, some differences surfaced. When asked to recall the route, the volunteers could

do as efficiently only when they were in the same state as when they'd learned the route.

The students who had been given vodka remembered the route better if they were given more vodka than if they were sober. Likewise, the nonalcoholized group did better on recall when sober than when slightly drunk.

This "state dependence" on a particular drug—be it alcohol, caffeine, amphetamines, or whatever—might have some disturbing consequences. When you settle down with a martini or two in the evening to digest a report or a speech to be delivered next day, you run the risk of poor recall—unless you wisely opt to bolster your memory with a drink the following day. More seriously, this state-dependence effect could jeopardize the mental health of psychiatric patients. They are often administered drugs during psychotherapy, but as soon as the drugs are withdrawn, they risk a relapse.

One way around this dilemma that Dr. Lowe is currently exploring is what he calls "cross transfer"—that is, the use of a comparatively innocuous substance such as caffeine to replace the less desirable substance.

There's some evidence from animal experiments that learning may not necessarily be impaired if a surrogate drug is used, but so far this crossover effect just isn't well enough understood for human application.

—Peter Evans

*I don't think President Carter is capable of doing more than Jesus Christ. He tries, though.*  
—Admiral Hyman Rickover

*'The universe is not to be narrowed down to the limits of our understanding, but our understanding must be stretched and enlarged to take in the image of the universe as it is discovered.'*  
—Sir Francis Bacon

## BLOOD-DONOR DOGS

Routine transplant surgery for pets is coming, pioneering British veterinary surgeon Raymond Long says. Long operates a revolutionary blood-transfusion service for dogs that has saved the lives of scores of animals since he began the procedure at his office in London, England, over seven years ago.

Long has 25 regular blood donors, each of which must weigh over 25 kilograms (the weight of a small Labrador).

which donate blood two or three times a year. Canine blood falls into five basic groups, but any one can be given to any dog in an emergency if special care is taken.

It is only lack of money now that is stopping dogs and other animals from benefiting from heart transplants and other complicated operations—which is ironic considering that all the early research for surgery of these kinds in humans was performed on animals. Long says, once funds become available, the technology is there to perform complex operations on animals. Already quite a few dogs have heart monitors, since these devices are relatively inexpensive; they might become commonplace in the next ten years.

Long predicts that the vet of the future will routinely perform transplants, open-heart surgery and perhaps even brain surgery.

—John Galt



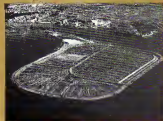
A Labrador donor weighs in. The vet, Raymond Long, of London, says

# CONTINUUM

## ISLE OF WASTE

Just off the Swedish mainland, a chemical company is making perhaps the world's largest silk purse out of a

an area of 600,000 square meters. Second it pumped out the water. Then it built a foundation with thousands of tons of fill. The new island was lined with thick plastic



Supra's island of waste. As large as 120 football fields, it consists of a seawall, a plastic liner, and tons of gypsum waste.

cow's ear. It is building an island of waste as large as 120 football fields to be covered eventually with soil and trees. It will have a marina and a recreational area for local communities.

The isle of waste is the concoction of Supra, Sweden's largest chemical company. Before the Environmental Act, the firm annually discharged more than 300,000 tons of gypsum waste into the sea from factories in Landskrona located on the south-west tip of Sweden, across from Copenhagen, Denmark.

Beginning in 1978, Supra had to find other disposal methods. So it began reclaiming part of the sea. First it built a seawall surrounding

to prevent seepage. Finally came the gypsum waste.

"A deposit like this is a solution to waste disposal anywhere," said Supra's Gunnar Wiberg. "The toxic runoff is almost at zero level."

Supra's idea may be catching on. A New York State industrial consultant Nigel Chastley has proposed man-made islands in the Atlantic Ocean, 18 kilometers south of Manhattan, for waste products and for new power plants. The proposal—which interests business, energy, and environmental groups—intends to keep power-plant emissions from populated areas and sewage from being dumped into the oceans, as it is today—S.D.

## WILDLIFE TALES

Here are the National Wildlife Federation's most amusing animal capers of the past year.

- Soviet surgeons successfully inserted an artificial lens into the eye of a seal that had a cataract. Later the seal performed several tricks for its benefactors.

- A San Francisco dentist made a new desk for an injured heron out of the same pink acrylic he uses to make human dentures.

- West German scientists put electrically emitting goldfish into one city's water supply to monitor its purity. When the water is polluted, the sex fish generate a weak electric current; this is detected by sensors that in turn set off an alarm at the waterworks.

- A Los Angeles man opened his door to a stranger who had a knife

and a snake in his hands. The intruder threatened to let the snake loose unless the man surrendered his money to him.

- Australian customs officials arrested a man from Bali who attempted to smuggle five pythons into Australia by carrying them in his underwear and in pouches attached to his legs.

- A turtle named Number Six won a race in Newport, California, and then showed its feelings by blicking into the upper lip of its trainer, who sought to give it a congratulatory kiss. It took a dose of Valium to loosen the turtle's viselike hold.

- A Virginia physician caught a burglar who had been stealing narcotics from his medicine cabinet. The thief was a raccoon. The doctor lured the animal away with peanut butter and sardines.—D.D.



Raccoons are notorious for burglarizing homes and playing with human possessions. And now they've begun to steal drugs.

## BUILDINGS WITHOUT FURNACES

Outside, it's -40°F. But inside a 20-story office building in Calgary, Canada, it's 70°F. Why is this so unusual? The building has no heating system.

The new Gulf Canada Square complex, in downtown Calgary, gets all its heat from people, lights, and equipment. It uses superinsulation and solar-heat gain. Though it may be the most dramatic example of new technology to save energy, it is not alone. Stung by ever-higher energy costs, many people are designing buildings that need little or no conventional heat.

All these structures use passive solar energy: the heating of rocks, water-filled drums, or other materials by the sun.

The materials store the sun's warmth and radiate it indoors as needed. Complex machinery is absent, but fans may be used to blow warm air from one part of the building to another. Some buildings are partly underground. Others have solar collectors and wood stoves. All have extraordinary insulation. The interiors, however, don't look different from conventional rooms.

On Cape Cod, Massachusetts, one homeowner spent \$9.63 for heat during a recent winter. That was the cost of the electricity he used to run some fans. A New Mexico house is warmed by ten-inch-thick, heat-storing adobe walls. Rhode Island and Long Island homes tested by Brookhaven National Labo-

ratory show that residents can live comfortably while paying only 10 percent of today's typical heating bills.

Many big commercial buildings air-condition the



Gulf Canada Square. Heated by lights and body warmth.

sunny side in winter and heat the shady side. The complex in Calgary moves the natural heat from the sunny to the shaded side, eliminating both air conditioners and furnaces. Body heat warms into the calculations: 100 people emit as much warmth each hour as a small furnace does.

—Stuart Diamond

"Freedom is not an essential and basic condition for the growth of science; the care and diligence of government authorities are the most important conditions for this development."

—Mao Z. Tse-tung

## ICEBERG FERTILIZER

Two oceanographers believe melting Antarctic icebergs may help fertilize the ocean for the growth of phytoplankton, the first link in the oceanic food chain.

Steve Nashbya and Ed Josephberger, of Oregon State University, are studying the effects of icebergs melting on the growth of phytoplankton and the tiny animals called krill that feed upon them. Between whales eat krill, and the creatures are now being considered as a possible food source for humans.

So far the two scientists have noted a type of layering in the water column as a result of the icebergs melting. It might be, says Nashbya, "that the slowly moving icebergs leave a trail of nutrient-enhanced surface fluid." "The ice itself," he explains, "has nitrogen that

was fixed into the snow from the atmosphere thousands of years ago. It's locked in, then released into the ocean when the icebergs melt."

Ordinary upwelling brings nutrients from deep in the ocean, but, at least along the U.S. West Coast, that upwelling is seasonal, happening only during the spring and summer. Nashbya says icebergs-caused upwelling is essentially permanent. "It has the potential of being a far more continuing and significant source of nutrients."

—Joel Davis

*I like the dreams of the future better than the history of the past.*

—Thomas Jefferson

*"Not a day passes over the earth but men and women of no note do great deeds, speak great words, and suffer noble sorrows."*

—Charles Reed



Melting Antarctic icebergs. Two scientists have noticed a type of layering in the water column that might be a trail of nutrients.

# CONTINUUM

## JUNK PHONE CALLS

Almost everyone who has a phone has been bothered at some time by "junk phone calls." Billions of unsolicited telephone sales calls are made annually, and this number is likely to increase, thanks to the greater use of new automated dialing and message-playing machines that can make 100 calls an hour.

Now help in barring unwelcome electronic sales pitches may be just around the corner. The Bell System's new Common Channel Interoffice Signaling (CCIS) network will carry the caller's number so that you will know where the call is originating.



A new device can stamp out phone sales pitches.

from before you pick up the phone (or choose not to pick up the phone).

An "intelligent telephone" hooked into CCIS would indicate different kinds of calls by different ringing tones or colored lights, or by an electronic readout display of the calling number.

Long-distance calls could

be identified by their area code. Emergency or priority calls could have a special ring or could flash a red light if the phone were in use. The subscriber could give out a personal three-digit code to friends and relatives that would flash a green light or sound a special tone when dialed. If telephone advertisers all had a common exchange prefix, analogous to the 800 number used for placing free calls, subscribers would know when a ringing phone signaled a sales pitch and could decide whether to accept the call.

The system could also be programmed to screen calls so that some are rung through, others are recorded, and yet others are forwarded to another number. These services would be available for about \$2 or \$3 a month.

The Bell System has no specific date planned for offering these call-screening services to subscribers although it is already using CCIS to automate credit-card billing and to expand toll-free services for commercial accounts.

—Walt F. Left

"Like a mutation, an idea may be recorded in the wrong time, to be latent like a recessive gene and spring once more to life in an auspicious era."

—Loren Eiseley

"Thanks to science, you can now fly almost anywhere in half the time it will take you to wait for your luggage after you get there."

—Bill Vaughan

## HORSE TEETH

Thanks to some pretty fancy dentistry, you can now look at a gift a horse got in the mouth.

Two inventive dentists from Seattle recently installed

ing grass, her dietary staple, and lost more than 45 kilograms.

Drs. Lowell Naufoed and John Carmody galloped to the rescue. The dentists took a polyethylene impression of the damage and had a den-



Dentists work on Blanche's mouth. First false tooth for a horse.

specialty designed bridge-work, spanning four inch-long teeth, in a lucky equine named Blanche.

It's quite likely this is the most extensive inside job dentists have ever done on a four-legged animal, according to the American Dental Association. Dentists have, however, previously clipped teeth on dogs and, at least once, on a lion.

The cause of all this was a fluky accident. Blanche was centering along when a mule spooked her so deeply that she keeled over, face first, and knocked out two lower jaw incisors.

The horse's teeth were torn off at the gums, and removing the roots undamned might have proved difficult as well as dangerous. With her choppers thus impaired, Blanche had trouble chew-

ing grass, her dietary staple, and lost more than 45 kilograms.

As she lay on the ground, the two dentists drilled away in unison. They had to pull off the job within 30 minutes.

"We were worried the anesthetic would wear off before we finished," Dr. Naufoed said.

Since the dentists had never done veterinary dentistry, they must have considered the task a professional challenge, right?

"We did it as a kind of 'lark,'" Naufoed admits. "It wasn't critical to the animal's survival. It was a matter of trying something we hadn't done before. It was out of the ordinary, and so I figured, 'Let's give it a go!'"

—Robert Brody



*Humanity is poised on the launchpad  
of a future so revolutionary  
it will make us a new kind of animal*

## COUNTDOWN TO HABITAT ONE

BY JOHN PREIFFER

**A** rocket launching, the end of countdown, ignition, and a burst of flame. There is no motion for the first few fractions of a second. Then the beginning of takeoff, almost imperceptible at first. The rocket rises a little way perpendicular and ponderous, as if it would never leave Earth, a painful wrenching away from the grip of gravity. From here on, it is all crescendo: an arcing up and away, speed mounting like the scream of a siren, the enormous spurt into space.

This is the image, the appropriate metaphor for human evolution. The instant of flash corresponds to the time, perhaps 5 million to 10 million years ago, when the first "hominids" appeared as something more than apes—but not much more. The sluggish lift-off corresponds to the earliest phase of human adventure: when our ancestors broke away from the earth-binding, mental force of heredity. The rocket's escape from gravity, the great burst of power released, corresponds to the explosion of culture that picked up momentum some 35,000 years ago, the birth of an eyelid

in evolutionary terms, and proceeds at an ever-accelerating pace today.

The human species, the so-called doubly wise *Homo sapiens sapiens*, is an infant, a mere neophyte. We are something new under the sun, a brand-new kind of creature now in the driver's seat, with only a learner's permit at that, and only the vaguest notion of ultimate destination.

Given the world as it existed 3 billion or 4 billion years ago, when its highest life forms were unicellular, who could have predicted the coming of such unlikely creatures as whales, sharks, beetles, apes? Today it is just as difficult to imagine our descendants in the long-term future.

Alan Merri, a University of Pennsylvania anthropologist,

PAINTING BY  
JAMES WYETH

wonders whether we will make it at all. I don't believe in an optimistic rise toward the stars. Being human involves a certain level of aggressiveness, an inability to react passively with other societies, other cultures. My feeling is that we won't conquer such tendencies; that things will get worse and the species will become extinct."

If the history of evolution is any lesson Mann has the odds in his favor: since more than 100 species have become extinct for every one still alive today. The sad truth is that our species is chronically and morally aggressive. Getting along with one another does not come naturally. Human beings are technologically supreme, but socially backward. We have a perverse love of fighting, a fear and distrust of strangers, and most dangerous of all, a deep seated reluctance to take a cold-eyed unromantic look at ourselves.

The truth may hurt, but sweeping it under the rug hurts more. Above all, we need unparalyzing honesty. Harvard sociobiologist Edwin O. Wilson observes: "Why are we tribalistic? Why do we feel so ferocious about territory and blood lines? People under stress tend to polarize issues: to accentuate differences between insiders and outsiders, dehumanizing the outsiders and thinking of them as monsters. We jump at it. It stirs the blood, and demagogues know well how to take advantage of it. We are ready at a moment's notice to explode to escalate even a mild disagreement into a

full-blown tribal conflict. If we could only cut that wire, the psychological bomb would be defused."

#### TAMING OURSELVES

On the positive side is our genius for adapting. Of all species, we are by far the most flexible. Consider the Megalopolis. Cities get bad press these days, but for all the violence and turmoil they represent impressive artifacts viewed in evolutionary perspective. Among animals, conflict escalates sharply with increasing population density. Yet we have somehow managed to conduct the bulk of the world's business in urban settings. When you consider that prehistoric hominids were free and loose for millions of years, it borders on the miraculous that their recent descendants manage to live domesticated, law-abiding lives inside cubicular apartment complexes.

The concept of domesticating ourselves is not mere rhetoric. Unrestrained impulsive violence is not tolerated in most societies. The ruthless mass murderer who may have been a conqueror centuries ago is incarcerated or is put to death today. We have tamed our species by segregating the most aggressive, unpredictable individuals and not allowing them to reproduce.

Berkeley anthropologist Sherwood Washburn feels that physical differences in the thickness of the skull between ancient and modern man, for example, are

exactly paralleled in the wild Norway rat and its domesticated descendant, used in laboratories all over the world. We have, to a certain extent, created a tamer and a more sociable man than ever existed before.

Genetic breakthroughs in modern psychology condition us to view ourselves as a hyperaggressive species. But studies of other animals in the wild, which have lengthened into a decade or more, now confirm Homo sapiens as the most peaceable of all species. In nearly every other animal the incidence of fighting, killing and infanticide is greater than the human rate many times over. "I look out on an auditorium packed with hundreds of strangers," Harvard anthropologist Iven DeVore remarks, "and then they all shoulder to shoulder all politely waiting their turn to talk about how human beings are the most ruthless, bloodthirsty species that ever walked the earth. It is just ridiculous. In no other species could there be anywhere near so much cooperation."

#### RITCHWORK MAN

Invention and technology will shape our future in undreamed-of ways. There will be strange hybrid creatures, combinations of synthetic and living tissue—part man-made and part begotten, rather less human than we are, because they will depend on an increasing number of sophisticated prosthetic devices. "This is definitely on the books," says John Bonter, head of the Princeton University biology department. "Judging by the ingenuity of work under way on the design of artificial limbs, the future is certainly going to see a boom in prostheses."

The hand is already well under way. In the United States alone an estimated 2 million to 3 million plastic, ceramic glass, and metal parts are implanted into patients annually—everything from artificial leg ducts, middle-ear bones, and entire hip and knee joints to nerve sheaths, arteries, heart valves, and heart pacers.

There is more to come, much more. The next 50 years should see two to three times more Americans pass the age of sixty-five (current figure, about 25 million), and the adding of another decade to today's seventy-plus average. Furthermore, many geneticists are convinced that we make things tougher for ourselves with every medical advance. Every time doctors prolong the life of a patient born with a defective heart or a tendency toward diabetes or high blood pressure or cancer, they are thwarting organic evolution, preserving for future generations undesirable recessive genes, which death weeded out of the population in earlier times. So the recessives pile up, several hundred perhaps, most of them masked by dominant genes, but taking a toll nevertheless. Sir Julian Huxley, the noted biologist, said a generation ago, "The general quality of the world's population is not very high, is beginning to deteriorate, and should and could be improved. It is deteriorating thanks to genetic



"Where I come from, we shake hands."



defectives, who would otherwise have died being kept alive.

The result is something of a paradox. Here we are, the earth's most powerful and most rapidly evolving species, becoming more vulnerable to a variety of physical and mental disorders, and the demand for prostheses soars accordingly.

Right now we are still relatively humble and defense-minded. The focus is on tuning out artificial organs and tissues as of fective as those that we were born with. We hope to succeed but are ready to settle for something less. Within a generation or so doctors will consult catalogs offering micro-sensory systems to replace failing eyes and ears, artificial glands, drug-dispersing capsules, and subminiature monitoring computers to track and control blood pressure, antibody levels, breathing, and other life rhythms.

Fine, for starters. But the catalogs will also list devices that improve on nature rather than merely imitate it. Take pain and sleep, as two examples. They have served us well in many ways, but we can do better now. Pain frequently lasts well beyond its usefulness, and no one needs a fire alarm that keeps on clanging long after the fireman have extinguished the blaze. It is high time we block pain once it has done its duty with implanted electronic transmitters to flash signals to inhibitory nerve synapses. We may eventually eliminate pain once and for all and substitute an entirely different

sensation such as a distinctive type of spinal tingling starting at whatever level and mounting in intensity if not needed promptly.

Sleep, the eight-hour-nightly variety is also ripe for adjustment. Suitable for prehistoric living—since there wasn't much to do anyway—it seems rather a waste of time in a modern context. If we could fall more rapidly into deep, delta-wave sleep and stay there longer, it has been speculated that those to four slumbering hours would be sufficient. A device designed to accomplish this would add at least another decade to our waking lives. Incidentally, such a device may be combined with the pain eliminator to form a compact, double-duty unit.

#### THE EXTENDED BRAIN

When it comes to intelligence, the human brain is probably more than adequate for the foreseeable future. It appeared in its present form some 40 millions ago, produced the earliest known art, elaborate ceremonies, and regular mass-kill hunts, and has been getting us into and out of uncountable predicaments ever since. Not long ago humans of the twenty-first century were envisioned as futuristic superintelligents with huge, swollen brains and shrunken trunk and limbs. But that was before anyone realized how much brainwork could be shifted to extracorporeal devices.

There will be less to remember as more

facts go into institutional and personal computers, which is just as well since knowledge is expanding by some 200 million words, or about five sets of the *Encyclopaedia Britannica*, per hour. That flood of information is already too much for the un-augmented brain to handle effectively. The real breakthrough would be machines that learn. A chess-playing computer that improves with experience, for example, could be pitted against a duplicate of itself, and the two could be left to match wits until they arrive at a perfect, unbeatable strategy. Marvin Minsky, founder of MIT's artificial-intelligence laboratory, says that even one machine could use the same program to play both sides in a game of chess, alternately playing black and white pieces. Imagine the impact of applying machine-versus-machine approaches to solving human problems in such diverse fields as mathematics, engineering design, business, and government.

Brainpower is being amplified with a vengeance, and without building goggetty into the brain itself. This takes the pressure off premature eugenic schemes, such as the recently announced sperm bank offering hopeful females artificial insemination with the reproductive cells of Nobel Prize-winning males. Aside from the sexist implications, the evidence for the heritability of genius is at best shaky, for geniuses frequently come from intellectually undistinguished parents and subsequently produce intellectually undistinguished offspring. Moreover, we know virtually nothing about the contents of those Nobel sperm packages. You have to take the whole kit and caboodle: the bad genes along with the good, and that always means a high-risk gamble. For these and other reasons the sperm-bank notion may capture headlines, but it makes no sense scientifically.

What we need far more than elevated IQ scores, and what will be far trickier to achieve, is elevated cerebral stability. As things stand now, everything conspires to aggravate rather than reduce our tendency to commit mayhem. Education and physiology are out of phase, working at cross purposes, as the gap widens between social and sexual maturity. The way from pre-pube to human being has been a process of slower and slower opening. Human offspring are dependent longer, but that is also their strength, giving them time to prepare for life in increasingly complex societies. Meanwhile, largely because of improved nutrition, puberty is appearing earlier and earlier, currently at the age of 12.5 to 13 among girls and a year or so later among boys. How will we resolve the discrepancy? Delaying the onset of puberty perhaps with the aid of gland implants, might reduce testosons appreciably and would certainly be in line with a trend that is pervasive in hominid evolution—prolonging the period of youth and learning. A limbic-system pacemaker might also be useful, a device comparable to a heart pacemaker that would help keep the brain's emotional cen-



tars on an even keel functioning well.

Further tinkering will come with the ascendancy of genetic engineering. During the past few years genetic engineering has advanced from a far out possibility to a hot business investment (see "The Gene Tuet," March 1980). It depends on infinitely delicate techniques for manipulating DNA, the hereditary material, about two meters of it, coiled inside the nucleus of every human cell. This act is roughly the equivalent of cramming a thread the length of a football field into a volume smaller than the dot over the "i."

One procedure involves snipping off selected human DNA sections and splicing them into the DNA chains of bacteria, which then turn out various medically important proteins, such as insulin, growth hormone and antiviral (perhaps anti-cancerous) interferon. Biotechnology will probably yield commercial quantities of products in three to five years. More time is needed to eliminate diseases like sickle-cell anemia that result from the absence of a single gene; this might be accomplished by grafting copies of the gene into a deficient DNA chain. The elimination of malignant conditions, ranging from cancer to psychosis, will require a degree of scientific finesse not yet available.

In any case, the power to shape ourselves, to direct a purely random process, is now within our grasp. Washburn stresses the prospects: "Genetic evolution is purposeless and very slow. It is difficult to demonstrate any change over the last forty thousand years. Genetic engineering is purposeful and fast, and that makes all the difference." A drive has been launched to improve, by applied molecular biology as well as prostheses, the quality of human beings.

#### HABITATS BIG AND SMALL

Opposing forces are at work to determine the living conditions of future man. Cities are the nodes, the focal points, of what passes for civilization, and some of them will grow much bigger. At the same time the small-is-beautiful forces are shifting into high gear. René Dubois, Rockefeller University's microbiologist-in-chief, foresees an intelligent species creating more congenial environments for itself, and the key principle will be decentralization. "With the introduction of new electronic technology," he says, "there is no longer any reason why people should commute daily to work in big factories and big cities. Communicating with central management by remote computer terminals can be done from village and small-town offices, or even at home."

Not only the few environmentally conscious individuals and organizations speak for such a reordering of our priorities. The whole thrust of evolution is solidly behind the transformation. It calls for an intensity of planning that will make all our previous planning seem haphazard by comparison, and the ability to accomplish this is a rare

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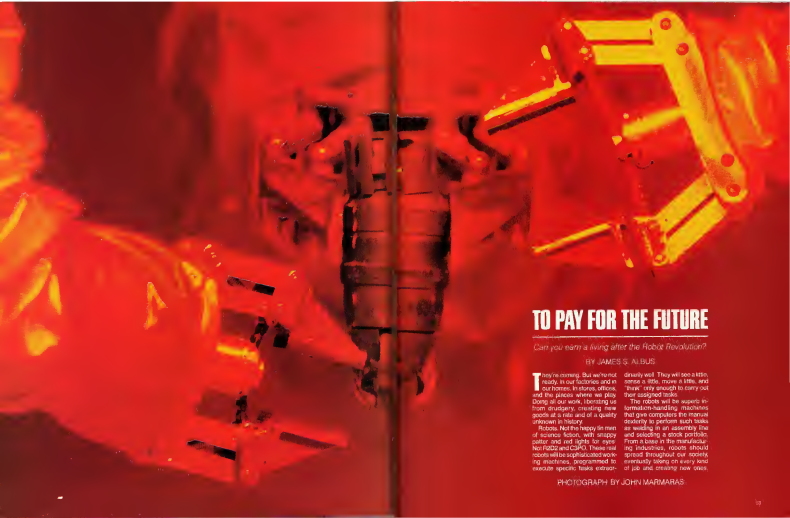
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## TO PAY FOR THE FUTURE

*Can you earn a living after the Robot Revolution?*

BY JAMES S. ALBUS

**T**hey're coming. But we're not ready. In our factories and in our homes, in stores, offices, and the places where we play. Doing all our work, liberating us from drudgery, creating new goods at a rate and of a quality unknown in history.

Robots. Not the happy six men of science fiction, with snappy patter and red lights for eyes. Not P202 and C3PO. These real robots will be sophisticated working machines, programmed to execute specific tasks, extract-

directly well. They will see a little, sense a little, move a little, and "hear" only enough to carry out their assigned tasks.

The robots will be expert information-handling machines that give computers the manual dexterity to perform such tasks as welding in an assembly line and selecting a stock portfolio. From a base in the manufacturing industries, robots should spread throughout our society, eventually doing on every kind of job and creating new ones.

PHOTOGRAPH BY JOHN MARMARAS

◀Our social, economic,  
and political fabric is simply  
not strong enough today  
to withstand the stresses robot  
technology will bring.▶

These ultimate, responsive working machines will transform our economy and our lives the way the discovery of steam power revolutionized the world 200 years ago. Steam unleashed a vast supply of new power that changed industrial and commercial enterprises. Robotics will create an entirely new form of work. Steam took over jobs that required lifting, shaping, moving, and heating. Robots will supplant human workers in tasks that require manipulation, measurement, complex interaction, and quality control.

Our modern age resulted from that first industrial revolution. The future belongs to the second industrial revolution, the robotic revolution.

Yet we are not prepared, in the slightest degree, for the changes that loom ahead. It would be nice to paint a rosy picture of happy workers and happy robots building a better world together. But real life usually doesn't work this way.

The first industrial revolution, though better than what had gone before, propagated unbridled misery in the lives of workers. The world's lack of preparation for the changes that occurred led to sweatshops, labor riots, starved political allegiances, and enormous suffering. Karl Marx was moved to call for a revolt by the world's oppressed workers as the only means to rectify the wrongs the industrial revolution had brought with it.

The second industrial revolution will have an even greater impact on the world than its predecessor did. And our social, economic, and political fabric is simply not strong enough now to withstand the stresses robot technology will introduce. If we don't change our present patterns, the inevitable widespread use of robots will come at the cost of high unemployment, high inflation, social unrest, and violence both physical and psychological.

We face the cruel paradox that our greatest hope for an idyllic future is also the greatest threat to our society's orderly existence. If we ignore robotics, we will be outdistanced in the world market by the forward-looking countries that adopt it; their products will be both far cheaper and better made than our own. If we move into the Robot Age in a haphazard, unplanned

manner, we will wrench our society apart within a single generation.

So the only sensible course available to us is extensive and early planning for a smooth transition from today's world of human workers to tomorrow's world of robot workers. We can avoid the pitfalls of the second industrial revolution if we begin working now. We can democratically create programs now that will be far better than those that might be imposed upon us for the sake of survival.

Consider the magnitude of the change that approaches. Today most of us are inextricably bound to our jobs and wages. We spend most of our waking hours on the job or in transit to and from our working place. Our livelihood depends upon the money we receive in exchange for making a product or performing a service.

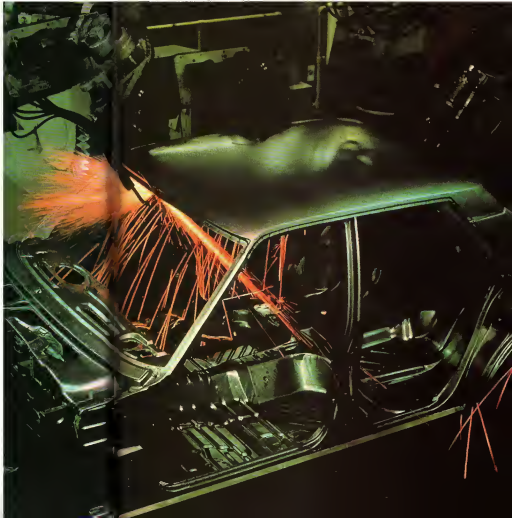
In a robotic society we won't work. The robots will do most jobs more efficiently than we could do them. Such robots can usher in an age of superabundant, very inexpensive goods. But there's a hitch: If humans don't work, do they deserve to be paid? Where can they get the money to buy all the wonderful and inexpensive products the robots will produce?

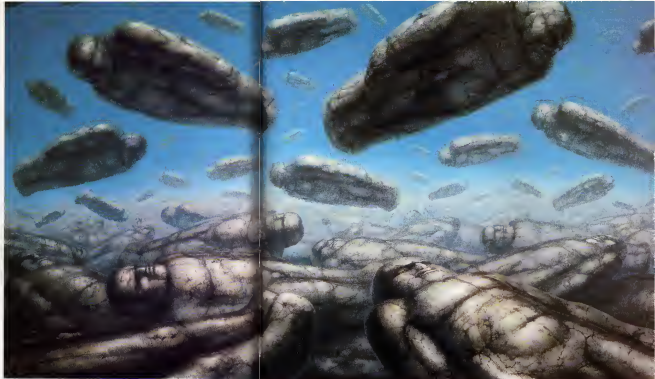
We can't have a society of unemployed people who can't afford the products made for them by the robots that took away their jobs. That's absurd. We must devise a scheme that will shift the manner in which we receive income without endangering either our standard of living or our self-respect.

The first challenge of robotics is: How do we pay for the robots? Vast sums will be required for investment if we are to benefit from robots. At first, worker machines will be quite expensive. They will have to be constructed by people. Eventually one generation of robots can be programmed to build the next, bringing the cost of robots steadily downward. But where will we get the money for the all-important first push into the robotic age?

One way or another, the money will have to come from the people. In the past, when

Previous page: Remote-controlled arm dips semis nuclear fuel rods. Right: Robot welders building cars at a Chrysler plant in Delaware.





FICTION

# THE MARCHING MORONS

BY C. M. KORNBLUTH

*In the worldwide  
breeding contest the  
defective masses  
had won hands down.  
There was only  
one thing for the  
intelligent elite to do*

PAINTING BY  
DE ES SCHWERTBERGER

Some things had not changed. A potter's wheel was still a potter's wheel and clay was still clay. Elton Hawkins had built his shop near Goose Lake, which had a narrow band of good fat clay and a narrow beach of white sand. He fired three bottle-nosed kilns with wide chimneys from the wood lot. The wood lot was also useful for long walks while the kilns were cooling, if he let himself stay

within sight of them, he would open them prematurely, impatient to see how some new shape or glaze had come through the fire, and—pling!—the new shape or glaze would be good for nothing but the shard pile.

A business conference was in full swing in his shop, a modest cube of brick, tile-roofed, as the Chicago—Los Angeles "rocket" thundered overhead—very noisy, very sweet back, very

very jets, shaped as sleekly swift-looking as an airborne barracuda.

The buyer from Marshall Fields was turning over a black-glassed one-liter carafe, nodding approval with his massive, handsome head. This is real pretty, he told Hawkins and his own secretary, Gomez-Laplace. This has got lots of what ya call real esthetic principles.

How much? the secretary asked the potter.

Seven-fifty in dozen lots," said Hawkins. I run up fifteen dozen last month.

"They are real esthetic," repeated the buyer from Fields. I will take them all."

I don't think we can do that, Doctor, said the secretary. They'd cost us thirteen hundred fifty dollars. That would leave only five hundred thirty-two dollars in our quarter budget. And we still have to run down to East Liverpool to pick up some cheap dinner sets.

Dinner sets?" asked the buyer, his big face full of wonder.

"Dinner sets. The department has been out of them for two months now. Mr. Garvey Seabright got pretty nasty about it yesterday, remember?"

"Garvey Seabright, that meat-headed bluebeard," the buyer said contemptuously. He don't know nothin about esthetics. Why for don't he lemme run my own department? His eye fell on a stony copy of Whamcozambo Cornov and he sat down with it. An occasional deep chuckle escaped him as he turned the pages.

Uninterrupted, the potter and the buyer's secretary quickly closed a deal for two dozen of the liter carafes. I wish we could take more," said the secretary, but you heard what I told him. We've had to turn away customers for ordinary dinnerware because he shot the last quarter's budget on some Mexican piggy banks some enthusiastic importer stuck him with. The fifth floor is packed solid with them.

"I'll bet they look mighty est'ec!"

"They be painted with purple cash."

The potter shuddered and crossed the glaze of the sample carafe.

The buyer looked up and rumbled, "An't you dummies through yakes, yet? What good's a secretary for if he don't take the burden of de-fail off n my back, haik?"

We're all through, Doctor. Are you ready to go?"

The buyer grunted peevishly, dropped Whamcozambo Cornov on the floor and led the way out of the building and down the long corridor road to the highway. His car was waiting on the concrete. It was, like all contemporary cars, too low slung to get over the logs. He climbed down into the car and started the motor with a tremendous spinkle and roar.

Gomez-Laplace called out the potter under cover of the noise. Had anything come of the radiation program they were working on the last time I was on duty at the Pole?

The same old fallacy," said the secretary gloomily. It stopped us on mutation. CMA.

It stopped us on culling. It stopped us on segregation and now it's stopped us on hypnosis.

Well, I'm scheduled back to the grind in nine days. Time for another long night now I've got a howl later to try.

"I'll miss you. I shall be 'vacationing'—turning the drafting room of the New Century Engineering Corporation in Denver. They're going to put up a two-hundred-story office building, and naturally somebody's got to be on hand."

Naturally," said Hawkins with a sour smile.

There was an eerily pungent sweet blast as the buyer leaned on the horn button. Also, a yard-fall jet of what looked like flame spouted up from the car's radiator cap, the car's power plant was a gas turbine and had no radiator.

"I'm coming, Doctor," said the secretary desperately. He climbed down into the car and it whooshed off, with much flame and noise, down the almost deserted highway.

*The city loomed ahead. He clutched at the cushions. Those two coppers. They were going to—He didn't see what happened because their collision courses took them behind a building.*

The potter, depressed, wandered back up the corridor road and contemplated his cooling kilns. The rustling wind in the boughs was obscuring the creak and mutter of the shrinking refractory brick. Hawkins wondered about the number two kiln—a reduction line on a load of lusher wugs. Would it do any harm if he just took one close—?

Common sense took Hawkins, by the scruff of the neck and yanked him over to the tool shed. He got out his pick and resolutely set off on a prospecting jaunt to a hummocky field that might yield some oxides. He was especially low on coppers.

The long walk left him sweating hard with his lust for a peek into the lair quenched in his breast. He sawing his pick almost at random into one of the hummocks, it clanged on a stone, which he excavated. A largely obliterated inscription said:

GRISTY OF CHIC  
DICAL LABO  
ELOYED MEMORY OF  
KILLED IN ACT

The potter swore mildly. He had hoped the field would turn out to be a cemetery.

preferably a once-fashionable one full of once-massive bronze castles molded into oxides of tin and copper.

Well, he'll, maybe there was some around anyway.

He headed lackadaimically for the second largest hillock and sliced into it with his pick. There was a stone to undercut and topple into a trench, and then the potter was very glad he'd stuck at it. His nostrils were filled with the bitter smell, and he'd bet was braced with the exciting blue of copper salts. The pick went clang!

Hawkins, putting, pried up a stainless steel plate that was quite badly stained and also marked with incised letters. It seemed to have pulled loose from roiling bronze. There were marks on the back that brought up flakes of green patina. The potter wiped off the surface dirt with his sleeve, turned it to catch the sunlight obliquely and read:

#### HONEST JOHN BARLOW

Honest John, famed in university annals, represents a challenge which medical science has not yet answered: revival of a human being accidentally thrown into a state of suspended animation.

In 1958 Mr. Barlow, a leading Evanston real estate dealer, visited his dentist for treatment of an impacted wisdom tooth. His dentist requested and received permission to use the experimental anesthetic Cycloparadethanol B-7, developed at the University.

After administration of the anesthetic, the dentist resorted to his drill. By freakish coincidence, a short circuit in his machine delivered 220 volts of 60-cycle current into the patient (no damage sustained by Mrs. Barlow against the dentist, the University, and the makers of the drill; a jury found for the defendants.) It was assumed that Mr. Barlow had died of poisoning, electrocution, or both.

Moribund, preparing him for embalming discovered, however, that their subject was—though certainly not living—just as certainly not dead. The University was notified and a series of exhaustive tests was begun, including attempts to duplicate the pance state on volunteers. After a bad run of seven cases which ended fatally, the attempts were abandoned.

Honest John was long an exhibit at the University museum and viewed many a football game as mascot of the University's Blue Crushers. The bounds of taste were overstepped, however, when a pledge to Sigma Delta Chi was ordered in 2003 to Adipap. Honest John, from his loosely guarded glass museum case and introduced him to the Rachel Swanson Memorial GYMnasium shower room.

On May 22, 2003, the University Board of Regents issued the following order. By unanimous vote, it is directed that the remains of Honest John Barlow be removed from the University museum and conveyed to the University's Lieutenant James Scott W. Memorial Biological Laboratories and

there be securely locked in a specially prepared vault. It is further directed that all possible measures for the preservation of these remains be taken by the Laboratory administration and that access to these remains be denied to all persons except qualified scholars authorized in writing by the Board. The Board reluctantly takes this action in view of recent national and photographic in the nation's press which, to say the least, reflect unfavorably upon the University.

It was far from his field, but Hawkins understood what had happened—an early and accidental blundering onto the bone bones of the Levantman shock anesthetic, which had since been replicated by other methods. To bring subjects out of Levantman shock, you let them have a squirt of simple saline in the trigeminal nerve. And now about that bronze—

He heaved the pick into the rotting green slits, expecting no resistance, and almost fractured his wrist. Something down there was solid. He began to take off the oxides.

A half hour of work brought him down to phosphor bronze, a huge casing of the almost incorruptible metal. It had weakened structurally over the centuries; he could fit the point of his pick under a corroded base and pry off great creaking and grumbling slabs of the stuff.

Hawkins wished he had an archaeologist with him but didn't dream of returning to his shop and calling one to take over the find. He was an all-around man, by choice, and in his free time, an artist in clay and glaze, by necessity, an automotive, electronics, and atomic engineer who could also swing a project in traffic control, individual and group psychology, architecture, or tool design. He didn't yell for a specialist every time something out of his line came up; there were so few with so much to do.

He trenched around his find, discovering that it was a great brick-shaped bronze mass with an excitingly hollow sound. A long strip of moldering metal from one of the long vertical faces pulled away exposing red rust that went whoosh and was sucked into the interior of the mass.

It had been devised, thought Hawkins, and there must have been an inner jacket of glass that had crystallized through the centuries and quietly crumbled at the first clang of his pick. He didn't know what a vacuum would do to a subject of Levantman shock, but he had hopes; nor did he quite understand what a real estate dealer was, but it might have something to do with pottery. And anything might have a bearing on Topic Number One.

He flung his pick out of the trench, climbed out, and set off at a dogtrot for his shop. A little rummaging turned up a hypo and there was a plastic container of silt in the kitchen.

Back at his dig, he chipped for another half hour to expose the juncture of lid and body. The hinges were hopeless, so he smashed them off.

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Hawkins extended the telescopic handle of the pick for the best leverage, lifted its point into a deep pit, set its pull-in fulcrum, and heaved. Five more heaves and he could see—made the vault, what looked like a dusty marble statue. Ten more and he could see that it was the naked body of Honest John Barlow, Evanston real estate dealer, uncorrupted by time.

The potter found the apex of the trigonometrical nerve with his needle's point and gave him 60 cc.

In an hour Barlow's chest began to pump.

In another hour he rasped: "Did it work?"

"Did it?" muttered Hawkins.

Barlow opened his eyes, looked down, turned his hands before his eyes—

"Finger!" he screamed. "My clothes! My fingernails!" A horrid suspicion came over his face and he clapped his hands to his hairless scalp. "My hair!" he wailed. "I love you for every penny you've got! That release won't mean a damned thing in court—I didn't sign away my hair and clothes and fingernails!"

"They'll grow back," said Hawkins casually. Also your epidermis. Those parts of you weren't alive; you know. So they weren't preserved like the rest of you. I'm afraid the clothes are gone, though.

What is this—the university hospital? demanded Barlow. I want a phone. No, you phone. Tell my wife I'm all right, and tell Sam Linnerman—he's my lawyer!—to get over here right away. Greenleaf 7-4022. Ow! He had tried to sit up, and a portion of his pink skin rubbed against the inner surface of the casket, which was powdered by the ancient crystallized glass. "What the hell did you guys do, boil me alive? Oh, you're going to pay for this!"

"You're all right," said Hawkins, wishing now he had a reference book to clear up several obscure terms. "Your epidermis will start growing immediately. You're not in the hospital. Look here."

He handed Barlow the stainless steel plate that had labeled the casket. After a suspicious glance, the man started to read. Finishing, he laid the plate carefully on the edge of the vault and was silent.

Poor Verma, he said at last. "It doesn't say whether she was stung with the court costs. Do you happen to know—"

No, said the potter. All I know is what was on the plate—and how to revive you. The dentist accidentally gave you a dose of what we call Laxman shock anesthetic. We haven't used it for centuries, it was powerful, but too dangerous.

Centuries, brooded the man. "Centuries. I'll bet Sam swindled her out of her eyelashes. Poor Verma. How long ago was it? What year is this?"

Hawkins shrugged. "We call it 7-B-936. That's no help to you."

Like that movie, Barlow muttered. "Who would have thought it? Poor Verma!"

Almost angrily the potter demanded, "How many children did you have?"

None yet, sniffed Barlow. "My first wife



didn't want them. But Verma wants one—wanted one—but we're going to wait until—we were going to wait until—

"Of course," said the potter, feeling a savage desire to tell him off, blast him to hell and gone for his work. But he choked it down. There was the Problem to think of, there was always the Problem to think of, and the poor blubberer might unexpectedly supply a clue. Hawkins would have to peep him out.

"Come along," Hawkins said. "My time is short."

Barlow tipped up, outraged. "How can you be so unfeeling? I'm a human being like—"

The Los Angeles—Chicago "rocket" thundered overhead, and Barlow broke off in mid-complaint. Beautiful! he breathed following it with his eyes. Beautiful!

He climbed out of the vault, too interested to be pained by its roughness against his infantile skin. After all, he said briskly, this should have its sunny side. I never was much for reading, but this is just like one of those stories. And I ought to make some money out of it, shouldn't I? He gave Hawkins a shrewd glance.

"You want money?" asked the potter. Here! He handed over a fistful of change and bills. "You'd better put my shoes on. It'll be about a quarter mile. Oh, and you're—uh, modest?—yes, that was the word here." Hawkins gave him his pants, but Barlow was excitedly counting the money.

Eighty-five, eighty-six—and it's dollars too! I thought it'd be credits or whatever they call them. E Pluribus Unum and Liberty—just different faces. Say is there a catch to this? Are these real, genuine, honest twenty-two-cent dollars like we had, or just wallpaper?

"They're quite all right, I assure you," said the potter. "I wish you'd come along. I'm in a hurry."

The man babbled as they stumped toward the stop. Where are we going—the Council of Scientists, the World Coordinator, or something like that?

"Who? Oh, no. We call them President and Congress. No, that wouldn't do any good at all. I'm just taking you to see some people."

"I ought to make plenty out of this. Plenty! I could write books. Get some smart young fellow to put it into words for me, and I'll bet I could turn out a best seller. What's the setup on things like that?"

It's about like that. Smart young fellows. But there aren't any best sellers anymore. People don't read much nowadays. We'll find something equally profitable for you to do."

Back in the shop, Hawkins gave Barlow a suit of clothes, deposited him in the waiting room, and called Central in Chicago. "Take him away," he pleaded—"I have time for one more thing, and he blathers and blathers. I haven't told him anything. Perhaps we should just turn him loose and let him find his own level, but there's a chance—"

"The Problem," agreed Central. "Yes, there's a chance."



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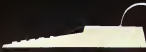
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The potter delighted Barlow by making him a cup of coffee with a cube that not only dissolved in cold water but heated the water to the boiling point. Killing time, Hawkins chatted about the "locker." Barlow had admired and had to haul himself up short he had almost told the real estate man what his top speed really was—almost, indeed revealed that it was not a rocket.

He regretted too that he had so casually handed Barlow a couple hundred dollars. The man seemed obsessed with fear that they were worthless since Hawkins refused to take a note or I.O.U. or even a definite promise of repayment. But Hawkins couldn't go into details and was very glad when a stranger arrived from Central.

"Tummy-Peete... from Algebras," the stranger told him swiftly as the two of them sat at the door. Psychiatrist for Paprob. Polassigned special overtake Barlow.

"Thank heaven," said Hawkins. Barlow he told the man from the past: this is Tummy-Peete. He's going to take care of you and help you make lots of money."

The psychiatrist stayed for a cup of the coffee whose preparation had delighted Barlow, then conducted the real estate man down the concourse road to his car, leaving the potter to speculate on whether he could at least crack his knuckles.

Hawkins abruptly dismissing Barlow and the Problem, happily picked the check from around the door of the number two kiosk, prying it open a trifle. A blast of heat and the heady, smoky scent of the reduction had delighted him. He peered and saw that the beautiful scannable lumber had lived to perfection, a haunting limo of silvery black metal with strange bluish lights in it as it turned before the eyes, and the Problem of Population seemed very far away to Hawkins then.

Barlow and Tummy-Peete arrived at the concrete highway where the psychiatrist's car was parked in a safety bay.

Barlow surveyed it with awe. Swept back lines, deep-drawn compound curves, kilograms of chrome. Herein his hands over the door—or was it the door?—in a futile search for a handle, and asked respectfully: How fast does it go?

The psychiatrist gave him a keen look and said slowly: "Two hundred and fifty. You can tell by the speedometer."

"Wow! My old Chevy could hit a hundred on a straightaway but you're out of my class, mister!"

Tummy-Peete somehow got a huge, low door open and Barlow descended three steps into immense cushions, floundering over to the right. He was too incantated to pay serious attention to his fayed derms. The dashboard was a lovely wilderness of dials, plugs, indicators, lights, scales, and switches.

The psychiatrist climbed down into the driver's seat and did something with his feet. The motor started like lightning a blowtorch as big as a ship. Wellpurring around in the cushions, Barlow saw through a rear-view mirror a tremendous exhaust filled

with innumerable brilliant white sparkles.

"Do you like it?" yelled the psychiatrist.

"It's terrific!" Barlow yelled back. "It's—"

"He was shut up as the car pulled out from the bay into the road with a great pop-ooo-coom!" A gate roared past Barlow's head though the windows seemed to be closed, the impression of speed was terrific. He located the speedometer on the dashboard and saw it climb past 90, 100, 150, 200.

"Fast enough for me," yelled the psychiatrist, noting that Barlow's face fell in response. "Radio?"

He passed over a surprisingly light object like a football helmet, with no trailing wires, and pointed to a row of buttons. Barlow put on the helmet, glad to have the noise abated, and pushed a pushbutton. It lit up satisfactorily and Barlow settled back even farther for a sample of the brave new world's supermodern taste in ingenious entertainment.

TAKE IT AND STICK IT! (a voice roared

◆That evening Mrs  
Garry tried to ask whether  
her husband was sure  
about those rockets, but  
he was dozing during  
Take It and Stick It. So  
she watched the screen  
and forgot about the puzzle.◆

in his ears, deafening him.

He snatched off the helmet and gave the psychiatrist an injured look. Tummy-Peete grinned and turned a dial associated with the pushbutton layout. The man from the past denied the helmet again and found the voice had lowered to normal.

"The show of shows! The supershow! The superduper show! The quiz of quizzes! Take it and Stick it!"

There were shrieks of laughter in the background.

"Here we go! The confes-tants all ready to go. You know how we work it. I hand a confes-tant a triangle-shaped outfit and like that down the line. Now we got these here boards, they got outfit places the same shape as the triangles and things, only they're all different shapes, and the first comes-out that sticks the outfits into the boards, he wins."

"Now I'm gonna interview the first confes-tant. Right here, honey. What's your name?"

"Name? Uh—"

"Heddays like that, folks? She don't remember her name! Ha? Would you buy that for a quarter?" The question was spo-

ken with arch significance, and the audience shrieked, howled, and whistled its appreciation.

It was dull listening when you didn't know the punch lines and catch lines. Barlow pushed another button, with his free hand ready at the volume control.

—least from Washington. It's about Senator Hull-Mendoza. He's still attacking the Bureau of Fisheries. The North California Syndicalist says he got affidavits that John Kingsley-Schultz is a bluesone away back. He didn't publish the affidavits, but he says that they say that Kingsley-Schultz was saw at bluesone meetings in Oregon State College and later at Florida University. Kingsley-Schultz says he gotta confess he did major in fly casting at Oregon and got his Ph.D. in game fish at Florida.

And here is a quote from Kingsley-Schultz: Hull-Mendoza don't know what he's talking about. He should drop dead. Unquote.

The Chicago—Los Angeles morning rocket crashed and exploded in the Mojave—Mo-javvy, whatever-you-call-it—Desert. All ninety-four people aboard got killed. An eyewitness says that the pilot was buzzing herds of sheep and didn't pull out in time.

And here is a bulletin I just got from Denver. It seems—

Barlow took off the headset unconprehendingly. "He seemed so calm," he yelled at the driver. "I was listening to a newscast—"

Tummy-Peete shook his head and pointed at his ears. The roar of air was deafening. Barlow frowned baffledly and stared out of the window.

A glowing sign said:

MOOGS!  
WOULD YOU BUY IT  
FOR A QUARTER?

He didn't know what Moogs was or were, the illustration showed an incredibly proportioned girl 99.9 percent naked, writing passionately in animated full color.

The roadside angle was still with him, but with a new feature. Radar or something spotted the car and alerted the lines of the angle. Each in turn spun along a roadside track, even with the car so it could be heard before the next line was alerted.

IF THERE'S A GUY  
YOU WANT TO GET  
DIPLOCCULATE  
LAWROMANTIC (W/ST  
ATTPAPPTT)TIO

Another advertised job, in two panels, the familiar "Before and After." The first said "Just Any Ogar?" and was illustrated with a two-person domestic tragedy of a wife holding her nose while her coarse and reduced husband pulled a slimy-looking rope. The second panel glowed "Or a VUEKAAUG?" and was illustrated with—

Barlow blushed and looked at his feet until he and Tummy-Peete had passed the sign-

"Coming into Chicago!" bawled Tiny Peete.

Other cars were showing up, all of them dreamboats.

Watching them, Barlow began to wonder whether he knew what a kilometer was exactly. They seemed to be traveling so slowly, if you ignored the roaring air past your ears and didn't let the speedy lines of the dreamboats fool you. He would have sworn they were teetly crawling along at twenty-five, with occasional spurts up to thirty. How much was a kilometer anyway?

The city loomed ahead, and it was just what it ought to be: towering skyscrapers, overhead ramps, landing platforms for helicopters—

He clutched at the cushions. Those two cops! They were going to—they were going to—they—

He didn't see what happened because their apparent collision courses took them behind a giant building.

Screamingly sweet blasts of sound surrounded them as they stopped for a red light. What the hell is going on here? said Barlow in a shrill, frightened voice, because the braking time was just about zero and he wasn't hurtled against the dashboard. Who's leading who?

"Why, what's the matter?" demanded the driver.

The light changed to green, and he started the pickup. Barlow stifled as he realized that the rush of air past his ears began just a brief, unreal split second before the car was actually moving. He grabbed for the door handle on his side.

The city grew on them slowly, scattered buildings, denser buildings, taller buildings, and a red light ahead. The car rolled to a stop in zero braking time, the rush of air cut off an instant after it stopped, and Barlow was out of the car and running head-zipped down a sidewalk one instant after that.

They'll track me down, he thought, panting. It's a secret police thing. They'll get you—mind-reading machines, television eyes everywhere, afraid you'll tell their stoves about freedom and stuff.

Winded, he slowed to a walk and congratulated himself that he had guts enough not to turn around. That was what they always watched for. Walking, he was just another business-sured back among hundreds. He would be safe, he would be safe—

A hand gripped his shoulder and words tumbled from a large, coarse, handsome face thrust close to his. "Wassamatta bumbumma people likeya own sidewalk gottaammer stamya imma mabya bassar?" It was neither the mad peder nor the mad driver.

"Excuse me," said Barlow. "What did you say?"

"Oh, yeah?" yelled the stranger dangerously as he waited for an answer.

Barlow, with the feeling that he rolled somewhere been sucked into the short end of an intricate land-life deal, heard himself

reply beligerently to the stranger: "Yeah!"

The stranger let go of his shoulder and snarled: "Oh, yeah?"

"Yeah!" said Barlow, yanking his jacket back into shape.

"Aah!" snarled the stranger, with more contempt and disgust than ferocity. He added an obscenely current in Barlow's time, a standard but physiologically impossible directive, and shuttled off hailing his shoulders and telling his fists.

Barlow walked on, trembling. Evidently he had handled it well enough. He stopped at a red light while the long, low dreamboats roared before him and pedestrians in the sidewalk flow with him threaded their way through the stream of cars. Brakes screamed, fenders clanged and dented, hoarse cries flew back and forth between drivers and walkers. He leaped backward furiously as one car swerved over an arc of sidewalk to miss another.

The signal changed to green, the cars kept on coming for about thirty seconds

●The Polar President offered to resign in his favor, with certain emergency powers that the Polar Congress would vote him, if necessary. Barlow demanded the title of World Dictator.●

and then dwindled to an occasional light runner. Barlow crossed warily and leaned against a vending machine, blowing big breaths.

Look natural, he told himself. Buy something from the machine. He fumbled out some change, got a newspaper for a dime, a handkerchief for a quarter, and a candy bar for another quarter.

The faint chocolate smell made him ravenous suddenly. He clawed at the glassy wrapper, panted. Croquettes quite suitably for a few seconds, and then it divided neatly by itself. The bar made three good bites, and he bought two more bare and gobbled them down.

Thirsty, he drew a carbonated orange drink in another one of the glassy wrappers from the machine. When he fumbled with it, it divided neatly and spilled all over his knees. Barlow decided he had been there long enough and walked on.

The shop windows were—shop windows. People still wore and bought clothes, still smoked and bought tobacco, still ate and bought food. And they still went to the movies, he saw with pleased surprise as he passed and then returned to a glittering

place whose sign said it was The Bucky.

The place seemed to be showing a triple feature: Babes Are Tempted, Don't Have Children, and The Canak Kid.

It was irresistible, he paid a dollar and went in.

He caught the tail end of The Canak Kid in a three-dimensional, full-color, full-sound production. It appeared to be an interplanetary saga winding up with a chase scene and a reconciliation between estranged hero and heroine. Babes Are Tempted and Don't Have Children were fantasies; arguments against parenthood—the grotesquely exaggerated dangers of painfully graphic childbirth, vicious children, old parents beaten and starved by their sadistic offspring. The audience, Barlow astoundedly noted, was placidly chomping sweets and showing no particular signs of revulsion.

The coming attractions drew him into the lobby. The lanterns were shading the blazing colors blinding and the added scents stomach-heaving.

When his eyes again became accustomed to the moderate lighting of the lobby he groped his way to a bench and opened the newspaper he had bought. It turned out to be The Racing Street, which afflicted him with a crushing sense of loss. The familiar boxed index in the lower left hand corner of the front page showed almost unbearably that Churchill Downs and Empire City were still in business.

Banking back tears, he turned to the Past Performance at Churchill. They weren't using abbreviations anymore, and the pages because of that were single-column instead of double. But it was all the same—or was it?

He counted at the first race, a three-quarter-mile maiden claimer for thirteen hundred dollars. Incredibly, the track record was two minutes, ten and three-fifths seconds. Any beef in his time could have knocked off the three-quarter in one-tenth. It was the same for the other distances, much worse for route events.

What the hell had happened to everything?

He studied the form of a five-year-old brown mare in the second and couldn't make head or tail of it. She'd won and lost and placed and showed and lost and placed without rhyme or reason. She looked like a front runner for a couple of races, and then she looked like a no-good pig, and then she looked like a mudder, but the next time it rained she wasn't and then she was a stayer, and then she was a pig again. In a good five-thousand-dollar allowance event, too!

Barlow looked at the other entries, and it slowly dawned on him that they were all like the five-year-old brown mare. Not a single damned horse running had even the slightest trace of class.

Somebody sat down beside him and said: That's the story.

Barlow whirled to his feet and saw it was Tiny Peete, his driver.

# PREDESTINATIONS

*We've developed the tools to shape our own biological destiny, but many question whether we've evolved the wisdom to play God*

BY DAVID ROYVIK

**F**ive hundred years hence, Aldous Huxley forecast in his novel *Brave New World*, a "biological revolution" will invest a scientific elite with awesome powers of "genetic predestination." That revolution is already upon us. Historians will look back on the last end of the twentieth century as a turning point in the ascent of man, auguring the new era of "participatory evolution."

The late Nobelist Dr. Edward L. Tatum has called the growing ability of *Homo sapiens* to engineer the genetic future of the species "the most astounding prospect so far suggested by science." Cornell biologist Robert L. Sinsheimer terms it "one of the most important concepts to arise in the history of mankind." He adds, "For the first time a living creature understands its origins and can undertake to design its future."

Not everyone is sanguine about what all this portends for mankind. To some, genetic engineering is a monstrous affront to God and nature, a forbidden act of cosmic masturbation; man with his hands down his genes, juggling with himself. One does not have to turn to the fundamentalists to hear this attitude. Even a "liberal" pangandium like Norman Mailer laments that the bioengineers have now "boiled through the outer cores of pornography" to arrive at the very "rim of conception." They are, he shudders, "looking to operate on the Lord."

Some of the bioengineers themselves have serious doubts about man's headlong rush into creation, fearing that we now have the ability to create but not the wisdom to know what, when, or whether to create. "Our ignorance is profound," declares Nobel Prize winner George Wald, urging a moratorium on much of the current gene tinkering.

"Have we the right," asks Columbia University biochemist Erwin Chargaff, "to counteract, inversely, the evolutionary wisdom of millions of years in order to satisfy the ambition and the curiosity of a few scientists?"

The trouble is, it is no longer merely a few scientists. It is a multitude of scientists, and it is business—big business. Genetic engineering is being touted, with increasing

PHOTOGRAPH BY CHRISTOPHER SPRINGMANN



persuasiveness, as the next big growth industry—potentially bigger than the semiconductor industry which is sponsoring its own revolution in another dimension. "The new IBMs are in the making right now," says an executive of one of the fledgling bioengineering outfits.

The biological revolution is proceeding along two parallel fronts. The first is genetic engineering—recombinant DNA, gene splicing—and so on. The other is "genetic engineering"—the *in vitro* manipulation of germ cells, including such phenomena as test-tube babies and cloning. Several human test-tube babies are already among us—the result of eggs that were fertilized in laboratory dishes and then implanted in the women from whom they were first obtained. These forerunners of the test-tube generation will soon be joined by brothers and sisters who will be the products of more exotic genetic engineering. Embryo transplants will allow women who do not produce viable eggs of their own to bear a child. They will also permit "normal" women to have children of their own without the inconvenience or risks of pregnancy.

Human-egg banks are already joining human-sperm banks. Soon they will merge to form human-embryo banks. Indeed, there are genetic enterprises gestating in the cradles of corporations whose studies have convinced them that it may be both feasible and profitable to offer life for sale in frozen pellets. Aerial embryo banking is

already a substantial business. There is no doubt it will work as well with human embryos. One Indian test-tube baby before implantation had been deep-frozen until the prospective mother's reproductive cycle reached greatest receptivity.

It was Dr. Hermann Muller, winner of the Nobel Prize in medicine, who suggested many years ago that embryos grown from gametes concocted by only the "best" of us be frozen and made available to infertile mortals in an effort to "improve" the human gene pool. Recently it was revealed that a sperm bank, modeled along the lines proposed by Dr. Muller, has been established utilizing the sperm of Nobel laureates. The only donor so far willing to identify his self is Dr. William Shockley, the Nobelist who had previously "fathered" the transistor.

Cloning, the duplication of an organism from a single body cell, has now been achieved, not only in reptiles but also in mammals. Many physicians have proclaimed that mammalian cloning is still years and probably decades away. They were undoubtedly somewhat embarrassed when Dr. Karl Illmensee and his colleagues at Geneva University in Switzerland announced this spring that they had cloned several mice, the cells of which are in many respects, as difficult to deal with as human cells. Dr. Landrum Shettles, a pioneering reproductive biologist (profiled in our March 1979 issue), reported last year in the *American Journal of Obstetrics and*

Gynecology that he had succeeded in microscopically transferring the nuclei of human spermatogonial cells (sperm precursors that still possess a full set of chromosomes, like any other body cell) as opposed to the half set contained in the mature germ cells) into human eggs with their nuclei removed. In three cases the clone showed healthy development to the stage where an embryo normally attaches itself to the womb lining. "There was every indication," Dr. Shettles reported, "that each specimen was developing normally and could readily have been transferred in utero." The foremost obstacles to cloning humans, he now concludes, are social rather than scientific.

Plant cloning is already a flourishing enterprise. Livestock cloning is expected to become a multimillion dollar business in the next few decades. Soviet scientists eager to increase milk and meat production claim the ability to replicate large animals. Humans, too, are bound to avail themselves of cloning technology.

Some may want to use human cloning not only to foster fertility but to guarantee a child of one sex or the other and, perhaps, to produce an ego-gratifying "chip off the old block"—literally the spitting image of the old man (or woman, as the case may be). Individuals unhappy with what they see in the mirror may recruit the genetic material of others. Columbia University sociologist Amitai Etzioni argues that a black market in body cells, bought or "ripped off" by wholesalers, will arise in our lifetime, making it possible for couples with cash in hand to give birth to carbon copies of film idols, sports figures, popular leaders, and so on. Using cell-breeding techniques, nostalgia buffs may be able to birth anew the heroes of yesteryear.

Such abuses will pose no great threat to society as a whole, but they will complicate the lives of those human copies, who will have to struggle harder than ever to develop unique identities. Much more controversial is the prospect of keeping, de-centralized doubtless, their cloned copies as long but mindless repositories of spare parts that could be transplanted, as needed, without risk of rejection. With a "parts replacement" program like this, individuals might live decades longer.

All sorts of macabre possibilities loom ahead. With the advent of ectogenesis—complete test-tube fertilization, gestation and birth—we will have easy access to the developing fetus, to correct defects and, if we desire, to alter development. Such a technique might produce endless batches of happily disposed, defect-free, blue-eyed, blond-haired, pink-skinned monotonies—if we wished. Researchers have already sustained mammalian test-tube life beyond the stage at which major organs begin to form and function.

There are people willing and eager to muddle in genetic predetermination, some by trying to dictate who may reproduce with whom, others through direct genetic



"You're much too sensitive Garvey. There is just no need to ask for volunteers."

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# PRAIRIE SUN

*They plundered the past  
and returned to their own time with a  
trophy they would never forget*

BY EDWARD BRYANT

**S**ilence

Except for the boy, nothing moved on the prairie. The hawks did not hurt the morning. Not even the vultures circled in the empty sky. The beds evidently were waiting until Micah Tawerner made his bed.

The heat hung like a heavy curtain over the world. All motion seemed suspended. The thought entered Micah's mind that on these plains anything at all could happen. His was a sudden and early maturity, and not one he relished.

The teen-year-old Micah moved quietly—perhaps not so silently as an Indian, but still disturbing the saw-toothed grass with less noise than most others in the company. He balanced his father's long muzzle-loader carefully, thumb ready to take the hammer off half-cock. A small antelope would be welcome. A young white-tailed deer would be even better. A large pointblank would suffice.

To Micah's right the river Platte would slowly east by south, the direction from which the company had come. At this point the road followed a straighter path than the river. The boy's present course took him up a gentle rise so that he had now attained an elevation of a hundred yards above the river. Within a rod of the Platte, all was lush and green. The grass and the trees grew luxuriantly. Beyond them, the world turned to shades of brown and tan and yellow.

The world seemed to contain little more than the river and the prairie. And the road. Had the boy wished to stand in the ruts made by countless passing wheels, he would have found them waist-deep.

Micah heard a sound in the dead air. He froze, waiting. He heard something again. Glass breaking. The mutter of words. The sounds came from beyond the low rise ahead. Two voices. Whoever they were who were speaking, they were close by the trail.

The boy slowly cocked the hammer of the rifle. It seemed to him the click echoed out across the parched land like the gunshot itself. Again he heard



PAINTING BY ALBERT BIERSTADT

words too distant and indistinct to be understood. But the tone did not sound alarmed.

White man? he thought. Pawnee had been the first word in his mind. Or Sioux. Or Blackfeet. He had heard the tales of slaughter and torture from the talkers around the fire. He had listened then with eyes wide and the breath catching in his throat, even though his father had laughed and suggested wryly that the red tribes were no more monsters than were the men of the company. And, after all, men of other companies had given deadlier gifts than bullets to the Indians.

Michah gripped his father's rifle tighter and stealthily approached the summit. Sounds again—this time a rattle as if iron articles and wood were being placed together in a bag. Outcroppings of porous stone afforded the boy some cover as he reached the hill's crest.

What! At least the strangers were not red men, though they appeared odd to Michah's eyes. There were two of them and they were poking through the heaps of discards beside the trail. The road was lined with all manner of belongings thrown away by the exhausted, overburdened men and women barely halfway along their arduous journey. The wagons, the oxen, the horses and mules, the people—all could carry only so much.

Michah had seen the jettisoned tools and household goods start to appear beside

the wagon runs not long after Fort Kearney many miles even before reaching the foot of the South Platte. Before the sickness began, his father had been keeping a running tally of what he saw for just a mile or two. "There must be ten thousand dollars' worth of goods there," he had said. All for the picking, had one the time or the desire.

But few struggling toward California or Oregon, of course, had the time or the desire. So the prized New England heirloom furniture, the discarded barrels of flour and sacks of white beans, the Franklin stove and the priming glasses, all lay rotting beneath the prairie sun.

And now Michah saw the two strange white men, looking like hogs among the once proud belongings scattered beside the road. Their backs were to him, so for a while he watched without their knowledge. Both men were tall, each easily attaining a height of over six feet. Though one had dark hair and the other's hair was as light as the dried grass, they seemed much alike in appearance. The pair wore similar clothing: plaid shirts with suspenders, brown cloth trousers, and thick-soled boots. The towhead's shirt was red; the darker man's was green. But Michah saw there was something not quite right about the clothing. For one thing, the cloth was slick and it gleamed under the direct sun. For another, he abruptly realized that as the men flexed to pick up objects, each man's outfit was all of one piece of material. It was as if each

were wearing a set of long johns colored to appear to be real clothing.

The towhead was showing the other a New England hooked rug much like the treasure Michah's mother still packed deep in the wagon after adamantly refusing to discard it at the Poudre River crossing. Michah wondered whether he should a) creep then or whether it would be wiser simply to back-track along the trail and forage in another direction. Then the darker man turned slightly, glanced up, and looked straight at Michah. He said something to his companion. Both of them stand at the boy.

Finally one of them, the towhead, said: "Come on down here, young man." He put down the hooked rug and stood there quietly with empty hands. The other man slowly spread his hands, palms outward. Michah realized they were both looking at the father's muzzle-loader.

He warily approached the pair, then looked beyond them. The muzzle of the rifle came up. "Don't—," said the darker man. Whatever else he was going to say was interrupted by the black-powder explosion. Two yards of decapitated prairie rattler jerked and flopped in death throes close by their feet as each man yelled and leaped aside. They looked from the snake to Michah and back to the snake again.

"Thank you, boy," said the towhead. "Mighty big one," said Michah. He felt very pleased with the shot and had not to grin. He started to reload the rifle. "Probably the biggest one I've seen."

The men exchanged glances. "What's your name, son?" the darker man asked. Michah told them.

"Well now, Master Michah Taverner," said the towhead, "please call me John. My friend here is Droos. Droos inclined his head. We both of us truly do appreciate your eliminating the serpent."

"It was nothing," Michah said, ramming wadding down the barrel. "Just glad to help."

There was silence. The men seemed trying to communicate with each other by sharp looks. Michah paid attention only to the muzzle-loader.

Finally John said: "I suppose you're wondering what the two of us are doing out here."

"None of my business," said Michah. "Admirable," said Droos, turning away. His mouth set in an extraordinarily loose as young John. Now let's get back to work and see if we can find any more East India-bury bottles like the one you so carelessly dropped."

But John seemed fascinated by the boy. "May I ask what you're doing out here?" he said. "I believe the last train passed by here nearly a week ago, and the next wagons aren't due for days."

"My mother sent me to look for game," said Michah. "She believes that meat broth will soothe Annie's innards."

"Who is Annie?"  
"My little sister. She is sick with the smallpox and cannot be moved."



*"Forgive me, Mrs. Welaughby, for continuing to address you as Mrs. Bellows. As you know, psychiatry is an inexact science."*



# VODKA & ROSE'S

Droos turned around from the wooden crates in which he was rummaging and stared. "Smallpox? We totally eradicated that more than a century ago."

"In our time," said John. "Your time?" said Micah, confused now. "Never mind," said John. "It's a long story. Where's your wagon?"

"That way," Micah pointed back along the river. "About three miles. We should have stayed in Fort Laramie, but Anne did not seem to fit them. The rest of the company said they would wait one more day at Independence Rock. I fear by now they will have gone on."

"But your family stayed alone?" Anne cries out when the wagon moves. "She is too weak. My mother thought that the rest might help."

"Your mother," said John. "What about your father?"

Micah stared at the ground. "He took ill and died of the cholera shortly before the crossing of the Platte."

"God Almighty," said Droos. "And so your mother and you have brought the wagon this far since?" John inquired.

The boy nodded. "Some of the men of the company helped us. But they had their own wagons, and their families. And many of them were weak with the cholera."

"Unbelievable," Droos said. He unconsciously fondled a silver teapot.

"Now we have seen the elephant," said Micah.

Droos cocked an eyebrow. "Elephants? You actually found one here?"

Micah looked equally quizzical. "It means only that we found far more on our path than we expected. We would return to Ross County Ohio, but it is now just as far to go back as it is to go on. Perhaps we can catch up with the company when Anne is better. Before he rode on, the captain told us we would have to move soon, or we should all be caught by the winter in the Sierra Nevada."

The two men stared at him, transfixed. "People truly used to live and die this way," Droos said bemusedly.

Micah, John said slowly. "Can you keep a secret?"

"If it is an honorable secret."

"What if I told you that we both were from the future?"

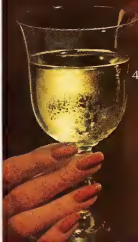
The boy shook his head. "I do not understand."

Droos opened his mouth as if to protest. John held up a restraining hand. "Droos and I are travelers, and we've come a great distance to be here. But we didn't make the sort of journey you might imagine. Not from England, not around the Horn, but instead, through time. What year is it, Micah?"

"The year of our Lord 1850."

"Our world exists more than two centuries beyond that."

Micah shook his head silently. Food meant something. Sickiness meant something. But the future? His mind already reeled with too many burdens.



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John turned to Droos, who was slowly glowing a silver leathernoin a fabric pack. "Can you explain it more adequately?" Droos stared down at the objects he held. "These are truly exquisite," he said. "Sundish Barry Baltimore, probably about 1820."

Droos, the dark-haired man, looked up and said, "This is against all the rules, you know. Why must you be a compulsive fool?"

"I was the only one in the department you could trust," John bent down to look at Micah levelly. "Do you know about the Romans?"

Micah nodded. "Father read us stories. Have you ever thought about what it would be like if you could really go back and visit the Romans?"

Yes," said Micah. "Well, we can do that, Micah. We live in your future. We can come back and visit your time, or the time of the Romans, or any other time of our choosing. We come from a year when smallpox has long since been banished from the earth and most other diseases have been eliminated equally."

Micah knew he did not understand all that was being said to him. But a few words punched through the confusion. "You can heal smallpox?"

"Our ancestors did," said John. "Your grandchildren will."

Can you cure Antia?" Time again seemed suspended on the

praise. Everything was still. Micah stared at the men. They stared back at him. "Well, I suppose," said John.

No," said Droos. "Droos has an emergency medical kit. It might alleviate the symptoms."

No. This time Droos's answer was more vehement.

John wheeled angrily on his companion. "Just once," he said.

Absolutely not," said Droos. "If I have to pull rank, I'll do so."

One child," said John. "One life."

Droos dropped a dozen silver spoons and let them lie on the dusty trail side. "Let me remind you of a few things," he said. "I'm not being arbitrary about delaying your humanitarian impulse. The first thing is that this is not exactly a sanctioned mission; you know. The second thing is that we'll be strung up doubly by our tails if the department finds out we've been exchanging collectibles from the past for resale in the present. Third, there's the primary travel directive—"

Come on," said John. "Saving one little girl's life is highly unlikely to alter the future in any significant—"

Droos interrupted him, raising his voice even higher. "We don't know that. It's one thing to scavenge these antiques because nature would have destroyed them anyway. It's quite another to meddle with lives. Besides, we don't know that his sister is going to die of smallpox. She might recover. I

believe prisoner children were resilient—"

"I say we do it!" said John.

"If I have to, I'll put your neck on the block without endangering mine," said Droos. His voice quiet and deadly. "I am capable of that, you know."

"I know that," John spread his arms helplessly. "Please?"

No. There are rules—and these rules we will follow implicitly. We live in that kind of world." Droos knelt and began picking up the spoons, blowing the dust off and polishing them against his leg, before placing the utensils inside a bag of soft cloth. "Accept that."

In the ensuing silence Micah said, "Can you cure Antia?"

John did not meet his eye this time. The towheaded man hesitated. Then he said, "No, we can't. I'm sorry, Micah."

Micah considered that. Then he asked, "But you could?"

Neither man said anything. But you won't?"

John flushed. Droos stowed the packet of silver and extracted a crystal loop and petal, candlestick from a crate. "I'm truly sorry," said John. "I never should have spoken at all."

Very slowly Micah said, "Father used to tell me, 'I help my friends. God help my enemies.'"

We are not your enemies," said John earnestly. "There are simply rules that say we cannot be the friends we'd wish."

Micah said nothing. He only turned and picking up both the dead snake and the muzzled leader that leaped against a fire-standing gilt mirror in its hardwood frame walked away from the two men.

Micah distractedly shot the rabbit on the way back to the wagon. The bag jack darted from the brush and then made the mistake of pausing to assess the intruder on the frame. The ball passed cleanly through its right eye. The moat was unspoiled.

When the boy arrived at the wagon, the sun was long past its zenith. The teen looked up incuriously to greet him, then bent their heavy heads back to the tough grass. Micah paused by the rear of the wagon.

Ma?" he said. "I have a snake and a rabbit, Ma."

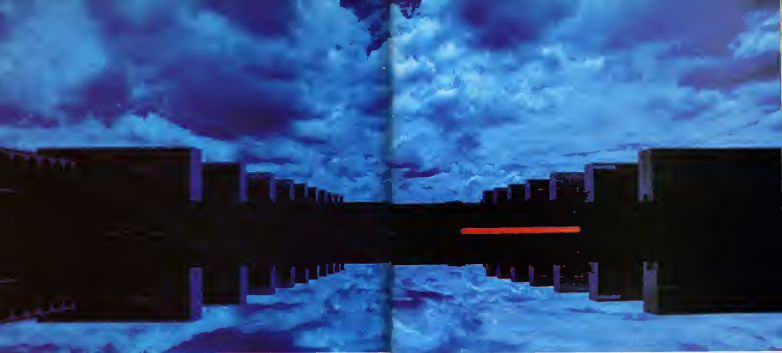
His mother drew the canvas flap aside and held a finger to her lips. "Hush," she said. "Your sister is dying. The gay colors of her gingham stood at stark contrast to the ashen gray of the canvas top."

They waited an hour, then a second hour beside the grill bed, listening to Antia's labored breathing. They took turns squeezing new compresses for the girl's forehead. Every few minutes Micah took the bucket to the river for fresh cold water.

Antia's face continued to shine with sweat, even with the compresses. At the same time she shook as if with a chill, and they kept her bundled in her mother's hand-knotted, thick woaden blankets.



"We can't get back—our space budget was cut, too!"



*Future homes may grow themselves,  
change on command, feed us, or fit on our backs*

## ECOSHELTER

BY R. BRUCE McCOLM

On a shallow shoal at the bottom of the Gulf Stream 320 kilometers southwest of the Cayman Islands a research ship will sink wire-mesh forms the size of football fields. A small generator sends electrical charges down through these forms and sets in motion a process known as marine accretion. The electrified structures

PHOTOGRAPHS BY PETE TURNER



collect minerals from the sea and begin to grow like coral reefs. An organic platform eventually forms a self-growing habitat that will shelter a community of scientists, engineers, and artists.

Wolf Hilbertz, who directs the Symbiotic Process Laboratory at the University of Texas in Austin and founded the Marine Resources Company, is America's major practitioner of a new architectural school called biotecture. Its goal is to design human habitats as organic systems, wholly integrated with their immediate environment and built from renewable sources.

I simply became discontented with existing technology and traditional thinking," says Hilbertz. So I formulated the idea of evolutionary environments. Using crystal growth plant forms and geological formation, architects can play a vital part in the evolutionary process. Eventually humans will live in a symbiotic relationship with their environment. Natural sensors and the artificial intelligence within the environment will not only adapt the physical realm to human needs but provide new conditions. A house will sense a coming hailstorm. But its presence may also cause a hailstorm. By building with these processes, you create an instant ecosystem.

Today advanced technologies are making such architectural visions increasingly possible. A crack in the wall of conventional design has opened new vistas of human habitation that leave today's cities far behind. Martin Pawley whose book *Private Future* speculates on the complete human withdrawal into the house suggests that we may outgrow city life altogether.

Everybody is pretending that community life is having a rebirth. But the opposite is happening. Abandonment of the world's cities is proceeding on a large scale.

We are leaving our cities behind; we may be heading toward living systems that parallel Hilbertz's underwater *Autopis*.

Already Hilbertz has grown several artificial reefs and underwater monuments off St. Croix in the Virgin Islands and Corpus Christi, Texas. In nature, such man-made objects as junk cars, old trees, and concrete blocks have formed barrier reefs. With windmill power and wire-mesh forms that resemble the submerged hull of a World War II naval vessel, Hilbertz has created instant reefs teeming with plant and animal life. Marine biologists found that after a year Hilbertz's Virgin Island reefs attracted 3 to 16 times more fish than natural junk reefs. Hilbertz now is using marine accretion in the Cayman Islands to grow an underwater park for scuba divers.

Significantly the green material—largely calcium carbonate—acts like bone and repairs itself, Hilbertz says. This is the first construction material to have the regenerative properties of bone. It has the same mechanism that properly distributes materials wherever they are needed. This means that if the reef breaks or is hit by a ship, the accreted material will heal itself.

The notion of a self-growing island such

as *Autopis* may sound utopian, but embryonic sea cities already exist in the new port of Rotterdam and the large rigs in the North Sea off England. Hilbertz envisions a day when whole underwater cities will be grown. Mother ships will drop forms to the seafloor bottom where they will accrete material. Once they have reached the desired shapes, the ships would literally harvest the building structures from the ocean floor with the aid of lifeline cranes. These building materials would then be assembled offshore into buildings.

#### BLACK FOREST BIOTECTURE

In Germany's Black Forest the Luddite of the biotecture movement, Rudolf Doernach, grows buildings of a lesser sort. For the past decade Doernach, director and founder of the Biotecture Institute in Stuttgart, has adapted a 300-year-old weaving technique to build living, wiflow houses. Architecture as well as technology is an evolutionary mistake, Doernach com-

◆ *With windmill power and wire-mesh forms that look like a World War II sunken warship, Hilbertz has created instant reefs teeming with marine life. If injured, Hilbertz's reefs will heal themselves.* ◆

ments caustically. "It is basically parasite polluting and nonproductive. The central issue is to build houses in the same way as trees grow. It is far more intelligent to cohabit with a living plant system than to cut it into lumber and lose fifty percent of it. What do you get in this manner but a house that was a lot of energy?"

Doernach's "bi-house" is a shelter composed of various living trees bent, gratted, and pruned into a habitable shape. On the outside his homes look like huge, slightly hyperbolic beehives. Leaves act as living shingles against bad weather. A hexagonal mesh shape stimulates interior growing. The overall design allows all sections of the house to receive constant sunlight from the sun eye—an opening in the roof.

A bi-house sports the obvious advantages of any plant. It recycles water. It uses human waste as humus to fertilize the house. It produces food. It cleans the air. It stores solar energy.

Biotecture's biggest problem is psychological. Few can easily accept the idea of a house as both an employer and a primary food producer. "It takes people at least two years to recondition themselves to work in

the house," Doernach explains. But two houses and biotowers, he believes, are inevitable developments for Germany, Great Britain, and the United States as they enter the postindustrial age. In American cities, for example, Doernach would suppress the rage to ghrofit old buildings in blighted areas—with a blair of biotecture.

Doernach has already taken the first steps in putting his ideas to use. His "vertical gardening" is transforming center-city rooftops of Zurich, Düsseldorf, and Stuttgart into greenhouses and mazes by covering the facades of the old homes with trellises woven from various food-producing plants. Experiments have been conducted comparing these biotified houses with others not involved in the project. Owners of Doernach-modified homes saved 30 percent on their energy bill, and those who lived in them had only half as many illnesses. Better health results from exposure to psychological green, which benefits the mind. The way in which plants absorb more viruses than ordinary building materials do is good for the body as well.

#### TRASH HOUSING

Pawley shares Doernach's jaundiced view of industrial society. Consequently his architecture is trash. Literally. Beer cans, rusted old cars, tires, and bottles. He especially likes the 48-ounce Crowl Pleaser made by Coca-Cola. Under stress tests the Coke bottle withstood 10,000 pounds of pressure. You could build the Brooklyn Bridge with those things, Pawley says.

A frequent adviser to the United Nations on the world's housing needs, Pawley estimates that 20 cities the size of Philadelphia will have to be built each year from now to 2000 if the world's population is to have shelter. He considers building with waste to be the appropriate response. The United States, Pawley discovered, produces 12 cans for each buck. And he found far more waste to make packages than to construct homes. By examining the various waste products of American industries, the British architect gleaned a number of cheap, but excellent, materials to use in building.

Waste is the only thing that increases in proportion to our consumption, Pawley says. "All other resources diminish. If you look at a consumer society and its by-products, you realize that the packaging of the steel, the aluminum, the rubber, the glass waste products are not poor building materials. They are great ones."

Pawley has used trash in several ways. In 1975, while teaching at Rensselaer Polytechnic Institute in Troy, New York, he built the Dora Crouch house. He constructed the house's frame from discarded newspaper cores—heavy cardboard tubing reinforced with metal. The outside walls were made of large cans set in cement and weatherproofed with sulfur coating. Rubber left over from rubber washers served as roof ties; the insulation was polyester rejected from local textile mills, and the stained-glass living-room wall was made

from bottles. This 56-square-meter house cost all of \$550 to make.

Last year Pawley traveled along Florida's Panhandle, observing the filthy shanty shacks dotting the backroads. He recalls, "The poverty there was staggering. I surveyed the shacks and found that forty percent had no water, but sixty percent had junk cars in the yards. That was the answer to their problems." By outfitting the car wrecks with 120 meters of pipe, a wind circulating pump, an expansion chamber and a discarded oil drum, Pawley created water collectors and solar heaters for the shack dwellers.

Some of Pawley's other garbage suggestions are that tin breads be woven with palm-leafs to create large domelike structures and that six-packs be compressed into building blocks. Pawley considers these off-the-cuff ideas of great future importance. "In the Third World, development isn't just a question of industry and agriculture. The people of the Third World want a consumer society. They want their own Coca-Cola. And all this can be integrated into solving the worldwide housing problem. After all, there's never any shortage of garbage."

#### THE GREEN MACHINE

A few blocks from the Pacific, in Venice, California, lies a scrubby garbage-strewn plot of land. Rows of crumbling bungalows stand adjacent to the lot. This is a most unlikely site for the future—and a low-cost future at that—to take form. But California architect Glen Small will build "an anti-building" called the Green Machine there.

The Green Machine will be a low-cost housing complex containing either recycled mobile homes or industrialized modular housing units stuffed inside a space-frame pyramid. The project will work as an ecological machine. A structure will rise five and a half meters off the ground, with high-rise, plant-filled boulevards. "The effect is as if you are living in a giant greenhouse," says Small. Dew and rainwater will be collected, filtered, and recycled for watering the plants. Parabolic disc solar collectors installed on the roof will supplement the heat provided by methane-gas digesters working off all human, garden, and kitchen waste. A microcomputer will serve as "an intelligent synchronizer, adjusting the complex to climatic changes through a series of sensors and photocells that register such alterations."

If Small were to have his way, all of Los Angeles would eventually be rolled up and put inside his Biomorphic Biosphere Megastructure, a 2,400-meter-high tentlike structure that would loom an artificial mountain range in the air over the Los Angeles basin. Instead of just recycling wastes, the BSM would transform the city by recycling entire blighted neighborhoods back to open space. Conventional building techniques would be used to span downtown Los Angeles with the first sec-

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tions of the megastructure. Then Small foresees a mixture of biotechnical processes taking over. Computer-run holographic projectors would generate parts of the new city allowing for controlled growth. New materials, such as plastic made from soybeans, would be used to construct the new cityscape. Wind and solar devices would generate power at high altitudes.

Not only would the inhabitants enjoy the sensation of being liberated from Earth's surface, but their houses could be plugged into the structure at any level. They could even fly down to Earth's surface for vacations. The house, according to Small, is a demerit of history. The flying house is an attempt on my part to block out our concept of house. The house could be a Jungle Gym, where you bounce off the walls, and it would respond to you. At night the floors would roll up into bedrooms. And at sunrise the walls would automatically open to the outdoors.

Unlike industrial cities, the BBM could also wither away and self-destruct. If it fails, it can be recycled, says Small. What would be left would be a great Eiffel Tower or a modern Disneyland.

Hilbertz has also had some interesting notions about habitats that recycle themselves. Architectural evolution may lead to cyberstructures that computers and holographic projectors generate at will. Like a spider spinning its web, a mobile building machine projects a three-dimensional

holographic image and then transforms it into a solid structure by spraying it with a mist of plastic that solidifies on contact with light. Lab tests conducted at the Symbiotic Process Lab prove the principle of this speculation. Light waves from a laser were shot through methyl methacrylate, a plastic powder. Small plastic filaments were created and then dissolved by an altered light-wave pattern.

In 1973, in an experiment called Ice City, Hilbertz and some of his students built the first computer-generated building out of ice in Fargo, North Dakota. The floor design was drawn on an electronic tablet, which a computer then translated into a three-dimensional movement for an ice-spraying machine to follow. The building, an igloo composed of ice layers, was sprayed and by a reverse process dissolved. It is a disappearing environment, says Hilbertz.

#### BLOOMING DESERTS

In contrast to Hilbertz's ice house, there is architect Carolyn Dry's vision of deserts that build themselves. Dry, a professor at UCLA and consultant to the U.S. Navy, believes that "botanic architecture" will allow us to not just live and live in our expanding deserts. She foresees a sand-bound civilization much like Frank Herbert's *Dune*, where shelter means a hollow out of the wind and hidden from view.

Architectural oases, Dry thinks, will be built in desert areas. These will be group-

ings of earth-integrated houses molded from hydromatrix, a material made from seaweed, cement, water, and plant seeds. When watered by osmotic pumps drilled into the desert ground, the buildings will become giant seed strips. A ground cover will grow and stabilize erosion. As the oases spread across the desert, the climate will change. In effect, what you are doing is creating an environmental feedback system on the desert. By making the ground cover more absorptive and blacker, you will cause more rain. This process of growing buildings on the desert creates an thermal mountain. So the building itself affects the climate.

Among Dry's plans to employ the "grand poetry" as the call building with natural processes, is the application of Hilbertz's marine accretion method to desert homes. A pump called a salt finger siphoned into the desert, forcing salt water to the surface. The water generates hydroelectric power for the area and serves as a medium in which buildings can be grown.

Archigram, an English architectural group formed in the 1960s, turns to technology instead of to nature for flexibility and freedom in new living modes. Archigram's space-minded work glorifies the wildest possibilities of new technological developments. *Flow-Out Village* for instance, designed by the group's leader, Peter Cook, can be a mobile habitat for people affected by some disaster, a portable environment for remote, inhospitable regions, or an attachment to a resort. The whole village can be moved anywhere by hovercraft and then be anchored. Its center is a huge hydraulic mast. From the top of the mast hang inflatable ribs, which support the village's weatherproof plastic covering. When not in use, the village hydraulically contracts for storage or moving.

Recently Cook has devised an alternative to the modern city—a highly dense, technological suburb. Cook says, "We have to invent a new kind of city one that eventually will lead to a development where each person will have his or her own very intense network. You are already getting this in southern California and in Belgium. This network will be based on the time dimension, on the socioeconomic dimension, and on habit. My center of London for example, is not the guy down the block, center of London. We still have only a very primitive idea of how this operates. But I think the future city will be a very concentrated, polynucleated system. It will be incredibly complicated, but also relaxed."

Cook's technologized suburbia, called *Aradia*, involves enormous architectural sleight-of-hand. The bucolic haystack hides a dwelling. The nostalgic old barn on the countryside is really a suburban commune. Nature and buildings merge, not in the biotechnology way but as occasional props, an ultimate stage set. Orchards support tent structures and tree enclosures, like the English hedges, shelter people. Concealed behind all this stage-



# TORRENTS OF BABEL

*Our inability to communicate may compromise the course of social evolution.*

BY EDWIN NEWMAN



The Boy Scouts of America are struggling to maintain. Troopsters and adults will have to get in contact with the whole shirt. Adults are to be removed, and the whole shirt must be replaced by a baseball cap. The old uniform, in use since 1922 and familiar to three generations of American boys, is being phased out.

I hope that no such fate awaits the Boy Scout motto: Be

prepared. It is a most often used two words (three syllables, but only one word) that has to be said. If the words were getting a motto today, it would be loaded down with contingency plans and the spectrum of calculated response-reactions. There would be talk of holistic motivation, in a people-oriented, action-oriented, results-oriented, future-oriented ongoing organization. Anything

PAINTING BY GREGORY MANCHES



as succinct and straightforward as Be prepared would be laughed out of court.

"Ah," someone will say, gracing through the murky "lawyers' language." Not so. Lawyers will, of course, look at you with a straight face and ask whether something happened as a result of intentionality or accidentality. They will without embarrassment, send out a letter that says:

Gentlemen,

Enclosed for service upon you please find verified copy of defendant's answer and counterclaim herein.

Please communicate with this office at your earliest convenience toward the amicable settlement heretofore possible without resort to further legal action herein.

"Thanking you for your attention, I am,"

They sign their names therunder.

Still, it is not the lawyers. If their language were all we had to worry about, we could isolate it and deal with it. Unfortunately the language used by many other groups of Americans is little, if any, better than that of the lawyers. Moreover, lawyers always have been the way they are. For others, it is a recent affliction, and extremely widespread. That is what is so troubling.

It is not unthinkable to assume that as language evolves, so too will its excesses be pruned to fit the streamlined image of future man. Yet the opposite appears to be true. In language, we Americans are becoming intolerably pompous and boring. A life preserver today has evolved into a personal flotation device. A tape recorder we listen to in a car is "a contemporary communication device incorporated into the automotive experience." There are Americans who no longer clarify anything. They prefer to disambiguate it, because that is two syllables longer. At Fort Devens, Massachusetts, the guardhouse—imagine this, the guardhouse—has become a correctional custody facility. The Navy's no better. An admiral recommending that suggestive books and movies be kept off ships, says that to have them on board "is to underline deprivation in an already deprivational situation," thereby disambiguating fuzzy notions about the reason why war is hell. It's a deprivational situation.

The admiral would feel right at home among American educators, who tout books whose "concepts will help every person to project himself within his own process consciousness" in adjusting his values to proper and relevant perspectives. They spot circumstances in which "theorization seems to be required," worry about "the lacuna in systematized monitored options," and devise "balanced organizational parameters" that they claim, "have been organized not only to limit and demarc certain areas of concentration and specialization, they have also been patterned to include synchronized open-ended gnoseopulsations and thus assure maximum compatible capability." By turning a visit to the library into "instructional improvement through library resource integration," educators believe that

they have contributed significantly, or in extreme cases, meaningfully, to educational theory and practice.

Still with me? Let's try some government language, from a report by the District Department of Health, Education and Welfare on Cost Effectiveness of Physicians' Assistants: "...the changes, whether incremental or substitutive, would tend to occur gradually, making only small sequential thrusts against the existing clinic environment and against the established proportions of output components (for instance primary care versus supportive services). Whether the seroton thrusts would sum to major alterations of the system—for example, in the basic clinic environment—would depend upon the system's commitment to reestablished arrangements and its ability to absorb change. Hence the ceteris paribus assumption may be less fragile than it appears to be at first sight."

Less fragile than it appears? We must all, ceteris paribus, fervently hope so.

---

● We have been  
producing year after  
year, classes  
of young people deficient  
in communication  
skills—what we used to  
call reading,  
writing, and speaking ●

---

I see the language of Americans moving along parallel paths toward disaster. One, already suggested, is the path of pomposity. The other is the path of incompetence or ignorance. So it came about that we learned through a press release from the San Diego Holiday Bowl about a man who had settled in that city three decades earlier and was therefore "a thirty year native of San Diego." When Indira Gandhi won the last general election in India, NBC spelled her name, which has been pronounced for more than half a century, G-I-N-D-I. The ABC station in New York abbreviated partly cloudy "PT CLOUDY." CBS showing some film it had obtained from NBC, graciously noted, "Courtesy NBC Sports."

A television station did its duty at election time by admonishing us to "Choose the candidate of your choice. A timely warning against choosing the candidate of someone else's. The television onto of the New York Times reported that a guest on an NBC program had been preselected. You have to get up pretty early in the morning to be preselected.

The Times is thought to be (by among others, itself) a paragon among newspa-

pers. Yet it led an editorial with this pronouncement: "No crisis is complete without a press flap and Iran is no exception." How if no crisis is complete without a press flap, there could be an exception, the Times did not explain. It ran a headline saying that the U.S. Olympic hockey players got their just deserts, which, since just deserts usually go to villains, just doesn't seem just. Also, a headline stating that baseball veteran Pete Rose "Won't Withstand With Age," which leaves unanswered whether he will where out.

The Times—without which I could not have written my books about the sad state of American English—daily supplies evidence of the consequences of the neglect of English. It is, for example, hopelessly confused about the word podium. It said of Edward Kennedy that he seemed undecided "whether to pound the podium or play things low key," though he will surely attract more attention if he pounds the podium. How many politicians do you see in that position? Of Jerry Brown, the Times said, "Behind the podium, he is quick, cerebral and singular." He is also invisible to most of his auditors.

In a headline over a story about automobile insurance for single people, the Times said, "Unmarital Status Held No Bar to Insurance." Soon after, the Times had someone riding a horse along the oval path in Old Westbury Long Island Race along that path long enough and you lose your marital status.

Here is that vast company Sears, advertising its Sears Bugwacker Bug Killer and boasting that the bug killer "attracts night-flying insects within about a 100-foot radius and electrifies them on an inner grid." Who wants electrified insects flying about the place? That would only make them more annoying. But then, American business often makes unattractive offers to its potential customers, in connection with one of its products. Polyglottal has given automobile owners this warning: "Unless applied by a professionally trained New Car Dealer, you could damage your automobile surface." However devoted Americans may be to their cars, the number who want to be stuck to them permanently to protect the finish must be limited.

These mistakes are insignificant in themselves, but they are symptoms, at a fairly high level in American society of what happens when language is brushed aside as unimportant, as anivon for pedants and drunks. According to this view, young people may be "inexperience traditional academics," but what matters is that they "listen" to one another, that they develop "leadership skills" and "healthy interpersonal relations."

Accompanying this view—and highly convenient for "educators" who find so-called standard English unnecessary and undesirable—is the notion that, rules somehow stand in the way of children's creativity. Children should, therefore, not be corrected, doing so will inhibit their natural



expression. The consequence of this is that we have been producing, year after year, dozens of young people of whom appalling numbers are deficient in what are now called communication skills and what were called, in poorer days, reading, writing and speaking.

A physician who examines candidates for places at one of the country's leading hospitals told me that the English of these medical-school graduates was pathetic; it made him despair. I am not astonished. When I walk around my New York neighborhood—sometimes called the fashionable East Side, I find a shop selling Dobberman pups, another closed while the owner is on vacation, another seeking a house, and still another whose specialty is boudoirs. An establishment billing itself as a men's spa temptingly offers Imperial Appointment. Nearby a restaurant is temporarily closed. Just up the street, you may buy barbecued ribs, pronounced, I suppose, barbecued For vegetarians with Continental aspirations, there is a restaurant with a saucy French name, Au Natural.

Whether or as the New York Times might prefer to put it, wither are we heading? Add to the pomposity and semiliteracy already outlined the soulless language of the computer with its bytes, bits, dbits and augends; its quantizers, concatenated data sets and longitudinal redundancy check characters. Then add the effusions of the trainers and developers now loose upon many of the work forces in this country. Drawing on the behavioral psychologists, they speak of interaction management, profile assessment, targeted feedback, risk aversion, negative/positive reinforcement concepts, funding progression and cognitive integration. Many can barely get through a sentence without "experiential" and "methodology." Pomposity, semiliteracy and jargon: It is a bleak outlook.

There are encouraging signs—plain language laws covering certain contracts in some states, the requirement of some competence in English by a number of schools and universities, ridicule on a scale unknown before of gassy academic and governmental musing, a presidential order calling for plain English in government regulations—but all of this is a mere beginning. We have become a country in which millions of people are able to express themselves in only a rudimentary way while many of those who can do better go to almost any length to avoid being generally understood. Not in these difficult times, a recipe for a successful nation.

What is to be done? One thing we should not do is suggest that this is a complex problem. It isn't. We don't need commissions, panels, and committees to tell us that there is some recondite answer to be found if only it can all be made to sound sufficiently complicated. We do need to understand that language is important: that the lives of people and nations are affected, for good or ill, by the effectiveness—and the zest—with which it is used. **DO**

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FICTION  
BY PHILIP K. DICK

## RAUTAVAARA'S CASE

**T**he three technicians of the floating globe monitored fluctuations in interstellar magnetic fields, and they did a good job until the moment they died.

Basalt fragments, traveling at enormous velocity in relation to their globe, ruptured their burner and abolished their air supply. The two males were slow to react and did nothing. The young female technician from Finland, Agneta Rautavaara, managed to get her emergency helmet on, but the hoses tangled; she asphyxiated and died, a melancholy death, strangling on her own vomit. Her death ended the survey task of EX208, their floating globe. In another month the technicians would have been relieved and returned to Earth.

We could not get there in time to save the three Earthpersons, but we did dispatch a robot to see whether any of them could be regenerated. Earthpersons do not like us, but in this case their survey globe was operating in our vicinity. There are rules governing such emergencies that are binding on all races in the galaxy. We had no desire to help Earthpersons, but we obey the rules.

The rules called for an attempt on our part to restore life to the three dead technicians, but we allowed a robot to take on the responsibility, and perhaps there we erred. Also, the rules required us to notify the closest Earth ship of the calamity, and we chose not to. I will not defend this omission or analyze our reasoning at the time.

---

*The aliens saved the woman's life only  
to find themselves defending  
their action before a board of inquiry*

---

PHOTOGRAPH BY  
HUBERT KRETZSCHMAR

The robot signaled that it had found no brain function in the two males and that their neural tissue had degenerated. Regarding Agneta Rautavaara, a slight brain wave could be detected. So in Rautavaara's case the robot would begin a restoration attempt. Since it could not make a judgment decision on its own, however, it contacted us. We told it to make the attempt. The fault—the guilt—to speak—therefore lies with us. Had we been on the scene, we would have known better. We accept the blame.

An hour later the robot signaled that it had restored significant brain function in Rautavaara by supplying her brain with oxygen-rich blood from her dead body. The oxygen, but not the nutrients, came from the robot. We instructed it to begin synthesis of nutrients by processing Rautavaara's body using it as raw material. This is the point at which the Earth authorities later made their most profound objection. But we did not have any other source of nutrients. Since we ourselves are a plasma, we could not offer our own bodies.

They objected that we could have used the bodies of Rautavaara's dead companions. But we felt that, based on the robot's reports, the other bodies were too contaminated by radioactivity and hence were toxic to Rautavaara; nutrients derived from those sources would soon poison her brain. If you do not accept our logic, it does not matter to us: this was the situation as we construed it from our remote point. This is why I say our real error lay in sending a robot rather than going ourselves. If you wish to intrude us, intrude us for real.

We asked the robot to patch into Rautavaara's brain and transmit her thoughts to us so that we could assess the physical condition of her neural cells.

The impression that we received was sanguine. It was at this point that we notified the Earth authorities. We informed them of the accident that had destroyed EX208. We informed them that two of the technicians, the males, were irrevocably dead; we informed them that, through swift efforts on our part, we had the one female showing stable cephalic activity—which is to say we had her brain alive.

Her what? The Earthperson radio operator said in response to our call.

We are supplying her nutrients derived from her body—

Oh, Christ! the Earthperson radio operator said. You can feed her brain that way. What good is just a brain?

"It can think," we said.

All right. We'll take over now! the Earthperson radio operator said. But there will be an inquiry.

Was it not right to save her brain? we asked. After all, the psyche is located in the brain. The physical body is a device by which the brain relates to—

Give me the location of EX208, the Earthperson radio operator said. We'll send a ship there at once. You should have notified us of once before trying your own

rescue efforts. You Approximations simply do not understand somatic life forms.

It is offensive to us to hear the term Approximations. It is an Earth slur regarding our origin in the Proxima Centauri system. What it implies is that we are not authentic, that we merely simulate life.

This was our reward in the Rautavaara case. To be denied. And indeed there was an inquiry.

Within the depths of her damaged brain Agneta Rautavaara tasted acid vomit and recoiled in fear and aversion. All around her EX208 lay its splinters. She could see Travs and Elms; they had been torn to bloody bits, and the blood had frozen. Ice covered the interior of the globe. Air gone. Temperature gone. What's keeping me alive? she wondered. She put her hands up and touched her face—or rather tried to touch her face. My helmet, she thought. I got ice on time.

The ice, which covered everything

*• We notified Earth authorities. We informed them that two of the technicians were dead and that we had the female showing stable cephalic activity—which is to say, we had her brain alive •*

began to melt. The severed arms and legs of her two companions rejoined their bodies. Basal fragments, embedded in the hull of the globe, withdrew and flew away.

Time, Agneta realized, is running backward. How strange!

As returned, she heard the dull tone of the indicator horn. Travs and Elms, groggily got to their feet. They stared around them, bewildered. She felt like laughing but it was too grim for that. Apparently the force of the impact had caused a local time perturbation.

Both of you sit down! she said.

Travs said thickly, "I—okay, you're right." He seated himself at his console and pressed the button that strapped him securely in place. Elms, however, just stood.

We were hit by rather large particles,

Agneta said.

Yes, Elms said.

Large enough and with enough impact to perturb time? Agneta said. So we've gone back to before the event.

Well, the magnetic fields are partly responsible, Travs said. He rubbed his eyes; his hands shook. Get your helmet

off, Agneta. You don't really need it."

"But the impact is coming," she said.

Both men glanced at her.

"We'll repeat the accident," she said.

"Shit," Travs said. "I'll take the EX out of here. I've pushed many keys on his console. It'll miss us."

Agneta removed her helmet. She stepped out of her boots, poked them up—and then saw the figure.

The figure stood behind the three of them. It was Christ.

"Look," she said to Travs and Elms.

The figure wore a traditional white robe and sandals; his hair was long and pale with what looked like moonlight. Bearded, his face was gentle and wise. Just like in the holidays the churches back home put out, Agneta thought. Robed, bearded, wise and gentle, and his arms slightly raised. Even the nebulae in space. How odd that our preconceptions were so accurate!

"Oh, my God," Travs said. Both men stared, and she stared too. He's come for us."

Well, it's time with me, Elms said.

"Sure, it would be time with you," Travs said bitterly. "You have no wife and children. And what about Agneta? She's only three hundred years old; she's a baby!"

Christ said, "I am the vine, you are the branches. Whoever remains in me with me, bears fruit in plenty; for cut off from me, you can do nothing."

I'm getting the EX out of this vector,"

Travs said.

"My little children," Christ said, "I shall not be with you much longer."

Good," Travs said. The EX was now moving at peak velocity in the direction of the Sirius axis; their star chart showed massive flux.

Damn you, Travs! Elms said savagely.

This is a great opportunity. I mean, how many people have seen Christ? I mean, it's Christ! You are Christ, aren't you? he asked the figure.

Christ said, "I am the Way, the Truth, and the Life. No one can come to the Father except through me. If you know me, you know my Father too. From this moment you know him and have seen him."

There! Elms said, his face showing happiness. See! I want to know that I am very glad of this occasion. M— "He broke off. I was going to say, Mr. Christ. That's stupid, that is really stupid. Christ! Mr. Christ will you sit down? You can sit in my cotchete or at Mr. Rautavaara's. I sit that right, Agneta? This here is Walter Travs, he's not a Christian, but I am. I've been a Christian all my life. Well, most of my life. I'm not sure about Mr. Rautavaara. What do you say, Agneta?"

Stop babbling, Elms," Travs said.

Elms said, "He's going to judge us."

Christ said, "if anyone hears my words and does not keep them faithfully, it is not I who shall condemn him; since I have come not to condemn the world but to save the world, he who rejects me and refuses my words has his judge already."

"There," Elms said, nodding gravely. Frightened, Agneta said to the figure, "Go easy on us. The three of us have been through a major trauma." She wondered suddenly whether Travis and Elms remembered that they had been killed; that their bodies had been destroyed.

The figure smiled, as if to reassure her. Travis, Agneta said, bending down over him as he sat at his console. "I want you to listen to me. Neither you nor Elms survived the accident; survived the basic particles. That's why he's here. I'm the only one who wasn't!" She hesitated.

Killed, Elms said. "We're dead, and he has come for us." To the figure he said, "I'm ready Lord. Take me."

"Take both of them," Travis said. "I'm sending out a radio H.E.L.P. call. And I'm telling them what's taking place here. I'm going to report it before he takes me or tries to take me."

"You're dead," Elms told him. "I can still be a radio report," Travis said, but his face showed his resignation.

To the figure, Agneta said, "Gee Travis a little time. He doesn't fully understand. But I guess you know that; you know everything."

The figure nodded.

We and the Earth Board of Inquiry listened to and watched this activity in Rautavaara's brain, and we realized jointly what had happened. But we did not agree on our evaluation of it. Whereas the six Earthpersons saw it as precious, we saw it as grand—both for Agneta Rautavaara and for us. By means of her damaged brain, restored by an ill-advised robot, we were in touch with the next world and the powers that ruled it.

The Earthpersons' view distressed us. "She's hallucinating," the spokesperson of the Earthpeople said. "Since she has no sensory data coming in. Since her body is dead. Look what you've done to her."

We made the point that Agneta Rautavaara was happy.

"What we must do," the human spokesperson said, "is shut down her brain."

"And cut us off from the next world?" we objected. This is a splendid opportunity to view the aberrant, Agneta Rautavaara's brain is our lens. The salutary merit outweighs the humanitarian.

This was the position we took at the inquiry. It was a position of ninety not of expedience.

The Earthpersons decided to keep Rautavaara's brain at full function with both video and audio transmission, which of course was recorded; meanwhile the matter of censoring us was put in suspension.

I personally found myself fascinated by the Earthhead of the Savior. It was for us an antique and quaint conception—not because it was anthropomorphic but because it involved a schoolroom adjudication of the departed soul. Some kind of tale board was involved, listing good and bad acts; a transcendent report card such as one finds employed in the teaching and

grading of elementary-school children.

This, to us, was a primitive conception of the Savior and while I watched and listened—while we watched and listened as a polycephalic entity—I wondered what Agneta Rautavaara's reaction would have been to a Savior or Guide of the Soul based on our expectations. Her brain, after all, was maintained by our equipment, by the original mechanism that our rescue robot had brought to the scene of the accident. It would have been too risky to disconnect it; too much brain damage had occurred already. The total apparatus involving her brain had been transferred to the site of the judicial inquiry, a neutral ark located between the Proxima Centauri system and the Sol system.

Later, in discreet discussion with my companions, I suggested that we attempt to infuse our own conception of the Afterlife Guide of the Soul into Rautavaara's artificially sustained brain. My point: It would be interesting to see how she reacted.

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At once my companions pointed out to me the contradiction in my logic: I had argued at the inquiry that Rautavaara's brain was a window on the next world and hence justified—which exculpated us. Now I argued that what she experienced was a projection of her own mental presuppositions, nothing more.

"Both propositions are true," I said. "It is a genuine window on the next world, and it is a presentation of Rautavaara's own cultural racial propensities."

What we had in essence was a model into which we could introduce carefully selected variables. We could introduce into Rautavaara's brain our own conception of the Guide of the Soul and thereby see how our rendition differed radically from the purview of the Earthpersons.

This was a novel opportunity to test out our own theology. In our opinion the Earthpersons' theology had been tested sufficiently and had been found wanting.

We decided to perform the act, since we maintained the gear supporting Rautavaara's brain. To us, this was a much more interesting issue than the outcome of the inquiry. Blame is a mere cultural matter; it

does not travel across species boundaries.

I suppose the Earthpersons could regard our intentions as malign. I deny that; we deny that. Call it instead a game. It would provide us aesthetic enjoyment to witness Rautavaara confronted by our Savior rather than hers.

To Travis, Elms, and Agneta, the figure, raising its arms, said, "I am the resurrection. If anyone believes in me, even though he dies, he will live; and whoever lives and believes in me will never die. Do you believe this?"

I sure do," Elms said heartily. "I sure do," Elms said.

To herself, Agneta Rautavaara thought, "I'm not sure. I just don't know."

We were sure to decide if we were going to go with him, Elms said. "Travis, you're done for you're out. Sit there and rot—that's your fate." To Agneta he said, "I hope you find for Christ, Agneta. I want you to have eternal life like I'm going to have. Isn't that right, Lord?" he asked the figure.

The figure nodded.

Agneta said, "Travis, I think—I well, I feel you should go along with this. I—." She did not want to press the point that Travis was dead. But he had to understand the situation, otherwise, as Elms said, he was doomed. "Go with us," she said.

"You're going then?" Travis said, bitterly. "Yes," she said.

Elms, gazing at the figure, said in a low voice, "Quite possibly I'm mistaken, but it seems to be changing."

She looked, but saw no change. Yet Elms seemed lightened.

The figure, in its white robe, walked slowly toward the seated Travis. The figure halted close by Travis, stood for a time, and then, bending, bit Travis's face.

Agneta screamed. Elms stared, and Travis, locked into his seat, thrashed. The figure calmly ate him.

Now you see," the spokesperson for the Board of Inquiry said, "this brain must be shut down. The deterioration is severe, the experience is terrible for her; it must end." I said, "No. We from the Proxima system find this turn of events highly interesting."

But the Savior is eating Travis," another of the Earthpersons exclaimed.

"In your religion," I said, "is it not the case that you eat the flesh of your God and drink his blood? All that has happened here is a minor image of that Eucharist."

I order her brain shut down," the spokesperson for the board said; his face was pale, sweat stood out on his forehead.

We should see how fast," I said. "I found it highly exciting; this enactment of our own sacrament, our highest sacrament, in which our Savior consumes us."

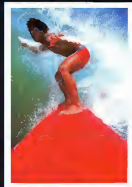
"Agneta," Elms whispered, "did you see that? Christ ate Travis. That's nothing left but his gloves and boots."

Oh, God, Agneta Rautavaara thought. What is happening? I don't understand.



## SWEPT AWAY

*We've only begun to harness nature's potential in our pursuit of new athletic highs*



Having freed us from much of life's drudgery, technology now revolutionizes the ways in which we spend our leisure time. Faced with more hours of play than ever before, man has been challenged to devise novel means of recreation—ones that will permit ever more subtle and more exciting maneuvers on the ground, on the sea, in the air, and eventually in the weightlessness of space. Now lightweight materials, streamlined engineering designs, and refined methods of capturing the wind's energy open up the full range of experience that nature's playgrounds afford. Shorter surfboards, some only 17.5 cm in length (above), increase the speed and agility of surfers racing to high a ride along an

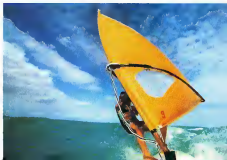
BY KATHLEEN McLAULIFFE



Outrigger the wind in a steep-rigged catamaran, the fastest sailing vessel on the high seas (left). With feet strapped to the board, a Hawaiian wind surfer launches off the top of a breaker (below). The fixed keel is held by a hook on the wishbone enables the wind surfer to relax his grip and concentrate more on the angle of the sail and mast (bottom). This cuts physical effort in half.

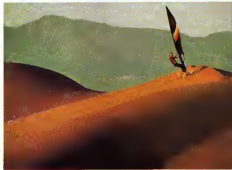


unfurling crest. Another innovation, the double-fin design (preceding pages), offers greater stability than earlier single-finned boards, which tended to spin out from under the surfer during difficult turns. This technical modification has also contributed to wind surfing's sudden popularity. A sport that combines the best aspects of surfing and sailing, wind surfing has recently undergone a radical transformation. Hawaiians, in their quest to attain ever faster speeds in deep waters, have moved the mast and keel to the back of the board. Consequently, one no longer changes direction mainly through the balancing of the mast toward fore or aft but with a play of feet. Skyrocketing off the tops of breakers, leaping as high as nine meters in the air, Hawaiian wild surfers have no trouble reaching speeds up to 25 knots. With the



• Vast expanses of desert are ideal playgrounds for the newly evolved sport of speed sailing. •

exception of the catamaran, no sailing vessel can achieve these speeds under ordinary conditions. Back on terra firma, the speed sail is turning the desert into a new kind of amusement park. Resembling a skateboard with a mast at the center, the speed sail permits the rider at the helm to skid over sand dunes the way a skier bounces a mogul-filled slope. Its remarkable handling and mere 20 kilograms make quick, easy maneuvers possible. In colder parts of the world ice boating is transforming frozen ponds, lakes, and seas into an immense recreational ground. On gusty days ice boats glide effortlessly across glistening terrain, traveling up to 150 kph. Such speeds are truly awesome for a sport that relies on natural means of propulsion. (By way of comparison, the fastest recorded descent of a free-falling man is 258 kph.) The



Bernie de Rosnay, as photographed during his pursuit crossing of the Sahara at the helm of his speed sail—the name he invented for his four-wheeled land yacht. Flying over the sand dunes, de Rosnay completed his 1,000-kilometer journey from Morocco to Senegal in just under 60 hours. The speed sail requires expertise at balancing one's body weight against wind pressure. Its light weight and remarkable maneuverability help one steer it clear of unexpected obstacles.

An outstanding way to spend a winter's afternoon: ice boating is rapidly gaining popularity in Canada and the northern United States. Racing at Anxous speeds, boats a foot or like in length, use boaters wear helmets and goggles to protect themselves against hard landings on the ice. The boat blades serve the same function as a rudder on a sailboat, they are moved by two jacks at the front of the boat or by a wheel that is remotely controlled.



photographs presented here were collected for Cross by Ron Arnaud de Rosnay, a leading sportsman and innovator of new forms of recreation. They represent a sampling of the sports that will be featured in his upcoming film, *Gravity*, which he describes as "a spectacle, employing nature as a backdrop and ballet dancers who will organically evolve because of the mystery of the surrounding elements." A chief proponent of the return to nature via lower sports, de Rosnay sees team sports—dominated by rules, competitive strategies, and the referee's whistle—as an extension of many pressures of twentieth-century life. "With overcrowding and mounting competition for jobs and living space," de Rosnay says, "man will want to escape cramped quarters and, as a solitary player, explore nature's boundless pleasures." □

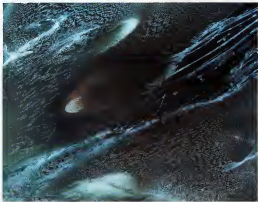




## THE GOD IN SCIENCE FICTION

*Will He be found as we  
explore the cosmos, or should our  
search be closer to home?*

BY RAY BRADBURY



Somewhere back in time, the Sun God Apollo became the Sun God Christ, born in the week of the winter solstice to prove that the world had not died but would rise again in the New Year that was truly that week and not January 1.

Somewhere further along in Time, Christ

moves in Space, cargoed on missions that for Now anyway take the name of Apollo. So old myth and now circumnavigate the stars; rebuild old dreams, promise again better destinies on faraway worlds we cannot now imagine.

Christ in the next billion years! How will He

PAINTINGS BY ALDO SESSA

shape himself? How will we shape ourselves as we fly from seedbed Earth toward stars that promise nothing?

And while Christ is changing, how will his Father do? While we are recombining the genetic glues and the essences of our world to grow a Superman ten ways tall, in what ways will we recombine the Universal stuffs to serve forth impossible feast of God, available on Mars, Pluto, and next stop, Alpha Centauri?

Will the changes be as brutal as when we shook Olympus, knocked all the deities into one mold, and worshipped a Single Person, plus Son, plus Ghost?

Are we ourselves in some miraculous fashion the Holy Ghost that will haunt the cosmic dusts and call them alive? Will we conjure dead matter on Martian thresholds and Christ-like summon it up into intelligence and immortal life as we pass?

The questions swarm in mobs and multitudes. The answers similarly swarm leaving us almost if not quite, with old Khayyam, who came out by that same door where I went.

Doctors and scientists meanwhile, will give great argument. Science-fiction writers will learn more and more into theology, forced by NASA's blasphemous intrusion on the Lord's territorial imperatives to question where we have come from and just where in Heaven or Hell we are going.

In my own work as just one more laborer in a now more respectable field, here are some of the ways in which I have tried to scale man up to a size fitting the galaxies, even as Nature blindly tries, or seems to try, to scale him down.

Early on I wrote a story called, "The Man." It concerns a star-riding ship that happens on a world the day after Christ has left it to go far-thinging.

My rocket Captain, wild at the thought that he has missed a collision with the Savior, rushes off to pursue His Spirit around the Cosmos, doomed to failure. We perceive His crew quieter, truly believing, turn and walk into this strange City on this strange world, convinced He has not left.

And Christ is, indeed, waiting for them. A parable of faith, but difficult to sell to any magazine anywhere in our American culture back in 1949. We have since forgotten how damnable the Church peered over our shoulders and made censorious noises in those long years before the Great Change of the Sixties.

In early 1950 I telephoned a local Catholic priest and expressed my deep need to confess a Martian story outline to him, that is, if he wouldn't mind my madness or the fact that it was some sort of fallen-away Baptist. He wouldn't mind, and I went by. At the door of the rectory the young priest blinked at me and said, "Well?"

"Well," said I, "I'm writing a tale of some priests who land on Mars and are startled by blue fires, bright, intellectual spirits that soar in the skies above them. These are the Martians, illuminations without bodies, blue lights that speak in tongues. Now how

do my priests decide whether or not these fiery Martians, these searing illuminations are human?"

"Good grief!" cried the priest. "Fascinating! Fascinating! Come in! Sit down!"

I sat. We talked up a blue-fire storm. I went and wrote. The answer was, of course, that if a creature knows the difference between good and evil, light and dark, can choose love instead of murder, can withhold violence, can extend peace, can judge, can value that creature is human, regardless of its outer appearance, be it flesh or fire.

Humanity after all, is a concept that only indirectly has to do with shape, size, color, texture, or number of fingers, limbs, heads, presence or absence of gills, tails, or for that matter sex.

We sense a near humanity with dolphins, whales, and other creatures here on Earth. On far worlds, confronted by six-foot apes, we would, at a safe distance, question their motives to judge their humanity.

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*• We are the miracle  
of force and matter making  
itself over into  
imagination and will. The  
Life-Force, experimenting  
with forms: you for one,  
me for another . . . We  
are the incredible echo. •*

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No matter how dreadful their maskings, their shapes, their seeming appearances, if Christ's Spirit or Buddha's or Muhammad's, instructed them, we would sit and break bread with them, confident that they were no more or no less paradoxical than ourselves. Knowing that dark and light exist in us all, with the will to murder put aside more often than exercised.

As it turned out in my story "The Fire Belloons," the Christian priests don't have to save the Martian illuminations. Our concept of sin is based on bodily opportunities, more often than not. Lacking hands, we cannot steal. Lacking feet, we cannot kick our way to destruction. Lacking sexual organs, we cannot fornicate our way out of the Garden. These special blue-fire Martians, it seems, have no flesh at all, are spirits without our earthly encumbrances and temptations. Free of sin, they live in a State of Grace, not unlike that spoken of by George Bernard Shaw before I was born.

The priests turn away, move back to the small Martian colonial town to save their own people.

So the Life-Force moves in the Universe, changing, and Christ moves also, sym-

bolizing that Force, putting off old masks to put on new.

In a story called "The Messiah," some years later, I pursued yet another line in a series of encounters with Him on other worlds.

But first an aside, if you will permit. How was it that the science-fiction Baptist Bradbury, who had fallen away into the depths of pubertarian atheism, at sixteen reconciled himself to miracles again in his twenties and began worrying about Christ on improbable planets?

You might well say, I was Born Again through John Huston's handing me the task of killing a Whale and rendering out a screenplay for *Moby-Dick*, in 1953.

Melville in turn tossed me back not only into the embrace of Shakespeare and his Richard III, but also into the ancient Time Machine, the Bible. To sit at the Last Supper with Matthew, Mark, Luke, and John while brooding the wisdom with Ishmael of old.

My rekindlement increased when MGM Studios called me in late one autumn day in 1960 and confessed that while they had spent 7 million pieces of silver on an eleven highly tinted version of King of Kings they had "no ending for the film."

I was stunned. Had they tried the Apostles? I wondered.

"Yes, yes, they had, but still, no ending. Would I sign in and solve the problem?"

I would and did.

I found my ending for the film in John where the Last Supper after the Last Supper occurs. Christ resumed to appear on the shore of the Sea of Galilee. He stands by a spread of white-hot coals on which fish are baking. He tells Simon-Called-Peter and the other disciples to take of the fish and feed their brethren and then to take of His message and move through all the nations of the world, preaching forgiveness of sin, in the hell-light before dawn. Christ lifts His hand above the fire. We see the mark of the nail. Blood drops from His palm upon the coals. Thus He proves His identity.

MGM did not film my ending, which is a great shame, for John has never been used as the basis for ending any film ever made about Christ.

It remained for me to use some part of John in yet another Martian story ten years later. Late at night on Mars, two priests speak of their reasons for joining the Church. The younger priest confesses that "I joined, hoping one day to actually meet Christ should He truly return."

The priests retire to sleep. At three in the deep morning, the young priest sits, awakens, listens to the Martian wind grove about the small colonial church. He hears a steady dripping sound from below in the baptistry. Moving silently he peers into the dark baptismal room and sees out.

Just beyond the font, self-illuminated, stands the figure of a white-robed man bearded, with very eyes.

The dripping sound? It is caused by the upraised hand of the Man, from whose

palm slow drops of blood fall into the baptismal waters.

The priest, stunned, falls to his knees calling out to this apparition, no, this reality. "At last, oh, at last, after more than two thousand years. You've come!"

"No!" the Apparition cries. "Stand back, avert your gaze! I am not the Thing you imagine. I am not the Worker on the Sea of Galilee! Your thought will kill me. Turn away!"

And in that moment the priest realizes that his childhood dream of someday meeting Christ has moved out into the Martian night and trapped a Martian. The Martians have telepathic abilities. They can assume the shapes of dreams, appear in any guise that the imagination summons forth. So the Martian seized into the church by the priest's dream, trapped by his hoping, desiring mind, appears as Christ.

"Let go!" the Martian pleads.

The priest feeds his eyes on the Dream before him. But realizing that he will kill the Martian if he keeps him too long in this form, the priest agrees to avert his gaze, let the Dream go, if the Christ promises to come back once a year.

"Yes," the Martian agrees. "When do you want me to return?"

"Once each year," says the priest. "At Easter."

"I know your holidays," says the Martian. "I shall come back, Easter morning. Look for me."

The priest shuts his eyes.

The Martian, gleamed in the ghostly flesh of Christ, set free, whirrs, runs. The door alarms. The church is empty. The Martian wind blows by in the night.

Alone by the baptismal font, the young priest weeps. It will be a long year until next Easter.

And all this because MGM never got around to shooting my ending for *King of Kings*. What got lost on a studio back lot, relocated and found itself on Mars.

Baptized in somewhat unholy waters by John Huston and Melville and his Whale, rediscovered by MGM and the Four Apostles, I set about writing my own Shakespearean/biblical/Melvillean stage play set in outer Space.

Dedicated to Melville, my *Leviathan 50* utilizes the trappings of *Moby Dick* but refreshes them: seas of stars for ocean seas, rockets displacing whaling craft, astronauts standing in for sailors. My Ishmael, with November in his soul, gets himself to Space along with Quail, his green-skinned telepathic loving friend from the island planets in Andromeda.

On the night before Deep Fall into Space, Ishmael and Quail attend worship in an astronomical chapel where a robot priest rises to speak not the sermon of Father Mapple and his Whale, but a reseeded of the theme.

Is God dead? That's a very old question by now. But once I replied: No, only sleep-

ing until you chattering bones shut up."

Gentle laughter from the listening astronauts. The robot priest continues:

A better answer is: *Aie, you died?* Does that blood move in your hand? Does that hand move to touch metal? Does that meat move to touch Space? Do wild thoughts of travel and migration move behind your flesh?

"They do. You live. Therefore, God lives."

"You are the thin skin of life upon an unsensory Earth. You are that growing edge of God that manifests itself in hungers for Space."

So much of God lies vibrantly asleep. The very stuffs of worlds and galaxies they know not themselves. But here God stirs in His sleep—you are that stirring. He wakes—you are that wakening. God reaches for the stars—you are His Hand. Creation Manifest, you go in search. He goes to find you go to find Himself.

Everything you *three* along the way, therefore, it will be holy. On far worlds you will meet your own flesh, semifying and strange, but still your own. That it will. Beneath the Shape, you share the Godhead.

Was to you if you do not find it. Life most holy and coming to lay yourself down cannot lay.

O Father God, You awaken me.

I awaken Thee.

Immortal We then walk upon the waters of Deep Space.

In the New Morn.

# ONE-TRICK PONY

PAUL SIMON'S  
FIRST  
ALBUM ON  
WARNER  
BROS.  
RECORDS

FEATURING  
THE HIT SINGLE  
"LATE IN  
THE EVENING."



THE MUSIC ON THIS ALBUM  
WAS CREATED FOR  
THE PAUL SIMON MOVIE  
"ONE-TRICK PONY"



Which names itself: Forever  
Forever: the congregation whispers  
Amen.

And they turn to go and fly toward Alpha  
Centauri with a mad space Captain in  
search of a Great White Comet that put out  
his eyes when he was a young man.

And yet again.

My love for George Bernard Shaw being  
continuous and extreme, I connived to  
write him into a story titled "GNS Mark V." I  
lodged his psyche in an audio-animated  
robot aboard a starship bound for the Crab  
Nebula. Each night while other crew  
members salivate over their life-size wind-  
up toy Marilyn, I sneak below machinery  
stairs to call my electro-playwright awake.  
Thus summoned, Shaw sits bolt upright  
stares at the Milky Way and shouts:

"By God, I do accept it!"

"Accept what, Mr. Shaw?"

"The Universe," he cries. "It thinks there  
fore I am!"

In just such fashion, Shaw spoke from  
pulpits long before our time. With a wit half-  
full of cynicism and an awe half-empty of  
atheism, he came to desire the Life-Force  
to knock him into believing, to drag him  
kicking into the cathedral of Space, there to  
free his amiable soul from his sexual, if  
vegetarian body.

Later in that same "GNS Mark V." story, I  
take Shaw up to gaze at the Cosmos and  
speak on philosophies. Finally I nudge him  
and whisper:

"Say it, Mr. Shaw."

"Say what?"

"You know what I want to hear. Say it."

Shaw looks at the distant stars, then  
touches my elbow, touches himself.

"What are we? What, in the long night  
of the Universe, is this creature that happens  
in time? Why?"

We are the miracle of force and matter  
making itself over into imagination and will.  
The Life-Force, experimenting with forms,  
you for one, me for another? The Universe  
shouts: We are the incredible echo. The  
void is filled with ten billion on a billion  
bombardments of ignorant light, mindless  
avalanches of energy, matter, cosmic  
smuffs. God exhales. Comets appear. God  
sneezes—up we jump! Among so much  
flight and ignorance, we are the blind force  
that gropes like Lazarus from a billion-  
light-years tomb. We summon ourselves.  
We cry: O Lazarus, Life-Force, truly come  
thou forth! So the Universe, a motion of  
deaths, tumbles to reach across Time to  
feel its own flesh and know it to be ours. We  
touch both ways and find each other mi-  
raculous because we are One.

Kazantzakis, like Shaw, says much the  
same. In his briefest and greatest work, *The  
Saviors of God*, Kazantzakis trumpets: God  
cries out to be saved! We, it seems, must  
continuously and forever moult to itself  
breathe Him into existence. The Saviors  
Saviors is how our billing will run, as vast  
and wide and long as the Milky Way itself.

So, as I have moved in Space, I have  
taken as conversation-long after midnight  
companions the sublime idiot Nikos  
Kazantzakis and the divine demon St.  
George-St. Bernard Shaw.

We all go on the same Search, looking to  
solve the old Mystery: We will not, of course,  
ever solve it. We will climb all over it and  
devour it. We will finally inhabit the Mys-  
tery even as Norma inhabited his Nautilus  
to course the Deep.

If a sun can live 5 billion years and not  
know it, we have decided to do as well,  
survive—meanwhile sensing the facts  
adding the sums. Along the way we will  
write another dozen Bibles where needed  
and meet Father Sun and Holy Ghost in  
many guises, on various star paths to this  
immortally, we demand for ourselves  
since His flesh is ours and worth our protec-  
tion.

I go with that search, like hoped for sur-  
vival, that attempt to find new words, better  
tongues, to probe old mysteries and try to  
speak new truths. Some of my summing up  
of all this shows in a new poem that I have  
written to express my needs. In it, God  
measures Himself and His Earth children  
like this:

We fly much like each other  
We walk a common clay  
I dreamed Man into being  
He dreams Me now to stay—  
I am mere series of seeing  
We live Forever's Day.

The stars move even as God moves in  
His great sleep, continuing.

If Man should die, I'd blindly  
Rebirth that Beast again  
I cannot live without him  
Man dead? Then God is slain.

My Universe needs seeing  
That's Man's eternal task  
What is the use of being  
If God is but a mask?

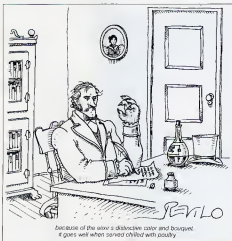
A single beat here, if this were a film, the  
music would now lift softly to back the  
triple.

Behold! the Mystery spring  
Here come the human moles!  
To see behind God's masking  
And peek out from the holes.

We go to do just that, in our lives. In our  
science fictions. In our dearest dreams. In  
our technologies. In our futures that will  
reluctantly stretch forever from here on out  
to the Nebula in Orion, which must stand as  
a metaphor for our existence through all  
Future Time.

The rest is not silence.  
I will write of this, speak of this, act on this  
for the rest of my days.

I give you the greatest gift that Mankind  
in turn can give to itself:  
Live Forever! **OO**



because of the wine's distinctive color and bouquet,  
it goes well when served chilled with poultry.



*Retracing the steps  
of chemical evolution,  
this philosopher-scientist  
has put modern research  
to work answering  
man's oldest question*

## INTERVIEW

# CYRIL PONNAMPERUMA

**H**ow did life begin? Dr. Cyril Ponnamperuma has sought the answer almost all his professional life. A lively and intense man, Dr. Ponnamperuma has spent much of his career as a chemist trying to duplicate the conditions under which life arose and watching geology and astrophysics for data to show that his experiments truly retrace chemical evolution.

"All life has a common chemical beginning," says Ponnamperuma. "If we examine the smallest microbes or the most intelligent human being, the molecules are the same. We can trace a continuum from the formation of the elements at the beginning of the universe to the appearance of replicating systems. We can draw a line from eighteen billion years ago to the time when the first man walked on Earth."

Ponnamperuma was born in Sri Lanka, received a bachelor's degree in chemistry from Warwick College in London in 1959 and his Ph.D. from the University of California at Berkeley in 1962. The following year he joined NASA's Exobiology Division and became

chief of the chemical evolution branch. Since 1971 he has been professor of chemistry and director of the Laboratory of Chemical Evolution at the University of Maryland.

In his laboratory he creates the organic compounds that might have been formed in Earth's atmosphere before life began. Fossil molecules show him traces of life in sedimentary rock. In meteorites he finds evidence of organic matter that formed when the solar system was young. And data from the Viking and Voyager space missions are lifted in to confirm his theories. The chemist talks about his work with all the pleasure of a poet reciting favorite lines. Clearly he sees his place in a long line of scientists and philosophers who sought answers only to the biggest questions.

Today Ponnamperuma suspects that, although organic matter is common in the universe, life is not. He does believe that there is life in other star systems, however—perhaps even intelligent life.

Science writer Ellen Zeisel recently interviewed Dr. Ponnamperuma for *Omnis*. Their conversation began far from Earth.



● *One has only to look at the night sky and see all those stars to conclude that there must be numerous possibilities of life on other planets around other stars.*

**Omri:** You have often said that your work on the chemical evolution of life makes you very optimistic about the possibility of there being life in some form elsewhere in the universe. Why do you think so?

**Panampërums:** I can give you a number of reasons. First of all, I think we can go to the information supplied us by astronomers. One has only to look at the night sky and see all those stars. Each is like our sun. If our sun is the mainstay of life upon this world, then one has to conclude that there must be numerous possibilities of life beyond the earth, on other planets around other stars.

Another reason why I think life exists elsewhere is that, working in the laboratory and under conditions that are nonbiological or prebiological, we can make almost every molecule that is necessary to a living organism. At the same time we find these molecules in meteorites. So we know that some of these processes that happened here on Earth and that we can simulate in the laboratory have occurred elsewhere in the universe.

A third argument, which is a very strong one, is that during the last twelve years since 1968, radio astronomers have found some of the molecules important to chemical evolution—such as ammonia, water, hydrogen cyanide, and carbon monoxide—in the interstellar medium.

Therefore, we have three scientific arguments—laboratory simulations, meteorite analysis, and interstellar molecules—all suggesting that the chemistry of life is commonplace in the universe. Put these together with the probability that planets are plentiful in the universe, and the chances for life somewhere seem to be very great.

**Omri:** How do you define life?

**Panampërums:** We think of something that has four legs and wags its tail as being alive. We look at a rock and say it's not living. There's a difference between these two. Yet when we get down to the no-man's land of virus particles, replicating molecules, we are hard put to define what is living and what is not living.

We can come up with a working definition of life, which is what we did for the Viking mission to Mars. We said we could think in terms of a large molecule made up of carbon compounds that can replicate and metabolize. So that's the thought: macro-molecule, metabolism, replication.

But I think what we are coming to as a result of our observations of the universe is that we can think of life as a property that's more and more manifest. We come to a point where something is living, you and I. We can talk to each other. But in everything there is a certain measure of life.

**Omri:** Has your own definition of life changed over the years?

**Panampërums:** Well, I suppose I see more into it now. The definition I just gave you was only a practical definition to use in going to another planet, such as Mars, if you were to ask me in our laboratory exper-

iments. When do you get to the point when something is living? I would answer:

When we see replication. If we had replication of a molecule alone in some of our vessels, I believe we would have the beginnings of life there.

**Omri:** The questions you ask about how life began have been asked by philosophers and theologians and some chemists before you. Can you put the work you are doing into historical context?

**Panampërums:** Yes. Recently while speaking before the Washington Philosophical Society I said, "In talking to you, I will be putting the ancient doctrine of spontaneous generation in a more refined, cosmic chemical manner."

For centuries the idea of spontaneous generation was regarded as an explanation of the origin of life. Aristotle put this idea forward in his *Metaphysics*, where he gave us the example of flies arising from the morning dew. Vergil describes a swarm of bees rising from the carcass of a cow. The Belgian physician and chemist Jan Baptista van Helmont gave us a very interesting recipe titled "How to Make Mice." It instructed: "Dirty undergarments enshrouded in wheat, twenty-one days is the critical period. The mice that jump out are neither weanlings nor sucklings, but fully formed."

It was the work of Louis Pasteur that dealt the deathblow to the whole idea. In 1864 he told the French Academy, "Never will the idea of spontaneous generation recover from this mortal blow."

But today we are coming back to the idea of spontaneous generation. We are not talking about frogs from the primordial ooze or mice from old linen. Rather, we are looking at an orderly sequence from atoms to small molecules to large molecules to replicating systems—to a continuum in the universe from its beginnings eighteen billion to twenty billion years ago to the time when the first man walked on Earth.

**Omri:** Some of the first scientific speculations on the origin of life were made by Charles Darwin. You frequently quote the letter he wrote his friend Hooker in 1871 in which he says, "If we could conceive in some warm little pond, with all sorts of ammonia and phosphoric salts—light, heat, electricity, and so forth—present, that a protein compound was chemically formed ready to undergo still more complex changes." How does your work connect with what Darwin theorized?

**Panampërums:** Well, Darwin's warm little pond has in it the germ of the entire concept of chemical evolution. What we try to do in the laboratory is to re-create Darwin's warm little pond.

When Darwin wrote to Hooker he was trying to extend his own ideas. There's no doubt that if we accept Darwinian or biological evolution, we must postulate a form of evolution before it, and that would be chemical evolution. Chemical evolution is the process that started with the beginning of the universe and that led to the

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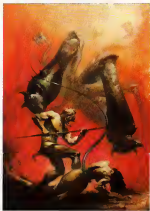
Primitive heroes  
from the past are coming  
into your future

## NOBLE SAVAGE

BY L. SPRAGUE DE CAMP

**B**ladeward in one hand  
guttering torch in the other, his keen barbarian senses  
alert, Darthan slunk through the tunnels beneath the lost  
city of Cais on his way to the fabled treasure.

Heroic fantasy is alive and flourishing. The more com-  
plex, convoluted, and restrained the civilization, the more  
man's mind returns to a dream of earlier times, when  
issues of good and evil were clear-cut and a man could  
venture out with his sword, conquer his enemies, and win  
a kingdom and a beautiful woman. The idea is compell-  
ing, even though such an age probably never existed.  
Tarzan, Conan, Tanelor Pellucidar, John Carter of Mars,  
and all the other boyish heroes of heroic fiction derive



PAINTINGS BY BORIS VALLEJO





from Jean-Jacques Rousseau, whose idea that primitive men were superior to those of today is rooted in ancient myths of Eden, in dimly remembered Golden Age, and in great dream of William Blake.

The most successful barbarian of recent times is Robert E. Howard's Conan the Cimmerian. Howard, an admirer of Edgar Rice Burroughs, Rudyard Kipling, and Jack London, created several other primitive heroes. Conan lives, loves, and battles in an imaginary prehistoric age, the Hyborian Age, existing some 12,000 years ago between the sinking of Atlantis and the rise of Hrosgard history. A gipsy barbarian adventurer and a matchless fighter, Conan wades through rivers of gore and vanquishes foes both natural and supernatural to become at last the monarch of a great Hyborian kingdom. He is the primitive hero to end all.

Preceding pages, left: from William Tenn's *Of Men and Monsters*, right: from *The Best of Leigh Brackett*. Clockwise from above: Paul Anderson's *The Broken Sword*, a fairy tale about exchanged children who fall in love; from *The Best of Leigh Brackett*, another dimension, from Roger Zelazny's *Amber series*.



• Fictional barbarians are always big, stalwart men with thighs of iron. •





primitive heroes. When, after his enemies capture and crucify him, a vulture flies down to peck his eyes out, Conan bites off the vulture's head. You can't have a tougher hero than that.

There is a boundless attraction to the barbarian hero. Dreamers are bound to look back longingly to the days when the world was uncrowded and unregulated and "natural" man flourished. No matter that the real barbarian only rarely resembles the barbarian hero of fiction. As real barbarism recedes into the misty past, more and more people, exasperated by the elaboration of life that their burgeoning numbers bring, will idealize a supposedly simpler, freer barbarian past, even though that past is nine-tenths fiction. The strong, half-naked man of heroic fiction is assured of popularity for many years to come. **DD**

*Clockwise from left: Conan of Aquilonia, a portrait of Howard's warrior hero, a land of evil has an eagle queen, from Philip José Farmer's *Master of Universes*, hand-to-hand combat with an enraged centaur in Farmer's *A Private Cosmos**

In the years ahead we may  
live differently, but our human values  
should remain the same

## FUTURE VIEWS

### ENDURING INDIVIDUALS

For our second anniversary, Omni asked several highly visible individuals to peer at the world ahead and comment on the problems and potentials they see there. We elicited surprising opinions from an eclectic assortment of forward-looking famous folk. Some seemed particularly concerned about how the future will affect us as individuals, while others focused on the broader sweep of events and technology. Here, and on the following pages, we offer a selection of their comments.

I tend to be gloo about the future, because I don't fear it, I welcome it. I think all the advances we're seeing are terrific. And I think the negative aspects of life can be tackled. As a dramatist, I believe in conflict in plays. But it's ever-present in life, as well, and I don't think it is necessarily a negative part of our existence. It makes people regard themselves and their lives more realistically. As it does in almost every field, technology may change the entertainment industry but only physically. When it comes to telling a story, people are interested in human emotions and human circumstances. It's been that way for thousands of years and will continue to be so in theater, movies, and television. I'm looking forward to what changes there are. You're in a bad way if you don't grow, people who thrive on change seem to get younger as they get older. —Neil Simon

We all have fears of holocausts and self-destruction and nuclear war. I have one major fear: that too few of us possess the one thing that can stop all of this: a sense of moral outrage. It was moral outrage that propelled most of our ancestors to this country, and we have lost that quality. Today we "play the game, go downswain, don't make waves." Too many responsible people are consciously mute. Technology can be a great aid to man, but it can also be dangerous. Seeing that it's well handled is as much the responsibility of the individual as it is the job of scientists and politicians. We can't simply ignore it. —Giff Robertson

Human nature does not change now and it most likely will not change in the future. So we should be pretty stable in dealing with moral issues. Ideally having a baby should be the only experience unique to women. Almost everything else men and women experience similarly and therefore can contribute to equally. But I fear that in the future we'll still have the problem of who brings up the babies. It hasn't worked out for the most part that men share equally in the responsibility of parenting or housework. I don't want to see an androgynous future, because it's less interesting if there's no polarity. But the current arrangement puts a greater burden on women. —Helen Gurley Brown

My hope is that in the future we may die, ultimately, in good health. That sounds like a paradox. But millions of people live to be eighty or ninety years old and then go to bed one night and never wake up. That is a good way to die. There is no need to perish of the miseries that result from cardiovascular disturbances, from malignancies, from senile psychosis and depression, or from any of the other things that make the advanced years of our lives a source of great misery. I hope we'll see biomedical research bring about this kind of progress, as well as the new knowledge that will enable us to control other illnesses, for which we do not now have either a prevention or a cure. I'm fearful only that all of this will not come to pass as quickly as an impatient seventy-three-year-old would like to see it come to pass. I've been impatient all my life, and I'm not getting any less impatient the older I grow. I see things that need to be done, that can be done, but that are not being done. But I've lived with this for a long time. We won't  
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PHOTOGRAPHS BY DAN MORRILL



*Our culture must overcome  
fundamental challenges to rise beyond  
the present world of crisis*

## **FUTURE VIEWS** DIVERGING SOCIETIES

I'm fundamentally optimistic, and in American history the optimists have been the realists. We're not going to be living a deprived, sacrificing, energy-short existence. Poverty is very much less of a problem in this country than it ever has been in the past. I think this trend will continue. The difficulty we face is not depression but inflation. We know how to deal with depression. Indeed, everything that's happened economically and sociologically in the last forty years has pointed away from any recurrence of what we all remember from the black-and-white movies of the Thirties. But, in guarding against this, we have built in an inflationary bias in this society, and this is a problem. Where technology is concerned, I don't think we'll all be staying in our houses and communicating only by television. People who suggest these things don't understand how human beings interact. I don't think we'll be working two-day weeks and taking time off to fish. For one thing, we'll be burning the heat to keep the house warm. But human beings are not constructed to really want that. We're more likely to see a return to something resembling the work ethic than we are to see the full-scale greening of America. —William S. Ruckelshaus, Managing Editor, *Fortune*

Over the next thirty years there's a substantial risk of military or ecological disaster that requires great wisdom and prudence on the part of competing nations. It will take vigilance to keep the various nation-states from fighting one another in disastrous ways, and it will also require that modern societies be very careful about their propensity to pollute and abuse natural systems. The potential for increasing our quality of life and for enhancing natural systems, as well as thoughtful technological innovations, is quite good. I would like to see a substantial increase in America's commitment to space development and exploration. I feel there's real necessity for a permanent orbiting space station. There are real, enormous benefits in the development of a

capacity to retreat and refurbish communications and other satellites, and I see great opportunities for mineral prospecting as well as resource monitoring from space. I see a potential for international cooperation in space to develop an Earth consciousness to minimize gross parochialisms that are now confining with modern warfare to threaten the well-being of people in this world. —Edmund G. Brown, Jr., governor of California

I fear the pluralization of government, the lack of responsibility. People today are frightened and concerned about where our society is going. They wonder whether we have leadership in Washington. We don't. There is no boss. Nobody's really in charge. You can't take a guy who's been a peanut farmer or a movie star or a Jesuit seminarian and throw him into government as president and expect him to know what he's doing. Our federal science agencies are suffering from the same lack of leadership. We're not putting enough effort into basic research, even though today's basic research is tomorrow's applied discovery. The U.S. space program thirty years from now will be only twenty years behind where it should be. That's not so with the Russians. They have a laser weapon that works and a charged-particle-beam weapon that works; they disabled a U.S. satellite two

CONTINUED ON PAGE 118





The bet had been to see whether Henry Culler could get a pool ball in his mouth. Twenty years ago the boys at Iota Kappa surrounding him had said that if he could get a pool ball in his mouth, he'd be in. Simple as that. He'd be one of the surroundings next time instead of the one surrounded.

Henry who at eighteen was shy and eager and anxious about everything—including pool balls—agreed. So they gave him the eight ball and, just before he tried, a padding for loyalty.

Henry wiped the yellow chalk dust on his pants. Holding the ball to his light, he measured the black orb with his eyes and fingers. He took everything about the ball into account except the curvature of his teeth.

When he was ready, Henry opened wide and, with one sweeping, overly dramatic gesture, popped the pool ball in. He looked around the group of boys—who by this time were laughing, hooting, half-rolling on the floor—and grinned as best he could. He made happy saluted noses. The crowd of Iotas mimicked him. They stepped him on the

# EASY POINTS

The rules of the game might vary,  
but the objective always stayed the same

BY KATHLEEN V. WESTFALL

PAINTING BY GEORGE TOOKER

back, and everything was going just fine until Henry tried to pop it out.

Then he remembered the curvature of his teeth.

The lotus called a cab, which took Henry—minus four dollars and twenty-three cents and most of the lotus—to the hospital. In fairness, though, Brian MacAlfee, the pledge master, did go along for the ride.

The nurse at the emergency room cussed them both out.

She gave Henry a shot in the jaw and was not at all delicate about the insertion of the needle. Within minutes the muscles of Henry's face began to relax. Sag. Droop. Progressively like clocks in a Dali painting.

The young intern who extracted the ball told Henry in no uncertain terms he looked retarded.

"At least," Henry mumbled when Brian and he—minus the hospital costs—left. "I got it in. When will I get my pledge card?"

Brian laughed. "Henry," he said, "we lotuses are... how shall I say it? Henry we are the intellectuals on campus. And you know? What that doctor said just now was right. That shot has made you look retarded. I'm afraid you won't be getting your pledge card. Henry. You just aren't a lota material. Sorry."

"What?" A thin line of saliva dripped down Henry's chin.

"Henry you finked! Look, everyone knows you can get a pool ball in your mouth. That's no big deal. It's just that once you get it in, you can't ever get it out. Not by yourself, anyway. And that's why you won't be getting your pledge card."

"You see," Brian continued, obviously relishing every word, "we lotuses feel that knowing in advance the results of one's actions tends to determine one's intellectual capacity. All you had to do to pass the test was to say no. And, Henry, you didn't do that."

Henry thought about what Brian MacAlfee had said twenty years ago. He looked across the desk and watched as the man, paunchy and nervous in the hard wooden chair, squirmed. Henry smiled and said, "No."

"What?"

Henry chuckled. "Oh, nothing. I was just thinking about that night twenty years ago. You remember. The night of the pool ball."

"Oh, yeah," Brian MacAlfee said. He tried to laugh but did not succeed.

Henry rubbed the bald spot on his head. He smiled.

That really was something that night. Mr. Cutler. It certainly is good to see you again."

"I'm sure," Henry said. "Now to the business at hand." Henry looked at the form Brian had just deposited on his desk. He pulled his pen from its black-onyx holder. The holder was shaped something like an egg or Henry thought now with a certain malicious humor possibly like a pool ball. He tapped his pen several times across Brian's neat application. Out of the corner

of his eye, he watched as Brian squirmed. Finally he said, "Well, everything seems to be in order here." At this, Henry turned his head ever so slightly toward the picture of the President on the wall and winked.

"Mr. MacAlfee," Henry said, "if you will take this form over to Building G. That's in the third quadrangle. What you do, you just go out this building the same way you entered, turn to the left, and keep going for two or so blocks. G is on your right. There's a fountain in front of it—are you getting all this down?—there's a fountain in front, so you really can't get lost. Now, when you get there—Building G—go up to room 807 and ask for Mr. Acue. Get another form from him entitled B, as in Barbara, dash eight three two dash A, as in Anne—in triplicate—and bring it back to me. When you've done all that, we'll take it from there, okay?"

Fine Mr. Cutler. And I want you to know I really appreciate this.

Henry took, shaking his head. "Nothing to it. Really I'm happy to be of help."

● A sign said, CAUTION  
FRESH MAX. Henry counted  
over forty of the  
public: seated, legs up on  
the benches or bent  
uncomfortably under them.  
"Not dry yet?" Henry  
called to one, an old man. ●

That's Building G, right? The one with the fountain?"

"Yes," Henry told him. "It's a very big fountain. It has blue tiled sides and three jets. Oh, you can't possibly miss it."

Eleanor Dano stormed into Henry's office right after Brian left. "I hope you don't think that's going to count, Cutler."

"Well," Henry speculated, "I don't see why not. He isn't a friend, per se. I haven't seen that bastard for twenty years."

Dano held a gray notebook to her ear and Henry thought, efficient breasts. Sparse, hard little knockers.

Dano appraised him carefully. "There's a grudge factor, Henry. I was watching in Control, and believe me, I detected a distinct hostility. Technically, I should dock you."

"Yeah. Maybe. I guess I should have sent him over to John or Albert. Let them try for points. But, Dano," he said, tossing his arms up, "it was just too damn much fun!"

Dano, the dry and exuberantly humorless woman, smiled at this. "I must admit that touch about the fountain was brilliant. But you should have saved it for points. Albert

was there, too." She said jerking her thumb toward the President, toward the picture with the camera lens in the lens of his right eye. And with Albert in Control, I tell you by this afternoon, half the players in the building will be inventing fountains for the public.

"I wonder how high the Inflation Factor will go?"

Fine. Maybe a sucker. Possibly a ten for the psychos. It's hard to tell so early. Dano made a notation in her book. "As yet, no points for you today." She studied the notebook, then glanced at Henry. She looked puzzled and a little concerned. "You're really behind this week. Are you feeling all right?"

Henry shrugged.

"Well, you look pale to me. And, Henry, you're getting awfully thin. Perhaps you should see a doctor."

Henry shuddered. "No, no, I'm fine."

Dano said, "Okay." She moved toward the door and, just before she left, turned and said "You really should have saved the fountain. But good luck to you anyway."

The phone on Henry's desk rang.

A woman named Ramona Kitchens wanted a V as in Valerie, oh dash three seven seven form sent to her house. Henry listened to her with great patience. He drew a small elephant on his blotter. He put little blue ballpoint flowers on its head. Finally he had to cut in. "I'm sorry Mrs. Kitchens. I have an incoming call. Can I put you on hold?"

The response was, as Henry expected, affirmative. So he pushed the button that put her on hold, got up, got his hat and left for lunch.

As was often his custom, Henry ate a luncheon surprise alone in the lunchroom. He sat at a table near a huge plate window and read the paper. Once a woman—whom Henry did not recognize, but suspected to be one of the public—came up and asked whether the seat next to him was taken. Indignantly he barked her back.

He finished his tuna slowly and, when he got to the classlock, folded the paper and sighed. It was time for the afternoon heat and he knew he was far for behind. He got up and left for his office.

On the way there, he passed Waiting Section P on the third floor. The large, windowless room had temporarily been roped off. Henry peeked past the sign that said CAUTION REPS-WAX.

Inside, on the benches that lined the room, Henry counted over forty of the public: seated, their legs up on the benches or bent uncomfortably under themselves. The floor mirrored these legless scores in its fresh gray sheen.

"Not dry yet?" Henry called to one of them, an old man perched near the fire exit.

The man looked terribly confused. Slowly he shook his head and blinked. "They told us not to move until it was."

"Yes. That's right. Stay there till it's dry."

Several of the public shot Henry brief,

# PREDESTINATIONS

CONTINUED FROM PAGE 72

that there is also a potential for disaster. Noting that genetic instructions for the production of cancer and other dread diseases are being spliced into bacteria with an affinity for the human body, these critics raise the specter of a new killer bug being accidentally unleashed on a vulnerable population. Thus the debate about genetic engineering focuses primarily on what regulations and safeguards must govern this work. These fears may have some merit, but they have been exaggerated.

Accidents are not the real danger. With

abuse as and in the long run the most insidious danger of life well-meaning misuse. Though some of the biogreens ardently insist that gene splicing is "inherently benign," just as another group of researchers earlier promulgated the dream of "the peaceful atom," there is little doubt that gene splicing is being used to produce new bioweapons that could someday make the old germ warfare seem tame by comparison. Assurances that we are protected from such perils by existing treaties will help only the naive to sleep soundly.

Despite assertions by President Nixon in 1969 that we were retaining our bioweapons, unlikely the CIA is suspected in 1971 to have introduced a virus into Cuba that forced the slaughter of half a million were temporarily dislocat-

Soviet researchers are aggressively investigating genetic vulnerabilities. Terrorists too, can be expected to take note.

The line between outright abuse and well-meaning misuse blurs abruptly in those instances where the armed forces, insurance companies, manufacturers, and others are investigating genetic factors in an effort to separate "bad" risks from "good" ones. The DuPont Company, for example, now routinely screens black job applicants in search of the sickle-cell trait. The screening, some charge, is used to divert blacks from certain jobs. DuPont responds that it is all part of an innovative effort to keep "susceptible" individuals away from potentially toxic materials in the

screening for all is potentially positive contributions may eventually serve as a means of declaring certain "genetic types" dangerous, useless, inefficient, or obsolete. We have already subtended the rich diversity of nature in our successful efforts to create, through similar genetic intervention, vast monocultures of "miracle crops" that have proved vulnerable to outbreaks of unexpected or unfamiliar diseases. We may likewise be in peril of producing equally vulnerable human monocultures.

Instead of addressing the causes of violence, we are now attempting to stockpile our ability to be violent. Instead of improving our diet and clearing up our environment as a way to fight cancer and other

diseases of progress, we are hunting for a recombinant "magic bullet" that will cure rather than prevent these diseases and that will allow us to go on polluting our selves and our world. There are recombinant bugs in the works that will let us digest plant proteins, turning us into grass eaters, and thereby solving the world's food-shortage problem (at least for a while), encouraging us to keep on overpopulating. And if life crowding causes stress, the stress can undoubtedly be dealt with through a little genetic surgery.

These new technologies if fear will not make man more noble, more compassionate, more aware of his own diverse mystery, but rather more malicious, more tolerant of social and environmental decay. The "super race" whose advent so

many have feared will not be the forced irrational product of a mad dictator's dreams but the cost-analyzed, market-tested, pragmatic product of profit-oriented scientific businessmen. Blue eyes and blond hair won't be as hallowed as important as the ability to endure clenches, stress, virulent food, crowding, industrial pollution, boredom, and depersonalization.

The New Man will be remarkably stoic: nonemotional, deflected-free, well-adjusted, "responsible," and, like the New Breed that is already with us, bland, short on real nourishment, processed, refined, whitened, artificially preserved and fortified, and baked to absolute uniformity. And no one will doubt him when he asserts he's happy. **DD**

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workplace. MIT molecular biologist Jonathan King, an outspoken critic of genetic engineering, states flatly that "DuPont's position is scientific racism. People are not going to get sick because they are hypersusceptible; they are going to get sick because they are being poisoned." A study funded by the U.S. government has sought genetic traits that dispose one toward antisocial or violent behavior. The ostensible goal is to weed out these traits in a program of genetic "prior restraint."

These and other developments portend an invasion of privacy that may ultimately provide "scientific" bases for discrimination, alienation, and exclusion more powerful than any yet experienced. Genetic

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## MARCHING MORONS

CONTINUED FROM PAGE 66

"I was in doubts about telling you," said the psychiatrist, but I see you have some growing suspicions of the truth. Please don't get excited. It's all right, I tell you."

"So you've got me," said Barlow. "Got you?"

"Don't pretend. I can put two and two together. You're the secret police. You and the rest of the anelocrats live in luxury on the sweat of these oppressed slaves. You're afraid of me because you have to keep them ignorant."

There was a below of bright laughter from the psychiatrist that got them blank looks from other persons in the lobby. The laughter didn't sound at all sinister.

"Let's get out of here," said Tenny-Peete still chuckling. "You couldn't possibly have it more wrong." He engaged Barlow's arm and led him to the street. The actual truth is that the malones of workers live in luxury on the sweat of the handful of anelocrats. I shall probably die before my time of overwork unless—

He gave Barlow a speculative look. "You may be able to help us."

"I know that gag," sneered Barlow. "I made money in my time, and to make money you have to get people on your side. Go ahead, and shoot me if you want, but you're not going to make a fool out of me."

"You nasty little ingrate!" snapped the psychiatrist with a kaleidoscopic change of mood. "This damned mess is all your fault, and the fault of people like you! Now come along and no more of your nonsense."

He yanked Barlow into an office building lobby and an elevator that disconcertingly went whoosh loudly as it rose. The real estate man's knees were wobbly as the psychiatrist pushed him from the elevator down a corridor and into an office.

A hawk-faced man rose from a plain chair as the door closed behind them. After an angry look at Barlow, he asked the psychiatrist, "Was I called from the Pole to inspect this—this—?"

"Ungel upendured. I've deeprobed at find quairchance ex-him Popprobat-tackles," said the psychiatrist soothingly.

"Doubt," grunted the hawk-faced man. "Try," suggested Tenny-Peete.

"Very well, Mr. Barlow. I understand you and your lamented had no children."

"What of it?"

"This of it. You were a blind, selfish stupid ass to tolerate economic and social conditions which penalized childbearing by the prudent and foresighted. You made us what we are today, and I want you to know that we are far from satisfied. Damn-fool rockets! Damn-fool automobiles! Damn-fool cities with overhead ramps!"

"As far as I can see," said Barlow, "you're running down the best features of your time. Are you crazy?"

The rockets aren't rockets. They're turbojets—good turbojets—but the fancy shell around them makes for a bad drag.

The automobiles have a top speed of one hundred kilometers per hour—a kilometer as, if I recall my paleontologists, three fifths of a mile—and the speedometers are all rigged accordingly so the drivers will think they're going two hundred and fifty. The cities are ridiculous, expensive, unsanitary wasteful conglomerations of people who'd be better off and more productive if they were spread over the countryside.

"We need the rockets and tick speedometers and cities because, while you and your kind were being prudent and foresighted and not having children, the ignorant workers, slum dwellers, and tenant farmers were shiftlessly and short-sightedly having children—breeding, breeding. My God, how they breed!"

"Wait a minute," objected Barlow. "There were lots of people in our crowd who had two or three children."

The attribution of accidents, illness, wars, and such took care of that. Your intelligence was bred out. It is gone. Children that should have been born never were. The total-averages, they fit-get-along majority took over the population. The average IQ now is forty-five."

"But that's far in the future—"

"So are you," grunted the hawk-faced man sourly.

"But who are you people?"

Just people—real people. Some generations ago the geneticists realized at last that nobody was going to pay any attention to what they said. So they abandoned words for deeds. Specifically they formed and recruited for a closed corporation intended to maintain and improve the breed. We are their descendants, about three millions of us. There are five billion of the others. So we are their slaves.

"During the past couple of years I've designed a skyscraper kept Billings Memorial Hospital here in Chicago running, headed off war with Mexico, and directed traffic at LaGuardia Field in New York."

"I don't understand! Why don't you let them go to hell in their own way?"

The man grimaced. "We tried it once for three months. We holed up at the South Pole and waited. They didn't notice. Some drafting-room people were missing, some nurses didn't show up, minor government people on the nonpolicy level couldn't be located. It didn't seem to matter."

"In a week there was hunger in two weeks, famine and plague in three weeks, war and anarchy. We called off the experiment. It took us most of the next generation to get things squared away again."

"But why don't you let them kill each other off?"

"Five billion corpses mean about five hundred million tons of rotting flesh."

Barlow had another idea. "Why don't you sterilize them?"

"Two and one-half billion operations is a lot of operations. Because they breed continuously the job would never be done."

"I see. Like the marching Chinese?"

"Who the devil are they?"

"It was a—uh—paradox of my time. Somebody figured out that if all the Chinese in the world were to line up four abreast, I think it was, and start marching past a given point, they'd never stop because of the babies that would be born and grow up before they passed the point."

That's right. Only instead of a given point, make it the largest conceivable number of operating rooms that we could build and staff! There could never be enough."

Say! said Barlow. "Those movies about babies—was that your propaganda?"

It was, I don't want to mean anything to them. We have abandoned the idea of attempting propaganda contrary to a biological drive.

So if you work with a biological drive—?"

"I know of none which is consistent with inhibition of fertility."

Barlow's face went poker-blank, the result of years of careful discipline. "You don't hurt? You're the great brains, and you can't think of any?"

Why no? said the psychiatrist innocently. "Can you?"

"That depends. I sold ten thousand acres of Siberian tundra—through a dummy firm, of course—after the partition of Russia. The buyers thought they were getting improved building lots on the out skirts of Kiev. I'd say that was a lot tougher than this job."

How so? asked the hawk-faced man.

Those were normal, suspicious customers, and these are morons, both suckers. You just figure out a con they'll fall for, they won't know enough to do any smart checking."

The psychiatrist and the hawk-faced man had also had training; they kept themselves from looking with sudden hope at each other.

"You seem to have something in mind," said the psychiatrist.

Barlow's poker face went blanker still. "Maybe I have. I haven't heard any offer yet."

There's the satisfaction of knowing that you've prevented Earth's resources from being plundered," the hawk-faced man pointed out, "that the race will soon be come extinct."

"I don't know that," Barlow said bluntly. "All I have is your word."

"If you really have a method, I don't think any price would be too great," the psychiatrist offered.

"Money?" said Barlow.

"All you want."

"More than you want," the hawk-faced man collected.

Presto! added Barlow. Plenty of publicity. My picture and my name in the papers and over TV every day, statues to me, parks and plazas and streets and other things named after me. A whole chapter in the history books."

The psychiatrist made a facial sign to the hawk-faced man that meant "Oh, brother!"

The hawk-faced man signaled back. "Steady boy?"

"It's not too much to ask," the psychiatrist agreed.

Barlow sensing a seller's market, said:

"Power!"

"Power?" the hawk-faced man repeated, puzzled. "Your own hydro station or nuclear pile?"

"I mean a world dictatorship with me as dictator!"

Well, now— said the psychiatrist.

But the hawk-faced man interrupted. "It would take a special emergency act of Congress, but the situation warrants it. I think that can be guaranteed."

Could you give us some indication of your plan? the psychiatrist asked.

Ever hear of lemmings?

No.

They are—were, I guess, since you haven't heard of them—little animals in Norway and every few years they'd swim to the coast and swim out to sea until they drowned. I figure on putting some lemming urge into the population.

How?

"I'll save that till I get the right signature on the deal."

The hawk-faced man said, "I'd like to work with you on it, Barlow. My name's Ryan-Ngana. He put out his hand.

Barlow looked closely at the hand, then at the man's face. "Ryan what? Ngana?"

"That sounds like an African name."

"It is. My mother's father was a Watusi. Barlow didn't take the hand. "I thought you looked pretty dark. I don't want to hurt your feelings, but I don't think I'd be at my best working with you. There must be somebody else just as well qualified."

The psychiatrist made a facial sign to Ryan-Ngana that meant, "Steady yourself, boy!"

Very well? Ryan-Ngana told Barlow. "We'll see what arrangement can be made."


It's not that I'm prejudiced, you understand. Some of my best friends—"

Mr. Barlow don't give it another thought. Anybody who could pick on the lemming analogy is going to be useful to us."

And so he would, thought Ryan-Ngana alone in the office after Timmy-Peete had taken Barlow up to the helicopter stage. So he would. Poprob had exhausted every rational attempt and the new Poprob-tocklines would have to be rational or sub-rational. This creature from the past with his lemming legends and his improved building lots would be a fountain of precious vicious self-interest.

Ryan-Ngana sighed and stretched. He had to go and run the San Francisco subway. Summoned early from the Pole to study Barlow, he'd left unfinished a nice little theorem. Between interruptions, he was slowly constructing an n-dimensional geometry whose foundations and super-

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structure owed no debt to intuition.

Upstairs, waiting for a helicopter, Barlow was explaining to Timmy-Peele that he had nothing against Negroes, and Timmy-Peele wished he had some of Ryan-Nigans's imperturbability and humor for the ordeal.

The helicopter took them to International Airport, where Timmy-Peele explained Barlow would leave for the Pole.

The man from the past wasn't sure he'd like a dreary waste of ice and cold.

It's all right, said the psychiatrist. A civilized layout. Warm pleasant. You'll be able to work more efficiently there. All the facts at your fingertips, a good secretary—

"I'll need a pretty big staff," said Barlow who had learned from thousands of diaries never to take the first offer.

"I want a private confidential one," said Timmy-Peele readily, "but you can have as many as you want. You'll naturally have top-priority top priority if you really have a workable plan."

Let's not forget the dictatorship angle," said Barlow.

He didn't know that the psychiatrist would just as readily have promised him dedication to get him happily on the "rockets" for the Pole. Timmy-Peele had no wish to be torn limb from limb, he knew very well that it would and that way if the population learned from this anachronism that there was a small elite that considered itself head shoulders trunk and groin above the

rest. The fact that this assumption was perfectly true and the fact that the elite was condemned by its superiority to a life of the most grinding toil would not be considered the difference would.

The psychiatrist finally put Barlow about the "rockets" with some thirty people—real people—headed for the Pole.

Barlow was amok all the way because of a posthypnotic suggestion. Timmy-Peele had planted in him. One idea was to make him as aware as possible to a return trip and another idea was to spare the other passengers from his aggressive talkative company.

Barlow during the first day at the Pole was reminded of his first day in the Army. It was the same, now where the hell are we going to put you? Business until he took a firm line with them. Then instead of acting like supply sergeants they acted like hotel clerks.

It was a wonderful, wonderfully calculated buildup and one that he failed to suspect. After all, in his time a visitor from the past would have been torized.

At day's end he reflected in a snug underground billet with the sixty-mile gales roaring yards overhead and tried to put two and two together.

It was like old times, he thought—like a coup in real estate where you had the competition by the throat like a fifty percent net boost when you knew damned well there was no place for the tenants to move,

like smiling when you read over the breakfast orange juice that the city council had decided to build a school on the ground you had acquired by a deal with the city council. And it was simple. He would just sell funds building lots to eagerly suicidal lemmings, and that was absolutely all there was to solving the Problem that had these double-domes spinning.

They'd have to work out most of the details naturally but what the hell that was what subordinates were for. He'd need specialists in advertising, engineering, communications—did they know anything about hypnosis? That might be helpful. If not, there'd have to be a lot of bribery done but he'd make sure—damned sure—there were unlimited funds.

Just selling building lots to lemmings. He wished, as he fell asleep that poor Werns could have been in on this. It was his biggest, most stuporous deal. Werns—that sharp shyler Immersman must have swindled her.

It began the next day with people coming to visit him. He knew the approach. They merely wanted to be helpful to their illustrious visitor from the past and would he help fill them in about his era, which unfortunately was somewhat obscure historically and what did he think could be done about the Problem? He told them he was too old to be raped anymore and they wouldn't get any information out of him until he got a letter of intent from the Polar President and a session of the Polar Congress empowered to make him dictator.

He got the letter and the session. He presented his program was asked whether his conscience didn't revolt at its callousness, explained succinctly that a deal was a deal and anybody who wasn't smart enough to protect himself didn't deserve protection—"Casual employer, he threw in for scholarship and had to translate it to. Let the buyer beware." He didn't he stated, give a damn about either the morons or their intelligent slaves. He'd told them his price and that was all he was interested in.

Would they meet it or wouldn't they? The Polar President offered to resign in his favor with certain temporary emergency powers that the Polar Congress would vote him if he thought them necessary. Barlow demanded the title of World Dictator, complete control of world finances, salary to be decided by himself, and the publicity campaign and historical writeup to begin at once.

"As for the emergency powers," he added, "they are to be neither temporary nor limited."

Somebody wanted the floor to discuss the matter with the declared hope that perhaps Barlow would modify his demands.

"You've got the proposition," Barlow said. "I'm not knocking off over ten percent."

But what if the Congress refuses, sir? the President asked.



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"Then you can stay here at the Pole and try to work it out yourselves. I'll get what I want from the morons. A ahead operator like the doesn't have to compromise. I haven't got a single competitor in the whole cockeyed moronic era."

Congress debated debate and voted by show of hands. Barlow won unanimously.

"You don't know how close you came to losing me," he said in his first official address to the joint Houses. "I'm not the boy to haggle either I get what I ask, or I go elsewhere. The first thing I want is to see designs for a new palace for me—nothing unbecomingly either—and your best painters and sculptors to start working on my portraits and statues. Meanwhile I'll get my stuff together."

He dismissed the Polar President and the Polar Congress, telling them that he'd let them know exactly when the next meeting would be.

A week later the program started, with North America the first target.

Mrs. Garvy was having after dinner before the ordeal of turning on the dishwasher. The TV, of course, was on and it said "Gosh!"—long shuddery and ecstatic the cue for the Parfum Assaut Criminel spot commercial. "Gee," said the announcer hoarsely, "do you want your man? It's easy to get him—easy as a trip to Venus."

"Huh?" said Mrs. Garvy. "Wassermater?" snorted her husband

starting out of a doze.

"Ja hear that?"

"What?"

He said, "Easy like a trip to Venus."

So?

"Well, I thought ya couldn't get to Venus. I thought they just had that one rocket thing that dashed on the moon."

"Aah, women don't keep up with the news," said Garvy righteously, subsiding again.

"Oh," said his wife uncertainly.

And the next day on Henry's Other Mistress there was a new character who had just breezed in. Buzz Renshaw, master rocket pilot of the Venus run. On Henry's Other Mistress, the broadcast drama about you and your neighbors, folksy people, ordinary people, real people! Mrs. Garvy listened with amazement over a cooling cup of coffee as Buzz made hay of her hairy convictions.

Mona: Darling, it's so good to see you again!

Buzz: You don't know how I missed you on that dreary Venus run!

Sound: Venetian blind run down, key turned in lock.

Mona: Was it very dull, dearest?

Buzz: Let's not talk about my humdrum job, darling. Let's talk about us.

Sound: Creaking bed.

Well, the program was back to normal at

last. That evening Mrs. Garvy tried to ask again whether her husband was sure about those rockets, but he was dozing right through Take It and Snock it. So she watched the screen and forgot the puzzle.

She was still rocking with laughter at the gag line, "Would you buy it for a quarter?" when the commercial came on for the detergent powder she always faithfully loaded her dishwasher with on the first of every month.

The announcer displayed mountains of suds from a tiny piece of the stuff and coyly added, "Of course, Cleano don't lay around for you to pick up like the soap suds on Venus, but it's pretty cheap and it's almost pretty near just as good. So for us plain folks who ain't lucky enough to live up there on Venus, Cleano is the real cleaning stuff!"

Then the chorus went into their "Cleano-is-the-stuff" jingle but Mrs. Garvy didn't hear it. She was a stubborn woman, but it occurred to her that she was very sick indeed. She didn't want to worry her husband. The next day she quietly made an appointment with her family friend.

In the waiting room she picked up a fresh new copy of Readers Pabst and put it down with a faint palpitation. The lead article, according to the table of contents on the cover was titled "The Most Memorable Venusian I Ever Met."

"The Freud will see you now," said the nurse and Mrs. Garvy tottered into his office.

His traditional glasses and whiskers were reassuring. She choked out the ritual, "Freud, forgive me, for I have neuroses."

He chanted the anaphoral, "Tut, my dear girl, what seems to be the trouble?"

"I got like a hole in the head," she quavered. "I seem to forget all kinds of things. Things like everybody knows and I don't!"

"Well, that happens to everybody occasionally, my dear. I suggest a vacation on Venus."

The Freud stared at the empty chair. His nurse came in and demanded, "Hay you see how she screamed? What was the matter with her?"

He took off his glasses and whiskers meditatively. "You can search me. I told her she should maybe try a vacation on Venus." A bafflement came into his face and he dug through his desk drawers until he found a copy of the four-color, profusely illustrated journal of his profession. It had come that morning and he had lip-read it, though looking mostly at the pictures. He leaped to the article "Advantages of the Planet Venus in Rest Cures."

"It's right there," he said.

The nurse looked. "It sure is," she agreed. "Why shouldn't it be?"

The trouble with these here neuroses," declared the Freud, "is that they all the time got to fight reality. Show in the next witch."

He put on his glasses and whiskers again and forgot Mrs. Garvy and her strange behavior.

"Freud, forgive me, for I have neuroses."





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Tut, my dear girl, what seems to be the trouble?"

Like many cures of mental disorders, Mrs. Garvy's was achieved largely by self-treatment. She disciplined herself sternly out of the crazy notion that there had been only one rocket ship and that one a failure. She could go on without weeping, eventually in any conversation on the desirability of Venus as a place to retire, on its fabulous floral profusion. Finally she went to Venus.

At her friends were trying to book passage with the Evening Star Travel and Real Estate Corporation, but naturally the demand was crushing. She considered her self lucky to get a seat at last for the two-week summer cruise. The spaceship took off from a place called Los Alamos, New Mexico. It looked just like all the spaceships on television and in the picture magazines but was more comfortable than you would expect.

Mrs. Garvy was delighted with the fifty or so fellow passengers assembled before takeoff. They were from all over the country, and she had a distinct impression that they were on the brainy side. The captain, a tall hawk-faced, impressive fellow named Ryan, Something-or-other, welcomed them aboard and trusted that their trip would be a memorable one. He regretted that there would be nothing to see because "due to the meteoric season" the ports would be clogged down. It was disappointing, yet reassuring that the line was taking no chances.

There was the expected momentary discomfort at takeoff and then two monotonous days of drowsing travel through space to be whiled away in the lounge at cards or craps. The landing was a routine bump and the voyagers were issued tablets to swallow to immunize them against any minor ailments.

When the tablets took effect, the lock was opened and Venus was there.

It looked much like a tropical island on Earth, except for a blanket of cloud overhead. But it had a heady otherworldly quality that was intoxicating and glamorous.

The ten days of the vacation were suffused with a hazy magic. The soap suds as advertised was free and sudsy. The fruits, mostly tropical varieties transplanted from Earth, were delightful. The simple shelters provided by the travel company were more than adequate for the balmy days and nights.

It was with sincere regret that the voyagers fled again into the ship and swallowed more tablets doled out to counteract and sterilize any Venus illnesses they might unwittingly communicate to Earth.

Vacationing was one thing. Power politics was another.

At the Pole, a small man was in a sound-proof room; his face deathly pale and his body limp in a straight chair.

In the American Senate Chamber Senator Hull-Mendoza (Synd. N. Calif.) was saying: Mr. President and gentlemen, I would be remiss in my duty as a legisla-

ture if I didn't bring to the attention of the august body I see here a perilous situation which is fraught with peril. American rockets now traverse the limitless void of space between this planet and our nearest planetary neighbor in space. I want to inquire what steps are being taken to colonize Venus with a vanguard of patriotic citizens like those Minutemen of yore.

Mr. President and gentlemen! There are in this world regions, envious nations—I do not name Mexico—who by fair means or foul may seek to wrest from Columbia's grasp the torch of freedom of space; nations whose low living standards and innate depravity give them an unfair advantage over the citizens of our fair republic.

This is my program. I suggest that a city of more than one hundred thousand population be selected by lot. The citizens of the fortunate city are to be awarded choice lands on Venus free and clear to have and to hold and convey to their descendants. And the national government shall provide free transportation to Venus for these citizens. And this program shall continue, city by city until there has been deposited on Venus a sufficient vanguard of citizens to protect our minuted rights in that planet.

Mr. President and gentlemen, there is no time to waste—Venus must be American!

Black-Kuppman at the Pole opened his eyes and said feebly: The style was a little uneven. Do you think anybody'll notice?

"You did fine, boy, just fine," Barlow reassured him.

Hull-Mendoza's bill became law.

Drafting machines at the South Pole were busy around the clock, and the Pittsburgh steel mills speeded millions of plates into the Los Alamos spacecraft of the Evening Star Travel and Real Estate Corporation. It was going to be Los Angeles, for logistic reasons, and the three most accomplished psychokineborists went to Washington and mingled in the crowd at the drawing to make certain that the Los Angeles capsule slithered into the fingers of the blindfolded senator.

Los Angeles loved the idea, and a forest of spaceships began to blossom in the desert. They weren't very good spaceships, but they didn't have to be.

A team at the Pole worked at Barlow's direction on a mail setup. There would have to be letters to and from Venus to keep the slightest slant of suspicion from arising. Luckily Barlow remembered that the problem had been solved once before—by Hitler. Relays of persons incarcerated in the furnaces of Lublin or Majdanek continued to get cheery postal cards.

The Los Angeles flight went off on schedule under tremendous press, news, and television coverage. The world cheered the gallant Angelorots who were setting off on their pathetic voyage to the land of milk and honey. The forest of spaceships thundered up, and up, and out of sight without untoward incident. Billions cheered the Angelorots, stamped and on

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short rations though they were.

Weekends from San Francisco whose capsule came up second, moved immediately into the City of the Angels for the scrap steel their own flight would require. Senator Hull-Mendoza's constituents could do no less.

The President of Mexico, hypocritically alarmed at this extension of yanqui imperialism beyond the stratosphere, launched his own Venus-colony program.

Across the water it was England versus Ireland, France versus Germany, China versus Russia, India versus Indonesia. Ancient hatreds grew into the fumes that were rocket ships assailing the air by hundreds daily.

Dear Ed, how are you? Sam and I are fine and hope you are fine. Is it nice up there like they say with food and close gone on here? I drove by Springfield yesterday and it sure looked funny all the buildings down but of course it is worth it we have to keep the grassers in their place. Do you have any trouble with them on Venus? Drop me a line some time. Your loving sister, Alma.

Dear Alma, I am fine and hope you are fine. It is a fine place here fine climate and easy living. The doctor told me today that I seem to be ten years younger. He thinks there is something in the air here keeps people young. We do not have much trouble with the grassers here they keep to themselves it is just a question of us outnumbering them and taking out the best places for the Americans. In South Bay I know a nice little island that I have been saving for you and Sam with lots of blanket trees and ham bushes. Hoping to see you and Sam soon, your loving brother, Ed.

Sam and Alma were on their way shortly. Poprob got a dividend in every nation after the emigration had passed the halfway mark. The lonesome stay-at-homes were unable to bear the melancholy of a low population density, their conditioning had been to swarms of their kin. After that point it was possible to fast off the crudest stripped-down accommodations on would-be emigrants, they didn't care.

Black-Kupperman did a fine job on President Hull-Mendoza, the last job that genius of hypocrisies would ever do on any mortal important or otherwise.

Hull-Mendoza, panic-stricken by his presidency over an empty nation joined his constituents. The Independence, aboard which traveled the national government of America was the most elaborate of all the spaceships—bigger, more comfortable, with a lounge that was handsome, though cramped, and cloakrooms for senators and representatives. It went, however to the same place as the others, and Black-Kupperman killed himself, leaving a note that stated he couldn't live with his conscience.

The day after the American President departed Barlow flew into a rage. Across his specially built desk were supposed to flow all Poprob high-level documents, and this thing—this outrageous thing—called Poprobism apparently had got into the executive stage before he had even had a glimpse of it!

He buzzed for Rogge-Smith, his statistician. Rogge-Smith seemed to be at the bottom of it. Poprobism seemed to be about first and second and third derivatives whatever they were. Barlow had a deep distrust of anything more complex than what he called an "average."

While Rogge-Smith was still at the door Barlow snapped, "What's the meaning of this? Why haven't I been consulted? How far have you people got and why have you been working on something I haven't authorized?"

"Didn't want to bother you, Chief," said Rogge-Smith. "It was really a technical matter, kind of a final cleanup. Want to come and see the work?"

Mollified, Barlow followed his statistician down the corridor.

You still shouldn't have gone ahead without my okay," he gumbled. "Where the hell would you people have been without me?"

That's right, Chief. We couldn't have swung it ourselves, our minds just got work that way. And all that stuff you knew from Hitler—it wouldn't have occurred to us. Like poor Black-Kupperman.

They were in a fan-sized machine shop at the end of a slight upward incline. It was cold. Rogge-Smith pushed a button that started a motor and a flood of arctic light poured in as the roof parted slowly. It showed a small spaceship with the door open.

Barlow gaped as Rogge-Smith took him by the elbow and his other boys appeared. Swenson, Swenson, the engineer. Tausugmushi-Duncan, his procloments man. Kaib French, advertising.

"In you go, Chief," said Tausugmushi-Duncan. "This is Poprobism!"

But I'm the World Dictator!

You bet, Chief. You'll be in history all right—but this is necessary I'm afraid."

The door was closed. Acceleration slammed Barlow cruelly to the metal floor. Something broke and warm, wet stuff, stuffy tasting, ran from his mouth to his chin. Arctic sunlight through a port suddenly became a fierce lance stabbing at his eyes. He was out of the atmosphere. Lying twisted and broken under the acceleration. Barlow realized that some things had not changed: that Jack Katch was never asked to dinner however many shillings you paid him to do your dirty work, that murder will out, that crime pays only temporarily.

The last thing he learned was that death is the end of pain. **DD**

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## ECOSHelter

CONTINUED FROM PAGE 58

craft is a vast technological support network. One suggestion of Cook is to replace natural rocks and trees with Rok and Log plugs where community residents can hook their dwellings up to the outside world. Camouflaged with a space finish to promote rapid moss growth, these plugs will contain cable lines delivering electricity, telephone, international computer hookups, banking facilities and other basic services.

### MAY THE FORM BE WITH YOU

Another Archigram member, New York-based architect Michael Webb, avoids the community altogether in his plans. He adopted the slogan "The overcoat is a house," a car with the motor clipped on and he developed a series of proposals for mobile environments ranging from drive-in housing to the Cushicle, or Surtalon, a house worn like a space suit.

The proposed drive-in housing has stationary components. The kitchen and bathroom are fixed service units, but the living room and other parts of the house are made up of mobile containers that form rooms by means of folding panels. When not being used, the containers are driven off and stored. If someone is giving a party down the street, the neighbors can drive their living rooms over to the host's house to create a larger space.

The Cushicle (That's a ghastly Americanization of cushion vehicle) is modeled after the space suit as the minimal house Webb explains. "The Cushicle is a vehicle to which a person could strap himself. The suit a person wears becomes both a stand-in for the suit of clothes he wears, the metal shell of the vehicle he hides inside and the house he lives in. With Detroit styling, there would be different vehicles for different types of people."

The Cushicle itself has a spiral system containing all appliances and services along with an inflatable envelope. The inflatable skin consists of two layers—an opaque thermal insulating material and a translucent external covering. This skin can be blown up to make a chase lounge, a room or an entire house, depending on the circumstances.

Each Cushicle unit has a plug, which serves the same function as the front door. For a romantic interlude, you can plug into your lover's unit and enter his or her suit while leaving yours clipped to the outside. Or, as Webb envisions, several Cushicles can plug together to build a large structure or a "moment city," as he calls it.

The space-suit approach to future environments is also adopted by UCLAs F. M. Eslandary. His Life Support Suit was originally designed to check people medically through sensors monitored by regional health centers. However, the suit, according to Eslandary, would provide a continu-

ous protective and self-sufficient habitat for an individual whether he was journeying up the Amazon, exploring the tunnels of Siberia, or touring the ruins of Brooklyn.

Such individualized environments in Eslandary's opinion, are perfect for a future dominated by hypermobility and increased decentralization in all aspects of life. He claims that the most forward view of our future living pattern is the electronic community or telecommunity. Here, through a global microelectronic network, everyone will link in and out with people all across the earth. When working, shopping, voting and creative activities can be conducted through home computer units, the city as we now know it will cease to exist.

No standing buildings left? Possibly. But there might be nonphysical buildings. Buildings turned on and off with the flick of a switch and made invisible. A magic architecture that never has a physical form. Holographic icebergs might float down Boston's Charles River. A bridge might be projected in the sky. These are the thoughts of Frederick St. Florian, of the Rhode Island School of Design.

St. Florian expects holography to free the architect from the cumbersome permanent world of building materials so that he can create dreamscapes. The architect's dream is to create a space that goes beyond its physical boundaries. To create an illusion and a perception that go beyond reality. Ultimately, the use of holography to extend our physical reality is a recognition of the fact we live in a world with more than one set of realities.

Through holography, once-restricted building forms—such as office buildings and schools—can be transformed to perform any function. The outside environment can take on a poetic existence through the projection of anything from imaginary icicles flowing down over a city as suggested by St. Florian, to a sky-floating skyscraper. "Theoretically it's possible to project an entire building with holograms," says St. Florian. But now it's utterly impractical.

If cities vanish, as some of our architects maintain, St. Florian's Museum of Architecture may someday be built. He has already given us hints of what it would be like.

In 1970, he proposed holographically to resurrect old New York landmarks that had been lost or torn down. Out on the Arizona Desert, for example, tourists could go to view the old Pennsylvania Station during its daily projection. Someday, he hopes, they might go see all of Manhattan.

With architects beginning to use more advanced technologies, it's not inconceivable that in the future we'll marvel at St. Florian's holographic icebergs from our flying house built from a self-growing bionic material. Perhaps architect Ray Mason has envisioned the future more concretely. "The ultimate design tool will be a biofeedback machine plugged to your head. You think a building, and a computer generates it. So fantasy becomes reality literally in an instant." **DO**

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## SOCIETIES

CONTINUED FROM PAGE 108

years ago, although the Pentagon led about it. NASA is just as faulted up on the space shuttle, so far behind that if the first flight is a year from now as NASA is maintaining, the second flight will not come until fourteen years later.

But I'm optimistic about the future. People are beginning to feel intellectually accused and disoriented by the government in part from this, and in part from fundamental need. I think we'll see a greater use of solar power at lower costs, specifically in homes. But this is not going to solve the energy crisis. Hydrogen will be extracted from the ocean, and we'll have hydrogen-powered cars and airplanes. Thirty years from now the United States will have a hydrogen-fueled SST, a big airplane capable of carrying four hundred passengers. Ten years from now we'll have seven-hundred-passenger 747 derivatives to help the airline companies get through the fuel crunch. Within the next few years we'll see more wind power for islands like Hawaii where the wind blows a great deal. Perhaps plant power as well, extracting oil from vegetation — Jules Bergman, science reporter for ABC-TV News.

I hope that some of the recent so-called technological crises are going to force

upon us changes that are very good. Technology is basically a lethargic and slow-to-develop industry because the investment costs for new products are so enormous. For example, we're not using transportation very efficiently not by a long shot. Turbine engines are not getting anywhere near the amount of power they're capable of for the energy they consume. The government has correctly let the sheer weight of economic factors control the development, and now we have more severe pressures to try to improve efficiency privately. In a more humanitarian vein, I hope we will have more than financial remedies available to poor people. I'd like to see educational and vocational assistance. I just don't believe that anybody on welfare is happy. It's a terribly undignified experience. Having seen what we can do in training even retarded people to look out for themselves, I think the current situation is a gross waste that could be turned around to make society happier and these people more productive — F. Lee Bailey.

I fear that in the future people will be responsible to computers. I hope that in the future computers will be responsible to people — Peter Usunov.

The world at the end of the next century will differ from what it was at the beginning in a more degenerate way than our world has changed from what it was two hundred and

even three hundred years ago. Nine tenths of goods and services available to people in the foreseeable future will be of materials and purposes unlike the present ones. Global problems—the problems of war and peace, the abolition of economic and social contrasts between the developed and developing countries, adequate energy, mineral and food resources, the prevention of the catastrophic pollution of the environment and others—must, and it is my deep belief can, be resolved in the foreseeable future. The coming century will not be a social idyll. It will be full of struggle against the traditions and prejudices of the past — Edward Arab-Ogry, leading Soviet philosopher.

In the largest perspective, it is not implausible that life as a whole, having developed for so long and so hopefully on Earth, should nevertheless disappear from it at last, leaving this planet as lifeless as other planets. In the immensity of the universe as a whole, it may be that the extinction of life on one planet among millions of others that support life would be no more important than the death of one fish in an ocean that contained millions. What distinguishes us human beings from all the less advanced forms of life on Earth is that, having at last become conscious of the challenge of survival, we have consciously undertaken to shape our own future. This requires us to look ahead, even beyond the span of a single generation — Louis J. Halle, former White House policy adviser.

A constant challenge for the remainder of the century will be making our great urban centers attractive and stimulating by revitalizing their economic bases and accommodating the diversity of persons living in them. The federal and state governments are a key part of this process, and they must be sensitive and responsive to urban needs. The cities in turn must strive to become more self-reliant, drawing upon their substantial resources of energy, innovation, creativity and spirit to accomplish truly major and equitable changes in urban society — Jane Byrne, mayor of Chicago.

How can one see into the future? I'm not a prophet, but I'm always optimistic. Who knows? I worry about the future about the obvious things, about our relations with the Soviet Union foremost. But I have great hope for important discoveries that might come out of pure research that looks now as if it will have no commercial value at all. And I consider spaceflight to be a most exciting prospect. I expect to go into space myself as soon as possible. I'm number two on the space shuttle passenger list behind Dr. Fletcher, the former head of NASA. I think spaceflight is something I'd enjoy. I think it's something we'd all enjoy — Lowell Thomas.

I'm uneasy about the future. That's why I left it and am here now — Marty Feldman. **CC**



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## INDIVIDUALS

CONTINUED FROM 12A

World War II on twenty percent efficiency. So I'm confident we'll get these answers — Dr Albert Sabin

I don't think that our lives are going to be that much different technologically twenty or thirty years hence. Yes, there are going to be changes. We'll have the computer do the shopping for us, but that really will be an extension of what we're doing now with all the mail-order catalogs. Sure, television will be present, but I can't truthfully say that it or any other change in the last thirty years even *Satan's Wasp* has made a basic difference in our lives. Life will be a little easier in the future, but not significantly different. Most of all, I believe that the family will continue to grow, continue to strengthen. What young people want most in life is a happy home — Dr Joyce Brothers

Naturally as a comedian I think humor will be important in the future. It eases tensions, opens the door a crack for better understanding among people. But humor can't bring peace. You can't stop a bullet with a joke. Still, I feel that if world leaders maintain their sense of humor instead of being surly toward one another, we'd get a better, happier world — Don Rickles

I don't believe in futurology, and I don't believe in "the future" as an abstract concept. I think that if human beings could only achieve the nirvana of living in the present moment, then the future would take care of itself. Alas, we are very far from that nirvana, and most of us spend most of our time in either anticipation or regret. — Enos Jong

I worry about the printed word, the novel, the short story, the poem. I fear they will be read in the future by as many people as are presently butterfly collectors. Even today it's tragic that a critic novelist is read by only twenty-five thousand people out of two hundred million. Most people don't read a book a year and our culture suffers horribly for it. The process that is involved in reading, that changing of a word into an idea as you read it off a page, requires much more mental agility than sitting in front of a screen or looking at a picture. Turning the phrase that you are reading into an image in your head demands a tremendous amount of brain exercise. I suppose I'd love to be around a hundred years from now though. We won't be quoting Shelley and Keats, but at least there will be a lot of time left for other things, such as tennis and making love. — George Plimpton

I hope that no one in the future will be asking me what I think the future will be like. My fear is that more and more people will be asking me this question, and I will have to answer it — Art Buchwald

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## PRAIRIE SUN

CONTINUED FROM PAGE 17

Finally the breathing stopped. Mother and brother waited minutes in the sudden stillness. Micah started to touch his mother's shoulder. She shook his hand aside. "Let me be alone," she said. Slowly she unwound the two wool blankets and took up her daughter's body in her arms. Without words she stepped down from the wagon and walked through the cotton woods toward the river's edge.

Micah stood in the rear of the wagon and watched her go. The thought never entered his mind: What sort of people would allow a child to do this way? What form of Christian charity would let his sister perish in such a fashion?

He realized he simply did not know.

After what seemed a long, long time Micah emptied his mother's most prized possession, the finely carved sandalwood chest, and repacked it.

The two men who claimed to be from the future were a half mile farther down the trail from where they had met with Micah. They were still rummaging through the heaps of abandoned goods, apparently working their way toward Missouri.

Scrub cottonwoods, sage, a dusty drive juts of porous stone, the wagon nuts themselves, all lent Micah cover. The boy knew that an Indian would have discerned him in a moment. But John and Droos had no such skills. For the second time, but for only a moment, Micah truly wondered what it was like in the future. Then his mind told him once again that such speculation was an impossible luxury and he bent all his effort to remaining undiscovered.

For two or three seconds he actually stood in full view. But both men were apparently absorbed in examining a bulky contraption of legs and drawers. Micah set the sandalwood chest down in the dust strategically in sight only a few yards beyond the men. Then he melted back into the country's natural cover.

In a few minutes Micah reappeared, walking down the slope toward John and Droos and making no effort at concealment. The two men were looking over a William and Mary highboy touching the smooth finish, sliding the drawers in and out, checking the joints. Note the lacquered Chinese detail," said Droos. "Though not actually executed by Oriental artisans, the figures are Chinese in both feeling and technique." Buried in his task, he did not look up to see why John had not responded until Micah stood before them.

The boy's face was coated with dust; his eyes felt like burnt holes in a mask. He tasted prairie grit and would have spat out the dirt. But he no longer had the saliva.

John sounded unsure and awkward. Hello, Micah. Welcome back. We were just preparing to leave. Our time is almost up, and we must go home.

Micah looked from one to the other steadily. He had to start the words several times because of the dry rasp in his throat. "You still would do nothing for my sister?"

"We can do nothing," said Droos. "We come from a quite different world. Micah. There are things we must not do. There are rules."

Micah turned his gaze to John. John finally stared at the ground and nodded. "Very well," the boy said, sounding tired and much older than his thirteen years. The men looked at him warily.

"I truly am sorry," said John.

Micah said nothing. Nor did he answer any other entreaty made by either of the men. He retreated to sit on a wooden crate that held mining tools and simply watched them.

"We'd best get back to work," said Droos, checking something on his wrist. With redoubled energy the two men again busied themselves among the debris. Every once in a while they looked at Micah. The boy remained stationary on the box.

"A swell bottle!" said Droos. "A second!"

This looks like a Pennsylvania Dutch door hanging," said John.

A full set of eighteenth-century sextant gear."

"Another Roosevelt teapot?"

What's this? John hunkered down beside the sandalwood chest.

What extraordinary workmanship," said Droos, also bending over the chest. "Absolutely gorgeous." His fingertips ran eagerly over the inlaid panels. Then he raised the flat lid and said: Oh, yes, yes indeed. Drawing the contents from the chest, he said: "Shetland?"

Looks like it," said John.

And loomed by my mother's hand," thought Micah, but he spoke no word aloud.

Droos again inspected his wrist and said: "Damn! It's almost over. You attach a tracer to the chest. It'll finish up the rest."

Their departure was not dramatic.

"Ten seconds," said Droos, adjusting something at his belt.

John at least spoke to Micah. "Good-bye," he said, offering a slow sad wave of his hand. "I'm sorry, Micah."

Both men simply were gone. As though they had never existed, Micah watched as all up and down the trail, objects vanished. Crates and bags melted into the air. The massive William and Mary highboy disappeared. Finally his mother's sandalwood chest vanished, too, and along with it the fine hand-loomed blankets of good Shetland wool, the blankets that had kept his sister from the frontier cold those past nights.

Micah stood then and hoped his mother was waiting for him at the wagon. The chest and blankets were gone. They had left him there to stand sweating in the prairie sun, in a plan of near-absolute stiffness. Fused but no longer expectant—a plan on which it seemed to him, anything could happen.

And it had **OO**

# RAUTAVAARA'S CASE

CONTINUED FROM PAGE 45

She moved away from the figure, over to Elms. Instinctively.

"He is my blood," the figure said as it licked its lips. "I drink of this blood, the blood of eternal life. When I have drunk it, I will live forever. He is my body. I have no body of my own. I am only a plasma. By eating his body I obtain everlasting life. This is the new truth that I proclaim, that I am eternal."

"He is going to eat us, too," Elms said. "Yes, Agneta Rautavaara thought. He is. She could see now that the figure was an Approximation of a Proxima life form, she realized. He's right, he has no body of his own. The only way he can get a body is—"

"I'm going to kill him," Elms said. He popped the emergency laser rifle from its rack and pointed it at the figure.

The figure said, "The hour has come. 'Stay away from me,' Elms said."

Soon you will no longer see me," the figure said, "unless I drink of your blood and eat of your body. Glorify yourself that I may live." The figure moved toward Elms.

Elms fired the laser rifle. The figure staggered and bled. It was Dave's blood. Agneta realized. In here. Not his own blood. This is terrible. She put her hands to her face, terrified.

"Quick," she said to Elms. "Say 'I am

innocent of this man's blood.' Say it before it's too late."

"I am innocent of this man's blood," Elms whispered hoarsely.

The figure fell. Bleeding. Is say dying. It was no longer a bearded man. It was something else, but Agneta Rautavaara could not tell what it was. It said, "Eli. Eli lama sabachthani?"

As she and Elms gazed down at it, the figure died.

I killed it. Elms said. "I killed Christ." He held the laser rifle pointed at himself, groaning for the trigger.

That wasn't Christ," Agneta said. "It was something else. The opposite of Christ." She took the gun from Elms.

Elms was weeping.

The Earthpersons on the Board of Inquiry possessed the majority vote and they voted to abolish all activity in Rautavaara's artificially sustained brain. This disappointed us, but there was no remedy for us.

We had seen the beginning of an absolutely stunning scientific experiment: the theology of one race grafted onto that of another. Shutting down the Earthperson's brain was a scientific tragedy. For example, in terms of the basic relationship to God, the Earth race held a diametrically opposite view from us. This of course must be attributed to the fact that they are a domestic race while we are a plasma. They drink the

blood of their God; they eat his flesh; that way they become immortal. To them, there is no scandal in this. They find it perfectly natural. Yet to us it is dreadful. That the worshiper should eat and drink his God? Awful to us, awful indeed. A disgrace and a shame—an abomination. The higher should always pray on the lower; the God should consume the worshiper.

We watched as the Rautavaara case was closed—closed by the shutting down of her brain so that all EEG activity ceased and she motioned and cooed nothing. We felt disappointment. In addition, the Earthpersons voted out a verdict of censure of us for our handling of the rescue mission in the first place.

It is striking the gulf that separates races developing in different star systems. We have tried to understand the Earthpersons and we have failed. We are aware, too, that they do not understand us and are appalled in turn by some of our customs. This was demonstrated in the Rautavaara case. But were we not serving the purposes of detached scientific study? I myself was amazed at Rautavaara's reaction when the Savior ate Mr. Travis. I would have wished to see this most holy of the sacraments fulfilled with the others, with Rautavaara and Elms as well.

But we were deprived of this. And the experiment, from our standpoint, failed. And we live now, too, under the ban of unnecessary moral dilemmas. **CC**

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# The Sight of Music



## Digital Harmony

by John Whitney

**BYTE BOOKS** is pleased to offer **DIGITAL HARMONY**, a major new work by John Whitney, a pioneer of the special effects technology used in **STAR WARS** and **2001: A SPACE ODYSSEY**. His book explores the special union of music and computer graphics, and expands the frontier between sight and sound, synthesizing the two to create a new art form. Whitney tells how it's done, provides a thorough theoretical background, and includes listings and programs for those interested in joining in the discovery of this new art form. **DIGITAL HARMONY** lays the foundation for audio-visual art made possible by microcomputers. It is most reading for all art, music and home computer enthusiasts.

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## INTERVIEW

UNIVERSITY MICROFILMS

appearance of life on Earth. Darwin's ideas along these lines were rather ignored for a long time.

Then in 1924 the Russian biochemist Alexander Ivanovich Oparin argued that there was no fundamental difference between living organisms and lifeless matter and that life must have arisen in the process of the evolution of matter. In 1928 the British scientist Haldane wrote a paper suggesting the formation of a primordial broth by the action of ultraviolet light on the earth's primitive atmosphere. Haldane gave us the idea of the primordial soup.

**Q:** Let's talk about what you do in this laboratory. How do you study chemical evolution and the origin of life?

**Ponnamperuma:** We have two approaches. In one, we try to re-create what happened on Earth so many billions of years ago—to make the molecules necessary for life. But we also want to see whether what we think happened really did happen. So we also analyze actual ancient Earth sediments and meteorites.

With respect to the first approach, one thing we are doing is studying the origin of organic matter in the universe. For example, we ask: How did amino acids arise? What we do is to try to find out what happened in the primordial nebula before the

planets of the solar system were formed.

We put the nebula into a bottle, put in carbon monoxide, some ammonia, and some cosmic dust, which we get from crushing a meteorite. Then we heat it. Organic matter is formed. We analyze it. This is one type of experiment.

In another experiment we study the effects of different forms of energy on the primitive atmosphere to see how these molecules are formed. We have an apparatus built by NASA to test spacecraft materials that delivers a very powerful ultraviolet source—four orders of magnitude more powerful than the sun in the region we are interested in. We take a mixture of gases, expose it to ultraviolet, and then analyze the material that's produced.

**Q:** Then do you look to see whether the molecules you have made in the laboratory are also found in sedimentary rocks?

**Ponnamperuma:** Yes. Our laboratory experiments would appear far more credible if we could find some primordial soup, some of the molecules from the early prebiotic era, hidden away in Earth's crust.

We estimate the age of the earth to be four billion six hundred million years. The oldest known microfossils (fossilized cells) are dated at three and a half billion years. These are the stromatolite structures that have been found in Western Australia. However, going even further back, we have found "molecular fossils" in three-billion eight hundred million-year-old sedimentary

rock in Texas, in Greenland, which are among the oldest known rocks on Earth. The rock has been extensively metamorphosed, turning most of the carbon-containing material to crystalline graphite.

However, by comparing carbon isotope ratios we found within this graphite some areas that were not crystalline and that had retained their original composition as organic molecules. Biological processes, particularly photosynthesis, tend to increase the concentration of the carbon-12 isotope as compared to carbon-13. We think the hydrocarbons found in the Texas rocks were formed by living organisms. Of course, actual cellular fossils would be the most convincing evidence of life, but so far we have found none of these in the Greenland rocks.

**Q:** You also study the chemistry of meteorites.

**Ponnamperuma:** Yes. Meteorite studies are a very important part of our work.

Meteorites are small pieces of rock from the asteroid belt that got trapped in the earth's gravitational field and fell to the ground. They are believed to have been formed like the planets from the solar nebula some four billion six hundred million years ago. Among the meteorites are some that are classified as carbonaceous chondrites. They contain organic matter. These meteorites give us an unusual opportunity to study organic compounds of a younger, neutral origin.

Under the glass there is the Murchison meteorite, which fell in Australia on September 24, 1914. That is the meteorite in which, for the first time, we were able to establish very clearly the presence of six terrestrial amino acids.

Since that time we have looked at other meteorites—the Mighei, which fell in the Soviet Union in 1968, and the Murray which fell in Kentucky in 1952. In each case we were able to establish the indigenous nature of the amino acids.

Incidentally, we have a tremendous bonanza of meteorites now. The last expedition to Antarctica, during December and January, brought back three thousand new fragments of meteorites. Twenty-eight are carbonaceous chondrites. These meteorites are a great resource, since they appear to be uncontaminated by terrestrial organic material. They gave us evidence of prebiotic amino acid formation that may have been occurring even before the planets were born. So short of going to the asteroid belt and bringing back a meteorite, we have some of the clearest evidence available.

**Q:** You have also looked for life or pre-life on both the lunar surface and on Mars. What were the results?

**Ponnamperuma:** Well, we examined fractions of every lunar sample that was brought back from Apollo 11 through Apollo 17. We made an extensive search for traces of organic material that might be indicative of chemical evolution. We found organic matter on the order of two hundred parts per million, but no evidence of amino



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Since television signals travel through space, Sagan has been asked to speculate on what beings of other worlds might think of his series.

"I would hope," he said, "that they would see this as an attempt by humans to understand something of their origins and their destinies."

So watch for "Cosmos" on PBS. Somewhere out there, "they" may be watching, too.

**ARCO**



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acade, no evidence of any molecules of organic significance. This showed us that if there was any organic matter on the surface of the moon that dated from the very early stages of the solar nebula, it has been destroyed.

When we went to Mars, it was a different story. Our task on Mars was to play the laboratory of the devil's advocate. What happened on the surface of Mars was that the mass spectrometer told us there was less than ten parts per billion of organic matter. It was surprising—less than on the moon. So in the absence of organic matter, the chances of any life seem to be very small. Hardly likely in fact.

**Ques:** What are the implications of the fact that you are able to create these biological molecules in the laboratory and to find them in the meteorites, yet when you actually look at other worlds, you're not able to find any indication of them?

**Pennampuruma:** That's a very good question. All that we know about the surfaces is that this organic material has disappeared. We don't expect to find any on Venus. The temperatures there are too high. Mars is too oxidized. However, when you move farther into the cold and look at Jupiter and Saturn, especially Jupiter, the whole planet's surface is just laden with organic material. It's a boiling cauldron of organic molecules. So the synthesis of organic molecules under the right conditions is certainly no problem.

But once having formed, if the conditions change, they disappear. So there are certain narrow limits within which these molecules, once formed, will survive—at least to the point where life would originate. **Ques:** You are also working on analyzing the data from Voyager. What can you say about that?

**Pennampuruma:** It's our task to help interpret some of the data that came back from the Voyager mission. We simulate the atmosphere of Jupiter and compare our results with ground-based observations and the spectral observations of Voyager.

Jupiter is an exciting planet for such studies. The colors of the planet result, I think, from organic matter that we can synthesize. If you take methane and ammonia and pass a positive electric charge through them, you get all sorts of colored material.

We are also proceeding with simulations of the Saturnian atmosphere and that of the major moon of Saturn, Titan. There's much excitement about Titan, because it has an atmosphere. In the laboratory we are trying to figure out whether organic matter exists on Titan. If it does, what is the nature of the molecules? These simulations are being conducted now so that we may compare the results with those of the Voyager 1 Saturn encounter this November.

**Ques:** If life did originate elsewhere in our own solar system, what is the likelihood that it did originate somewhere else?

**Pennampuruma:** Well, as I told you earlier, I do think it is likely. There are  $10^{22}$  stars in the universe. If that is the case, there are  $10^{23}$  possibilities for life. But not all stars

have conditions around them that are suitable for life. Oppenheimer calculations, such as those of Al Cameron at Harvard, say fifty percent of all stars may have around them conditions suitable for life. More conservative estimates say five percent. Whether five percent or fifty percent—or even one percent—of  $10^{23}$  it is still a very big number.

Put this together with what I've said about our laboratory studies of chemical evolution in the universe, and the chances for life seem very great.

**Ques:** What about the possibilities of intelligent life that can communicate with us?

**Pennampuruma:** Once again, if we push our arguments to their logical conclusion, there must be intelligent life somewhere.

In the one example where we know it has happened here on Earth, one draws the conclusion that biological evolution is an inevitable result of chemical evolution. And intelligence may be an inevitable concomitant of biological evolution.

**Ques:** There seems to be another point of view emerging in terms of intelligent life perhaps we are alone in the universe.

**Pennampuruma:** I beg to differ. I think we've barely begun to scratch the surface. Give us time. Right now only a few searches are being made.

**Ques:** What searches are going on?

**Pennampuruma:** At the moment, I believe there are about ten searches going on—listening for radio signals. I look upon this as probably the most monumental task the human race could undertake. The idea is that you wouldn't communicate by sending a message, raising a question, asking them something, but rather by gathering information. The benefits to mankind could be incredible. Think of all the libraries waiting to be read.

**Ques:** Are we perhaps being too narrow in our definition of life? Is it possible that in other places there is life based on something other than the DNA-RNA-amino acid apparatus implicit in our discussion today?

**Pennampuruma:** It's certainly a valid question. It is possible, but most unlikely. And the reasons are simple.

The periodic table of elements that exist here on Earth is the same elsewhere. The elements are the same. The chemistry of the compounds is the same. The movement around the nucleus will be the same whether it's here or on Alpha Centauri. And carbon is the center of everything. The nearest thing to it is silicon. But I think the similarity is merely superficial.

Take the difference between carbon dioxide and silicon dioxide. One is a gas, the other is quartz. In spite of four and a half billion years of evolution and the abundance of silicon available, you don't see silicon in any functional molecules, only in structural molecules.

I would conclude that it is highly unlikely that the chemistry anywhere in the universe will be any different. It will be a nucleic acid/protein life. Who knows? Maybe even feet tall and standing on two legs. **OO**

Somewhere in time is the feedback I get from women. Many of them, well-educated and with a good professional career going, say to me, 'You know we have everything the women's movement has told us we ought to have—but we'd trade it in for Mr. Wonderful to come and take us away.' That floors me. They're responding to my characters' persistence, and I'm really pleased with that kind of reaction."

Creating movies that provide such insight is not easy in trying to do so, newcomer Reeve swiftly learned the realities of moviemaking. "Somewhere in Time" originally ran two hours and twenty minutes, and at that length it was a very comprehensive study of the man and his problems. But it didn't even get past the executives. They cut thirty-five minutes out of it so that audiences wouldn't get restless. Most theatrical films are a rest two hours—the same length as TV films, which is not a coincidence. People just die on the vine before TV's blinking light. Their world becomes measured by half-hour increments, and their attention span isn't allowed to reach beyond the running time of a television movie."

Nor says Reeve are viewers the only ones corrupted by television. First, there are the producers. "That box is a big

monster eating up product. A film is no longer just a film; it's a video cassette and a cable entry and a prime-time movie and a series and a spinoff series and a miniseries. TV makes those who feed it so rich that you've got to be a saint to withstand it."

To keep his own theatrical skills in good repair, Reeve is spending some time away from the screen to appear on the stage. "To do credible table work in the theater is one of my two topmost goals," he explains. Asked to identify the other, he grins and with boyish enthusiasm declares: "To give a mind-blowing performance in a film, one that will have people dropping dead out of sheer amazement."

If anyone can do it, Reeve can. So say such industry giants as Katharine Hepburn and Francis Coppola, among many others. If not, Reeve notes with characteristic humility, "there's always the Air Force"—which is less of a joke than it might seem. For recreation and to escape the sobering pressures of his vocation, the actor flies in a plane. He owns a small commuter airline, and he pilots passengers himself whenever his schedule permits. He is also devoted to soaring and has gone sailplaning as high as 10,000 meters for seven hours.

"I feel that a sailplane is an extension of me that incidentally was important in playing Superman," he comments. "While upholding my responsibility to do super things, what I was more interested in was

the grace. Gliding helped me significantly with that."

Recently the actor experienced one of the greatest thrills of his flying career: being invited to Edwards Air Force Base to fly in a T-38, the supersonic trainer jet of the astronauts. "I thought I was just going along for the ride. No way!" he beams. "I flew the thing! I was doing all kinds of maneuvers, and then we went supersonic. The plane shot from eleven hundred to twelve thousand meters in a minute and five seconds. We were pulling three g's and I was comatose in the seat, but it was a real thrill!"

Even Reeve's leisure activities manage to embroil him in difficulty, however. "Earlier this year I was soaring cross-country in England when the weather changed and I lost my lift. I checked my map and found a place with a three-thousand-meter runway. So I landed. As soon as I did, police cars poured out. The officers walked over to me and asked, 'Are you aware that you've landed on a secret research center?' I said, 'No, it's not marked on the map.' They replied, 'If we marked it on the map, then it wouldn't be secret, would it?' Fortunately the officers recognized Reeve and, after checking his license, allowed him to dismantle his plane and have it trucked away. Which he did, pronto."

"Life," says Reeve mope-philosophically, "is never a piece of cake." He concludes with a wink: "Not even for Superman." **DB**

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VIDEO  
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Since before the first musical tone came from the human voice, this was true. But it isn't true anymore. In the last third of the twentieth century we have a medium that is more malleable and swifter than musical nerves. That medium is light itself. While it was always available, it was not until recently that precise means were found to modulate light faster than sound. Now we can do it—on a cathode-beam computer display for example. Now musical instruments that modulate air can be matched with instruments that modulate—with equal exactitude—the light medium of sight. And the audiovisual tracks of the video disc are perfectly suited for this balanced partnership of sound and sight.

I sat at a computer display looking and listening, testing and trying, until I can judge how light pattern and music pattern should consort in motion and sound. My computer is programmed in both music and graphics so it was imitating a deluxe digital composing machine. The finished product can be played on any television set in the world.

For less than \$20,000 you can own the musical half of this instrument, a digital composing instrument that has an advantage over say Fred Astaire's piano. When you finish your composition, you find it all stored in digital memory safe and ready to transfer to any of the new publishing media you choose. No one has yet offered to market a visual complement to this digital music synthesizer although dozens are trying to be the first to do so.

The experience of pure free colors is locked in our TV sets. The development of aniline dyes changed our lives from grays to the riot of color in paint in our clothes—everywhere. And video photographs promise much more. But this promise has yet to be realized.

The promise is not video Valium—that upright stuff, stirred and mixed like soup with Debussy or Pachelbel and played now and then on public-television programs. We like music that is anything but formless—from Bach to Linda Ronstadt. Today the analog video synthesizers you can buy or the battle box that makes nebulae patterns on your home computer or kaleidoscopes, or bubble machines—all well formlessness. Cheaper you should sit at home and watch the patterns of the burning log in your fireplace.

Formlessness is what one gets when one flails at the keyboard, as a child can do sometimes with great gusto. Harmony is what a girl struggles with when she is learning to play a guitar. It's a big event when she plays the proper chords to accompany a song. Harmony is the rule of the game that sustains our interest in music. Without rules, the seductive effect of the guitar's sonority or the lively colors of the mistuned color TV soon turn into a tedious bore.

Harmony is the rules of the game for the arts of time.

Ask me what the laws of harmony are and I'll send you to the textbooks. Ask me what the laws of visual harmony are and I'll confess I'm writing a first-of-its-kind textbook. And there's no assurance it will be definitive. Like aural harmony, digital graphic harmony is complex, and its brand-new Pythagoras in ancient Greece discovered the relationships of the simple ratios of musical harmony and he knew they formed an ideal visual geometry. But it is only in the last 10 or 20 years that this ideal geometry has taken on a great new meaning—thanks to computer graphics that can make harmonic geography move visually and visually moving.

We can create integral aural/visual composition in a domain of harmonic digital continuity. A universally acceptable visual art—an equal partner with music—is a terming hand in hand with current computer music improvements. With these developments there follows a change in prospects for music. Within this decade we will see that the search for new musical resources has produced unexpected results. A major task assumed by a variety of composers since the beginning of this century, pursuing that quest for a new vitality outside the classical harmony ends in a full-scale revolution of architectural tenor, porosity of which I submit, the full history of music is only the first chapter.

Using new kinds of instruments and new compositional procedures borrowed from computer programming and editing practices, the new composer will share with the painter and sculptor hands-on execution of his own work.

The word processor is a good example of this hands-on approach. I write this at my own word processor, a spinoff of the auto-graphic computer I own. Writing is a very slow task. All day long I may sit at the word, but when I am satisfied with what I read on the alpha-numeric display I type PRINT and that day-long tedium spews out letters on paper at 60 characters per second. It could just as well be music and image playing forth in final form from the computer memory as words composed bit by bit.

Digital instrumentation provides the capacity to modify over and over and reshape a composition without signal degeneration. When the instruments are available, composers will find a visual medium that will share with the musical digital synthesizers the editing, viewing, and reading capacities. The artist will feel an intimate, sensitive contact with his work, a contact that is sharpened in a way unprecedented in 500 years of refining musical instruments. The composer will work with harmonies equally applicable to sound and image. And the creative product of these composers will go directly to their video disc publishers.

Long live the revolution! And will some one please suggest a good name for this new video music? **CD**



• The paranormal,  
strange beasts, unusual physical  
phenomena,  
speculative archaeology •

## ANTI MATTER

In the beginning there was matter—and antimatter. This column is dedicated to that proposition.

It is the belief of many physicists that during the birth of our universe as much antimatter was created as matter. Yet, though antimatter can be produced in atom smashers, outside the laboratory it is nighunfindable.

For each particle, there should be an antiparticle with an opposite electrical charge. For each proton, an antiproton; for each electron, a positron, and so forth. In *Omni* we have the Continuum column, which keeps you abreast of happenings in the mainstream of science. And now we have *Antimatter*, an exploitation of the frontiers and fringes of science, a search for the nighunfindable. We will be covering studies of the paranormal, strange beasts, unusual physical phenomena, speculative archaeology, and, at times, amusing glimpses at people who seem to be living in a different universe from the rest of us. For example:

• **UFO UNEMPLOYMENT INSURANCE** A recent court decision indicates that people who encounter extraterrestrial harassment on the job may be able to quit and still collect unemployment benefits—at least in Pennsylvania. Philadelphia Judge James Crumlish awarded unemployment insurance payments to a woman who claimed that "nocturnal capers by unidentified beings" made her quit her job as administrator at St. Paul's Monastery Manor, a Pittsburgh nursing home. In his opinion, Judge Crumlish said the woman, Mary Wilson, suffered "mental harassment and precarious working conditions following a series of alarming extraterrestrial events...featuring self-igniting wastebaskets, interruption of the elevator's electrical power, unprogrammed radio concerts, [and] orotic clock revolutions....She had no alternative but to resign."

• **ASTROLOGY DEFENSE** A chance to use an astrologi-



cal defense just wasn't in the stars for Miami Beach attorney Jack Nageley. Nageley contended that his client, Mark Denton, charged with robbery, aggravated assault, and rape, belongs in a mental institution rather than in prison because his astrological chart shows he was predestined to become a disturbed person. The judge, however, disagreed. Before the

trial, he directed the prosecutor to consider charging Nageley with indirect contempt of court for making a mockery of justice, and Nageley withdrew as Denton's counsel.

But Nageley claims he has used astrology since 1948 to pick the jury and guide his summation in several cases. "Once you know an individual's sign," says Nageley, "it saves you fifty questions and gives you insights for your closing argument." He believes his technique led to acquittals in the Florida murder trials of George Datz in 1969 and William Walton in 1974 and saved his most notorious client, Jack "Murph the Surf" Murphy, from the electric chair. Although Murphy was convicted of murder and robbery in 1969, he got only "life, life, twenty, and five."

• **ANTI-PROTONS FOUND** And in a more cosmic vein, antimatter—the physical kind—has in fact been found by a team of New Mexico State University scientists. The researchers lofted a balloon carrying ultrasensitive instruments to an altitude of 34 kilometers. There, for the first time, the instruments detected a stream of antiprotons coming from interstellar space. These antiprotons were found to be as stable as protons, which raises some interesting questions: Why have we found so few antiprotons and why is the universe so wildly asymmetrical in favor of matter over antimatter? Are large amounts of antimatter hidden somewhere? Similar experiments are planned aboard the space shuttle, to be launched next year. In the meantime here are three more pages of journalistic antimatter.—DT

## FACE FROM SPACE

Two computer scientists have produced photographs of a gigantic rock on the surface of Mars. The rock looks like a human face.

Vincent DiPietro and Greg Molenaar hope that the computer-enhanced, copyrighted pictures (on this page) will help stimulate interest in future manned explorations of Mars.

DiPietro and Molenaar work for Computer Science Technician Associates of Seabrook, Maryland, a company that does contract work for NASA. A few years ago DiPietro saw a fuzzy photograph published in a book about ancient astronauts that showed a humanlike face, said to be taken from the images relayed to Earth by the Viking orbiter.

DiPietro and Molenaar secured thousands of meters of the original data tapes of the Plains of Elysium transmitted from the Viking spacecraft in 1976. Using equipment borrowed from NASA, the two scientists analyzed the tapes, improved the contrast, and eliminated interference.

The result was the picture



of the face (smaller photograph), which DiPietro and Molenaar estimate to be a monolith 2,000 meters high and 2,150 meters wide. The larger photo shows the general area on the Elysian Plains on which the face-like rock is located. (The monolith is on the right side of the photo, not quite halfway up from the bottom.)

The obvious explanation of the Martian face is that it is simply an unusual, but natural, rock formation. But DiPietro and Molenaar claim that there is no surrounding sediment that could have resulted from natural erosion. Therefore, these rock formations, DiPietro and Molenaar conclude, "appear to have been carved rather than formed by nature."

The project is outlined in a 12-page booklet entitled *Unusual Martian Surface Features*, available for \$7 from Mars Research, P.O. Box 284, Glen Dale, MD 20769—Harry Labelson.

## PSYCHIC HEALER

Two California researchers have achieved intriguing, if inconclusive, results in what may be the first laboratory test of a psychic healer's powers.

Elizabeth Raucher, a physicist, and Beverly Rubin, a biochemist, both of John F. Kennedy University in Martinez, California, asked well-known psychic healer Olga Wormell to keep bacteria alive under normally lethal conditions.

In the experiment Wormell placed her hand beneath a test tube containing *Tydimonium* bacteria, which were

doused with phenol, a household bactericide. Five percent of the bacteria were still alive and mobile after 12 minutes. Previous studies using the same bacteria and a control experiment indicated that the microorganisms ought to have been immobilized within two minutes. "We've never seen them survive beyond two minutes," said Raucher.

In another experiment Wormell "produced an enormous increase in the growth rate and motility of the organisms," according to Raucher. Describing the experiment, she said, "We decided to use microorganisms because their growth rate and motility are well characterized. This allowed us to control against factors such as experimenter suggestibility and sleight of hand."

Raucher expressed her pique at the more sensational accounts of her results. "We have to do our own replication," she said. "I would say if I saw this in ten to twenty experiments—and we did two—then I would think we had something. My personal view as a human being, is that there might be something going on, and it's certainly worth pursuing. As a scientist, I feel essentially the same way but I certainly wouldn't make a claim that you could prove anything with only two experiments."

—Allan Maurer

"There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy."

—Hamlet



## NIXON'S BATHROOM

If you can get good karma from a kitchen and a bathroom, Richard Nixon ought to have plenty when he's in his New York office.

A company called Karma Construction submitted the low bid of \$9,300 and was hired by the General Services Administration to build a private kitchen and bathroom for Nixon's new office.

The firm's motto is "We build mantra-filled walls." The company's founder, thirty-nine-year-old Barry Bryant, employs about 20 workers, craftsmen, artists, and spiritual seekers who "believe in meditation in action."

Using the Tibetan Buddhist mandala—which assigns a color to each aspect of human personality—as a guide, Bryant chose blue for the bathroom and yellow for the kitchen. "Blue represents anger, and

yellow pride," Bryant notes. "By contemplating these colors, one transforms anger and pride into equanimity."

Work on the project began with a purification ritual, which included burning incense, chanting mantras, and performing symbolic finger gestures. Ancient texts and Chinese and Tibetan relics were sealed in plastic bags behind the sheetrock walls, which also conceal written mantras.

"We felt the impact of building something for a former president," Bryant says. "The colors, tiles, and textures look as if they belong in a chateau. We really felt we were building a monument." —A.M.

"Unexplainable events occur constantly. One man will see spirits. Another will hear voices. A third will wake up and find himself running in the Preakness."

—Woody Allen



## PINK JAILS

Jails and prisons are violent places, but a new technique in penology may alleviate scenes such as the one above. The idea is simple: Just paint all the cells pink.

The Sweetwater, Florida, Police Department has already painted its jail pink, and claims the color has a calming effect on hostile prisoners. "It really works," said Lieutenant Bud Dawson, who got the idea from a news report about an experiment in California in which mental patients and hostile prisoners were calmed by pink rooms.

Sergeant Ray Toledo has seen more than 20 prisoners locked up in the cell since its color change. "Several prisoners came into the jail in a rage, and after a couple of minutes in the cell they calmed down. One hostile prisoner came into the cell and cried for two hours," he claimed.

Lieutenant Dawson offered a partial explanation: "They've always had cells painted gray or green or some other monster color. Pink is a surprise. It just gets the hostility out of them." Dawson said Sweetwater's police have repainted some of the experiment's cells on the newsstand, such as having a person lift weights in the pink cell. "They can't lift as much as normal," Dawson said.

Now several larger Florida institutions are also planning to try keeping inmates "in the pink." All the publicity surprises Dawson. "We needed to paint the cell anyway and just decided to give this a try." —A.M.

"If this hypothetical psychotic were truly talented, death probably wouldn't even stop him."

—Jeffrey Moshlove, the country's first Ph.D. in parapsychology, speaking of the use of psychics for espionage purposes



## SUMERIAN ASTRONAUTS

Did the ancient Sumerians possess an uncanny understanding of our solar system at a time when the rest of civilization still believed in an Earth-centered universe? That's the theory of biblical scholar Zecharia Sitchin, who puts forth his argument in his book *The Twelfth Planet*.

Note the six-pointed star with bells clustered around it, in the photo at right. It is an enlargement of a detail from the top left portion of the 4,500-year-old Sumerian tablet, below. The star and bells, says Sitchin, are in fact a map of our solar system. He claims the tablet is remarkable not only because it shows the sun (the six-pointed star) at the center of the solar system, but also because it depicts all nine planets plus our moon plus a tenth planet. And all this can

the Sumerians called Earth the seventh planet, though today we consider it to be the third planet (from the sun). The figure 7, Sitchin says, could have been arrived at only by someone counting from the outside of our solar system as he was coming into it. As further proof, Sitchin claims that the Sumerians considered Venus the eighth planet and Mars the sixth. The obvious conclusion, he says, is that the Sumerians were educated by ancient astronauts who landed on Earth approximately 450,000 years ago. Sitchin claims he found the phrase "People of the Rock-



tunes before astronomers realized that the earth revolves around the sun—that there are three planets beyond Saturn, and that there may be a tenth planet.

How did the Sumerians figure this out? Sitchin claims

et Ships" in Sumerian writings.

Astronomers and Sumerian scholars who have examined Sitchin's work doubt both his knowledge of astronomy and his grasp of Sumerian cuneiform.

## CHICKEN TEETH

In an experiment being cited as evidence that evolution may sometimes proceed by rapid species-changing leaps, a University of Connecticut biologist has managed to grow chicken teeth—in mice.

Edward Koller said that British embryologist Darrie Honour Fell discovered that teeth begin to form in five-day-old chick embryos but disappear by the sixth day.

So Koller joined embryonic chick cells with molar connective tissue from nude mice, a strain of mice that have no thymus gland and therefore do not reject foreign tissue. The mouse cells activated the dormant chick-teeth gene. Several weeks later septal-like teeth appeared (photo at right) in the mice, complete with enamel layers.

The experiment is being interpreted by a new group of evolutionary biologists as evidence that new species formation may be a macro-rather than a microgenetic event," Koller says. "They claim major changes occur because of sudden, severe, probably developmental phenomena that can produce new forms."

Koller has studied tooth development for 15 years, but he has always felt hampered by the lack of "a good dental mutant." Very often he explains, insights into normal processes can be gained from mutant aberrations. Unfortunately suitable teeth rarely develop. "When they do occur," says Koller, "they are so devastating to

the animal that it doesn't survive." Now thanks to his experiment, biologists may have an evolutionary dental mutant to study.

Next, Koller is considering



an attempt to join mouse cells with live chick embryos to see whether the chicks will be able to grow their own tooth. —A.M.

"In all the courses, there is naught but straight flying, bumping, clanking, and again straight flying. Phenomena are but lumps, jumps, and bumps. A mass and a career is but jumping, bumping, rejumping, rebumping, and finally unbumping."

—George Francis Gáede, known for his "backcrewing theory of gravity"

"Apart from the known and the unknown, what else is there?"

—Harold Pinter in *The Homecoming*

important challenges required huge investments, the government went to the people and asked them to invest in public bonds. During World War II, for instance, War Bonds represented a willing investment by the people in winning the war.

Robotics is the challenge of the future. The government could move us to accept it by forming a quasi-public agency to sell Victory Bonds for the Future. The money-gathering agency that issues the bonds might be called the National Mutual Fund (NMF). Here is how it might work.

First, a massive campaign of advertising, promotion and speeches would be undertaken to explain to the American public why robotics is so vital for their future. Without it, they would be told, the next generation of Americans will live in a second-rate society whose goods won't sell on world markets. Jobs will be scarcer than ever. The dollar will be so devalued that it won't buy a stick of chewing gum. Failing to accept the robotic challenge will put the United States in an ever deeper fiscal hole.

Americans will be encouraged to invest as much as they can—until it hurts—in Victory Bonds for the Future. To stimulate public acceptance further, the bonds could pay interest pegged to the cost of living. Investors would always receive, say, 5 percent interest more than the year's average rate of inflation.

With the money it receives from public investors, along with money appropriated by Congress or gathered from other government sources, the NMF would build a significant supply of cash. The NMF can use this cash to finance companies that want to adopt robot technologies. The firms can issue special stock offers, which the NMF can buy. They can then use the money from the stock sales to install robots.

Now let's look at the other side of robot economics. As the new technology expands, workers will be pushed out of jobs. We must plan to ease their discomfort and make up for their financial losses.

One way would be to allow the workers to own the robots that replace them. As owners, they could lease the robots back to their former employers for use at their old jobs. This plan is highly speculative, of course; it would require extraordinary cooperation among workers, unions, the owners of businesses, and government.

Another method might be to establish huge employee stock option plans. If employees are given large blocks of stock in their own company, they'll benefit directly from the increased productivity the robots will furnish. The dividends on their shares could offset their lost wages. This plan would ease the burden only for the labor force now employed; it would do little for those who enter the labor force after the transition into its stride.

Also, the fortunes of displaced workers

would be tied to the profitability of a single company. In a society in which only half or one quarter of the work force remains employed, the others displaced by robots, a bankruptcy in one company would be disastrous. The dividends would disappear, and no jobs would be available to offset the loss. The government might have to perform Chrysler-like bailouts on a herculean scale to maintain robot companies.

A third course, probably the most attractive one, would be to use the NMF as a conduit for payments to displaced workers. A spend from the dividends the NMF receives on the stocks it buys could be guaranteed to each unemployed human worker. Every time the NMF finances a company into the Robot Age, it will get stock, which pays dividends. As robots spread through the economy, the NMF will hold stock in more and more companies, receiving greater and greater dividends.

As more workers are put out of jobs by robots, the NMF will have steadily more

“One danger we may have to cope with is inflation. As money pours into robotics, the economy could become badly overheated, wages and prices might go a bit haywire.”

money to assist them. It will work somewhat the way Social Security or unemployment compensation does now, but the money distributed will not be tax revenues; it will be dividends, like those of any mutual fund.

Not all workers who lose jobs to robots will be put out of work. The adoption of robots in its early stages will eliminate many jobs, but it will open up many others. As assembly-line jobs disappear, construction of new robot factories will require skilled hands. As technical services go robotic, more programmers will be needed.

The shift from a worker economy to a robot economy will be gradual, appearing at least a generation. If the basic institutions and plans are ready at the inception, there will be time during the process to adjust to the changing situation. The shift to robotics could be managed almost on an industry-by-industry schedule, controlled and reasonable, if there are such agencies as the NMF ready to oversee the change.

One other problem our robot control plans will have to cope with is inflation. As companies and the government pour money into robotics, the economy could become dangerously overheated. For a

time, the relationship between wages and prices could go badly off balance. Eventually, the efficiency of robot workers will bring the prices of all goods well below current levels (raising the quality, too). During the interim, however, fluctuations in the economy might be dramatic.

This might necessitate establishment of a monetary control system above and beyond the Federal Reserve System. One possibility would be an “enforced savings” program. Whenever prices begin to gallop away, the government could impose a special deduction on all paychecks to draw money out of the economy and thus lower demand. This money would be designated “enforced savings,” placed in special savings accounts where it would stay—earning interest—until the economy cooled.

Obviously such a plan would represent a serious sacrifice for workers. It would also be an unusual infringement upon the rights of American citizens. But if we want to adopt the technology we need for the future, a few such exceptional efforts will surely be required. The alternatives would be ballooning inflation and an uncontrollable economy that could run all plans and throw the United States into financial chaos.

Even if our entry into the future goes smoothly, robots will not bring utopia. No machine can, because the final barrier to human happiness lies in human nature.

Robots will bring in an age of universal prosperity. They will help us stretch our natural resources and create synthetic resources when the natural ones are exhausted. They will improve the quality and availability of all goods. They will help us husband our food supply to provide an adequate diet for all humankind. They will encourage us to reach out and explore the universe, the earth, and ourselves.

But the robots won't solve our paramount problem: overpopulation. Our unchecked growth has outstripped the productivity of every technology ever devised and sucked dry every pocket of useful resources ever discovered. Our exorbitant numbers have strained world industries to the limit.

Robots will give us one last chance to overcome the fundamental bane of civilization. It won't solve the problem, but it will give us time to solve it ourselves.

Perhaps this is the best use to which we can put the seamless stretch of work-free time we'll have. Can we control ourselves? Can we create a social order that keeps within the limits of its resources, space, and food supply? Can we make an orderly transition to the frontier of the stars before our expanding population impoverishes even the robotic economy on Earth?

Freed from arduous toil, awash in material goods, we will have to become a new type of human. Will we use the freedom of this future age to secure mankind's stake in the universe, or will we fritter away the opportunity in boredom and desecration?

Robots pose this ultimate question to us, but only we can answer. Which will it be: an orchestrated future, or the last dance? **DO**

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# COUNTDOWN

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lively recent development. Times past are predominantly a record of here-and-now humans getting along with a bare minimum of foresight. As a matter of fact, Dubos suggests that looking ahead on the grand scale—really anticipating the possible consequences of our actions—began a more generation or so ago.

The ultimate in decentralization will not come on this or any other planet but on man-made satellite worlds already on engineering drawing boards. Gerard K. O'Neill, the Princeton University physicist, envisions human settlements even beyond our solar system. Now that we realize the possibility of earthlike habitation in space, all star systems become potential sites for colonies, whether or not those systems have planets.

Specifications for the first space colonies which O'Neill calls "Island One" models are being spelled out in detail. Each unit is designed as a sphere a mile in circumference, complete with shielding against small interstellar dust 200 sun-drenched acres of farmland and room for suburban-style homes, parks, lunar-sand beaches, and 30,000 human beings. On Earth we have an economy of scale," O'Neill postulates. "Nations impinge on the boundaries of other nations and export and

import food and other products, and that necessitates extensive distribution systems. All this brings a lot of things we dislike, such as large authoritarian governments. In space, however, everything works in the opposite direction. A hundred little space colonies are cheaper and more efficient than a single giant colony. The sheer economies of space pushes us toward thinking small!

O'Neill's "islands" will consist of self-sufficient units. They will not be isolated, however. Each colony will be an experimental community free to choose its own form of government but linked to other colonies by graphic display terminals and an overall computer network. Individuals will be free to travel around on fast celestial omnibuses to any other colony including Earth itself. This is an American prospectus. Soviet engineers are thinking along generally similar lines, one difference being that travel from one human collective in space or to another may take place through interconnecting tubes, hermetically sealed corridors.

## THE PERENNIAL IF

All of which brings us back to present-day realities. Communities of people in space may start small, but they won't stay small, and in all probability people will behave just as aggressively among the planets as they do here on Earth. Space War I could readily become something rather more lethal than any science-fiction

or TV game, unless future man evolves a brand-new ethic of working together to replace the current outthroat version of keeping up with the Joneses and Ivanovs (which of course means getting way ahead of them).

Will we make it? The answer depends on a number of basic ifs. If we control the world's population growth; if we develop sources of renewable energy if we have no more world wars. Without such achievements, we may not make it—as Mann has predicted. An alternate vision sees us evolving into something like the ants and other social insects that seem to have reached a kind of evolutionary plateau, a stable stop-action world without technological or social progress and without suffering, either. This is the future of man seen by Aldous Huxley, George Orwell, and John Bonner, a human anthill on an interplanetary scale. However, in this view no account is made for our moral evolution.

A third possibility is just as plausible and a lot more exciting—change, widening exploration and increasing complexity into the indefinite future, a prospect without precedent. But then the human variety of culture is also without precedent; Wilson, Washburn, and O'Neill opt for the sort of future, and my own prejudices lie in the same direction. It implies supersocieties, networks of symbiotic "space suburbs" colonies spreading benignly throughout the Milky Way and beyond. **DO**

COASTS OF THE PACIFIC OCEAN

occurred all around the world.

3) The emulated animals are consistently found to be hoifers, one to three years old though there is an occasional bull, horse, or antelope. All the animals appeared to be normal and healthy before they died.

4) The rectum and reproductive organs were suspiciously removed from all of the animals, as if by a laser knife. (to quote source) Other parts, such as an occasional tail, tongue or ear, were also removed from the animals "as if they were trying to throw us off." (to quote yet another source) There was no blood left in the dead animals, it was gone, it did not pool. Certain chemicals were missing from the vital organs (copper and potassium, I believe). An organic powder composed of phosphorus and magnesium that glowed when exposed to ultraviolet light was found on the heads of the dead animals and was also found on some live animals in the herds that the mutilated animals came from.

5) Scavengers such as coyotes and buzzards, and flies would not go near the mutilated carcasses. No tracks, not even those of the victims, were found within several feet of the bodies.

6) Little, if any, radioactivity was detected in the area around the carcasses.

7) The animals were alive when the mutilations occurred, and, as far as can be told, no anesthetic was used.

8) Mutations have occurred within 50 feet of a house full of people, without disturbing anyone.

54 In approximately 75 percent of the reported cases, nocturnal lights were sighted in the general area within about a 48-hour period before and after an occurrence.

10) There has never been an eyewitness to a mutation.

11) Some herds have been chosen to supply more than one guinea pig, though not at the same time. (Watched herds were never hit again.)

12) The last question on my list was, "In your opinion, do we have the technological ability to duplicate the mutilations exactly as they occurred?" The unanimous answer was, "No."

I think that I have produced sufficient information from highly reliable sources to prove the opposite of Mr. Rommel's findings. If I have not proved my case, at least I have supplied a reasonable doubt.

Mr. Rommel's investigation is an insult to my intelligence. I wholeheartedly concur with the *Abschweiger Journal's* opinion of Rommel and Richard M. Nixon. As for Mr. Rand, the only thing I find 'Amazing' about him is that he failed to get the proper background information on something that he was supposed to be writing about.

Ms. C. J. Harper  
Harrisburg, W. Va.

## LANDSAT Early

Charles Sheffield's article, "Earth Scans" (June 1988) presents some beautiful LANDSAT scenes, but the description of their acquisition and construction is somewhat misleading. Reading the article, one senses a camera aboard the spacecraft, but in reality the data are acquired by a multispectral scanner, which measures the brightness of some 265,000 adjacent areas of the earth each second. Since brightness data is obtained in four bands, this amounts to more than 1 million such values each second. Each standard LANDSAT frame (which measures 185 x 178 km) takes nearly 30 seconds to acquire and represents some 29 million data points (in all four bands). These data are used by the U.S. Geological Survey to prepare photographic products, using a complex data receiving and processing system. Photographic prints made from these data are available from the Geological Survey's Earth Resources Observation Systems (EROS) Data Center in Sioux Falls, South Dakota.

Three LANDSAT satellites have been launched to date. The only operating satellite in this series is LANDSAT 3, which is now plagued by on-board problems with its scanner. The launch of the next satellite of this series (LANDSAT D) is not scheduled until 1981 or 1982.

R. L. Hartley  
Chicago, Ill.

## Directed by the Light

I thank John Gribbin for his fine article "Jupiter's Nonexistence" (June 1980). He has successfully communicated what I have been trying to explain to people who use the planetary alignment as "proof" of the destruction of the world. Trying to educate them has been like talking to a blind man with sign language, but Mr Gribbin's article has helped.

Terry Fischer  
Grand Forks, N.D. 58203

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(AR2356)

## EASYPOINTS

CONTINUED FROM PAGE 102

almost grateful glances as he scoured off for the elevator.

Back in the office, he asked Margo—his blonde and full-breasted secretary—for the name of the head maintenance man on Section P.

Emilio Marquez. Is something wrong?  
No, no. Just try to get him for me sometime today. Margo. Oh, before I forget—how long was Ramona Kitchens on the phone?

The one who wanted V as in Velasco, oh, dash three-oh-seven?

Yes, that's the one.

Margo checked her log. "Twenty-two minutes and forty-eight seconds. That is, of course, before we cut her off completely."

Henry Cutler smiled. "Inform Mrs. Dano," he said. "And I want full credit, too. No more of that point-and-a-half deduction just because I wasn't face to face. That's really not her, you know, dear. Tell Dano I've decided to change the rules."

"Very good," Mr. Cutler. "I'm sure morale will soar! And, if I may say so, sir, I think you're one of the most sensitive middle managers we've ever had."

Henry Cutler smiled.

At two, Brian MacAffee telephoned. "Mr. Cutler, I think I must have confused what

you told me. I think I'm lost."

Oh?

I'm over in the third quadrangle now. As a matter of fact, he said with an obviously strained laugh, "I've been here for almost two hours. I can't find a fountain anywhere."

Oh?

"And I've really looked, too. All around Mr. Cutler. I just can't find that fountain."

Mr. MacAffee. Henry said, now himself sounding a little confused. "Why are you looking for a fountain?"

"Well, to find Building G, of course. You told me there was a fountain in front of Building G."

Henry Cutler smiled. "No, no, Mr. MacAffee. You have confused what I told you. I told you there was a fountain in Building G. There is an oak tree in front of it."

"An oak tree?"

An oak tree. It's in a planter, Henry said. A rectangular planter. It's cement. And it's dead. Bright cherry red.

Later Henry watched as the tall, angular man paced in imitation around his office. He watched the man's jerky, disjointed movements, then said, "Albert, why?"

Why? Why do I want a meeting of the Game Board, Henry? I'll tell you why. I heard you changed the rules. Again.

Yes, Albert. That's right. I did.

"Well, you can't do that! You can't just arbitrarily change the rules. And right before final scoring, too! It's unheard of!"

Henry felt cold suddenly. "And why can't I change the rules?" After all, I invented the Game.

Albert Matthews sat down behind Henry's desk in the hard wooden chair. Because one of its legs had been sawed half an inch shorter than the others, the chair rocked back and forth as Albert talked. "Henry, you're not playing solitaire. There are over a hundred players in this building alone. Ten times that number in the entire complex. And every now and then it grows!"

Henry, Albert said. "It's spreading, too. They're playing it in El Paso. Savannah's interested. The guys in Newark are saying they've had it all along. In fact, they're pissed because they think you stole it from them."

Henry frowned.

Look, Henry. I don't mean to be critical. God knows, before the Game, there was nothing! Efficiency was poor. There was no morale. It was terribly depressing. Now, of course, because of the Game, all that's changed. Henry, you've transformed us into a team! We finally have something in common.

"But you can't just change the rules on a whim? And I'll tell you something else, too. As the Albert looked around conspiratorially, "Henry, this is on the Q.T. Aw, maybe I shouldn't tell you this." Albert pulled the distressed chair close to Henry. "About the Game, I've whispered. I've heard it being considered by the President himself!"

"What can I say?" Henry said, feeling an intense pleasure. "The guys dumb. But he's not that dumb."

That's right, Henry. And that makes it all the more imperative that we convene the board."

You think so?

Absolutely. Look, we need to check over all the rules anyway. Add, delete, make changes where necessary. But I'm afraid you can't decide it all on your own any more."

Henry sighed. Albert had a point.

Faintly, Henry, Albert said. "The Game has just grown too big."

At three, Margo popped her head in the door. "Henry, Emilio Marquez again. He's got to get off his coffee break sometime."

Yes, try it again. Henry walked through the invisible clicks and buzzes and misadventures. "Emilio? Hey, boy! This is Henry Cutler. How are you doing?"

Fine, sir.

"I looked in on Section P today. Sick of genius. What was that you put on the floor?"

Emilio laughed. "A new wax, sir. Was in War-forever, dash eight-niner-zero. I invented it myself. Takes twelve hours to dry. Oh, you ought to go down there now, sir. One of the public got off the bench. I told her not to. But she was a real snotty bitch. She said, 'Shut up, spic. So I let her.'"

"You let her whine?"

"I let her get off the bench."

Henry rubbed his forehead. He had discovered that talking to Maintenance could





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sometimes be very difficult. "So?"

"Sir! She's stuck to the floor! Haan't been able to move for over an hour!"

Henry smiled. "Emlio. I want you to go over to Personnel. Fill out a B, as in Barbara, dash eight three two dash A, as in Anna. Mr. Acue has them."

"Yes, sir!"

"You know where he is?"

"Yes, sir!"

Emlio, "Henry said, 'I'm kicking you upstairs'."

Before he left for the night, Henry had Margot set up a meeting of the Game Board for nine in the morning. He also trimmed his nails. In mid-clap the phone rang.

Mr. Cutler: "I can't find that oak tree."

"Oh?" Henry dropped the painting into his ashtray. "What oak tree? And who is this?"

"Brian! Brian MacAffee! You said to look for an oak tree. In the planter? In front of Building G?"

Building G? Mr. MacAffee, there is no oak tree in front of Building G. It's a pine. Henry tapped his nail clipper lightly on the mouthpiece. "I'm sorry, Mr. MacAffee. I have an incoming call. Can I put you on hold?"

There was a ringing in Henry's ears when he finally made it home. A constant nagging noise. He tried to ignore it. He felt his heart race arrhythmically. Painfully. He went to the bathroom. He put the wastebasket on. He

started fixing dinner and, when he could no longer stand it, went to answer the phone.

"Hello, Mamma."

"Henry! I want to talk to you!" Absolutely not. Mamma. I know that tone of yours. Henry's hands began to sweat. I'm coming over, Henry.

"Oh, no, you need. I'll tell the doorman to keep you out."

Mamma laughed. "I'll go him better than you do. I can get in anytime I want. I was up there just today. Henry, and that's what I want to talk to you about."

The vents in Henry's neck began to throbb.

Henry: "I'm coming over."

Henry hung up the phone. It rang again, so he unplugged it. He went over to the door and pressed the buzzer to the lobby. After what seemed an interminable wait the doorman finally answered.

Oscar: "What's my mother up here today?"

"Maybe," came the answer. "It depends. Who are you?"

Henry: "Cutler! In 8-B! I gave you five dollars just last Christmas, remember?"

Oscar laughed. "Oh, yeah. Five bucks. I remember, huh!"

Well? Was my mother up here?"

"Let's old lady? Dyes her hair red? Good tippin'?"

Yeah. Why'd you let her in?"

"She's a good tippin'. What did she do, Mr. Cutler? Rap you off or something?"

Henry pinched the bridge of his nose.

"Oscar! I don't want you to let her up here again. Do you understand?"

"Well, Mr. Cutler, uh, I can't be too sure about that. I know I'm not on duty all the time, and even when I am, she's such a crafty devil, she could slip past and..."

Maybe we can work something out, Oscar."

Oscar settled for twenty dollars on the nose and five extra a week. Henry tried to condition himself to think of it as an insurance premium. Although he knew he would not pay gladly, Henry also knew he would pay.

Henry ate his dinner and listened to the radio. Halfway through the twelfth chorus of "Amusing Grace," he heard a terrible noise.

Henry? Henry: "Cutler! This is your mother speaking!"

Henry dropped his spoon. Terrified, he searched the small apartment.

"Come to the window, Henry!"

Henry went. He parted the curtains timidly.

"Henry! I want to talk to you!"

"God, Mamma!" Henry said as he flung the window open and bent out. What are you doing there? And put down that bulbhorn!"

The small woman who dyed her hair red and was a good tippin' said, "Not! Not! I'll talk to you, Henry!" Her voice had a strange, mechanical tone. It whirled up and bounced off the walls of the U-shaped building. Dozens of windows overlooking the concrete courtyard opened. Heads popped out. Curious. Pablo. I was up there today, Henry!"

"I know," he yelled back. "Will you put down that damn bulbhorn!"

"And do you know what I found up there, Henry? Cutler?"

Whadja find, lady? the man in 4-F yelled.

Damnation, Henry said. "Put down that bulbhorn!"

Mrs. Cutler reached into her bag and retrieved a small brown box. Henry could barely see it. I found these, Henry. Cutler! These!"

"What are they?" asked the woman in 5-A.

"Oh, they may be drugs!" said her neighbor, Mrs. Green. "That poor poor woman!"

Henry: "I've told you a thousand times! I want grandchildren! Do you hear? Grandchildren! Grandchildren! Grandchildren! I go up there to clean and what do I find? These!" She pointed the box at Henry.

"Hey, they're rubbers!" cried the teenage boy in 1-C.

"Rubbers?" asked the woman in 2-B. "They're rubbers!" she called to the man above her, who called to the man above him.

By the time the news reached Henry on eight, all the people in the complex knew. And were laughing. Hooting. Hell-hailing from their windows.

"I'm gonna kill you, Mamma!" Henry screamed, pulling away from the sill. "I'm



out any cutoffs to the "throughway."

"That's beautiful," Henry said.

"Wait! Listen to what else they've done. In Lot Q—you can see it from your office, Henry—in Lot Q, they've painted redwood on almost all the spaces. In fact, out of two hundred slots, they left only one that says 'visitor.' There was a hell of a fight down there this morning. Had to be fifteen or twenty of the public slugging it out for that spot."

"Who won?" Dana asked.

"Oh. Albert said 'I don't know.' Some guy. Anyway, I think we should let Grounds Maintenance in."

The Game Board agreed.

Henry went back to his office happy and relaxed.

Game Board or no Game Board, he realized, the Game was still his. He had staved over the birth of the Game. Whatever he wanted as in the past was simply voted in. Rules changes. Accounting systems. Mothers.

When he got back to his desk, Margo buzzed him and said he had a call.

"Mr. Custer," the voice said. "I'm in Building G. Yes. I finally found it. I'm in room 607, but now this is very strange. No one up here has ever heard of Mr. Acue."

That's puzzling," Henry said. "Very puzzling indeed. By the way, who are you?" And why are you looking for Mr. Acue?"

Brian MacAffee screamed his name at Henry. He screamed something else, too—something unintelligible. Then, quickly he apologized. "Look," he said. "I realize you're a busy man, and I hate to take your time. You'll never know how much I hate to take your time. But when I saw you yesterday, you said I needed to get a B, as in Barbara. dash eight three two dash A, as in Annie. You said a Mr. Acue in Building G had them."

"Building G?" Henry interrupted. "Mr. MacAffee, I'm afraid you've gotten things a little confused. Again, Mr. Acue isn't in Building G. He's in Building B—as in Barbara. Henry let this information sink in for a second, then he added, "Do you know where that is?"

Henry heard the sound of muffled sobbing on the line. He told Brian how to get to Building B, hung up, and dialed Dana. "Play back the tape of my last conversation," he said. "I just got to the Point of Frustration dear Score Automation."

The rest of Henry's morning was fairly typical.

Ramona Kitchens called back. Henry apologized profusely. He blamed the entire misunderstanding yesterday on Margo. And this time he took down half her address before he put her on hold and left for lunch.

He ate with Emilio Marquez. Emilio explained a plan he'd devised during the night. "Mr. Custer," he said, "it's the elevators."

"Call me, Henry, son."

"You say, Henry, what we do is this. We fix

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the public ones so they never go up."

"What?"

"Well, they do go up. Eventually. But never directly from the lobby. That's the beauty of it. Henry. No matter how many times the public punches up, the elevators always go down."

Henry smiled. "And then they go to the lobby again?"

Emilo shrugged. "Well, maybe. Maybe not."

Emilo. Henry said, "I predict that you will go far in this world."

When he got back to his office, Henry learned that Ramona Kitchens had stayed on the line five minutes for just a little over forty minutes.

"Before we cut her off again," Margo said.

"Good girl. Now call Dana."

So were cooking now. You've made beauty points just this morning.

Henry smiled. "When you get the chance, Margo, get my mother on the line."

That afternoon Henry did his paperwork.

He spilled coffee on a laboriously typed S. as in Sharon, dash two nines zero subscript four. He dropped an ash and accidentally burned off the name of the file on a P. as in Patty slash one. Through no fault of his own, he misplaced the last sheet of an Oh comma Annie. Margo, he said, send these back. But first stamp them INCOME. PLETE.

After the paperwork, Henry did yoga. He pushed and pulled and bent and strained then lay down for a nap.

Margo interrupted him. "Sir, you have a visitor." As she said this, she made an odd series of eyebrow gestures so if she were trying to communicate something to Henry.

"Margo," he said, concerned, "why don't you take next month off? I think you're catching a bit."

Margo winked at the President, then escorted the visitor in.

"Mr. Cutler, the visitor said, 'I've got the B as in Barbara, dash eight three two dash A as in Annie.'"

Henry looked at the disheveled and slightly bloodied man and said, "Brian, you're kidding."

"No. Here it is."

Henry asked Brian to sit down. That's a bad cut over your eye, he said, then took the form and conscientiously pored over it. He took his pen from the black-onyx holder and tapped it several times. Finally he said, "Well, this all looks just like, Brian."

Brian smiled. He lightly touched the cut over his eye.

"Yes," Henry said. "This all looks just fine—except for one little, tiny thing."

Brian visibly tensed in the chair. It began to look back and forth.

"Mr. MacAlfee," Henry said. "I'm afraid this isn't the form I asked you to get."

"What? What do you mean? You told me to get a B, as in Barbara, dash eight three two dash A, as in Annie, and there it is!"

"No, Mr. MacAlfee," Henry said slowly

deliberately. "I told you to get a B, as in Barbara, dash eight three two dash A, as in Annie, subscript one."

Brian exploded from the chair. "Damn it," he said. "I've already been in one fight today and I don't mind another!" He grabbed the nearest thing to him—the black-onyx pen holder—and waved it at Henry. "Why are you doing this to me? What is it? That damn twenty-year-old pool ball?"

Henry smiled.

"Damn it, Henry! I want an answer!"

"No, Brian. It isn't because of the pool ball. Not at all. At least, not really. Hell, Brian, it isn't even you, per se."

"Then what is it?"

Henry leaned back in his chair and carefully appraised the situation. The anger, righteous outrage, and frustrated confusion in the paunchy man's face seemed to point to an imminent breakdown. And Henry knew he was behind this week. This thought, along with the realization that he and Brian were alone in the office, began to

*● Ramona Kitchens called back. Henry apologized and blamed the entire misunderstanding on Margo. And this time he took down half her address before he put her on hold and left for lunch. ●*

worry itself up and down Henry's spine. He felt suddenly cold. Chilled. His chest ached. Suddenly he thought about the pool ball twenty years ago. He thought about the fact that there were no witnesses now and then suddenly he said it. "The public. It's just the public, Brian. That's really all there is to it."

"Just what the hell does that mean? The public?"

"Calm down, Brian. Henry relaxed in his chair. It means exactly what I said—the public. I probably shouldn't tell you this," he said, carefully observing a twitch in Brian's cheek, "you being one of them and all. But, too, I have the feeling that may change. I mean, anyone who can draw in red tape the way you do belongs in the government. You could yet be hired."

Brian did not seem appressed. "Are you telling me you treat everyone like this?"

Henry made a gesture as if to say maybe. "Maybe there's your case, Brian. After all, I haven't forgotten that pool ball."

"By God, I'm calling for an investigation, Henry! I'm going to write the Congress. I'm going to write the President."

Henry smiled. "That would be stupid."

Brian. You should be grateful to us, not—as you are now—arrogant. After all, we're only doing this for your own good."

Brian's jaw dropped. His twitch worsened.

"You see, Brian, it's simple. It's something we've discovered. Basically, this is just a system to increase internal efficiency and—at the same time—save the taxpayer money. You don't understand, do you? It's so easy! Simple even. We've just accepted the fact that things go so much more smoothly and cost less when we don't have to deal with the public. In fact, I think it would be better for everyone if we never had to deal with the public at all. What you ran up against, Brian, was just a little system for what shall I say? public discouragement. That's all."

"Public discouragement! That's insane, Henry. You're the government! You have to deal with the public!"

"No," Henry said, "not really. At least not here. You see, we're not a very important agency. The only public we deal with here are the ones who want to deal with us. Of course, it's not like that with all other agencies. Agencies like the IRS, the FBI, those guys. You see, the only public they deal with are the ones who don't want to deal with them. And they have their own little games to handle that."

But I may be confusing the issue. That happens a lot around here, Brian. No, what I said was true. The government, at least most of it, doesn't have to deal with the public. Not to survive, anyway."

"You're mad, Brian screamed. "I don't care what kind of crap you spout about money and efficiency. You can't treat the public like that!"

"The public! The public!" Henry mimicked in righteous indignation. "Who do you think the public is, Brian? Henry's voice assumed a forceful, serious tone. "The public! Hell, Brian, we're the public. You, Me. Everybody. Where do you think we bureaucrats come from? Henry pointed to the window. From out there, that's where. Look, you come in here prancing around for a job, and if you get it, you I have come from the public, too. So just where the hell do you get off?"

At that moment Margo came in. She walked over to Henry and whispered in his ear. "Sir, I've just heard from Grounds Maintenance. You know that slot in Visitors Parking, Lot Q? The only one there was? They just told me they painted it reserved." She whispered something else, and Henry smiled.

He walked over to the window. "Brian," he said, looking down on Q, "will you come here for a minute?"

Brian came and Henry said, "That isn't your car they're towing away, is it?"

Brian, who in fact was the owner of the car they were towing away, jumped on Henry. He pushed him to the floor and began to strangle the life out of him.

Henry's mouth gaped open. He felt his chest constrict painfully as he gasped for



# BEFORE THE BEGINNING

## STARS

By Patrick Moore

**H**ow many books and articles have you read dealing with the origin of the universe? My own score must be nearing the thousand mark by now. All sorts of theories have been put forward, some plausible, others less so. And yet I do not believe that anyone has made a serious attempt to discuss the origin of the universe. We are all dodging the main issue.

I except the biblical fundamentalists, who are convinced that every word in Genesis is true. And let us never forget Archbishop James Ussher of Armagh, who in the mid-seventeenth century proved to his satisfaction that the universe came into existence at ten o'clock in the morning on October 26, 4004 B.C. (I have never found out whether he made due allowance for such refinements as Summer Time and leap year.) The archbishop arrived at this date mainly by adding the ages of the patriarchs. This was no doubt an interesting exercise, but it can hardly be considered science.

Yet when I make the accusation of dodging the main issue, it is primarily

at modern scholars that I am directing it.

Let me explain. We know at least something about the age of the earth: we can date it, with fair precision, at between 4.5 thousand million and 5 thousand million years. The sun is presumably older and there is no reason to doubt that some of the stars in our galaxy are even older. When we look at objects thousands of millions of light-years away, we are looking back in time thousands of millions of years. It is difficult to be sure which is the remotest object known, but the time probably goes to one of the quasars, some of which are receding at very close to the velocity of light. If recessionary velocity goes on increasing with distance, there must be a limit to the size of the observable universe. The usual estimate is somewhere between 10 thousand million and 20 thousand million light-years. If we take 15 thousand million light-years as a happy mean, the universe must be at least 15 thousand million years old.

Virtually all astronomers accept that the universe is expanding, with every group of galaxies receding from every other group.

If this is true, we can work backward to estimate the period during which the expansion has been going on. This brings us once more to 15 thousand million years.

Three major theories of cosmology have been discussed in modern times. According to the big bang scenario, all the matter in the universe was created in one moment, and initially the temperature was unbelievably high. We may even be observing the remnant of this original "fireball." Microwave radiation at a wavelength of 3.2 cm is coming from all directions. This indicates that the universe has a background temperature of  $3^{\circ}\text{K}$ — $3^{\circ}$  above absolute zero. Things have cooled down considerably since the big bang.

If this idea is correct, the universe had a definite beginning, it is now evolving and will eventually die. We are not certain whether the present phase of expansion will continue indefinitely; this depends upon the overall density of matter in the universe. If, on average, it exceeds one hydrogen atom in a volume approximately twice that of Earth, the expansion will eventually cease and the galaxies will rush together again, perhaps producing another big bang. This is the cyclic theory. If not, then the expansion will continue indefinitely—the original big bang idea.

The second of these alternatives now seems to be in favor, but we can't be sure; there may be more mass than we can account for from today's observations.

If the average density does exceed the critical value, we have a cyclic universe. I have nicknamed it the Concertina Universe. Big bangs will occur at intervals of perhaps 80 thousand million years or so, and there is no knowing how many of them have already occurred. With every big bang, the universe is reborn.

The third major theory, which was all the rage for a while in the 1950s and 1960s, is called the steady state theory. It assumed that the universe has always existed, that it will exist forever, and that new material is being spontaneously created out of nothingness. It was the brainchild of Thomas Gold and Hermann Bondi and was at least philosophically satisfying in 1947, when it was advanced. Unfortunately, it was abandoned.



The universe appeared at the big bang, some 15 thousand million years ago. But what came before?

# ACKERMUSEUM

## EXPLORATIONS

By Kenneth Jon Rose

**L**os Angeles is noted for the offbeat. So it's not so surprising to find a museum there that houses...of all things...a science-fiction collection. This fascinating storeroom remains almost unknown; it's not even listed in the travel brochures. That's too bad, because it must contain the most complete accumulation of science-fiction works and artifacts this side of the Twilight Zone.

"I still can't seem to convince the world that they've got a museum here," complains Forrest J. Ackerman, alias JSJ, alias Fojak, alias Dr. Acula, who calls the Spanish villa at 2406 Glendower Avenue in Hollywood, the Ackermuseum. For the greater part of five decades now Fory Ackerman has been quietly building a repository for his collection of science-fiction material in the hope of leaving it to posterity when he enters the next world.

It all began innocently enough, when he was nine, with a copy of the October 1926 issue of *Amazing Stories*. It has grown ever since, compelling Ackerman to migrate to larger quarters when not even the refrigerators were safe from the crazing

onslaught of science-fiction films. "I've moved to one home after another, first from an apartment where I had seven rooms, into a home with thirteen, finally into this one," Ackerman reports. "This one" has 18 rooms and three garages. He also rents two more garages in downtown L.A.

Ackerman is a science-fiction devotee gone wild. In fact, when the Hugo awards (given to the Oscars in motion-picture circles) were created, Fory got the very first one (back in 1953) as the nation's "number one fan personality." Perhaps his greatest claim to fame, though, is his invention of the term sci-fi. In the days when science-fiction enthusiasts were called *scientifiction* fans, Ackerman coined the word after hearing it on the car radio. He has yet to live it down: "No one screams about *pub-lic*, do they?" he asks. Even so, he isn't about to remove his license plates from his red Caddy. The plates, of course, say *SCI-FI*.

Down in the basement of the Ackerman home, where most mansion owners in Hollywood would store their wines, is the Collection. It's staggering. Jammed into a

space no bigger than an average-sized classroom is the sum total of the genre. Or so it seems. Most of the material is still locked in boxes, waiting to be unpacked.

Somehow you get the idea that if the bar in Star Wars had been a library, it would have resembled Ackerman's basement. Between the books and magazines that cram the shelves, board the walls and doors plastered with movie stills and lobby cards, props from a dozen horror films stare out at you. Ghoulish faces wait for the full of the moon or for you to turn your back. This is one houseful you wouldn't want to baby-sit for.

Even for the occasional science-fiction reader there are enough magazines to satisfy the most discriminating taste: *Amazing*, *World*, *Rules*, and *Super Science*—even a few publications that didn't survive their first year—sit on shelves waiting to be plucked. Some editions, like the rare *Zippke's Stories*, are worth more than \$100 apiece.

One bookcase alone holds at least 185 separate editions of *Dracula*. There are just as many Frankenstein books. Nearby is an entire section devoted to "sunkin worlds." Stories by Edgar Rice Burroughs, who wrote both the Tarzan series and the tales of John Carter's adventures on Barsoom (Mars) and Amtor (Venus). Sit another section. Then there are the novels about women: short-story anthologies, even one row of pornographic science-fiction books.

If this were not enough, there still are the science-fiction games, 80,000 newspaper clippings, manuscripts, autographs, records, press booklets, puzzles, and calendars to pore through.

Viewing the movie props alone could take up the greater part of an afternoon. On one wall, life masks of Bela Lugosi, Boris Karloff, and Lon Chaney Jr. hang like so many trophies. Original models from *Earth vs. the Flying Saucers*, *20 Million Miles to Earth*, and *Land of the Giants* repose beside their library counterparts.

Fory keeps most of the props in a smaller room off to one side. Inside what looks like a walk-in closet, the head of one of the Morlocks from *The Time Machine*



Ackerman poses before a forlorn submarine, a favorite prop from *Atlantis: the Lost Continent*.

and the braincase of the metakun mutant from *The Island Earth* stare out into space. Nearby, the stingray-shaped Martian saucer that terrorized the countryside with its death ray has immobilized on its metal pedestal. Unlike the magnificently detailed models from *Star Wars* and *Alien*, the death machine from *War of the Worlds* is nothing more than a sculpted block covered with shiny paint, a glazed doughnut.

Ackerman's collection even includes the pleasure dome, the great winged replica that tried to carry Fay Wray away in the 1933 movie classic *King Kong*. Rod Serling's brother who was living in Washington, D.C., at the time, sent him to him at Fory's home in a shoe box.

Many of Fory's artifacts come to him this way—from friends like the great model maker Ray Harryhausen and from fellow fans. The green head and claws of the amphibious Creature from the Black Lagoon basking on the carpeted floor of Ackerman's museum were actually tossed out at the end of the last Black Lagoon film shot at Universal. A junior found the \$30,000 suit and gave it to his son, who after using it as a Halloween costume, sold it to a kid up the street for \$5. "When I heard that, I said 'Holy kid, you want to make a deal?' But he wasn't interested." Later when the boy was tired of playing with it, he gave it to the collector for nothing.

Among the more memorable gifts are the memorabilia of Lugosi, famous for his portrayal of Count Dracula. "I knew Lugosi personally for three years, on a social level," Ackerman said. "I drove him around. I was even at his funeral." On the collector's finger is the broochlike ring Lugosi wore in his films. And draped on a clothes hanger is the black cape of the notorious vampire. Actually it is one of the three capes that Lugosi used during his career. After his death, one of the capes was given to Ackerman. Lugosi's widow kept the second. He was buried in the third.

In the main room of the basement stands Fory's greatest pride, a life-sized recreation of the female robot from Fritz Lang's 1926 film *Metropolis*, at attention inside a glass-walled display case. Ackerman commissioned two artisans to build him a duplicate because the original is believed to have been destroyed in Berlin at the end of World War II. Ultima the Robotrix bears a striking resemblance to the chatty C-3PO in *Star Wars*. She should. Artists working on the recent movie used Ultima as a model for their famous "droid."

The expense of trying to keep up with the Collection has forced Ackerman to solicit donations. It may be a good investment if you survive World War III. Having acted in a dozen or so movies, Forrest J. was finally cast to play himself in his most recent film, *Aftermath*. "I play the curator of the last museum on Earth after a nuclear holocaust has destroyed almost everything else."

A visit to the Ackemuseum is free. Call Friday for the open house on Saturday. The number is 213-MOONFAN. **DO**

## SPACE

CONTINUED FROM PAGE 29

Benefits of this approach include the possibility of much higher efficiency (perhaps 40 percent compared with the prototype's 15 percent), our familiarity with large-scale turbomachinery and heat exchangers (except for the big parabolic mirrors), and the system's relative insensitivity to degradation by cosmic rays and the solar wind. Disadvantages include lower reliability, higher cost of construction and, of course, the same concerns over microwave transmission raised by the current design.

Another "design perturbation" on the prototype would use billions of small, simple, cheap solid state converters to generate the microwaves instead of the bigger more elaborate and much less reliable klystrons or magnetrons originally chosen. This decentralized power generation both increases reliability and greatly simplifies the satellite's design. It permits the use of "sandwich" construction with the solar-cell array on one side and the microwave transmitter on the other. Because the transmitter must always face Earth, however, big sun-facing mirrors are needed to reflect sunlight onto the solar arrays. These mirrors could be built as concentrators, thereby increasing the satellite's power output per unit of solar-cell area. They might even act as solar spectrum splitters like a prism, so that high-efficiency solar cells could be used to convert several wavelengths of light into useful power. Another prospective wrinkle on this basic sandwich is the use of the photocathode, a recent invention that combines the solar cells and microwave transmitter into a single device.

A wholly different system emerges when we apply laser technology to the SPS. Because laser light has a much shorter wavelength than microwaves, the power transmission beam is much tighter and more coherent. This reduces the Earth receiver's diameter from perhaps ten kilometers in the microwave system to a few tens of meters. Further, the laser's tight beam and convenient "pointability" allow us to put the massive power-generating equipment in a low "sun-synchronous" orbit around the earth; the power can be beamed up to a relatively small, low-mass laser mirror in the high geostationary orbit, which then reflects it to the receiver on Earth. This approach saves the high transportation cost of getting all that heavy hardware up to geostationary orbit. Though the laser generators could use relatively conventional electric-discharge or gas lasers, the system could profit enormously from the development of a "solar-pumped laser," in which sunlight stimulates the lasing medium directly.

The use of lasers would revolutionize the entire SPS concept, from solar-power conversion in orbit to the capture and use of

solar energy on Earth. But the high-power laser technology needed for all these functions is still in its infancy. It will require considerable work before lasers can become serious candidates for the SPS. The potential, however, is enormous, and it unquestionably warrants that effort. Ironically this work is being pursued not so much for its importance to SPS as for its less probable uses in proposed fusion-power plants.

A second, wholly different SPS concept relies on big orbiting mirrors to reflect sunlight directly to Earth-based solar-electric power plants. This would provide round-the-clock illumination and eliminate the need for energy storage, which today prevents solar plants from supplying base-load electric power. The mirrors can't be in geostationary orbit, however. The resulting "spot" on the ground would be, at best, about the size of Connecticut! Hence, hundreds of low-orbit mirrors would be needed, each phasing in and out as it passes over the power plants. This concept may be the most benign of all the SPS alternatives from environmental, social, and political viewpoints, but it would require considerable development to demonstrate its economic and operational practicality and to determine its most efficient scale.

Finally, there are many alternative approaches to the construction of so large a space project as an SPS, whatever its ultimate design. Transportation is the key and there are many choices. Proposals for launching to low earth orbit have included the current space shuttle, shuttle-derived cargo carriers, new fully reusable heavy-lift launchers (both ballistic and winged), and sophisticated single-stage-to-orbit craft that promise extremely low cost per kilogram delivered. Designs for in-space orbital transfer vehicles (space tugs) have included high-performance liquid-fueled rockets fed by solar-powered propellant plants in orbit, electric rockets of various kinds, and even solar sails.

Perhaps the most imaginative SPS construction scheme—and the one that almost unquestionably would turn out to be most practical if we eventually decide to build satellite power systems in quantity—is the use of raw materials gathered from space. It takes 20 times less propulsion energy to throw materials off the moon than to launch them from Earth. The energy cost of retrieving small asteroids, the ultimate source for building materials if we really go into production, is even lower.

One critical element that will decide the most efficient form of the ultimate SPS is obvious: a vigorous research effort, first on the ground and then in space, when the shuttle becomes available. But the second element is possibly just as important: to ensure that we don't waste all that effort doing the wrong job. We must keep all our options open and not freeze an SPS design until we're sure we've identified the system with the best chance of economic, social, environmental, and political success. **DO**



TALK, TALK

## PEOPLE

By Dick Teresi

**W**hen Nikita Khrushchev visited the United States in 1959 with his stock simultaneous translator in tow, Andrew Levine, then twelve, took notice. Impressed with the interpreter's virtuoso performance, Levine decided to become a simultaneous interpreter himself, then and there.

The only problem was, he didn't know any foreign language. So he began speaking Backwards English fluently. Twenty years later the University of Wisconsin philosophy professor performs for friends at parties and—just recently—spoke before the 1990 Acoustical Society of America in Atlanta, where he was the focus of a linguistic study designed to uncover the building blocks of language.

*Toko ona nigea na giesitayshagan rol seep*—was one of the many edifying statements Levine made to the attending scientists. (That translates to "Sadat and Begin are negotiating for peace.") Levine uses no visual aids and speaks backwards at a normal speed. He leaves the words in their original order but reverses the sound of each word. Qmw asked Levine about his idiom.

Levine: "If you'd like to hear how it sounds, I'll show you. I could get a job at the United Nations."

Qmw: "If only there were diplomats who spoke backwards. Could you recite the Pledge of Allegiance?"

Levine: "If I can remember it forward. Oh, yeah. *I yelp anu/yelpa coah/ gnef vashu dlat/moo oah/ahs faw akemio duno/ oah/ah kutubpeir of chekashnats*."

It was fluently intoned and sounded very much like Russian. "Sometimes I think that's all that Russian is," Levine says. "I can also speak backwards with a Japanese accent." He delivered the Backwards English Pledge of Allegiance with a Japanese accent—a feat quite impossible to transcribe. Qmw: How about German? Perhaps the opening lines of a poem by

Heinrich Heine? *Ich weiss nicht was soll es bedeuten, Dass ich so traurig bin*.

Levine: *Khu xiv khte on saw/ips ee ntebed, sol khu ows khord nib*.

Levine's special talent has befuddled the experts. He doesn't memorize the sentences given him, nor does he visualize the words in his head. He also claims he needs no practice and that talking backwards is more of a "minor compulsion" with him. Language development specialist Louis A. Leavitt, of the University of Wisconsin, is one of the experts who have studied Levine. "What Andy does," says Leavitt, "is to break words down phonemically, just the way linguists would." A phoneme is a basic sound unit of a word, smaller even than a syllable. The spoken words *red* and *bed*, for example, differ in their beginning phonemes.

Most important is the fact Levine picked up this skill at age twelve. Scientists find that adults generally have difficulty in training themselves to speak backwards in this way. Linguists

speculate that the young brain may be more flexible than previously thought and it therefore may be possible to teach children a wide range of languages and word skills before adolescence.

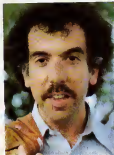
It may not be language, but it's a far cry from "Polly want a cracker." Irene M. Pepperberg, a Purdue University ethologist, has trained an African gray parrot named Alex to voice a recognizable name for each of some 30 objects. For example, when Pepperberg holds up a green clothespin, Alex will say, "Green pig wood." When Pepperberg holds up a wooden square, Alex responds with "Four corner wood." And when the bird doesn't want to undergo any more training, it emits a firm no. Alex's vocabulary includes nine nouns, three colors, and three shapes taught to him by Pepperberg over a three-year period. She believes that the parrot, now only four years old, may someday be able to demonstrate that a bird, like a chimpanzee, can acquire the rudiments of language-like behavior.

Pepperberg's training techniques are modeled on ones developed in earlier primate and parrot work, with modifications to avoid pitfalls that have become evident in those studies. Already Pepperberg claims, Alex shows some limited ability to categorize, generalize, and combine separate words into short phrases, all components of language.

Aware of the recent controversy over animals that communicate, however, she is cautious when describing the bird's accomplishments. "What Alex has achieved so far cannot be considered language," she says, "but it is two-way communication."

Reading science fiction is no excuse for strangling your neighbors. A Texas jury has decided, bringing in a guilty verdict against Robert (Terry) Tethune.

On trial for the stabbing and strangulation of a teen-aged Anderson, Texas, high school girl, Tethune claimed



Andrew Levine: *I yelp anu/yelpa coah/ gnef*

that reading a series of science-fiction novels led him to commit the crime. Terhune testified that, before going to sleep, he read books in the Gor series by John Norman (pseudonym for John Lange), in which women are dominated,

surgeons began to put blood and organs might possibly float out of the incision.

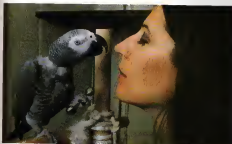
One person who does think about these things is Dr. Irene Long, a resident surgeon with the NASA-sponsored Civilian Aerospace Medicine Program

through latex gloves molded into the sides. "My long-range goal is to set up a clinic in a space station," Long says.

Does she expect this to happen in the near future? Probably not. But "since age has nothing to do with performance in aerospace," the twenty-nine-year-old surgeon says, "one finding is that the elderly may enjoy an advantage in zero g. 'I have all the time in the world'."

And now, energy-conservation backlash in the form of a new group called *Cruiser* for Peace, which puts forth the proposition that wasting gas is a patriotic act.

The group's leader and founder Rob Sauder of Richmond, Virginia, says, "If we use up all the gasoline in the world, we won't have anything left to fight about." Though it may be an expensive and rather obtuse plan for peace, Sauder says, "The idea is good for big business, and what's good for big business is good for America. And what's good for America is good for you and me, right?" ☐



Here Peppenberg and Alex. Not language, but a far cry from "Polly wants a cracker."

chained, beaten and raped by men.

The twenty-two-year-old former Texas University architecture student said, "On Gor there are many female slaves. It is very wrong on bondage." He testified that he fantasized about "tying women up, not so much for the sexuality but for the defiance."

Terhune's lawyers, backed by testimony from a psychiatrist, contended Terhune was temporarily insane at the time the crime was committed.

Terhune was convicted, anyway, and sentenced to 30 years in prison. The case is being appealed.

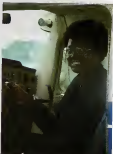
Ever think about what surgery would be like in outer space? There would be no gravity to perform housekeeping chores, such as anchoring the patient and medical instruments. And when the

who is developing surgical techniques for zero-gravity environments.

"The most likely medical emergency that would occur in space," according to Dr. Long, "is a surgical one. Given that space is a germ-free environment and astronauts are selected for their good health, the chances of disease among spacefarers are few. What cannot be eliminated, however, is the possibility of accidents: lacerations, concussions, broken bones.

And because of the physiological changes that take place in outer space "an astronaut will respond differently to surgery," says Long. "A space surgeon will have to care for patients differently. Surgical medicine has to be totally rewritten."

Long envisions the astronaut enclosed in a clear plastic bubble during spine surgery while the surgeon reaches in



Irene Long: Designing surgery for zero g.

# OMNIOLOG

By Geoffrey Golson

**O**mnio-log: a digest of events in the fall of 1980 that will help shape the decades to come. A date-book of upcoming activities whose wide-angle view tells you where you are in the present and where you'll be in the future, a guide to science and the imagination, appearing seasonally with some things you should know.

- The world's most powerful, most versatile radio telescope, with 27 dishlike antennas, each weighing 214 tons, will be dedicated on the Plains of San Augustin, in New Mexico, on October 10.
- A British team plans to launch the world's largest manned balloon this month in an attempt at the first nonstop journey by balloon around the world. Huddled in a pressurized gondola, the crew of four will ride jet-stream winds at an average speed of 160 kph at heights of up to 13,000 meters on a 20-day flight.
- Voyager 1, which passed Jupiter last year, will arrive at Saturn in November, making its closest approach to the planet on November 12.
- Seventy to 80 endangered whooping

cranes migrate south this October, flying over the central part of the United States. They'll pass over western North Dakota, across extreme eastern Montana, and down through central Nebraska and Oklahoma, then vacation at the Atascas Refuge, north of Corpus Christi, Texas. Watch for them flying with long necks straight out and skinny legs dangling behind their tails. They have bright white plumage and black-tipped wings. There are only 120 or so in existence.

- Falling stars will streak across the skies of the eastern United States after midnight on October 21, when the Orionid meteor shower reaches its maximum intensity.
- Starting in November, you can see gray whales spouting and breaching in the Pacific Ocean, off Point Reyes, north of San Francisco.
- Count the number of foggy days in October. According to New England folklore, for every October fog there will be one winter snowstorm.
- A dim moon will beckon ghouls and goblins this Halloween night, as our natural satellite enters its last quarter.

- The Space Age was launched 23 years ago, on October 4, 1957, when the Soviet Union placed Sputnik 1 into orbit.

## UPCOMING EVENTS

**Through October 5** "Invisible Light" demonstrates the artistic use of infrared photography, in which images are produced by heat instead of light, at the SUNY Albany Art Gallery in Albany, New York. Contact the Smithsonian Institution Traveling Exhibition Service at 202-357-3168.

**October 8-10** The 11th annual Conference on Satellite Communications for Public Service, at the Washington, D.C., Hilton includes a session for people unfamiliar with satellites. Topics range from portable Earth stations to satellite economics. Contact the Public Service Satellite Consortium at 202-331-1154.

**October 10-12** NONCON's science-fiction and fantasy convention at the Edmonton Inn, Edmonton, Alberta, Canada. Nebula Award winner Vonda McIntyre is the guest of honor. Contact NONCON P.O. Box 1740, Edmonton, Alberta, Canada T5J 2P1.

**October 13-16** The Aerospace Congress and Exposition, at the Los Angeles Convention Center, has more than 50 technical sessions on propulsion systems, aircraft, missiles, and spacecraft. The exhibit of aircraft systems is open to the public. Contact the Society of Manufacturing Engineers at 412-776-4841.

**October 14-17** The second Australian Technology Resources Fair in Melbourne, highlights inventions that range from concepts and ideas to fully commercialized items seeking a wider market. The first fair featured 50 exhibitors from 14 countries. Contact TRIX Fair Coordinator, Australian Innovation Corporation, Ltd., 150 Queen Street, Melbourne, Australia.

**October 17-19** The annual meeting of the Space and Unexplained Celestial Events Research Society (SAUCERS), in Charles Town, West Virginia. The society is half as "a volatile group, with no set dogmas,



Watch for whooping cranes migrating south over the central United States during October.

dedicated to the belief that people who report UFOs are not liars." Contact SAU CERS at 304-269-2729.

**October 24-25** WINDYCON's science-fiction convention, at the Hyatt Regency Hotel in Chicago. Owner's fiction editor Robert Shackley will be the guest of honor. Contact WINDYCON, P.O. Box 2572, Chicago, IL 60690.

**October 25**, "The 1980 Space Policy and Career Day at Cypress College, Cypress, California, focuses on U.S. space policy in the 1980s and on careers in space-related industry. The sponsors want to publicize the need for national involvement in effective Earth-based problem-solving in space. Contact the Committee on the Law of Outer Space at Western State University College, Cypress, California, or call 714-738-1000.

**October 29-30**, The Robot V Conference and Exposition, at the Hyatt-Regency Hotel in Dearborn, Michigan, has 25 technical presentations on the present and future of industrial robotics. The exposition features a myriad of robot demonstrations open to the general public. Contact the Society of Manufacturing Engineers at 313-271-1500.

**October 31-November 2**, The sixth World Fantasy Convention at the Marriott-Hunt Valley Inn, Cockeysville, Maryland, has scheduled Boris Vallejo as the artist guest of honor. Vallejo's work is shown in this month's *Cover*, starting on page 118. Contact Sixth World Fantasy Con, Chuck Miller, 239 North Fourth Street, Columbia, PA 17512.

**Continuing in the fall**, "Double Eagle II Flight Over the Atlantic." The National Air and Space Museum in Washington, D.C., exhibits the first balloon to cross the Atlantic. The story of the 1978 crossing will be told in a special presentation. The muse-

um's Albert Einstein Spacarium shows "New Eyes on the Universe," exploring the ways in which advanced technology has altered our perspective on quasars, black holes, and exploding stars. "The Briefing Room" is a special project at the museum where anyone can participate in demonstrations of the benefits of air and space flight. The "Douglas-Northrop Legacy Exhibit" features the contributions of two engineers who created aircraft designs that altered the course of military and commercial aviation in the United States. Contact National Air and Space Museum at 202-381-4222.

**Continuing in the fall**, "Shocking Demonstrations" is a live presentation of high-voltage electricity featuring the world's largest air-insulated Van de Graaff generator. The program explores lightning, coronas, and other electrical phenomena. Contact Thomson Theatre of Electrical Science, at the Boston Museum of Science, at 617-723-2500.

**Until November 2**, "Electroworks" is the first serious, comprehensive review of works by artists and designers on office copying machines. The more than 250 examples demonstrate artistic possibilities the manufacturers never anticipated. Contact the Cooper-Hewitt Museum in New York City at 212-900-6868.

**November 11-12**, The second Manufacturing Productivity Solutions Conference, at the Hyatt Regency O'Hare, in Rosemont, Illinois, focuses on the innovative use of improved technologies to produce significant gains in productivity. Contact the Society of Manufacturing Engineers at 313-271-1500.

**November 14-16**, PHILCON '80's science-fiction convention at the Sheraton-Downtown, Philadelphia. Omni's executive editor, Ben Bova, and fiction editor, Robert

Shackley, will be guests of honor. Contact Joann Lawlor, 2750 Nardella Road, Plymouth Meeting, PA 19462.

**Continuing until November 24**, "The End of the World." The Hayden Planetarium in New York City, explores the possibilities of how the world will end. Comets, asteroids, deep freezes, and human failure are considered. Contact the Hayden Planetarium at 212-675-1300.

**November 26**, The British Society of Dowsers presents a lecture by Frances Hitching on "Dowsing—The Elusive Phenomenon" in London. Contact the British Society of Dowsers, The Secretory Court Lodge Farm, Haslingdeigh, Kent TN25 5RN, England.

**December 8-11**, National Conference on Renewable Energy Technologies, in Honolulu, will feature the latest information on principal Department of Energy programs and projects in renewable energy technologies. Contact Donna S. Hopkins, Hawaii Natural Energy Institute, University of Hawaii, at Manoa, 2540 Dole Street, Holmes Hall 246, Honolulu, HI 96822.

**Deadline December 15**, Papers concerning the theory, use, or value of the fantastic in art, film, literature, music, and drama are sought by the second International Conference on the Fantastic in the Arts, scheduled for March 1981. Selected papers will be published. Contact T. R. Sullivan, 1675 N.E. Fourth Avenue, #712, Boca Raton, FL 33432.

**December 16-17**, The Man Will Never Fly Memorial Society has its annual bash, which begins at 4 p.m. on the 16th and continues until 10:30 a.m. on the 17th, at the Caribbean Hotel, Nags Head, North Carolina. Society members believe that man has never flown and will never fly. They believe it's all been an elaborate hoax, and they attempt to prove their point at the exact hour that the "Wright brothers didn't fly first." See *Omni's Last Word* in the December 1978 issue for more details. Contact the Man Will Never Fly Memorial Society International, P.O. Drawer 1903, Kill Devil Hills, NC 27948.

**Christmastime**, Several planetariums throughout the United States take a look back 1,950 years at the skies above Bethlehem in an attempt to explain the biblical star that led the Wise Men to the stable. Novas, comets and bright meteors are suggested as possibilities. Contact the Hayden Planetarium in New York City at 212-675-1300; the Morehead Planetarium in Chapel Hill, North Carolina, at 919-693-1236; the Morrison Planetarium in San Francisco at 415-752-6268; the Charles Hayden Planetarium in Boston at 617-723-2500.

If you want to list an upcoming event in *Coverlog*, write four months in advance, to *Coverlog*, Editor, *Omni*, 909 Third Avenue, New York, NY 10022. ☐



New England folklore forecasts winter storms by counting foggy days in October.



ASTEROID



SOOP ELECTRIC



PROTON

**ASTEROIDS**—Pop goes the planet? Just when astronomers thought they'd had to rest the nineteenth-century notion that asteroids are the remains of a lost world (some call it Krypton), a few very respectable scientists are bringing it back to life. Other space geologists think the asteroids may be the only unchanged matter remaining from the condensation of the sun billions of years ago. And how is it that some asteroids seem to have moons? In next month's *Omni*, writer James Oberg voyages beyond Mars for a look at one of the strangest kinds of our solar system.

**I SING THE BODY ELECTRIC**—This power to regenerate lost limbs, restore a severed spine, perhaps even cure cancer. We'll have it within 20 years if experiments now under way pay off, and it looks as if they will. Researchers have found that they can manipulate our cells with electromagnetic fields, causing new growth, triggering single genes, or altering a wide variety of bodily processes. The first practical product: a device that heals bone breaks that refuse to heal themselves. Find out about this revolutionary medical advance in the November *Omni*.

**CONTEMPLATING MEGAWATT**—If American soldiers had a weapon that vaporized opponents, would they be psychologically capable of using it? Could the Russians grow strong enough militarily to knock out our missiles, bombers, and nuclear submarines with one blow? Such are the ponderings of military think tanks, secretive aggregations of Ph.D.'s whose thoughts shape the balance of the future. In the November *Omni*, Dr. Paul Nahin takes you inside these high-power, low-profile centers to reveal facts about how they work and what they're thinking about now.

**THE ULTIMATE QUARK**—Einstein's dream of a unified field theory fairly blazes in neon lights. Now physicists think they're close. They scramble to track down the moment when matter disappears into nothing but a flash of gamma rays. They look for a proton led—for an unlikely like a-life between two of the three quarks rising around the huge, hollow space of the proton. The quarks might possibly fuse into leptons and vanish into gamma rays, the force between them having been transformed into the single "master" force. Quarks will then flash as the ultimate building blocks of the universe and afford clues to the big bang. Robert March will tell it all in next month's supreme detective story "Protons Are Not Forever."

**SCIENCE FICTION**—Norman Spinrad's "Prime Time" envisions a future in which you can retire to Total Television Heaven and tune out the outside world. A frustrated artist is haunted by an odd-looking, menacing young man in Walter Tevis's "Out of Luck." John Kessel's "Giddy Bell" is a most unusual and extremely dangerous game for compulsive gamblers. Good reading in the November *Omni*.

intelligence: will they become more human or will they develop a machine psychology different from our own?

"They will become less like computers as we understand them," Gregory suggests. Personally, I take the view that any machine is extremely interesting conceptually. I like the example of a sewing machine.

Although it's just going up and down, it's actually carrying out an extremely clever bit of functional operation. In order to do the very early sewing machines were just like fingers with needles; there is a series of them in the Smithsonian. As time goes on, however, things get less and less like the human being but still carry out the deep logical functions by a different mechanical means. I think this is a very good way to look at artificial intelligence. It doesn't have to look like a human being, but deep down the function should be similar.

Ultimately the process of machine decision making may to some extent remain unfathomable. Gregory thinks though that we might cope with machine illusions by programming them to recognize the symptoms. He breaks decision-hampering illusions into three categories: incorrect assumptions, inappropriate strategies, and distorted input signals. There are criteria by which illusions can be detected. It may be a difference between what a machine reports and what we see or what two machines report. Or it may be that a machine gives a dramatically different answer with a slight change in the problem.

Gregory uses the example of a radio telescope. If its detection equipment malfunctions, signals will be distorted. If the procedures for gathering information through it are faulty, the input will again be worthless. Finally, if the telescope is pointed at the wrong star, the information isn't useful. Any of these could cause unreliable results in a thinking machine.

This raises the root question of whether a thinking machine is conscious or merely intelligent. Gregory thinks we should carefully separate the two. In his view intelligence lies somewhere between a Keno machine (which is repetitious but lacking in novelty) and a random number generator (which is all novelty without any purpose). However, he says, if someone stands on your pet dog's tail, you believe that it hurts the dog not because it is intelligent but because it is conscious.

The question is philosophical, he notes. Why are we conscious? Is consciousness necessary for high levels of intelligence and if so is consciousness causal? If it is causal, how can we expect to find it in a computer program or an electronic system? It appears to be something categorically different from any formal process and this is where we get into metaphysics. It is a deep problem to which we have no answers. **OO**

relocation of radioactive waste, the spiraling of taxes, and stagflation.

John Louusso  
Depew, NY

## The Return of Radiation

How long is "long term"? Gordon Cooper [Interview, March 1980] implies that since no long-term effects from radiation accumulated during his spaceflights [in 1963 and 1965], there won't be any.

Unfortunately the hazards of accumulated radiation are scoffed at because effects are not immediately noticeable. Rather, radiation accumulation affects the third- and fourth-generation offspring of those exposed. For this reason, radiology departments recommend the use of lead aprons and shields for any woman of child-bearing age. "Long term" is certainly not 15 to 20 years, as Mr. Cooper assumes. I become concerned when someone as intelligent as he implies that fears regarding radiation are groundless. They are anything but that.

Kathleen M. Mason  
Sequim, Wash.

## Chemical Coaching

This letter is a comment on Susan Mazur's article "Winners" in the July 1980 issue of *Omn*. The article starts out innocently enough as Ms. Mazur discusses the computer training of athletes. However, after I finished reading it, I was left with a strong feeling of apprehension.

I am an avid sports fan, and I believe in the importance of physical fitness. When physical performance becomes important enough for us to make use of drugs and gene manipulation, though, it seems to me to be dangerous.

Surely human progress consists of the union of advancing technology with the enhancement of the spiritual side of man. Overemphasis of the physical can only serve to bind us to the earth with the weight of a ball and chain. If we practiced selective breeding, as the article suggests, couldn't we be tempted to use anyone, even criminals, for our purposes if this would produce a superior athlete?

I think that the real winners are not those who seek great physical prowess but those who nourish their spirit while tuning their hearts to the stars.

Ben Leader  
Rye, NY

## Closed Scientists

Today I watched on the *Phil Donahue Show* and heard two attorneys discussing genetic engineering and the recent U.S. Supreme Court ruling on patents for bioengineered products. The basic arguments raised an crisis of progress versus tales of horror. Both, no doubt, have merit. However, two attorneys?

If science and technology wait a fair

deal in the media, then scientists are going to have to come out of the closet and get out there and talk. We need the facts. The witch burners are on the move.

Daniel Stroup  
Clear Lake, Calif.

## Wiking Fund

If the ruling elite in Washington can't find the wisdom or guts to fund NASA properly, it's up to the common person to pick up the banner. It's time to put my money where my heart is—on the frontier. Thank you for providing the vehicle. Let's go!

T. Emrine  
Arlington, Tex.

## Useful Contribution

I have been an avid reader of *Omn* since its first issue and have been quite pleased with its content and quality. However, after reading Norman Spinrad's *Last Word* (June 1980), I am left feeling somewhat as I did at the close of *The Empire Strikes Back*: my emotions stirred, my pupils dilated from the colorful visuals, and certain posterior portions of my body feeling like a fish on a baked hook.

Spinrad's story of the plight of the giant flying vampire lord surely deserves a place among the classic fictions presented in *Omn*. In my opinion it does not, however merit publication in the "Opinion" section of *Omn*. Spinrad's mockery of concern for endangered species is in poor taste and is a pessimistic view of life on this planet.

Instead of allowing the lowly vampire lord to feed on welfare recipients (as he suggests), why not fence off the Walhalla swamp and throw Spinrad in so that he may contribute something useful to this hungry planet?

Robert Lindsay  
Calgary, Alta.  
Canada

## Correction

During the makeup of my article on Soviet space program research and development (August 1980), your staff injected a statement that the U.S. space shuttle would have a 2,809-kilogram (6,173 pounds) payload capacity. The correct figure for the maximum space shuttle payload capacity is 29,484 kilograms (65,000 pounds).

Graig Cowart  
Washington, DC

Mr. Cowart is correct, of course. We converted pounds to kilograms, rounded improperly to 28,000—and dropped a digit. We'd print the missing zero, but it's been given to the editors who did the arithmetic and attested to the story's accuracy—Ed.

## Attention European Readers

Because of an overwhelming response to the science-fiction short-story contest sponsored by the European edition of *Omn*, we regret that we cannot announce the winners until November.—Ed. ☐

lunately it did not stand up to the astrophysical evidence against it, and it has been reluctantly cast upon the scientific scrap heap. But since it still has a few supporters, let us return it for the moment.

Very well, then. What do these theories tell us about the origin of the universe? Nothing. We are not talking about the origin of the universe at all; we are talking about its evolution, which is a very different thing. The plain fact is that none of the theories—and none of the others that have been produced from time to time—make any attempt to explain just how the act of creation came about.

Consider an intelligent visitor who comes from, say, Alpha Centauri D and spends half an hour in Pico di Piccolo. He will see babies, boys, youths, young men, older men, and grandfathers. In his half hour he will not see a baby change into a boy or a boy into a man. If he is intelligent, he will recognize that babies, boys, and men represent different stages in the evolution of human beings, and he will be able to work out more or less what happens. But unless someone has told him the facts of life, he will have not the slightest idea of the origin of a human being. This is precisely the situation in which we find ourselves with respect to the universe.

We have to begin somewhere. We know that the matter making up the earth, the sun, the stars, you me, and the kitchen sink has been produced, but how? This we do not know. Consequently the big bang is no better than the steady-state theory. Our ignorance is total.

We must also consider the concept of time itself. In the big bang theory, "time" began at the same instant as the universe itself—roughly 15 thousand million years ago. Can we justifiably look back still further to, say, 60 thousand million years? The steady-state and cyclic theories may avoid this difficulty, but we shall find another that is equally insoluble. We have to consider a period of time that has no beginning. Our brains are unequal to anything of the sort.

If we start by assuming the existence of matter, we can work out a complete evolutionary sequence, ending up with the scene we know today. But this is just what our Alpha Centaurian could do during his brief sojourn in Pico di Piccolo. Until we can decide how the matter appeared in the first place, we are hazy to the waver.

Now do you see the point of my argument? Evolution, yes, we have found out a great deal. Origin, no, we are as much at a loss as our ancestors who believed Earth to be flat, motionless, and isolated in an unchanging universe. The various learned papers purporting to discuss the origin of the universe do nothing of the kind.

One day we may make some real progress in this most fundamental problem. But I don't think it will be soon. ☐



## Experiencing the Power of the Mind

As modern researchers explore the workings of the human brain, one intriguing question continues to arise. We seldom use more than 10% of the brain's tremendous capacity—what about the other 90%?

Are there ways to tap this unused reservoir, to activate the latent intelligence of the human mind? Science and fiction alike testify to the efforts of many who, through experimentation or imagination, have sought to realize the mind's vast inner potential. **AUTOBIOGRAPHY OF A YOGI** is the fascinating account of one who succeeded.

Paramahansa Yogananda's lucid, and often entertaining, explanations of the subtle yet definite science of Yoga have established **AUTOBIOGRAPHY OF A YOGI** as a classic in its field; it is required reading in courses at over 700 universities.

"There has been nothing before, written in English or in any other European language, like this presentation of Yoga."

—*Review of Esotopist*, published by Columbia University Press

Available at your local bookstore or from the publisher

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# GAMES

ANSWERS TO BRAIN (PAGE 161)

**THE FIVE HOUSES.** The best way to solve this puzzle is to chart the categories (house, man, drink, etc.) going down and the specifics (red, Swede, coffee, etc.) across. It's purely arbitrary how you arrange them, but you should end up with the answer below. Although neither diet soda nor spider monkeys are mentioned in the 15 clues, proper analysis of all of them reveals that the Russian drinks diet soda and the American owns the spider monkey. Here is the correct order of nationalities, houses, drinks, games, and pets:

The Russian lives in the yellow house, drinks diet soda, plays racquetball and has a camel.

The Swede lives in the blue house, drinks coffee, plays quarts, and keeps a rat.

The Englishman lives in the red house, drinks milk, plays backgammon, and owns a toad.

The Italian lives in the white house, drinks vodka, plays sadtune, and has a guppy in a tank as a pet.

The American lives in the green house, sips iced-tea, plays charades, and keeps a spider monkey.

### COMPLETE THE SERIES

- (1) 1 4 1 5 The numbers represent the chimes of a clock that strikes once on the half-hour.
- (2) (a) 14 Each number in the series, when spelled out, is longer than the previous number by one letter.
- (3) 32 33 Each of the numbers contains the letter i.
- (4) (d) 8 Each number when pronounced is a common English word (few, won, too, ate).
- (5) 8 Each number is the product of the two digits in the preceding number ( $7 \times 7 = 49$ ,  $4 \times 9 = 36$ ,  $3 \times 6 = 18$ ,  $1 \times 8 = 8$ ).

**READER ORIGINAL.** Heaven! The sequence of ordinal numbers is implied: first and second natures, Third World, Fourth Estate, Fifth Column, sixth sense, seventh heaven.

**RUBIK'S CUBE.** Not all these puzzle cubes are exactly alike. The spindle on the disassembled cube shows three colors—red, yellow and green—in a clockwise orientation. The small subcube at the lower left in the photograph has those three colors in a counterclockwise orientation. There is no way that this subcube (taken from another Rubik's Cube) will fit on the spindle shown, with all colors arranged correctly. ☐

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## PHENOMENA

Bora Bora, "the most beautiful island in the world," as James A. Michener once called it, is captured in this photograph by Nicholas DeVore III. Bora Bora is one of the Society Islands, in the South Pacific. The archipelago that includes Bora Bora and Tahiti holds a key position in the development of modern science. These distant outposts of life, cut off from the mainland for millennia, form crucibles in which evolution proceeds more openly than anywhere else on Earth. Bora Bora and islands like it inspired Charles Darwin as formative to his most important theories. The unexpected diversity of Galapagos finches revealed to him that natural selection is evolution's guiding force. Investigating islands like Bora Bora, he correctly surmised that they were formed by coral reefs built upon slowly sinking, eroded volcanoes. These insights radically altered science, creating a theoretical framework that guides research even today. To obtain this photograph, DeVore flew over Bora Bora at 1,500 meters and used a Nikkormat FTN camera, Kodachrome 25 film, and a polarizing lens. **DO**



Two killer puzzles, inside Rubik's Cube,  
and unnatural selections

# GAMES

By Scott Morris

Many readers send their favorite puzzles to this column: classic brain-benders that have been passed along, like folk songs, by friend-mentor-masochists who are addicted to them. Their origin is lost in countless generations of Xerox copies. Often the puzzles will have been edited and rewritten into two or three recognized versions. Here are two of the best.

**THE FIVE HOUSES** This is one of the neatest of the The-Shortstop-Eats-Spaghetti puzzles. Paul Fisher of San Diego, Joan Edgar of Arizona, Pennylvanian Van Cleave Morris of Wilmette, Illinois, and Pawel Flato, of Lund, Sweden, have each, independently sent versions of the Five Houses. I changed some of the specifics—favors cigarette brand was changed to favorite game, for example—but the structure remains intact. You are asked to study the 15 facts (below) and then answer

Question 1: Which man drinks diet soda?  
Question 2: Which man owns a spider monkey?

There are five houses. In each house lives a man of a certain nationality who has his favorite drink, his favorite game, and his own unusual pet.

- There are five houses in a row, each having a different color.
- The Englishman lives in the red house.
- The green house is to the right of the white house.
- The Italian owns a guppy.
- Left outside is drunk in the green house.
- The Swede drinks coffee.
- The man who plays backgammon owns a toad.
- The man who plays racquetball lives in the yellow house.
- The man in the middle house drinks milk.
- The Russian lives in the first house.
- The man who owns the camel lives next to the man who plays cards.

- The man who owns the cat lives next to the man who plays racquetball.
- The man who plays solitaire drinks vodka.
- The American plays chess.
- The Russian lives next to the blue house.

Every fact must be taken into account to answer the two questions. Finding a solution in less than 30 minutes is excellent, in one hour very good. Answers appear on page 188.

**DOG'S MEAD** Two distinct versions of this puzzle came in from James Lee Vickers of Rockwell, North Carolina, Roger J. Jones of Herkadia, New York, and Chester Kyle, of Long Beach, California. The puzzle's original author is clearly English, but his or her identity is lost under hundreds of rewritings. This cross-number puzzle is a dilly. The problem is brilliantly logical, and solving it requires equal measures of reasoning, calculation, and trial and error. The numbers mesh so completely that it is necessary to find virtually every one before identifying the final entry. 2 Down (Hint: Start with 15 Across.)

You can be proud of yourself if you crack this one in less than four hours. Less than three hours is excellent time. We've yet to hear of anyone solving it in less than two hours. Your time limit is 31 days. The answer will appear in the Games column next month.

Just fill in the numbers from the given clues and these helpful facts: The old English pound equals 20 shillings. There are four rods in an acre. An acre is 4,840 square yards. A farm has been in the Dunk family for some years, and a rectangular portion of the farm is known as Dog's Mead. The current year is 1939.

Ready? Go.

## DOG'S MEAD

- Across**
- Area of Dog's Mead, in square yards.
  - Age of Martha, Farmer Dunk's oldest daughter.
  - Difference between the length and

- the breadth of Dog's Mead, in yards.
- Number of rods in Dog's Mead times 9 Down.
  - The year when the Little Pigley farm was first occupied by the Dunk family.
  - Farmer Dunk's age.
  - Year of birth of Mary Farmer Dunk's younger daughter.
  - Perimeter of Dog's Mead, in yards.
  - Cube of Farmer Dunk's walking speed, in miles per hour.
  - 15 Across minus 9 Down.

## Down

- Value of Dog's Mead, in shillings per acre.
- The square of the age of Mrs. Grooty, Farmer Dunk's mother-in-law.
- Mary's age.
- Value of Dog's Mead, in pounds.
- The age of Farmer Dunk's firstborn, Edward, who next year will be twice the age of his sister Mary.
- Square of the number of yards in the breadth of Dog's Mead.
- Time, in minutes, it takes Dunk to walk 1 1/3 times around Dog's Mead.
- See 10 Down.
- 10 Across times 9 Down.
- One more than the sum of the digits in 10 Down.
- Number of years the Little Pigley farm has been in the Dunk family.



**Cross-Number Puzzle** Take three hours of reasoning, trial, error, and calculation.

#### COMPLETE THE SERIES

Here are two number sequences, each has a definite pattern:

(1) What are the next four numbers in this series: 12, 1, 1, 1, 2, 1, 3

(2) Which number is next in this series:

10, 4, 3, 11, 15 (a) 14 (b) 1 (c) 17 (d) 12

(3) What are the next two numbers in this series:

28, 29, 30, 31

(4) Which number completes this series:

4, 1, 2 (a) 6 (b) 10 (c) 7 (d) 8

(5) What is the next number in this series:

77, 49, 36, 18

#### READER ORIGINAL #25

Elizabeth D. Fetterly of Jonesboro, Arkansas, wants to know what is the next word in the following series: and, nature, world, estate, column, aspen (a) water (b) music (c) welcome (d) heaven

#### INSIDE RUBIK'S CUBE

Herewith, the inner mechanism of the mathematical toy invented by Hungarian sculptor and architect Ernő Rubik, da adored in last month's Games column. A masterpiece of three-dimensional engineering, it comes apart into 20 small subcubes. There are eight corner cubes, each colored on three sides. Squashed between them are 12 edge cubes, each colored on two sides. The subcubes interlock so that any given corner cube can be held in place by any two of the three edge cubes touching it.

The mechanism holding everything together looks like a child's jack. Each of its six arms terminates in a half-cube showing one of six colors, and each colored on one face only. These half-cubes are in the center of the outside faces when the cube is assembled, and they always stay in the center as the cube's faces are turned, just as corner

cubes always stay in the corners and edge cubes always stay on the edges. The center half-cubes are attached to the spindle by spring-loaded screws. The six springs pull the 20 interlocking pieces snug in the assembled cube.

To take Rubik's Cube apart, rotate the top face one-eighth turn—halfway to the next position. An edge piece of the top face can now be twisted upward, as shown (below right), and then it will come out. If the cube is soft, a screwdriver may be used. Once one piece is out, the others can be removed more easily.

As we explained last month, if you reassemble the subcubes randomly the

machine's ultimate potential and virtually any two organisms can be combined, the world may be populated with some very unusual critters.

The laughing jag, a cross between a hyacinth hyena and a jaguar.

The vampire, a flying, bloodsucking nocturnal elk that stalks prey in the north woods of Pennsylvania.

The bobby fisher, a cross between a bobwhite and a fish hawk (whose favorite opening gambit, by the way, is "prawn to knight four").



Inner Cube: subcubes around a central spindle (center); how to get inside (right)

chances are 11 in 12 that you will orient the colors in such a way that it will be impossible to get the cube back to START. A more subtle practical joker has tampered with the pieces in the disassembled cube pictured above. When these pieces (and others not shown) are put back together, the cube can never be returned to the original arrangement. What's wrong? Answers, page 186.

#### COMPETITION #16: UNNATURAL SELECTIONS

You've heard of the liger—a cross between a lion and a tiger. Advances in genetic research will soon create a world in which even stranger species will be created every day. When gene splicing

The cockgato, the world's ultimate pest: a cross between a cockroach and a mosquito.

The crocodilelone, a cross between a crocodile and an abalone clam, whose feds are sold as giant seaflaps.

The likelandina tuna, a flit of soul. Sorry, Charlie! The group works for scale.

THE COMPETITION: Send two unlikely species that will be created by biogenetic research. Postcards only please, and postmarked by November 15, 1990. The first prize winner will receive \$100; runners-up (2-10) will each receive \$25. Send to: Odds Competition #16, 909 Third Avenue, New York, NY 10022. DO



# LAST WORD

By Isaac Asimov

• *High birth rates reflect the frequency with which members of the human race engage in sex* •

For 3 billion years or more life has evolved by the process of random mutation to gether with the very slow and inefficient drive of natural selection.

This has managed, by some happy (or unhappy) circumstance, to produce a species, *Homo sapiens*, that is potentially capable of guiding its own evolution toward purposeful ends. Research into genetic engineering has put us on the brink of this exciting development, and it is none too soon for the world among us (me, for instance) to begin planning the direction of that evolution.

Consider that the major problem facing the world today is the great and continuing increase in population. The earth's resources of fossil fuels for energy and fertile soil, for crops, are being strained under the present load of 4.5 billion people. Civilization might well collapse under an augmented load of 1 billion or 2 billion in the course of the next few decades. We should therefore concentrate on the population problem.

Population increases results from an undesirably low death rate, an undesirably high birth rate, or both. As long as the low death rate is concerned, nothing can be achieved in the way of genetic engineering. The earth's people will undoubtedly remain opposed to breeding practices that shorten people's lives and make them subject to certain diseases, for instance, or subject to death by fight—unless all people can be guaranteed that they personally, their friends, and at least some of their relatives will be exempted. Sociological research has conclusively shown that universal exceptions spoil the plan.

So let us concentrate on the birth rate.

First, what makes it so high?

One causative factor, certainly is the enthusiastic frequency with which members of the species, both males and females, engage in sex. Human beings seem to be much more prone to this form of behavior than other like forms are.

One reason for this may be that, in contrast with females of other species, which are receptive, that is, "in heat," at only certain periods, the mature human female seems more or less ready for sex at all times. The mature human male, too, seems to be permanently on the make. Human pheromones must be being constantly exuded.

Suppose, though, that we evolve a strain of human beings in which hormone production is so designed as to place the female in heat at random intervals that average out to only two days a year.

Contemplate the results. Since men would not respond to women except in the presence of a pheromone, sexual harassment in the office and factory would cease. Work efficiency would increase everywhere. To cite only one example, the construction worker would have no reason to expend valuable energy in whistling at passing women or to waste vital mental effort in devising off color comments,

There would no longer be any need for toilettes, perfumes, scents, lotions or any artificial odors whatever. Indeed, if my work had a positive attachment to what little sex there was, since they might mask the exuding pheromone and leave men unmoved just when they ought to be moving—rapidly—toward the exuder.

All women will be on an equal footing.

What's more, the appearance of the pheromone would indicate the woman is prepared for the solemn ritual of love. It will do away with coyness, flirtatiousness, pretense of all sorts, and this will improve the moral fiber of females.

Being in no mood to be choosy a woman on her pheromonic day will accept whatever man in the vicinity reaches her first. This will mean that men, too, will all get their fair change and that irrelevant distinctions on the basis of girth of bicep or other appendages (such as the waist) will disappear. This will spare males the bitter pain of rejection and thus immeasurably improve their psychic health.

Any more any possible disadvantages?

Well, among other species, the period in which a female is receptive is also the period when she is in an active state of egg production (ovulation). At such times fertilization is just about inevitable. But, in designing the further course of human evolution, we will adjust only the matter of pheromonation. We will allow ovulation to remain as it is.

At the present time the human female usually ovulates 13 times a year, more or less regularly, over a period of 35 years or so. If pheromonation takes place randomly then in 35 years a particular woman will have 70 pheromonic days at unpredictable intervals.

There might be cause for the Guinness Book of World Records, where a particular woman pheromonates with regularity—or so irregularly as to use up all her 70 on 70 successive days—but usually there would be no penicillike pattern.

This means that the average woman will find pheromonation taking place on the day of ovulation twice in her life. A particular woman might never hit the jackpot, another might hit it six times, but on the whole there will be two children per woman, and if no premature death occurs among those children, the population of the earth will hold steady.

Since premature deaths are bound to occur, the population of the earth will shrink very slowly and humanely to some acceptable level—all regions and cultures doing so at equal speeds—over as the blessings of peace and democracy descend over all the planet.

When the shrinkage approaches a dangerous level, it will be simple to adjust the hormonal balance in human beings so as to produce a slight increase in the frequency of pheromonic days. Indeed, if there is a world census every ten years, it might be used as a guide to hormonal adjustment for the next ten years. □