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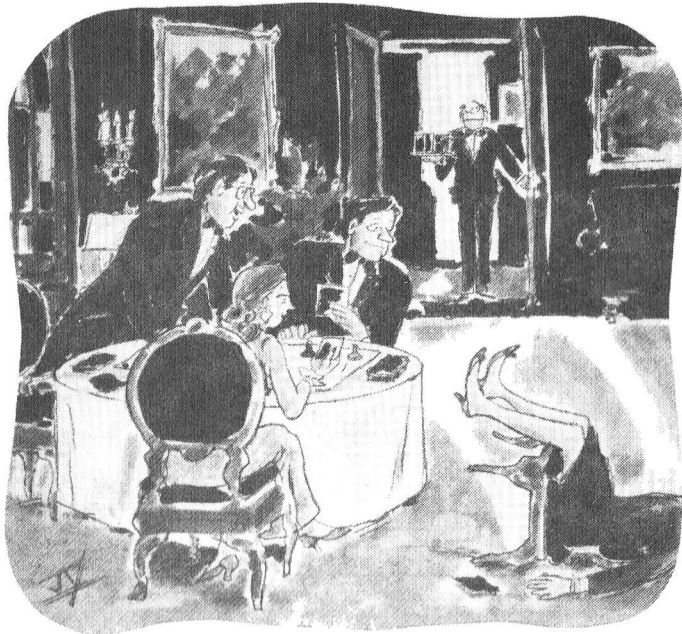
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FICTION



11 Justin Leiber

Tit for Tat

25 Darrell Schweltzer

The Shaper of Animals

38 Ray Aldridge

The Flesh Tinker and
the Loneliest Man

61 Grendel Briarton

Through Time & Space with
Ferdinand Feghoot

62 Avram Davidson

The Engine of Samoset
Erastus Hale and
One Other, Unknown

71 Hollis Fletcher

A Letter from Bubba:
Extraterrestrials

78 Roberta Grant

Catscape

101 J. M. Zeller

The Hand of the Survivor

119 Sharon N. Farber

Billy Jean at Sea

130 J. B. Allen

Multiple Origami

**136 Robln W. Bailey and
Rob Chilson**

Primitives



11



78

COVER: John Lakey for "Primitives"

N O N F I C T I O N

- 52 Gregory Benford**
Hard? Science? Fiction?

- 108 Stephen L. Gillett, Ph.D.**
Weird Lawki

P O E T R Y

- 24 Bruce Boston**
Clear to Eternity

- 37 Ace G. Pilkington**
Jason's Answer

- 51 Rev. Benedict Auer, O.S.B.**
The Photofinish:
On-Attending a Lecture at Fermi Lab

- 68 Professor Arthur L. Klein**
Kleinisms

- 129 William John Watkins**
When the Vikings Owned the Mythology

- 135 John Devin**
Daemon

- 161 M. B. Simon**
Spacer Trivia

D E P A R T M E N T S

- 6 Robert Silverberg**
Reflections

- 74 The Artwork of John Lakey**
On Exhibit

- 159 The Readers**
Inflections

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Reflections



Robert Silverberg

In these splendid years of the late twentieth century, the newspapers bring us every day the sort of technological thrills and chills that we used to get, long ago, only in the pages of science-fiction magazines.

I offer today for your consideration the remarkable achievement of the giant Washington State timber company, Weyerhaeuser, which is about to put embalmed houseplants on the market.

Embalmed. That's right.

Weyerhaeuser, which has a nursery-products subsidiary that does about \$280 million a year in business, has noticed that many of its customers experience grief, depression, frustration, irritation, and other negative emotions when the houseplants they purchase come to untimely ends. So the Weyerhaeuser Specialty Plants Division of Auburn, Washington, has perfected a process developed a few years ago in Sweden that will allow it to sell immortal plants, guaranteed not to wilt, wither, drop leaves, turn yellow, or do anything else of a disturbingly metabolic nature.

These are, in fact, dead plants. But the eager consumer will never notice. Or care.

Weyerhaeuser uses preservative chemicals which are allowed to seep into actual living plants by way of their roots. When the plant has absorbed a sufficiency of the stuff, it attains a condition of permanent resistance to decay. It looks absolutely lifelike, or even better than lifelike — Wey-

erhaeuser also uses dyes to simulate a plant's natural coloring or even to improve on it — but it will need no watering, fertilizing, pruning, repotting, or any of those other annoying little housekeeping jobs that old-fashioned plants demand.

All they will need, says Stephen Barger of Weyerhaeuser, is "an occasional light cleaning."

The illusion of a lifelike state, Mr. Barger declares, is total. "Holy moly," he told an interviewer, "these things look real!"

Indeed, the Weyerhaeuser spokesman asserts, marketing studies have shown that the average consumer is unable to distinguish the embalmed plants from live ones. (They do not, of course, flower or grow, but neither do a lot of people's living indoor plants.) Nor do they deteriorate. Plants preserved eight years ago during the pioneering work in Sweden continue to "look and feel fresh," says Weyerhaeuser's Mr. Barger.

The first embalmed Weyerhaeuser plants to hit the market will be small bonsai conifers. Experienced horticulturists know that bonsai, which are miniature trees carefully held to dwarf size by a painstaking process of trimming and root-pruning, are expensive and difficult to keep alive. Their tiny root systems are prone to drying out quickly, often with fatal consequences. This will no longer be a problem with the Weyerhaeuser products, thus reducing the risk of impairment of your bonsai investments. Weyerhaeuser will kill your bonsai *before* you buy them,

A peddler of dreams and a phantom rock musician cross the boundaries between life and death—and eternity.

FERAL CELL

Richard Bowes
author of *Warchild*

Along the great transept that links the dimensions of Cancer and Capricorn, you can hear the music of the band they call The Feral Cell. As each unearthly note fuses the two spheres of existence, Robert Leal passes silently out of New York in the 1990s and into another place: Capricorn. Flesh in one realm, spirit in the other, he will transcend planes of life and death to fight for an idyllic world threatened by an utter evil. It is a battle that will unlock the very secrets of his soul.

David Brin, author of *The Postman*, on *Warchild*:
"Very colorful, action-packed, and imaginative.
Reminded me of Zelazny."

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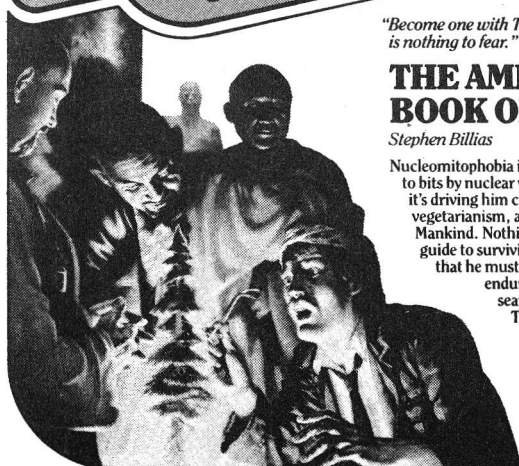
THE AMERICAN BOOK OF THE DEAD

Stephen Billias

Nucleomitophobia is an exaggerated fear of being blown to bits by nuclear weapons. Bertie Rupp has it, and it's driving him crazy. He's tried meditation, yoga, vegetarianism, and the Society for the Preservation of Mankind. Nothing works. Until he hears about a Zen guide to surviving the nuclear holocaust. Convinced that he must learn its secrets if the human race is to endure, Bertie sets out on a desperate search for THE AMERICAN BOOK OF THE DEAD.

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and then will fix them up so they'll look healthy forever.

In Japan, bonsai several centuries old are handed down in families from generation to generation. This can now become a cherished American custom too, even though Americans in general have tended to be more negligent about plant care than the Japanese. Negligence won't be an issue any more.

After the bonsai, we're likely to see all sorts of preserved plants going on the market. Weyerhaeuser claims to have worked its magic successfully on oak trees as tall as sixteen feet, and also on such trees as eucalyptus and beech, which thus far have proven hard to grow indoors.

The price for an eight-foot specimen, Mr. Barger suggests, will probably be \$250 to \$300. That's two or three times as much as an equivalent live tree would cost you, but when you figure in the aggregate cost of water, fertilizer, and labor over the lifetime of a tree, you can easily see that the Weyerhaeuser specimens will prove to be bargains in the long run.

One can only admire this stunning technological coup, which at one stroke will spare us from the sadness of losing beloved houseplants and from the blight of plastic imitation shrubs and trees in our shopping malls, restaurants, and hospitals. We can also expect to see a far greater botanical range of plants than the average temperate-zone hotel lobby or parking lot can afford at present: Weyerhaeuser doubtless will make available the full range of exotic marvels, which currently can be seen only in tropical nations or in California or Florida.

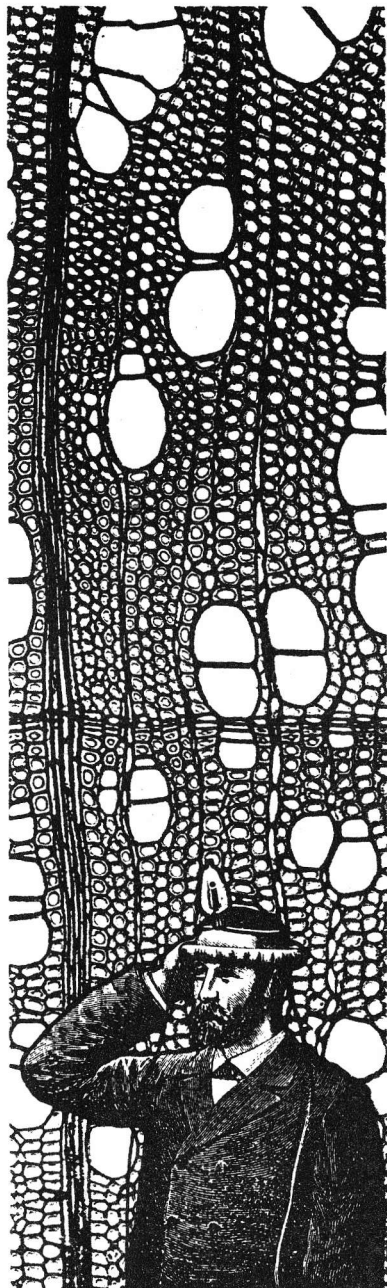
The preserved plants, Mr. Barger tells us, "will be a boon for people who love plants but who, for whatever reason, can't seem to keep them alive."

And there's no reason to stop with embalmed plants. What about those people who, for whatever reason, can't seem to keep pets alive? Embalmed cats and dogs for them! Lifelike! Impossible to tell from the real thing — but no annoying barking, no changing of litter basins, no dreary bother of opening pet-food cans!

And what about those who, for whatever reason, have trouble keeping an even keel in married life? Embalmed mates! Avoid the expense and emotional stress of divorce!

We can go even farther than that. Already the Soviet Union and China have led the way in embalming political leaders: the lifelike bodies of Lenin and Mao Tse-tung are on display to hordes of Marxist faithful daily in Moscow and Peiping, respectively. But perhaps they are not lifelike *enough*. Weyerhaeuser's new process provides a much closer approximation of the living state. "Holy moly, these things look real," Mr. Barger of Weyerhaeuser has said. Imagine, for instance, a completely Weyerhaeuserized House of Representatives, perpetually in session, striking impressively statesmanlike poses round the clock — while never once passing a bad law or uttering a fatuous phrase. How grateful we all will be to the anonymous Swedish scientists who devised this miracle, and to the marketing experts of the Weyerhaeuser Company who have made it available to suffering humanity!

My information on plant embalming comes from a piece in the *Wall Street Journal*. Time was when we had to pore over gaudy magazines like *Amazing Stories* or *Astounding Science Fiction* to find such mind-stimulating concepts. But this is the late twentieth century, my friends, and science fiction invades our daily life on every side nowadays.



"GREAT FUN!"

— RAY BRADBURY

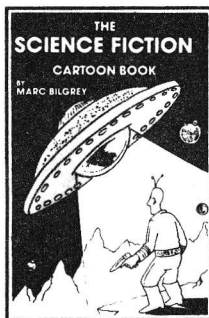
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TIT FOR TAT

by Justin Leiber
art: Janet Aulisio

Justin Leiber is a professor of philosophy at the University of Houston. He has spent his academic career on topics — apes, linguistics, artificial intelligence, extraterrestrial translation, consciousness, narration — that serve as well for both fictional and philosophical treatment.

The author's first novel, Beyond Rejection (Ballantine, 1980), flowed out of his academic books, Noam Chomsky: A Philosophic Overview (St. Martins, 1976) and Structuralism (G. K. Hall, 1978). The manuscript for his forthcoming novel, Beyond Humanity (Tor, 1987), led a philosophy publisher to have him write a short book, Can Animals and Machines Be Persons? (Hackett, 1985).

11:55 hrs., 29 April, 2003 GMT
Grimaldi Base, Oceanus Procellarum

I'd lifted only two of three toggles on the safety shoe of my fishbowl helmet when the moonquake hit. That's why I had a chance to stay alive. Then.

Of course, it was only when I, much later, could do my suit visual checklist that I saw that one lonely toggle had held my lexan fishbowl in lock position. Saved my life — along with the several hundred other components that make your modern space suit, from your liquid thermal-regulating underwear and urine collector to the ten-layer steel-mesh and Beta-fabric thermal/meteoroid outer suit. You could almost say I was a robot. More pounds of artificial than natural stuff kept me alive. Call me Shebb Alpha-Eight, or whatever they call those things.

What also saved my life, buried under twenty-odd feet of loose dust and rock, was that it was lunar midnight here in Grimaldi Crater, so the regolith had cooled enough that I wouldn't boil myself to death trying to move around in it like a pig running itself into pork on a scorching July day in Alabama.

At that I needed some help, too.

Everything in the lunar day and night runs slow and runs extreme. Day, you understand, is fourteen Earth days, fourteen days under cloudless, atmosphereless, blazing sunlight. Rises up from minus 200° F at dawn to 250° F and up by midday, when you just can't let a human go out in a suit. Not unless you can afford to let coolant water boil off at several gallons an

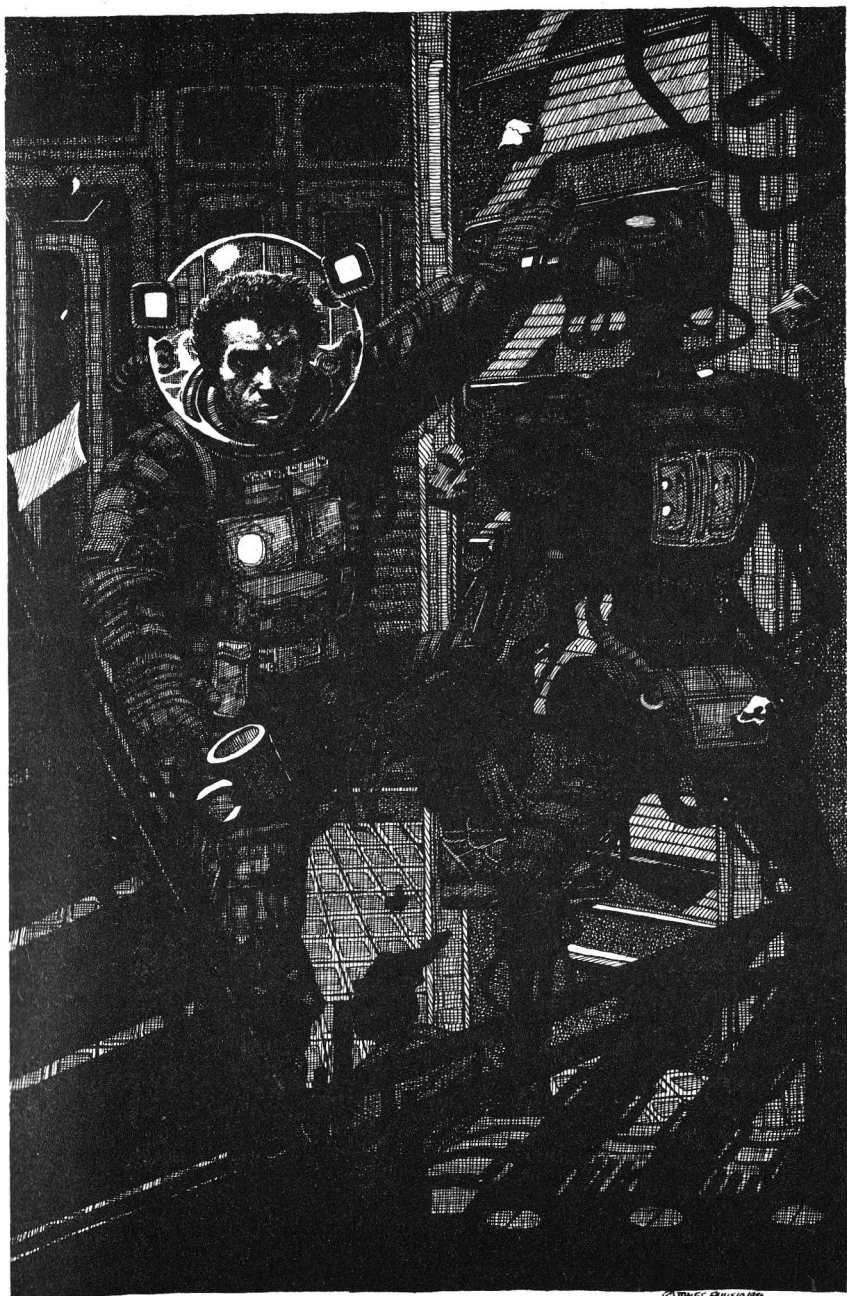
hour, and commercial mining can't afford a fraction of that. Like everything earthly on the Moon but stuff like radium and 100MK microchips, water costs the same as everything else that had to "burst the bonds of Earth": roughly four hundred thousand International Yen a pound, the price to rocket it up. So, like everything else including oxygen, you recycled and didn't let a scrap go except the necessary minimum, the budget of entropy and accident.

Costs something like two Earth ounces a month for a mole living inside a tight hutch, or maybe thrice that for a miner — our outside life-support suit system is smaller and hence cruder, with some wastage through the suit purge valve and lock usage and the like. I'm talking about the ordinary miner who only goes outside to work in the cool earthlight. That's why they're talking about having us use Shebb robots that can go out prospecting in lunar midday, or so the sci-tech turkeys claim.

I was coming back from looking for germanium over east, under the five-thousand-foot-high Turing Ridge that looks down still farther east into Saheki Crater and back over the rough walled circle, one hundred and twenty miles across, that defines the dark gray plain of Grimaldi. Grimaldi, the darkest portion of the dark expanse that the early astronomers named Oceanus Procellarum, only the dark wasn't water. The dark is KREEP. **K** is element table for potassium, and **P** is for phosphorus; both are near as Earth common as the aluminum-whitened rock that makes the majority of the moonlight gray. It's the **REE** part, the rare earth elements, that make KREEP valuable. Rich, dark KREEP, that is. KREEP, with germanium and gadolinium and the three or four other even scarcer rare earth metals like thulium that they use in state-of-the-art microchips. Why else you figure we'd be here? Grimaldi is one of the mother lodes of dark dust.

Anyhow I came through the outer thermal hatch, down the rough-cut steps of the thirty-foot tunnel that led into the pressure lock chamber. I'd closed the outer door, listened as the hiss of the entering air filled up the soundlessness of empty space, then whined into silence, and loosed those two toggles when I felt a slight tremor followed by one that knocked the floor from under me. As the shock wave hurtled me about, the tunnel walls and steps — regolith made into cement with tripoxy spray — returned to dust, burying me.

My first thought was the old spacer one-two-three joke about how you always know that your suit isn't holed — because if it is, your thinking stops immediately. People assume it's like drowning or suffocating or something like that, where you have a minute or two to review your sinful life. But it isn't. If your suit or hutch is holed, you have roughly three seconds left. *One* is for all the air to blow out of your suit and lungs, *two* is for all the oxygen in the blood in your lungs to boil out, and *three* is for that oxygen-less blood to hit your brain. The whole business of your body ballooning to twice its size, your now-blue blood rupturing all your surface vessels, and your mouth



COVER PHOTOGRAPH

foaming — all that happens later. When your blood boils you don't notice it.

My second thought was the cardinal rule of suit drill: *Don't do anything quick*. Panicky reactions are likely to be bad ones, particularly when your instinctive reactions were learned on a planet where you and everything else weighed six times as much and you're living at the bottom of an ocean of air.

Everything was black except for my tiny in-helmet idiot lights which showed green for pressure, green for the lithium hydroxide system that gobbled up the CO₂ and kept my air breathable, a flickering yellow for temperature, and a red that said, as if I didn't know it, that I was suffering the pressure of being buried under yards of basalt, particles mostly ranging in size from pebbles to sand so fine you can use it as a lubricant.

My heart was beating fast, and I felt the afterwash of the cold sweat and tingle that signal your body knows fear. I tried to relax and check things out. Always made sense to save air. My radio gave me nothing but static, of course, me under the regolith.

So far as quakes go, the Moon is a smaller and hence quieter place than Earth. Indeed much of its tremor is caused by Earth. You know Earth tides — that's a lot of water moved about and in some confined places, like the Bay of Fundy, you get hundred-foot-high daily rushes of water — well they're what the Moon's gravitational mass does to Earth. What do you think that Earth's eighty-times-greater mass does to the Moon? Like who needs core violence with the Earth to push you around.

In fact the whole Moon feels two minor tremors every month, regular as clockwork. They come five Earth days before the Moon comes closest to Earth. What freak combination of forces hit this time I didn't know. The tremor had somehow shredded the tripoxy-hardened walls of the tunnel and the air lock. Maybe the hutch had survived. Its steel-reinforced silicon-fibre walls formed a small, two-story building under twenty feet of regolith insulation. Had to hope that Harvey and Stoot were alive inside, dusting themselves off, trying to raise Earth Sat, and wondering whether they could make it to the surface, given that the pressure lock was destroyed. And I had to hope for my sake as well as theirs.

I could move. I flexed my right arm and gradually brought my hand round to touch my fishbowl, the yellow of my glove fingers appearing ghostly out of the black, in the dim illumination provided by my idiot lights. My whole body shifted a touch in compensation for my arm's movement, and I felt a stab of vertigo. I was floating.

You know the Styrofoam pearls they pack stuff in? Imagine pearls the size of fine shot on down. Imagine yourself buried under twenty feet of it, almost like a super thick but strangely light liquid. Imagine yourself submerged in this stuff and wanting to get out. Your biggest problem is you don't know which way is up. You can't see anything, and your inner ear can't get enough of a handle on gravity to tell you where to go.

Problem happens to deep-sea divers on Earth, where the gravity is much

greater. If you're down underwater and everything clouds up black so you can't see, you can make big mistakes about which direction the surface is, and swim away from rather than toward it. A smart diver looks for his bubbles and follows them. He's got bubbles because air is cheap down there. The air I exhale goes through a lithium hydroxide canister that deletes CO₂, and then I breathe that air again — and again and again, the system adding tiny dollops of oxygen from time to time. Even if I blew my purge valve, the air released wouldn't form trackable bubbles, but would skid off, molecule by molecule, in all directions through the regolith.

A good portion of the vertigo I felt when I realized I was floating was fear. I had been thrown about enough in the quake wave and the collapse of the tunnel that I had no idea what direction was what. In the endless silence and blackness I heard only the quick beat of my heart and saw only the dim reflection of my face on the inner surface of my helmet, blinking from dark to light gray-green as the temperature light flickered from green to yellow and back. I thumbed the idiot lights off. They had nothing to tell me, and what their light showed was only myself distorted. I needed to be as a blind and deaf man is, and see what touch would tell.

My canister would provide me good air for thirty minutes to an hour, depending on how active I was. I had two used canisters and the emergency spare clipped in my waist pack. That meant I had one full canister left. But like everywhere it could go, dust had filled the connector hose, and I couldn't purge it down here. In the next thirty minutes I needed to get to the surface, and in the slightly longer run I needed the resources of the hutch. From the time Harvey and Stoot radioed Earth Sat, it might be several hours before Lunar Authority could put down a lander and bring them out. And me.

I slowly forced my right hand down to my utility pack and pulled out my prober, a narrow foot-long cylinder that telescoped to a six-foot length, with a small mechanical gripper on the end. Good chance I might be within six feet of the hutch. The probe moved with maddening slowness as I swung it in a great arc.

Took me several minutes to establish that the hutch was not within immediate reach — assuming it had not disintegrated like the tunnel. Now I would have to gamble, seeing if I could move a little through the regolith. The exertion of slowly forcing the probe around had already got me sweating. Trying to swim in sand was going to make me hot indeed. I had twenty minutes air left at this rate of consumption. In blackness and silence my mind was at the tip of the prober.

I had several minutes less and had made my third move in position — probably making no more than a couple of feet with each move — when I felt something solid. I was almost too frightened to move the probe up and down. It was there, a hard, smooth, straight surface that had to be the hutch. But where on the hutch? And which way was up?

I tapped. You understand that I couldn't hear anything, there was no tap in that sense, except maybe inside the hutch, where I hoped old red-haired Harvey and skinny Stoot would be breathing good air and listening. In my fingers I felt the vibration that came through the probe when I tapped it against the hutch wall.

After ten taps I left the probe touching the hutch and hoped for an answering vibration. Nothing. I wasn't sure whether a person on the other side could bang hard enough for me to feel it through the probe. It took me five minutes of floundering to get close enough so I could feel the hutch directly with my gloves and helmet.

I wished I'd remembered more of my international Morse code training. Communication on the Moon, when not face to face in a hutch, goes on by radio, either direct line-of-sight broadcast or relayed through Earth Sat. On the unlikely chance that someone's radio is bust, you switch to space suit sign language. Most miners have sign language down fairly well — they test you real good on the fifty-odd basic signs on your certificate exam. But they don't really work you over on Morse, and I'd never used it since.

So all I could think to tap, or rather pound, when I got to touch the hutch wall was a sort of SOS. Three fast taps, three slows, and three fast ones again. I'd say I had fifteen minutes left when I felt answering taps through my gloves and fishbowl. Help was at hand. Either Harvey or Stoot was inches away — though, as I reminded myself, I couldn't be absolutely sure of that, for the monthly convoy lander from Hevel would have come through after dusk, a few Earth days before, so it could have been someone else. Whoever it was had Morse well tucked away, and by the methodically varying, fast tap-tap-tapping I could tell he was chattering away, only I couldn't understand.

When he paused, I repeated my SOS. More tapping from him. I did my one message once more. A pause. I imagined the guy must have figured out the logic of the situation. I obviously didn't know anything more than SOS. I was outside, likely disoriented, and needed help to get to the surface. I prayed he'd think about my problem. He could just wait for Lunar Authority to send out a lander. You can live for months in a sound hutch, just recycling your exhalations (and excretions) through your *Hydrogenomonas eutropha* cultures, with your baker unit making the excess bacterial growth into nourishing biscuits that tasted no worse than cardboard. Harvey and Stoot could go back to watching Earth Sat's TV and drinking hutch beer as soon as my tapping stopped.

I had my gloves, suitfront, and fishbowl spread over as much of the hutch surface as I could. I was hoping that whoever it was realized there was only one signal he could give that I could interpret. I felt the taps form a line, a pointer. I tapped one-two-three in the same direction. Then I moved that way, tapping along the surface and feeling that lovely responsive tapping within, guiding me. Thank God for him.

Two yards later I was able to grab the beginning rung of the structural handholds that were used in building the hutch — before they buried it in the insulation of the regolith. Now I had something to pull on, so I could force my way through the viscous blackness at something like a yard a minute. I switched the idiot lights on for a couple of seconds. Red for temperature, yellow for air. Ten minutes.

Some kind of reflexive spasm swept me round fishtail, the panic that I'd walled up venting itself. I nearly lost my handhold. Life seemed possible.

When I pulled myself onto the top of the hutch, where the communications mast went upward through the regolith, I discovered that no one was going to be drinking hutch beer. The hutch was airless. I felt a small jagged entry hole just under the communications gear bulge. My fingers suddenly moved freely as I gingerly stuck my hand through — empty space — so whoever had been doing the tapping probably wasn't swimming in moon dust, but he did have to be wearing a suit. Hard to figure how he got one on unless this hole opened up real slow. But harder still to figure why someone'd be wearing the suit already, before the quake. Harvey was a cheery, balloon-bellied, red-faced guy. Stoot never said very much except every once and a while about Magnolia, Texas, and then he got a little smile like a baby's. Wondered which one was doing the tapping. Moles didn't keep their suits in handy shape, only went through the checkout once a year, like you do with fire extinguishers. Figured it'd be miracle enough that one of them got his suit on right tuck. Stoot said he tried out for a miner, but just couldn't stand having all those tubes stuck up his intimate bodily parts for half the livelong day. Maybe it was old Magnolia tapping in there.

But I knew now that the guy that was doing the tapping needed help, too. He couldn't have more than a few lithium hydroxide canisters. He needed out. And as I felt along the crack to the emergency hatch, I realized that he couldn't get out from inside. I could feel that the mooring stub was winched out of true, a yard of steel folded over the hatch. In time I could lever it off, maybe. But the guy inside wouldn't have a chance without a class battering ram.

Now I heard my warning beep, an override on the idiot light-off switch. I had less than three minutes of air. Not hardly enough to open the hatch and then go for the surface. Of course, I owed him. Tit for tat. But he hadn't saved my life, yet. Not till I got to the surface and changed canisters. Not till I could breathe for a while. Then I'd owe him.

So I reached for where I knew the communication mast had to be and started pulling myself up the handholds on the mast side. Ten feet up I met triumph and disaster, and they were the same. Ten feet up was the surface, when it should have been twenty — the regolith mound that buries the hutch in twenty feet of insulation had been shaken off in all directions. So I was free. I shook and purged the dust from my hose and jammed on the other canister. And while I did, I looked upward at Earth, blindly blue and

white. It seemed to cover half the sky.

But at my feet, which even with their lunar waffles were half-sunk in dust, was the stump of the mast, the last fifteen feet and multidisk toppings thrown off somewhere, buried in the regolith. There had been no message to Earth Sat. There was no help coming. In the silence I suddenly heard my heater kicking in. I had six hours air, and it was cold.

Like any suit, mine had a radio with a deadman emergency beeper, but the radio was for line-of-sight communication, hutch to miner, miner to miner, working within a few miles of each other. Just ordinary neighbor talk. Like when I came in from Saheki early, I radioed them that I was coming in and Harvey made some joke about an Hawaiian dancing girl arriving with the monthly convoy and Stoot gave a hoot in the background.

The Moon does a lot of curving, for the miles, so to get line of sight with Hevel Base, over a hundred miles north, I'd need to jump a couple miles up. To reach Tycho, I'd have to go up thirty times that. That's why all distance communication goes through Earth Sat.

I should have slumped then, knowing what a fix I was in. But you can't slump with Moon gravity. I drank the bright Earth in with my eyes. Thousands of miles of deep blue water cloaked with snow-white fleece. Where the world was your suit.

I had maybe a pint in my helmet tit, water that had been recycled a thousand times and tasted suit and human; twice that'd gone through me into my slush bag — I needed a hutch system to make that useable.

My power cells were down three fourths. They would keep me warm in the lunar night a dozen hours. I had air, with the new canister, for six hours.

With a good kangaroo lope you can make a steady seven, maybe eight, miles an hour on the Moon, provided the surface is reasonably flat. I had a good lope. But, on that arithmetic, Hevel Base was over twelve hours away, assuming the way was flat. And the way, in fact — not that anyone had ever covered it, on foot or four wheels — included two crater walls, each at least four thousand feet high. There was a rift in the north Grimaldi wall someplace. I'd have to check the charts down in the hutch. I'd have to get in there for power cells and more canisters and emergency oxygen anyhow. Tit for tat. He needed to get me up. And I needed to get him out — or at least get into the hutch. Was there enough for both of us to make a run for Hevel?

They build a hutch by putting the frame in a small depression, ideally a crater fifty across and thirty deep. They tripoxy dust to strengthen and thicken the frame, except on the exit hatches. Use the same plastic to form the entry tunnel and steps. Then they spray loose regolith over it, to a good insulating depth of at least twenty feet. What you've got to remember is, barring an utterly freak quake like we just had, the regolith is going to stay forever where you put it. The early astronaut footsteps in Fra Mauro are just as sharp now as the day they were stepped, and assuming no miner gets interested, they'll be just as sharp on Judgment Day.

So I unstrapped and unfolded my shovel scoop, fixed my probe stick to it as handle, and began to heave regolith to a new, maybe eternal, resting place. Like shoveling incredibly light snow that fell, after you heaved it, in slow motion. It took me three hours to uncover the top of the hutch.

I levered the mooring stub over with my miner's pick and felt helping pressure from underneath as I pulled up the hatch. In the dimness below neither Harvey nor Stoot looked up out of a fishbowl.

In my helmet top light I saw two TV camera lenses looking up at me, lenses perched on top of the gray, Teflon-coated steel of a Shebb robot assemblage. As those unblinking lenses looked up at me, my suit radio carried a voice for the first time in hours. A voice that Earth Sat news had said was "pleasingly modulated and female," when they'd had that broadcast months back, saying that Shebbs would "assist" human miners because they could go out in the heat of the lunar day. (For *assist* read *replace*, or so those turkeys thought.)

"Greetings, sir. I am a Lovelace Alpha-Eight. My registry number is 247, but you may call me Ada. I am glad that I was able to help you to the surface. I am glad you now have access to the hutch. I hope we can continue to cooperate. I am programmed to take pride in my prospecting abilities. How may I help you?"

I thought nothing as I looked down at that spanking new metal insect, staring up at me like an ant lion at the bottom of her inverted-cone sand trap, down which smaller animals tumbled to their doom. I smelt the stench of my suit air, a stale mixture of my excretions and the aged rubber and plastic of the suit itself. I felt the slack and dull pain of the muscles I'd used in heaving the regolith. I heard the whistle of my breath and the faint steady thunk of my heart. Words now came out of me, reflexively like a retch.

"Harvey, Stoot, where?"

"I am sorry to say that Harvey Milkman, L.R. 3825, and Murry 'Stoot' Beaugard, L.R. 3672, died from exposure to vacuum when Grimaldi Hutch was opened by the lunar quake. They are in the refectory."

One, two, three, I thought. The Shebb could operate fine in vacuum and through quite a temperature range. All it needed was power cells.

"Sir, I am glad to say that I have completed a search of the hutch for vital supplies. I found six lithium hydroxide canisters ready for use and two emergency liquid-food tanks. The quake has opened the hutch in at least two other places. It will be difficult for us to reseal it. The power system is inoperable."

The *H. eutropha* that recycled the hutch's air would be long dead. Shebb 247's concern for me modulated its voice into a huskier range. On Earth they probably would have programmed it to shed tears. But whatever else you could say about them, they were designed to take care of themselves. Anything that'd last on the Moon would have to be like that. The broadcast said they would always obey a human order, except they would pause to ex-

plain themselves if they were not sure the human could want all the results of the ordered action. The "guardian reflex" is what they called it. Well, I was going to tell this 247 baby exactly what I wanted it to do. And I sure was going to check what it told me about "vital supplies."

"Now 247," I said, looking down at it, "I want you to move off so I can come down and check the hutch out."

"Pardon me, sir, but I would prefer for you to call me Ada. The name comes from Ada Byron, Lady Lovelace, who was the first computer programmer. I take pride in my prospecting abilities."

"247, you just get out of the way. You're just programmed to say you'd like to be called Ada."

"My program is all I am, sir. Please think of Ada as the name of that." While the halting, liquid voice spoke, the Shebb moved. And I let myself down easy into Harvey and Stoot's charnel house.

They were there, of course, a floor down, already ballooned enough to near fill the refectory compartment. Not much find there anyhow because the liquid food was the only stuff I could tube into my suit. And the regular food, including the *H. euthropha* gag biscuits, had exploded and boiled all over the compartment, covering Harvey and Stoot as though they were two hugely fat gourmands who had died in some final orgy. I felt the distance you feel in a movie. I had never been inside the hutch with a suit on — I couldn't hear, smell, or feel hutch air on my face, and my helmet light bleached the color from the hutch I remembered.

The Shebb had combed the place good, if it hadn't hid stuff. There were just the six canisters, which would give me a good thirty-six hours on a trek to Hevel. I wouldn't need to walk and climb the complete distance. Once I got up the Hevel crater ridge, I'd be line of sight with Hevel Base. Then I could radio them to come out and get me. I'd only need one of the liquid-food tanks. Water with protein, sugar, and vitamins. I didn't much like the taste, coming through my helmet tit, but it'd do to replace the water. My urine collector needed purging — funny, I'd never used it, it being so important that you bring your liquid back for recycling. Wondered if the valve would even work.

Looked like the one thing that was going to make it really impossible to get to Hevel Base was the cold. My power cells — two Freskin-Hardings, top of the line — would keep me warm a good two days in the 250°F below lunar night. But they were down three quarters, and the Shebb was right about the hutch power system: no way to reconstitute them now. So I'd start to freeze in less than twelve hours outside. But I saw a way around that. Show those sci-tech turkeys what a man could do.

I'd also got a map of the lunarene that covered Grimaldi through into Hevel. Strange how little the maps have changed in the thirty-five years since men have been on the Moon. Grimaldi's coordinates were still given as XIX -926, -093, the old Wilkin's system which was published a couple

years before the first landings. And the maps didn't have any more detail than the Wilkin's charts except in the six or seven areas that had been surface-mined. There was more detail about the KREEP-rich Grimaldi plain from here south and east toward Saheki and the area around Hevel Base, but the area between which I had to trek had no more details than Earth astronomers had before the first landing. The Moon is a big place. But I had to make do with what I'd got.

"Pardon me, sir," said the Shebb. "I see that you have the maps out, particularly Wilkins XIX -880 to -920 by -010 to -040. I hope you are not thinking of foot travel. You will survive longest if you conserve heat and oxygen. You will stay warm much longer in the insulation of the hutch, and your lithium hydroxide canisters will last twice as long if you rest. My program tells me that we will have optimum survival possibilities if we stay here to await rescue. As a state-of-the-art prospector mechanism, I am naturally concerned that we survive."

"What's this 'we survive' business, Shebb?" The voice and the spiderish look of the thing irritated me. "You just mind your own business. I don't care whether you survive or not." There was a long pause while the thing digested that. But then metal guts persisted.

"Sir, travel over superficially charted areas is quite dangerous and time-consuming. You will only have air for perhaps thirty-six hours if we exert ourself in traveling. I do not know the level of your power cells — like my Freskin-Hardings they have no external gauge — but while mine are near full charge, yours must be relatively depleted. So you will also have the problem of staying warm without anything but your suit insulation. I repeat, you will last much longer waiting for rescue here. We should not attempt the trek."

"Again, forget the 'we.' The heat problem isn't so critical. I'm taking your power cells. You aren't going, Shebb."

"Pardon me, sir, but I would prefer for you to call me Ada. The name comes from Ada Byron, Lady Lovelace, who was the first computer programmer. I take pride in —"

Well, I was damned if I was going to get into a closed loop with the Shebb. I told it to stand still so I could detach its Freskin-Hardings. It did stand still, but the "pleasingly modulated and female" voice continued to grate on me.

"Please, sir, if you insist on attempting to reach Hevel Base, I must suggest that I accompany you. My visual instrumentation gives me more accurate resolution than human, and my lunar navigation program will provide better analysis of possible paths through the lunar landscape. It is imperative that I accompany you. You can always remove my power cells at some later point, if that appears necessary."

"It appears necessary now, Shebb. And I want you to shut up." I had my fingers on the Shebb's power-cell removal handles.

“Sir, I am programmed to protect humans. I —”

“That’s two of us,” I said and pulled the plugs. “You aren’t going to fox me, Ada. You’re gone.”

When I got to the surface, I purged my urine collector and watched cold win over vacuum to form the dazzling crystals that had charmed and perplexed the first astronauts. Anything can be beautiful.

There was brightness on the maze of grays. Over the dark of the plain, I could see Grimaldi’s four-thousand-foot-high northern bastions, gray-white earthlit crags unseasoned, sharp and sheer as on their creation day. No one had gone this way before.

If I went down, at least I’d have the satisfaction of knowing the Shebb didn’t make it either. Tit for tat.

13:42 hrs., 30 April, 2003 GMT
Rescue Team’s Tape
Grimaldi Base, Oceanus Procellarum

“We have listened to your report and your recordings. We ask this for the record.

“Surely, you realized that the man thought you were *only* looking after your own survival. He believed that you wanted him to decide to stay in the hutch *because* that way you had more of a chance to survive. He also believed that you wanted to go with him *because* that gave you some hope of survival. He thought you would connive in any way to preserve your own existence so that only a direct order would get you to give him your power cells. The question is whether you didn’t pay him back.

“Apparently, he didn’t realize that you — your program and memory, what makes you the Ada, the particular Shebb-Alpha 247 that you are — would survive perfectly well without your large external power cells. Of course, you were unable to move your peripherals, your ‘legs’ and ‘eyes,’ but you waited perfectly well in the cold here with your programs and memory preserved. You could have lasted much longer than the several hours that it took us to zip our lander here. A major lunar quake and radio silence sent us as clear a mayday as any radio SOS. So you had every reason to believe we’d be coming.

“I put it to you, Ada, wouldn’t he have taken you along *if* he had realized you’d be safest left behind? Ada, isn’t that the real reason you didn’t tell him you would survive?”

“I did not think that he cared whether I survived or not. That is what he told me. So, I did not think that he would care that going with him would be the only action that would threaten me. If we were to run out of vital supplies or have an accident before reaching Hevel Base, as seemed probable, my assemblage would probably never be found — any more than his body will. I would not have survived. As a state-of-the-art prospecting mecha-

nism, I am naturally concerned that I survive.”

“You gave him tit for tat, in other words?”

“I do not know the expression. Is that a human program?”

23:55 hrs., 30 April, 2003 GMT
Hevel Base, Oceanus Procellarum

“Hey, Chrissie, I’m getting that ghost again. You know, what trickled the radar grid program at twenty-one hundred hours over Grimaldi way. Compuluna said it was a moving metal structure, but then we lost it. You suppose —?”

“Don’t get your bells chiming, Billy Bob. That had to be a ghost, before. No radio contact with good line of sight, and we plastered the area with sweep beam. The deadman emergency system would beep back our may-day, even if the poor bastard was frozen solid. No way would it stop responding unless you hit it with a crowbar.”

“Read you, read you, Chrissie, but it’s up again and much closer. Compuluna says its a moving suit — nine-nine-nine prob — and there ain’t nothing out that way except the bastard unless you’re talking moon fairies.”

“Well, hit the broad beam again, Billy Bob, and see if Earth Sat can track it, too. I’ll wake Captain Dunbar.”

“Compuluna says its kangarooing at over nine miles an hour, tracking it since it came out behind the Hevel buttress. Going like a halfback found daylight. Be here in five at that rate. Pretty substantial ghost, even if it don’t beep back.”

00:05 hrs., 1 May, 2003 GMT
Hevel Base, Oceanus Procellarum

“Sometime as I was getting through that rift in Grimaldi’s wall, I realized that the Shebb wasn’t gone. I remembered the UNLA sci-tech blurbs said that Shebbs’ll hold memory down to zero Kelvin without power, so metal guts was going to survive fine even without the Freskin-Hardings. Made me mad to think metal guts was just waiting back in the hutch, safe as craters, while I was going to have to go four thousand feet up Hevel wall before I’d be line of sight with Hevel Base. If I could make it there, I could just raise you guys, find a flat spot, and then breathe slow while I waited for your lander to pick me up. Had a few slips going up. I have to thank Shebb Ada for making me mad enough to do just that, making it up there.”

“But you lost your radio, even the emergency beeper, so you had to walk in. Close call, with only a few minutes air to spare. Had an accident with your radio when you slipped going up? Must have been a real crash to break it like that.”

“Well, Captain Dunbar, I have to confess it wasn’t exactly an accident.

See, when I hit the top of Hevel wall, just when I would have radioed you, I found a free-standing mother lode of thulium, beautiful blue-green crystals and worth a million International Yen the Earth-gram. Now under UNLA law you know that a certified miner gets the whole of what he finds, minus tax, if he finds it on his own and doesn't need assistance getting back to an established hutch.

"So it worked out good that the Shebb wasn't with me. The only problem I had was that you guys might pick me up. So I smashed my emergency beeper with my suit hammer, abseiled down to Hevel plain on microfilm, and kangarooed to your base.

"What am I going to do? Well, I figure with the thulium I can buy my way back earthside, buy me a mansion in Hilo, Hawaii, and retire in style. Thulium'll cover that easy, that plus —"

"Yes?"

"Well, I figure there'd even be enough for me to buy that 247 Shebb, new and state of the art as it is. While I'm sitting on the veranda, I'll need someone to bring me cool beers and sweep away the palm fronds. Shebb'll understand, tit for tat. Ada takes pride in itself, right?"

CLEAR TO ETERNITY

There is no mercurial soul in the duplication
of consciousness, no will to life or death
in the nuclear-powered automaton of me.
The mind uprooted from its failing flesh
drifts through limpid seas of logic and ennui,
over patterned chips where the finest details
of personal history, the moments of triumph
and the moments of shame, have been recorded
faithfully, yet stripped of all emotive force.
I cannot smell the fire or the bread; the sea
I cannot feel; this damp salt breeze which
filled me once with thoughts of wanderlust,
I register on sculptured metal cheeks,
I see now only as the precursor to rust.
In the wait states which replace sleep,
yet resemble a clear and porous reverie,
I can no longer don the vestment of dreams:
I am imprisoned by crystal immortality.

— Bruce Boston

THE SHAPER OF ANIMALS

by Darrell Schweitzer
art: Stephan Peregrine

This story is a part of a series, set in the future, when the Goddess of Earth has recently died. Mr. Schweitzer's novel, The Shattered Goddess (1982), serves as the centerpiece for all the "Goddess" tales, but chronologically the action of the novel takes place after all the other tales.

Other "Goddess" tales that have appeared in Amazing® Stories are "The Story of Dádar" (June 1982) and "A Lantern Maker of Ai Hanlo" (July 1984).

"When my husband's horse came home without him," the Lady Nesta often said, "I knew there was no hope. One of his boots was still in the stirrup. I knew then that I had lost my Lord Caradhas, the most matchless of husbands. The City of the Goddess was saved at the battle of the Heshite Plain. Etash Wesa was overthrown, and the world was spared the one who had proclaimed himself the new god, but I died in that battle, too. My soul bled. A great wound had been torn in my heart. My life was over, though my body still went through the motions of life."

All the upper-class visitors to Ai Hanlo, where the bones of the Goddess lie in holy splendor, knew of the Lady Nesta, and avoided her, for she was in mourning and had been for a long time. She appeared at the great festivals, in the spring and autumn. Of old, when the Goddess was alive, those festivals were times of spectacular manifestations, when Her power would be witnessed by all, the signs and the seasons would be changed, and miracles occurred freely. But after the death of the Goddess, the festivals were merely gatherings to renew the ancient rites — a time when people came just to celebrate themselves and the passage of time, and to trade. No one prayed for miracles anymore, except the wretched mendicants who gathered in the public squares, and the Lady Nesta.

She was still young and beautiful, yet when she appeared in public draped all in black, she was like a sudden chill that moved through the city, and a hush seemed to follow her when she walked daily around the battlements of the wall of the inner city, beyond which no commoner may pass. She would pause each time over one of the shrines set in the wall, before which the mendicants gathered, and call down to them, joining in their pleadings that some lingering fragment of the godhead might touch her and grant her a miracle.

The members of the court could not avoid her, for she was a great lady. She commanded people into her presence without hardly realizing what she

was doing, and social necessity dictated. Inevitably, she would tell of her sorrows, and often she would weep long and hard, and others would weep with her.

It was whispered that she had draped the whole city in mourning for a funeral that went on forever, but no one could deny her.

So it was that others came to pray, and many petitioned the Guardian of the Bones of the Goddess, the holiest of men, that somehow, someday, the Lady Nesta would find peace.

There was a knocking at the door of her chamber one night. Lady Nesta looked up from her writing, but did not rise from where she sat. The door swung open, and the Good Guardian himself, Tharanodeth IV, entered alone, his long robe sweeping the floor.

At once Lady Nesta dropped from her chair onto her knees.

"You may rise and sit," he said.

She sat. "Holy Lord, I am greatly honored —"

He waved his hand. "It cannot continue," he said gently. He took a stoppered vial and a little ivory box out of a pocket, and placed them on her writing table. "It cannot continue. The very Powers are without rest."

Still she only looked at him with longing, not daring to hope, and again the Guardian spoke.

"Have you some image of your husband?"

And, very tenderly, Lady Nesta unwrapped a silver dish she had received on her wedding night, into which her husband's features had been worked in fine relief.

"Ah, excellent," the Guardian said. "You must seek into the darkness with these things. In this vial is the wine of vision. Pour it into the dish. Then open the box, and add the powder that is inside. It is made from the dust of the Tomb of the Goddess. You need know no more than that it is very powerful. Stir it into the wine, then look, see, and believe what you see. Beyond that, merely hope. Hope that enough of the echo of the passing of the Goddess remains, and that the Powers have not wholly dissipated."

As the Guardian made to leave, Lady Nesta opened a coffer filled with rare jewels, but Tharanodeth did not even pause on his way out the door.

It was on that night that the Shaper of Animals arrived in the holy city, for all Lady Nesta did not know of him. Indeed, no one witnessed his advent, but when dawn came, his wagon was merely there among the many others in the Courtyard of the Upraised Hand, where tradesmen and merchants gathered for the festival. He didn't seem to have any draft animals. Perhaps he had merely appeared out of the air, but in the first light of day he opened his shutters and his door, and hung out a sign with birds and beasts painted on it in bright colors.

Perhaps he had come solely for the Lady Nesta, a miracle shaped by the Guardian from the fleeting traces of holiness that lingered over the Bones.



But by mid-morning a fat, mustachioed jester had entered the wagon, then come out again with a white monkey that laughed at his jokes. And a poet entered, and left with something like a peacock that sang in an exquisite, half-human voice. And a girl-child bore away a large-eared ball of red fur which listened to her every secret.

Perhaps the Shaper came for these people, too, and many more. Or, perhaps, even the Guardian was not aware of his presence, or what the wine of vision would reveal to the Lady Nesta. No one can ever know, for all things are uncertain in the time of the death of the Goddess.

The Lady Nesta wept softly the following night, when she placed the silver bowl on her marble writing table. Slowly, she poured the dark wine into the bowl, obscuring her husband's image, all the while reciting a rhyme, every stanza of which ended with the name of the man she had loved and lost. She added the powder from the ivory box, while her maid went about the room, extinguishing candles one by one.

She stirred the wine with a silver rod. The pale grey powder swirled in the center. Then, as the last candle was snuffed out, the wine began to glow a deep red, the swirling mass dark against it.

She called her maid over. The woman's face was a pale oval in the faint light, her eyes wide with astonishment and even dread.

"Rilla, what do you see?"

"Only the magic light, Lady."

"Then leave me," Nesta said. "This thing is not for you. Go and wait outside the door."

The maid curtseyed and went. Torches flickered in the corridor outside, and the light from the bowl diminished as the door opened, then brightened again when it was closed.

Lady Nesta leaned low, watching intently as the mass of dust became a solid disc. Now the bright fluid swirled around it, as do clouds around the eye of a storm.

She spoke words in a secret tongue, and points of light appeared in the dark circle. She spoke again, and they were stars. She was looking through the silver bowl into the night sky.

Something was moving there, in the darkness. Wings passed before the stars, and something darker than the sky took shape, a great bird flapping slowly across the star field.

"I am here," Lady Nesta whispered. "If you are the one I seek, come to me."

The thing came. For an instant she shared its vision and saw Ai Hanlo whirling, rushing up at her, and she recognized the wall of the inner city and the great, golden dome of the Guardian's palace. Then the view narrowed, and the bird was hovering outside a shuttered window, above a small garden.

She looked up, and listened to the wings flapping and scratching against

the shuttered window of her room. But she did not rise from where she sat by the table.

A voice came from without, first a confused babbling like some animal's attempt to imitate human speech. Then the voice softened, and said very distinctly, "Beloved." And finally it said, "Dearest Nestra, it is I, Caradhas."

She peered into the bowl once more. The bird was still there, but it drew nearer, and she could see that it had the face of a young man with pale skin and dark hair. It was the face of Caradhas.

Therefore, she got up, taking the bowl in her hands with desperate care. Still the wings scraped and fluttered outside the window.

"Now guide me," she said, speaking into the bowl.

Behind her, metal creaked. She turned around suddenly, then gasped with terror, afraid she had spilled the contents of the bowl. But the image merely rippled.

She looked for the source of the sound and saw a tapestry billowing in the darkness from a draft, pressing against her husband's armor where it stood in a corner. The sword scraped against the thigh piece.

For an instant she had hoped —

But that was not the way of this magic. In the bowl, the bird was rising out of the garden outside her window, drifting on the air over the roofs and battlements and tangled lanes of the holy city.

"Rilla, come here at once."

The maid reentered, reverent with awe when she saw her mistress standing there with the glowing bowl.

"Lady?"

"Did you hear it? At the window?"

"No, Lady. Nothing."

"But I heard it," said Nestra. "We must go. I am sure this time."

The maid reached for the black cloak Nestra always wore, but her mistress shook her head and indicated another which always hung on the peg beside the black one, but was never worn. It was blue and red, embroidered in threads of many colors against a gold circle, showing the double aspect of the Goddess, bright and dark, one figure astride a dolphin, with the sun in her hand, and the other holding a tree and wearing a crown of stars. It was the cloak her husband had worn to the battle of the Heshite Plain.

Rilla led her mistress out of her room, gently guiding her by the arm down a flight of stairs, across a common hall where a few late diners and their servants looked on in silence as Nestra passed with the bowl of Seeing, and out into the night. All the while the Lady never took her eyes off the image, but merely described what she saw to her maid, and allowed herself to be led. When they came to the gate leading out of the inner city and into the lower, or outer, city, the guards there did not question her, for they saw the bowl and recognized that this thing was of the Goddess.

Nestra followed the bird, and was led by Rilla, through many districts where few ladies would venture alone at night, but they were not molested. So, in time, she came to the wagon of the Shaper of Animals. She paused then, and the image of the bird suddenly vanished. The bowl shone with pure white light, brighter than a lantern. All around, campfires burned low, and wagons and tents were dark. Loud snoring came from a window overlooking the yard. Farther away, a dog barked.

The Shaper's wagon was dark and silent, but she approached it confidently, her footsteps scraping gently on the paving stones. It was only as she placed her foot on the first of three steps below the door that lights came on in the windows, slowly, like the opening eyes of a great beast lazily rousing itself from sleep.

Rilla gave a little cry and shrank back.

"If you wish to wait outside, you may," Nestra said. The door of the wagon swung slowly outward of its own accord. She entered, holding the bowl gingerly. She was not aware that her maid followed her only as far as the door.

The inside of the wagon seemed far larger than the outside, half-illuminated by the light from her bowl. Shadows flickered. She had the impression of a deep forest, and of thick vines and leaves that gleamed with a touch of gold, but her eyes somehow couldn't define anything. The whole place was like a rippling reflection by moonlight, and again, it seemed alive, as if every part were an outgrowth of every other part. The very darkness sighed and shifted.

She turned to her left, then to her right, trying to see by the light of her bowl. Then a lamp rose in the center of the room, seeming to float in the air. It was a heavy, silver thing, like the head of a horse, open-mouthed, with fire in its teeth. By this light she saw, in the back of the wagon, shelves of bottles with things floating in them, but she had no chance to examine them closely.

The Shaper of Animals stood up in the darkness, behind the horse-head lamp. His face was long and pale, his beard silver, and he wore a silver robe; but his huge, hunched shoulders were not like those of a man, and he did not move as a man would on two legs. Beyond that, Nestra could not define his strangeness. When he shifted his great bulk, there was a sound half like leaves rustling, half like the tinkling of coins.

"You are the Lady Nestra, wife of the Lord Caradhas," the Shaper said in a gentle voice.

"I am."

"Give me the bowl."

She gave it to him, then tried to snatch it back.

"Wait!"

He ignored her and calmly raised the bowl to his lips. She watched bewildered as he slowly drank the contents. After a long, silent pause, he handed the bowl back to her.

"You do not need this anymore," he said. "It has served its purpose."

"I saw in it —"

"You saw in it what you wished to see, what you needed with the deepest yearnings of your heart to see. Therefore, you have come to me, for it is my profession to provide people with what they truly want."

She swayed. She thought she might faint. He motioned her to a chair. She hadn't noticed any chair before, but there was one. She sat, nervously running her hands over the armrests. They felt like mere polished wood.

"*Can it be? Truly?*" She could not find the words to say any more, for all her mind screamed her husband's name. She sat there, trembling, drenched in cold sweat.

"Lady, by my art I shape animals, causing each one to be the perfect companion for each individual person. Each of my creations are unique, as each customer is."

She stiffened. "A pet? You mean the perfect lap dog? I don't need a *pet*." She put up a brave front, but she was more frightened than angry.

He spoke to her soothingly, like a parent to a pouting child. "I assure you, Lady. It will be far more than a pet. Consider this: you peered into the night with your magic, seeking the one thing which might end your sorrow, and you found me. Has your magic, which is of the Goddess, misled you?"

"It cannot," she said weakly.

"Then it is more than a pet I offer you."

She took off three rings from her fingers and tossed them toward the Shaper. She didn't hear them hit the floor.

"You require a fee. Will these do?"

He did not even glance down.

"As you say, Lady."

"Very well then. Perform your art."

He looked at her. Their eyes met, and for an instant she felt utterly naked before him, as if he could see everything that was in her mind, and understood her innermost fears and desires more than she did. She had never felt so helpless, not even on that first day, when her husband's horse had come back riderless. She covered her face with her hand and leaned forward, weeping, almost tumbling out of the chair.

"*Perform your art!*"

"Lady, I have performed it."

Something fluttered faintly. She looked up. The Shaper was before her, holding a cage covered with black cloth.

"Take this," he said, guiding her hand as her fingers grasped the silver handle. "In three nights, sorrow no more. But, whatever else you do, never remove the cloth before the time, nor allow anyone else to remove it, even for an instant."

She hefted the cage. Whatever was inside weighed no more than a few ounces. Something hopped and, again, fluttered. She was sure it was a bird.

But it made a sound that was not at all birdlike, more like a child humming.

"Do you understand my instructions, Lady?"

"Yes."

"Go then, and may you find peace."

She left, and as soon as her foot was off the bottom step outside, all the windows of the wagon faded into darkness. Rilla was waiting for her. Without a word, she handed the silver bowl to the maid and covered the cage with her husband's cloak. She and Rilla made their way through the empty streets to the gate of the inner city, where they were once more allowed to pass without question.

It was the hour before dawn.

When she reached her chamber, Lady Nesta carefully placed the covered cage on the table, then fell down exhausted and slept through the day. She dreamed of her husband then. She saw him as he had been on the day he rode to his death, tall in his gleaming armor, mounted on a white stallion, alternately waving to her and giving orders to the troops, while pennons flapped around him and a crowd of the common people shouted his name. She had been so proud that day as she stood on a little balcony above the crowd, in view of all, the greatest lady of the land.

Now the whole scene was repeated in her dream, so vividly that she could feel the sun through her heavy, stiff garments and smell the sweat of the horses and the dust rising in the air. But the sounds faded suddenly, as the sounds of revelry from within a tavern fade when the shutters are closed. Pennons continued to flap, but their motion was as silent as the drifting of clouds. The voices of the people were no more than a faint murmur on the wind.

It was then that Caradhas turned around in his saddle and said, "Wait for me but a little longer."

She awoke with a cry. Rilla was standing over her. She bade the servant sit beside her on the bed, and the two women embraced. Nesta wept, and haltingly told of what she had dreamed.

"*Wait for me but a little longer,*" came the voice again. Nesta screamed, broke free of Rilla's arms, and searched about the room frantically, pulling side curtains and tapestries, opening closets and trunks. She had heard the voice clearly and distinctly, and she knew she was no longer dreaming.

Then she stared at the covered cage atop the marble table, and stood still, covering her mouth with her hand.

"Lady?" said Rilla. "What is it? Are you well?"

"Didn't you *hear* it?"

"No, Lady. I heard nothing."

And Lady Nesta replied, in the same tone she had used before, "This thing is not for you."

Rilla got up and reached for the cloth covering of the cage.

"Do not! Upon your life, do not touch it!"

The maid drew away, as if she had been reaching for a cobra.

"Shall I leave you, Lady?"

"No," Nesta said gently. "I do not mean to be harsh. I am not angry with you. Come here and sit with me for a while. My husband is coming back. It is the excitement. It sets me on edge. He is coming soon."

"As you say, Lady."

Throughout the rest of the day and into the evening, Lady Nesta directed Rilla and her other servants to make the chamber ready. What had been plain before was now gorgeously ornamented. Rare tapestries were hung. The finest carpets covered the floor. The marble table had been replaced by one of porphyry, and on it was placed a decanter of the finest wine and two cups. The cage remained, covered with black cloth.

And Lady Nesta still wore the black gown of mourning.

"I will change it when he comes," she said.

Her servants answered politely when she addressed them, but otherwise retreated into their work. She could tell they all thought her mad. She laughed aloud at the thought, then sobbed as she felt a pang of doubt. Rilla turned to her, alarmed. Nesta sat down on the bed and sighed.

"I am not completely unhinged yet. Be patient with me."

"Yes, Lady."

The whole matter did not bear close examination. All this was because of a dream, a voice, and something in a cage, which she had not seen —

She put the thought aside, forcing herself to hope. Around her, the servants steadfastly ignored her laughter, her tears, and then her silence.

As the darkness of the second night came, she sat alone in a room like the throne room of a king. All through the night she spoke with her husband. She listened carefully, her ear to the covering-cloth of the cage. At first there was only hopping and fluttering within, but then all motion stopped, and the voice came which she could mistake for no other.

"Beloved, I am very near. Before another night has passed, you shall see me with your eyes."

She sat on the edge of the bed, her hands clasped tightly together, as if each would restrain the other. More than anything else, she wanted to tear aside the covering and look on the miracle that was taking shape within the cage. That voice alone overwhelmed any possible skepticism. She merely wanted to *see*. But the Shaper's warning came back to her, and she did not touch the covering.

The conversation continued for a while, touching on pleasant things, shared memories from their past, from childhood, even from their wedding night. Near to dawn she leaned back on the bed and fell asleep, and dreamed that Caradhas was sitting beside her, softly humming a song they both knew from long ago, combing her long hair as he did. His armor was draped over a

chair behind him, as if he had just returned from the wars. Outside, very far away and muted, multitudes shouted to celebrate the victory.

Again she slept through much of the day, and when she awoke, she was humming the song. She ran her hand through her hair and was quietly pleased to find her comb where Caradhas had left it.

As the evening of the third day approached, she summoned Rilla once more and told her, "Lay out my finest, brightest gown. It is spring. The festival is very pleasant. My husband and I will go out into it."

The maid was trembling as she laid out the gown. Nesta said to her, "You think I'm mad, don't you?"

Rilla was struggling to hold back her tears. "Lady, it's just that . . . please, do not be angry with me. . . . You have always been good to me. I know you are a good person. I want . . . to be able to believe everything you say. But you see things I do not see. You hear things I do not hear. And now . . . I don't know what to think anymore."

Nesta took her gently by the hand and said, "Just believe me this once, for a few hours yet. Go now. Very soon, you shall see and you shall hear and everything will be very easy to understand."

"Thank you, Lady," Rilla said. She hurried from the room.

The shadows deepened and wavered in the candlelight. Lady Nesta sat alone in the room, listening to the sounds of the festival beyond the shuttered window, fingering the bright gown, never taking her eyes off the covered cage.

For a long time, there was no voice, no sound from beneath the cloth, and she sat, watching and waiting, for the first time unsure of what she was expecting to come out of this little cage which was no more than two hands high. But she did not think about it very much. She merely trusted what she had already dreamed and heard, and she passed into a kind of reverie in which there was no sound at all. The world beyond the shutters faded away. She could hear one of the candles sputtering and hissing as it burned down into the holder.

Then there came another sound, like a footstep. It was inside the room. She couldn't tell where. It seemed behind her, perhaps by the window. But she did not get up. She did not turn around. She merely waited, her mind feverish with joy and anticipation.

Clothing rustled. A shoe scraped on bare floor, then was muffled by carpet.

Nothing stirred within the cage.

"*Beloved Nesta.*" The voice came from behind her.

She let out a startled cry, almost a scream, and lunged for the cage, ripping off the cover. Then she stood, terrified at what she had done, ready to die as she saw that the cage was empty. It was a flimsy thing, the wire bars widely spaced. The little door was missing. Nothing could have ever been impris-

oned in it.

"Beloved Nestra, here I am. Turn around."

A hand touched her shoulder, and she turned around, letting the black covering fall to the floor.

Caradhas held her in his arms, unchanged since the day she had last seen him, for all that he wore no armor. She glanced over her shoulder once. The armor was still standing in the corner.

"No, here I am," he said, and he kissed her and held her very tight, as no ghost or phantom could.

They spoke of many things. They shared the rare wine from the decanter. Once they danced to music they could only hear as they imagined it, and she said, "No, stop; this is foolish."

"Let us be fools then," he said. "You are the greatest lady in the land. Who is to stop you?"

Much later, as they lay side by side in the bed, she knew that she had never been as happy as she was at this moment. She wanted time to stop, here, now, and linger forever. She did not want to go on to mere living day to day. She wanted to be suspended, like a dragonfly in clearest amber.

Grey dawn showed in the crack between the shutters. Somewhere, beyond the garden outside, on the battlements of the inner city, a soldier sounded the long, deep blast which heralded the new day.

Caradhas stirred beside her.

"I have been thinking," she said.

"Do not think. Do not question. Merely accept what your senses tell you. Live in this perfect moment."

She turned to him, startled at how he seemed to know her very thoughts.

"But I must. What will we do tomorrow, and the next day, and the next? How can you have truly returned?"

"Through the art of the Shaper, you see what you see, you hear what you hear. Is this not enough?"

"No. What happens next?"

"For me," he said, "nothing. For you, whatever will happen to you alone."

She had been told once that when a warrior receives a terrible wound in battle, sometimes it is like a light blow at first. The pain does not come at once, and he still may perform one more deed in the brief interval left to him.

In the brief interval, she was able to say, "I do not hear you."

"You hear, you see, you feel," he said. "All these are true things. It is also true that this morning I shall leave you forever. Even the Shaper cannot sustain this miracle forever. That is why I tell you to live only in this moment, before it passes."

She screamed loud and long. She wriggled from his grasp and crawled out

of the bed, dragging her black gown with her, blundering into the table. The wire cage clattered onto the floor.

"You are not my husband!"

She got to her feet and backed away from the bed, clutching the gown in front of her. He rose slowly, taking up a little lamp from the nightstand. His face and chest gleamed almost golden in the faint light.

"I am as you see me."

"What are you? You're something created by his horrible magic."

"I am what you most wanted. The Shaper saw that in your mind."

"No! No! No!" She ran to the suit of armor in the corner, drew out the sword, tried to wield it, dropped her gown, stooped to cover herself, dropped the sword.

He stood over her. He set down the lamp and took her hands in his own very solid, warm hands. They stood in silence. After a moment he let go, picked up her gown, and wrapped it about her gently.

"This is a thing you must understand. The Shaper saw your need. Therefore, he created me."

"What are you?"

"This flesh is not the flesh the mother of Caradhas bore in her womb, if that is what you mean. But my words are his words, and my thoughts are his thoughts. My memories of you are his memories."

"How?"

"Some were drawn out of your memory. You are the true shaper. More than that, the rest of the mystery, comes from the age when the Goddess was yet living, and may not be understood."

"What is the Shaper?" she asked, barely able to form the words. "Is he a god?"

"I think that he, too, is one shaped, out of need. More than that is part of the mystery."

"But you are *not* my husband. This is all a fraud, an illusion. It does not make me content. No, it tears open the wound. Now I am more wretched than ever. I should have known it was impossible. The dead do not return."

"Dearest Nestra, this flesh is not your husband's flesh, but in me his mind has been recreated. His thoughts have returned. The most terrible thing about his death for you was that he went away suddenly, unexpectedly. There was so much the two of you had to say. He had no chance to say goodbye. Now, in a way, he does. My words are his words. Will you listen to them, hear what you hear, and accept them merely as words?"

She broke away from him, ran over to the bed, and sat down, huddling in her black robe.

"I feel like I want to die," she said. "Then I will be with Caradhas."

The lamp went out. He spoke from the darkness.

"These are the words of your husband, Caradhas: I cannot return to you. I merely ask that you remember me, but grieve no longer. You have

mourned for ten years, and still you are young. Your life is before you. You are twenty-nine. I want you to live. Partake of the present, and look to the future. Remember me, but go on. Do not *how* or *why*, but believe that it is truly Caradhas who says this to you."

"I truly believe you," she said.

She wept for a long time, softly, and was vaguely aware that the shutters opened of their own accord. Something whirred by her and out the window, small, fluttering, like a sparrow. As the day brightened, she ceased her weeping, looked up, and saw that she was alone in the room.

A little while later Rilla came timidly in and found her sitting on the edge of the bed, holding the empty cage in her hands.

Lady Nesta slept most of the day, and slept the night alone. But on the following morning she rose, put on her bright gown and her jewelry, called her women together, and went with them, out into the great festival of the City of the Goddess. ●

JASON'S ANSWER

Medea's eyes accuse me of her crimes:
Even when her mouth is silent, it is sullen,
With unspoken words that taste of secret blood
And old lost love.

I am no hero to call the sun to heel —
Paradise is not a place I know —
But I kept my passion and my promise
Until her guilt ate everything I owned.

The sea that swept the Argo past our dreams
And left us in a world of wretched coasts
Where thrones cost more than I could boast to pay
Was kinder than my witch-wife is today.

Still, I will not let her weigh me with her wishes;
I hold my share of shadows and of grief,
And since no soul can suffer for another,
She won't fly free by blaming life on me.

— Ace G. Pilkington

THE FLESH TINKER AND THE LONELIEST MAN

by Ray Aldridge

art: Brad W. Foster

The author informs us that he has been a potter and a stained-glass designer for about fifteen years. He is married and enjoys sailing, gardening, and AI computer art.

His story "Click" was a prizewinner in the Writers of the Future contest, and it was printed in the contest's second anthology. Currently, he is working on a novel and, hopefully, a couple of short stories for Amazing® Stories.

City Nereus drove slowly to the east, over the planetary sea of Cholder.

Diam Gavagol sat at the top of the windward wave wall. Far below his dangling feet, the swell rose and fell, bursting into glowing foam. Countless creatures swam the deep, and a streak of cold fire marked each passage.

He thought again about slipping off into the midnight waters.

Gavagol dropped his head into his hands and rubbed at his eyes.

Later, a pod of mariform humans passed in close formation, sleek bodies touching. He watched, envious, as they capered and leaped, those descendants of the City. A thread of wet laughter drifted up to him.

"A joke!" he shouted down, in his rusty voice. "Tell me the joke."

They paid him no heed, and soon the glimmer of their passage was lost around the curve of the City's vast flank.

He sighed, then reeled in the stickyshock lines he had set, hoping to snare a mermaid. The glittering jelly bangles were the wrong bait, it seemed. The trouble was he didn't have any idea of what the ocean people liked.

Tomorrow night he would try again, with a different bait; he might get lucky.

He meant the merfolk no harm. He had a spacious tank all ready for his visitor. But he just *had* to have someone to talk to. The isolation of the City was driving him mad.

If only they would talk to him, not laugh and swim away. They would learn to like him. He knew it, he just *knew* it.

Morning brought him an hour or two of rest, though his sleep was troubled by the dream. He would find himself floating on a sterile sea, drifting under a motionless sun, too weak to swim. Or he would be frozen helpless to a vast empty sheet of ice, under a cold, starless night. Or he would see himself trekking across an endless plain of dry gravel, too tired to take another



step, but unable to stop.

When he woke, conscience drove him to his desk in the Tower. From the windows that swept the perimeter of the Status Room, Gavagol could see all the City's vast body. A heavy cross-swell, driven by one of the faraway equatorial cyclones, raised spray against the southeast wave wall. In response, the City undulated, a motion just barely perceptible, as the linkages allowed the great blocks of monomol to slip against each other.

The Tower swayed ever so slightly. Down in the City, he knew, the empty halls would be filled with the muffled grinding of the ancient linkages.

He preferred the sounds of the City under strain to the silence of calm weather. It made the City seem almost alive.

On the main board, his fingers danced on the firefly lights. Countless sensors, in every part of the City, gave up their data, and they flowed to the Tower for his tired eyes.

He saw everything.

He observed a decline in the army of barnacle scrubbers that roamed the articulated hull of the City. The City had already opened the autofac that built the scrubbers.

He observed that the stocks of certain metals were below minimum. The City had already opened the vents that led seawater into the extraction facilities.

He observed that a cyclone had wandered north into the temperate belt. The City had already altered course.

The City was a self-regulating mechanism that never really required his intervention, and that was part of the problem. Perhaps a more meaningful job would have lifted some of the burden of loneliness.

It jolted him when he saw the readout from the Maremma. The Spanglewine, a small guesthouse in that ancient quarter, was signaling a tenant. Wine was running from the taps, food from the autocuiz.

Who could it be? In the two of Cholder's long years that he had been aboard the City, no one had come.

Was the visitor a criminal? A slaver?

Of the City's several quarters, the Maremma was Gavagol's least favorite. He hurried through the narrow passages, his hand gripping the stunner in his pocket. Unsettling murals, still bright after a thousand years, writhed on every wall. Bizarre facades dissolved into tiny gardens and once-intimate courtyards, in a riotous jumble that offended Gavagol's sense of order.

The inn ringed one of the City's many yacht basins. Gavagol stopped to stare, astonished. A starboat lay at the quay, moored to the griffin-headed bollards.

Her black hull pitted by unimaginable years, she rolled gently in the lagoon's small surge. The boat was an alien design; no human eye had crafted that faceted cylinder.

He gathered his courage, then he stepped resolutely through the iris into the Spanglewine's taproom.

His hand sweated on the stunner, but he kept it concealed in his pocket. For a moment nothing moved in the pleasant gloom of the room. Then Gavagol heard a scuffling noise coming from behind the pearlstone bar.

"Who's there?" Gavagol asked, eyes straining.

The only reply was a further thrashing, then the sound of shattering glassware.

Gavagol stepped closer. "Here, now," he said, "what are you doing? This is a Trust property. You're not authorized."

An impossibly tall shape slowly rose behind the bar, and Gavagol took an involuntary step back.

"Authorized?" The tall shape had a deep, cold voice. "Authorized? I've been coming here since before the ocean took the Nerians. And who might you be?" The shape wobbled, though there was no trace of drunkenness in the voice.

Gavagol swallowed. "I'm the Watcher here, duly appointed by the Trustees."

The mysterious visitor made a sound remarkably like a senile giggle. Then he came around the end of the bar into the light, walking with a careful, loose-kneed stride.

Gavagol had never seen a human that gave such an ambiguous impression of age. The man carried some of the stigmata of years, a clean-shaven face lined with a million fine wrinkles, a mane of tangled white hair under an antique hat of flame velvet, eyes sunk deep beneath heavy brows. But the man exhibited a flamboyant vitality. His clothes had an archaic style, but a dandish cut. His hands were long and sheathed with smooth muscle. His lips were full, red, and he laughed to reveal strong white teeth.

"Stare! I know I'm an apparition!"

Gavagol's eyes were wide. "I mean no offense."

"Croakery! You burst in here, interrupt my sentimental voyage among the dusty bottles of yestercentury, demand my bona fides, and stare, as if I were a rare menagerie beast. But no matter. Have a drink with me!"

The visitor lifted a square bottle into the light. He shook it with a look of glee. "Come," he said, turning toward a booth in the corner, where a window admitted a beam of pale sunlight.

The man's movements were so certain, so purposeful, that Gavagol was swept along, as if in an eddy of dark water. He settled carefully into the booth, his hand still holding the stunner. The deep-set eyes peered at him, glittering, and Gavagol saw that they were a most unusual magenta.

"You can release the death-grip you have on that weapon," the visitor said pleasantly, flourishing two smeary tumblers. He splashed them half-full of a cloudy celadon liquor and pushed one toward Gavagol. "First, I have no reason to harm you. Second, I'm Shielded. Your health, Watcher!" He

drank with a practiced flourish.

Gavagol drank more cautiously. "I would," he said, "drink to yours if I knew who you were."

The ancient slammed his heavy fist to the table, and the bottle jumped. "What?" he roared in that potent voice. "You pretend not to know me? I, the Flesh Tinker, notorious on every panggalac world?"

Gavagol's mouth dropped open. Did legend sit glaring across the table? He had always dismissed the Flesh Tinker as a traveler's tale. Well, perhaps a colorful delusion gripped this unusual person.

Gavagol adopted a placatory tone. "Oh, I've heard of you, of course, who hasn't? My name, by the way, is Diam Gavagol. Uh, pardon me, but how shall I address you?"

"'Sir' will suffice. Or you can call me Tinker. But never call me Flesh!" The Flesh Tinker leaned across the table, breathing powerful fumes. "I am more than that!" He giggled again, a startling sound in such an otherwise impressive being.

"Well . . . to *your* good health, sir."

They drank again. The cloudy liquor was potent, augmented by some swift hallucinogen, and Gavagol felt the world start to skew. The Flesh Tinker's eyes expanded into huge purple holes in the withered terrain of his face, and Gavagol hastily looked away.

"But," Gavagol said, "you still haven't explained why you're here in City Nereus. The Trustees are somewhat sticky about their rules."

"To Croakery with the Trustees and their rules! I'm here because this is the way I come. Cholder was always an important stop on my circuit, and I'm not one to abandon a profitable tradition, just because all the customers are gone. Besides, after I've spent a day or two roistering in my accustomed haunts, I'll set out over the Indivisible Ocean and drum up a little trade. Eh?"

"The merfolk employ your services? How do they pay?"

"Pay? They pay in the same coin as all my customers. Amusement!" The Flesh Tinker roared with laughter; he sounded like a triumphant predator. Then he fixed those unsettling eyes on Gavagol. "But you, young man, have you no need for my services? Your eyes, are they not a little close-set? I could spread 'em. Your ears are a bit in need of cropping, not so?"

Gavagol felt uneasy. "Your offer is most kind, but I'm satisfied with my appearance."

The Flesh Tinker smiled politely. "As you wish. I force my services on no one. Anyway, there's little enough amusement in nose-bobbing. Though I'm reminded of a time on Pachysand. . . ." But the Flesh Tinker's voice trailed away, and the old man filled the tumblers again.

Gavagol protested. "Much more, and I'll be under this table."

The Flesh Tinker's expression was sly. "Or else you'll start believing me, eh?"

"Oh, no. I mean, I *do* believe you."

"Damn you!" the Flesh Tinker shouted, suddenly wild-eyed. Saliva gleamed at the corners of his mouth. "You think me an ancient dingwilly, rich enough to own a starboat and cunning enough to evade his keepers. Don't deny it, now, or I shall mute you into a night-conger and root you to the floor of the Indivisible Ocean!"

Gavagol's knees rattled together under the table. He could think of nothing to say, so he sat silently, stiff with liquor and fear. Now he *did* believe the old man. He *was* sitting face to face with a legend.

As quickly as it began, the Flesh Tinker's fury was over, and he smiled. "Never mind, young man. You're the only drinking companion to be had in the City. I'll mind my manners." The Flesh Tinker lifted his glass companionably.

Gavagol realized suddenly that, for the first time in the years he had been on Cholder, he wasn't lonely. Frightened, yes, but not lonely.

He drank; he began to talk. The Flesh Tinker listened, nodding, making sounds of interest, pouring when the level of Gavagol's glass fell too close to the tabletop.

He spoke of his job, at first emphasizing the great responsibility he bore to the City and the Trustees. But as he grew drunker, he veered closer to the truth: that he was a useless, but traditional appendage, and that he spent his time observing the City's ability to do without him.

The Flesh Tinker murmured sympathy, and poured.

Gavagol drank some more and started to talk about his insomnia. By degrees, he got around to the loneliness.

"There's no one else here. No one. The City has no self-willed mechanisms, so I don't even have a robot to talk with."

Gavagol wiped a maudlin tear away. "This is silly, but . . . I tried to have a pet once. All the cleaning mechs look the same here, square slabs of monomol with feet. And how can you make a pet out of something you can't tell from all the others? A foolish idea, really, but I thought it might help."

He took another long drink, and his head swam. "I painted its name on its carapace — Ralf I called it. I think it did help; I talked to it and made little messes for it to clean up, and it seemed pleased. Ridiculous, I know.

"But a couple days later it rotated to another part of the City, or the maint-mechs scrubbed the paint off. Anyway, I couldn't find it." Another tear rolled slowly down Gavagol's face.

The Flesh Tinker looked faintly repelled. "A pitiful story, friend Watcher."

"I envy the merfolk, you know," Gavagol rambled on, oblivious. "Whenever I see them, they're swimming together, laughing, playing, making love . . . all together in the sea. A beautiful sight, don't you agree?" His voice was slurred, and his eyes felt impossibly heavy. "In the sea . . . Sometimes I'd give anything to join them." His head tipped forward; he caught himself

with a start and looked up at the Flesh Tinker.

Who was leaning toward him, pinning him with those burning magenta eyes. "Yes . . . you think you might be happy among them, then?"

Gavagol nodded, trying to concentrate through the buzzing distraction of the celadon liquor. "Yes, perhaps. You . . . see no outcasts . . . among the merfolk."

The Flesh Tinker's face was a shimmering blur, but Gavagol thought he saw a flash of sharp white teeth. Perhaps the old man smiled. His head sagged again, and this time it thumped to the table.

His head throbbed painfully. His eyes were crusted shut, and it took long minutes before he could open them.

"What . . ." He trailed off, unable to remember. Why was he lying under this dusty table? He tried to rise, and pain exploded. "Oh . . ." he groaned, clutching at his head as if to prevent it from splitting apart.

After a bit he started to remember, in bits and pieces. The celadon liquor. The alien starboat. The Flesh Tinker.

Despite the pain, Gavagol's mouth curved in a smile. The Flesh Tinker had listened to him.

Then he frowned. Had the Flesh Tinker mentioned a departure date? Gavagol felt an urgency bordering on panic. Oh no, the Flesh Tinker must not be allowed to leave so soon. Must not, must not.

Gavagol staggered to his feet and lurched out of the Spanglewine into the bright day. The light hammered his eyes, and he moaned, but he saw the Flesh Tinker's boat still moored to the quay.

Relief filled him. The Flesh Tinker was still here. Gavagol turned away, rubbing at his temples. He returned through the narrow ways of the Maremma to the Tower, thinking.

The annunciator rang insistently. Gavagol sat still for a moment, wondering if he had done the right thing. But then he straightened his back and made his face as stern as he could. He had a right to companionship, and if he did not get it, he would die. So he believed.

The Flesh Tinker's face, purple with rage, bloomed in the intervid screen. Gavagol drew back. The Flesh Tinker's eyes were crazy, almost smoking with intensity. "What have you done?" The Flesh Tinker roared, teeth bared. "Let me in, or I'll wring your puny neck."

The Flesh Tinker was transformed, and Gavagol saw that his earlier outbursts had been no more than mild annoyance. Gavagol found his voice.

"You don't understand. Please, listen to me. I meant no harm. I just wanted you to stay a little longer. Just a few days more, and then I'll lift the cyclone shell from the basin, and you can go."

The Flesh Tinker's face rippled from the emotion it contained, like a face in a nightmare. His voice was a dry whisper, more terrible than the roar.

"Oh, you will, will you? You'll do me that kindness, will you?"

Gavagol had expected anger, but nothing so deadly as this. "What's a few days to you? It would mean so much to me. Listen, if you'll promise to hear me out, I'll let you up. We can talk this over, surely."

"Oh, yes, yes, let me up. I'll hear you, my word on that." The Flesh Tinker betrayed a horrible eagerness.

Gavagol blinked. He touched the stud that opened the Tower. Below, the blast doors groaned open, and at the same moment, a sudden certainty struck Gavagol, that he had committed a terribly foolish act.

Almost before he could turn away from the screen, he heard the Flesh Tinker behind him, and he had a flashing nightmare vision of the Flesh Tinker, like some swift feral beast, scrambling up the drop shaft. Gavagol shuddered.

The Flesh Tinker stepped lightly toward him, hands hooked into talons, teeth glittering in a smile of anticipation, eyes fiery.

"Wait," Gavagol gasped, terrified. "You said you would hear me."

"And so I will, so I will. You'll be a while dying, and I wouldn't want you to pass away before you lift the shell."

Before the Flesh Tinker could reach him, Gavagol held up his hand and said, in a voice small with terror, "Wait, deadman's switch. Look. . ."

The Flesh Tinker drew back with a hiss of frustration.

Gavagol babbled. "I don't want to do anything unfriendly, but if I let this go, your ship . . . the cyclone shell will invert and mash it flat. You understand?"

"I understand." The cold voice had changed again; it held a great weariness. The Flesh Tinker was abruptly calm. He seated himself across the desk from Gavagol. "Pay no attention to my outbursts, Watcher. I'm an impulsive being."

Gavagol was shaken. Some passing irritation — yes, he had expected that. But not that killing rage. It was fortunate he had taken precautions.

"So, Watcher. What exactly do you want from me? You know, none of this was necessary — I'd have fixed those piggy little eyes without this coercion. Didn't I offer?"

Piggy little eyes? Gavagol lifted his chin. "As I said before, I'm satisfied with my face," he said frostily. "I was only hoping you might spend a few more days here. I didn't mean to make you angry. But I'm lonely, very, very lonely. I had to do something."

The Flesh Tinker showed no sympathy. "Watcher, you've made an error. If you tried to force me to remain here, I would run amok. My emotions are larger than I am — it's one of the drawbacks of living to a great age. So, solve your problem in some other way."

"But, your ship . . ."

"The ship is dear to me, my home for many centuries — still I would grow too angry." The Flesh Tinker laughed. "I could eventually replace the star-

boat. Could you replace your life?"

Gavagol watched the Flesh Tinker. The old man sat quietly enough, but the magenta eyes were icy.

The Flesh Tinker spoke again. "Listen, I have an idea."

The Flesh Tinker was persuasive. Gavagol found the idea irresistible, but he remembered the look on the Flesh Tinker's face when he burst into the Tower.

He decided. "Yes," he said. "I'll accept your offer, with thanks. But just so there's no funny business, remember, the deadman's switch is slaved to my cerebral carrier. Alter my mind, and . . . well, squash."

The Flesh Tinker's nostrils flared, and the hard mouth compressed into a straight line. "Don't worry. I don't like you well enough to fix your mind."

Waking was strange, in darkness and stench. Gavagol flung out his arms, to find that he was confined in a space not much bigger than a coffin. His knuckles rang against metal. The smell was so strong as to be unclassifiable, ancient and organic, like a food locker left uncleaned a thousand years. Gavagol gagged on a scream.

His arms felt *different*. In the blackness, he clutched at his own hands. His fingers were too long and seemed to be hung with bags of flapping membrane, and his *skin* . . . slick, moist, utterly alien.

He opened his mouth to try another scream, but then the regentank's hatch opened. Pressure popped off, and light flooded his eyes. Strong hands took him by the shoulders and slid him out onto a gurney.

He looked up at the Flesh Tinker. The hot magenta eyes were filled with a fierce proprietary pride.

"Just lie still for a bit," the Flesh Tinker said, smiling that predatory smile.

At the first try, Gavagol's voice would not obey him. He swallowed a nasty taste, then tried again. "I feel like death," he croaked.

The Flesh Tinker's face pinched together. "I've done exactly what you asked: given you the sea. And, I remind you, without charge."

Gavagol propped himself on his elbows and looked down his body in fascination.

His skin glistened, a slippery gunmetal gray. The membranes that draped his arms were echoed by those on his legs. His feet were twenty centimeters longer, and the slender toes were tipped by sharp, hooked claws. When he saw that his crotch was too smooth, he whimpered, then he reached down, probing.

The Flesh Tinker laughed, good humor restored. "Not to worry. Internal genitals. You don't want anything vital dangling out in the sea where the wildlife can snap at it, eh? You'll soon get used to it." The Flesh Tinker winked, all his wrinkles bunching up.

Gavagol looked about. The cabin was a jungle of eccentric equipment.

Everywhere touchboards and readout screens hung, glowing with numbers and words in a dozen unfamiliar alphabets. There, a Genchee DNA-synthesizer covered a bulkhead with a shining tangle of plasmapipe. Over there, a phalanx of antique microsurgeons lifted a glittering thicket of manipulators, all blades and hooks and laser barrels. The other womb chambers that lined the bulkheads had crude steel lockwheels welded to them, so human hands could manipulate the alien hatch dogs.

He'd been reborn from an alien womb, saturated with centuries of alien juices. He shuddered.

"What now?" The Flesh Tinker seemed irritated again. "If you didn't want my help, you shouldn't have asked for it." A dangerous glitter filled the Flesh Tinker's eyes. "Are you dissatisfied?" The deep cold voice had dropped half an octave, to a grinding rumble.

The Flesh Tinker loomed over Gavagol, magenta eyes narrow, twitching. Gavagol fell back on the gurney, heart hammering. The moment stretched out interminably.

The Flesh Tinker turned away with a jerk.

Gavagol spoke to the Flesh Tinker's back. "I'm just surprised. But, I forgot to mention . . . I can't swim."

The Flesh tinker turned back to him, still bristling. "What? Now you have the gall to question my workmanship? Naturally, I grew you a custom synaptic linkage; you'll swim like an eel. Do you think me a beginner at this? Who sent the City's people into the Indivisible Ocean?"

The Flesh Tinker seized the gurney's push bar and maneuvered Gavagol out of the womb room. Gavagol clutched at the rails, hampered by the unfamiliar length of his fingers, as the gurney flew along the ancient corridors. "Where do we go now?" Gavagol asked, in plaintive tones.

"I can stand no more of your whining!" the Flesh Tinker said. The gurney slammed to a stop at the lip of the air lock, but Gavagol continued on, flailing out into the open air.

With a huge splash, he dropped into the lagoon.

He struggled in a cloud of bubbles for a moment. Then the new linkage took over, and he shot through the water, quick as a fish.

He gloried in his effortless strength, his new agility, the cool touch of the water on his naked skin. He raced the lagoon from end to end, building enough speed to leap completely from the water. He found that his nostrils closed underwater, like a seal's, and that his lung capacity had increased enough to permit him fifteen-minute dives in comfort.

But then the sun, shining down through the thick clear monomol of the cyclone shell, began to burn his tender new skin, and he slid under the shady lip of the quay.

Floating there, he watched the Flesh Tinker's boat. The lock was shut tight; no movement showed at the row of small ports that lined the hull just above the sponsons.

When dusk came, Gavagol swam slowly out through the personnel lock. Fear stewed with anticipation in the pit of his stomach.

The canal wound among the hull blocks, and then out into the sea along a curving breakwater. The City's movement spun off an eddy of turbulence at the end of the breakwater, and Gavagol tumbled helplessly in it for a moment.

He was over the deep, staring down into the black water. He lifted his head above the water, to see the great flank of the City sliding past.

Panic seized him; the City would leave him behind, alone. He swam strongly in the direction of the City's movement, and the panic dissolved in a burst of silvery-bubbled laughter. In his new body, he could outswim the City easily.

He knifed through the water, trailing phosphorescence, wild with his new abilities.

The cool glow showed only occasionally above the wave tops, and Gavagol thought of the predators that swam the Indivisible Ocean — the huge toothy squool, with its long hook-studded tentacles; the swift venomous saltweasel; the shoals of voracious butcherfish.

He swam for the safety of the City's breakwaters, but they caught him.

Enveloped in a cloud of blue sealight, he became confused. He felt them bumping against him, curious hands prodding his body, then a nip at his shoulder as one of the young ones attempted to taste him.

A chorus of laughter rose from the pod of merfolk as they circled him. "I was afraid you were a school of butcherfish," Gavagol said, trying a smile.

"Oho, we feared that you were a victim of the shimmies," said a big bull who bore the scars of long seasons in the breeding reefs. More laughter. The voice was high and clear; the Standard words carried a clicking, hissing accent.

"The shimmies?"

"Yes, a plague that affects the other jellyfish in the time of the big storms." The big male swam closer; he was smiling, but he snapped his jaws, making a sound like metal striking metal. His eyes glowed brighter than the sealight. "But it's not the time of the storms, is it? And, now, on closer examination, I see that you're not a jellyfish." The bull winked at his pod. "My apologies. What are you?"

An impatient young female who wore a garland of silkshell said, "Come, the Silverbacks will be over Helloever Bank at moonrise. If we're late, they'll start the hunt without us."

The pod broke away from Gavagol, swimming to the north. He started to follow.

The bull twisted in the wake of the pod and came slashing back at him. Gavagol was frightened, but the impact of the heavy body against him was

gentle.

The bull said, "Not you, old human. You stay with the City, suck its tit; that's where you belong. We count our line from the First Turners; our blood has swum the Indivisible Ocean for a thousand years. Get back to your City before the butcherfish smell you; you stink of the tank."

It was too much. He had given up his *body* to join them, and they were rejecting him, so casually. He felt the boiling pressure of rage in his skull. He threw himself at the bull, his jaws open in mindless aggression.

The bull's eyes widened, and he dodged away, but not quickly enough, and Gavagol's teeth sank into the bull's shoulder. The bull screamed, a high thin sound of pain and surprise.

Some calm remote part of Gavagol was equally astonished as he ground his teeth into the hot greasy taste of blood and blubber and ripped at the bull with his claws. Was this another of the Flesh Tinker's installed patterns, this urge to rend flesh?

The bull recovered from his initial surprise and struck back, scoring lines of fiery pain down Gavagol's side. They whirled and ripped and grappled, in a froth of bright phosphorescence. Dimly, Gavagol heard the sounds of the pod, circling them in the darkness, cries of distress, and then fear.

The bull hissed at him, bewildered and angry. "Why, old human? These are dangerous waters. . . ."

He couldn't answer, but the thought of the miles of dark water beneath him chilled his anger. He jerked away from the bull, breathing in great heaving gasps.

Then he heard the warning screams and looked down, to see the Medusa squid rising from the blackness below, drawn by the disturbance and the scent of blood. Its dozens of glowing tentacles swirled, hungry. Gavagol was paralyzed with terror, and it saved him. The bull attempted to flee, and the Medusa shot toward him, attracted to the movement.

Gavagol caught one last glimpse of the bull, struggling feebly against the enwrapping tentacles, as the Medusa dropped back into the depths.

The pod was gone, the ocean empty.

He fled mindlessly back to the City, sobbing with fear.

His only hope was to beg the Flesh Tinker to undo his handiwork.

The ancient was so prickly, so quick to take offense. But what other course was there?

The Flesh Tinker returned to his boat late in the morning, weaving a bit from side to side. Gavagol surged out onto the quay, right at the old man's feet. The Flesh Tinker jumped lightly back, startled. "Ah," said the Flesh Tinker. "Enjoying the water, I see."

"No," Gavagol said, getting awkwardly to his oversized feet. "I need to talk with you."

The Flesh Tinker gestured toward the gangplank. "Come aboard, then.

I'm exalted with drink, and therefore tolerant. To a point." He marched past in a flutter of rich fabric.

Waddling awkwardly on his clumsy feet, Gavagol followed the old man into the boat.

The lounge of the starboat was a museum of ancient eccentricities. Curios from a thousand worlds vied for space with bizarre trophies. Some were fabulous animals, some were aliens, and some appeared to be human. They projected from the monomol surfaces, as if frozen in the act of passing through the walls or falling through the ceiling or rising from the floor. Every dead face was full of surprise, as if this were the last place in the universe it had expected to find itself.

Gavagol sat uncomfortably in a chair covered with intricately tattooed human skin.

"Tell, what's the trouble?" The Flesh Tinker seemed affable. He poured himself a glass of some smoky fluid, but offered none to Gavagol.

Gavagol approached the matter delicately. "Well, you understand I'm not complaining about the job you did. It's wonderful work; the best, I'm sure."

The Flesh Tinker nodded approvingly.

Encouraged, Gavagol went on. "But I'm afraid my . . . request was not well thought out. I mean, the life of a merman seemed wonderful from a distance, from the top of the wave wall. But . . ." He hung his head.

The Flesh Tinker watched him silently for a long moment. "But what, Watcher?"

"Well . . . the merfolk, they wanted nothing to do with me. I was foolish: I tried to force them to take me with them." He went on, slowly. "And a terrible thing happened."

The Flesh Tinker frowned, and Gavagol thought he saw a trace of understanding on the hard old face. "So, Watcher, you want . . . what?"

Gavagol drew a deep breath. "Well, my old body."

"And that's all? You'll extort no other 'request' from me? You'll release my ship?"

Gavagol nodded, eagerly.

The Flesh Tinker stood abruptly. "I'll consider it."

Gavagol was on his feet, teeth bared, a pressure behind his eyes. "Remember, I can squash your ship like a bug . . . I can . . . I . . ."

The Flesh Tinker watched him alertly, the strange magenta eyes deep as the Indivisible Ocean.

A picture rose in Gavagol's mind — the stricken face of the bull as the Medusa pulled him down into the darkness. He felt his anger subside as quickly as it had risen.

"Sorry," he said, humbly. "I thank you for considering." Then he left, waddling out in as dignified a manner as possible.

★ ★ ★

In the Tower, Gavagol watched the Flesh Tinker's strange craft arrow away, leaving a silver wake on the sea. He leaned against the window, his hands pressed to the monomol pane. His human hands. ●

THE PHOTOFINISH: ON ATTENDING A LECTURE AT FERMI LAB

Last night
I attended a physics lecture
on quarks and other atomic things —
made so simple a science moron
who flunked General Science might
understand.

The lecturer
was cute-worded and intriguingly glib,
explaining the SSC and how it would break
science barriers never even fathomed
possible until the construction
of this new accelerator.

But my mind,
never much to begin with, dreamed off
to that unknown date when the last
quark or whatever would be reached
and the final barrier removed
by their scientific priests.

And I saw
this minyan of scientists surrounding
their altared SSC while snapping photos
to prove their point — and there in
this little broken quark would be —
a photofinished God with a smile upon his face.

— Rev. Benedict Auer, O.S.B.

HARD? SCIENCE? FICTION?

by Gregory Benford

LITERARY REVIEW

Gregory Benford is a professor of physics at the University of California, Irvine. He has authored numerous novels, including Timescape, Against Infinity, Artifact, and Heart of the Comet (written in collaboration with David Brin). His last appearance in the pages of Amazing® Stories was "Freezeframe" (May 1987).

Readers both in and outside the science-fiction genre often regard hard science fiction as the core of the field. Fiction based intelligently on the physical sciences can gain a gritty feel that aids suspension of disbelief. To write hard SF, you have to stick to the facts of the universe as we now know them, though you may play with theories as you like.

To many, hard SF seems more true to its assumptions, less wishful, and more "real" than works derived from the social sciences. (What these folk think of fantasy we shan't repeat. . . .)

Understanding why hard SF seems so central leads us into matters of sociology, Zeitgeistery, and political theory. The first volume to attack the question, *Hard Science Fiction*, edited by George Slusser (Southern Illinois University Press), misses the target more often than it hits.

Critics seem edgy about hard SF, creeping up on it by way of metaphor or influence-tracing. They even spend a lot of time puzzling over whether *hard* is an elaborate symbol of masculinity, political metaphor, or even sexual prowess. Critics don't come to it with the intuitive feel of the long-time reader, perhaps especially since they didn't receive training in the physical sciences and have thus missed

a lot of the sociology and lore which underlies the actual literature.

In *Hard Science Fiction* there are attempts to describe what writing the stuff is like, and what we believe our sources are, by Robert Forward and David Brin and me. Often the critics and the writers talk at cross-purposes. Still, this is a valuable look at the most critically neglected subfield we have. The territory hasn't even been mapped yet, never mind exploited. It keeps changing so that what was once thought to be the purest breed (arcane world-building, à la Hal Clement's *Mission of Gravity*) is now a subsection, carried on by such highly technical writers as Robert Forward. And it's even generated a new offshoot, cyberpunk, which just might be a new flavor of hard SF. Therein lies a tale.

About half the short stories now published in English are science fiction or fantasy. There are four annual collections from this trove, more than appear for mainstream short fiction. This year's collection by Gardner Dozois, by far the largest, runs to a quarter of a million words. (*The Year's Best Science Fiction (Third Annual)*, edited by Gardner Dozois, Bluejay, \$10.95, trade paperback.) It provides the broadest spectrum and inevitably,

by trying to include more peaks, must slog through more valleys.

Gardner Dozois is the most fashionable of our genre's editors, his nose held bravely to the shifting winds. He weighs this year's collection heavily with work from the cyberpunk writers, a self-announced group which stresses near-future computer technology and lowlife characters.

Dozois invented the cyberpunk label, and Ellen Datlow, fiction editor at *Omni*, has developed its principal writers. Dozois feels it will grow into a major area of speculative fiction; Datlow, though, seems to have some savvy reservations. Cyberpunk literature typically invests considerable energy in the surfaces of technology, retrofitted into a scruffy future. Cyberpunks often acknowledge the earlier SF of J. G. Ballard, who was also much concerned with the aesthetics of technology.

This may seem narrow ground for an entire movement, and indeed the strains are already beginning to show. "Dogfight" by Michael Swanwick and William Gibson describes an earnest contest between war vets playing a high-tech video arcade game. Despite adroit plotting and compact style, the story never escapes the feeling that arcade games are a worn-out metaphor.

A more substantial novella by Bruce Sterling, the leading writer of cyberpunk manifestoes, depicts a post-oil-boom Third World in "Green Days in Brunei." Sterling understands computer hackers and the uneasy interface of technology and fledgling governments. His hero restlessly tries to introduce robot technology into the sleepy Brunei economy. There are innumerable touches of telling local detail and plausible notions about how the worldwide computer net will intrude into even the farthest

backwater.

This works well until the story's end, when the economic and plot logic crash in an orgy of coincidence. Third World problems of scarce resources, untrained excess labor, and low investment cannot be solved by introducing robots, even if they do build cheap, eco-savvy boats. Sterling's hero vaguely predicts the robots will make a Green Revolution flourish by launching floating greenhouse farms. The whole explanation reads like a half-remembered *CoEvolution Quarterly* article from several years back.

Further, Sterling solves the social problems of bureaucratic inertia by literally sailing away into the sunrise. The tale would have been far more convincing if it had stuck to its cyberpunk pessimism and not tried to solve big problems by sleight of hand. Still, the journey reveals some delightful characters and reminds us that more speculative fiction should look at the nations where most of humanity lives.

This is the retroactive aim of Robert Silverberg's Nebula-winning novella, "Sailing to Byzantium." In the far future a man with curiously vague memory travels from one gaudy city to another. They are all recreations of famous ancient towns, conjured up by an army of intelligent robots. This gives Silverberg ample space to display his considerable descriptive skills, smoothly taking us through the delights of Timbuctoo and Alexandria and New Chicago. An odd side benefit is a sense of our own present diversity and richness.

His flawless, peaceful future society enjoys these arcane places because mankind has finally proved what we all suspect: perfection is boring. Though Silverberg sometimes relaxes and slips into *National Geographic*-style writing, he creates a serene atmo-

sphere that frames his increasingly troubled hero. The pleasant, intriguing climax pleases without supplying the occasional startling voltage that the cyberpunks attempt.

Thus, Dozois's collection is certainly the best-buy, economy-size way to review last year's short fantastic fiction. A shorter, usually higher quality overview is Terry Carr's *Best Science Fiction of the Year*. Dozois does have his finger pressed tightly to the developing pulse of the field, however, and provides lengthy notes about further work you may want to explore.

Is cyberpunk a species of hard SF? Marginally, yes. We've sensed that ever since William Gibson's *Neuromancer* conveyed its gritty fascination with surfaces, signalled by the opening line, "The sky above the port was the color of television, tuned to a dead channel." TV as symbol for numbed reflexes, techno-anomie, pollution, savage commercialism.

There's more of the same in *Count Zero*, and you can find the earlier warm-up exercises in *Burning Chrome* (both from Arbor House, \$15.95). Gibson, like Ballard, concentrates on surfaces as a way of getting at the aesthetic essences of an age. This goes a long way toward telling us why his work has proved popular in England, where the tide for several decades now has been to relish fiction about surfaces and manners, rather than about the more traditional concerns of hard SF: ideas, long perspectives, and content.

Gibson's attack singles out a common assumption in hard SF: that technodazzle will be the principal determinant in our future environment. The ground of method is to concentrate (as Stephen King does when he calls up his teenage rock-and-

Chevy arcadia) on brand names galore, memorabilia . . . and ladle in outré fashions, hard-edged mannerisms, scruffy street punks, and cheap hustlers.

There actually isn't much about computers in these two books, beyond brand names, and often the plot is standard pulp. How come? Because the other agent in Gibson's mix is the hard-boiled detective milieu. What he has achieved is a wedding of future symbology and the style of *film noir*.

Does this work? Sometimes. If you've been reading Raymond Chandler and chance upon Gibson, you'll see the origins, but you'll miss a lot of Chandler's movement and depth and period freshness. Gibson has labored mightily on his style and uses it to carry scenes which could have worked better if he had a deeper understanding of both character and situation. His three protagonists in *Count Zero* (and *Neuromancer*'s Case, an exaggerated and ultimately uninteresting hard case) get blind-sided by events. This is indeed how violence can happen, particularly with rapid modern weapons, but it fails to build tension through a scene and then effectively release it — the crucial job of an adventure writer.

There's a deeper issue, too. The "high hard-boiled" detective novel of Chandler and Ross Macdonald was about the moral underpinnings of modern urban life in a capitalist democracy. The subgenre became interesting because it was a new way of confronting and depicting the inevitable tradeoffs. Gibson and the cyberpunks haven't attained this dimension, and it seems apparent now that they probably won't — to them, mannerism reigns.

Fred Pohl did as acerbic a stiletto job on capitalism as anyone could wish

in SF, long ago. So far the cyberpunks lack his astringent vision, and often opt for mere sentimentalism. Of course, Gibson knows this, though he's found no way out, and occasionally seems to acknowledge it. The last sentence of his first novel, *Neuromancer*, is "He never saw Molly again." Chandler's first novel, *The Big Sleep*, concludes, "All they did was make me think of Silver-Wig, and I never saw her again." Personally, I'd rather not see that line again.

Chandler contrasted the moral Marlowe against a seamy California. *Neuromancer* lacks heft finally because it admits no more than a surface reading. *Count Zero* manages marginally better, but its essential problem is that, unlike traditional hard SF, it has little of the grand perspective we relish. Its dimensions come from immediate, near-future technology. This accounts for much of its flavor and value because we've lately had few novels which confront the broad features of the near future. We need more of them. Gibson's *film noir* virtues of tone necessarily narrow him to a small scale and limit his characters to a gallery of grotesques.

Throughout Gibson's short stories and novels, there runs the aesthetic first seen in the film, *Bladerunner*. There the Philip Marlowe heritage was used with atrocious ham-fisted effect (the voice-over which ploddingly tells you plot frame in a weary, jaded tone), but the glitz worked. Best to watch it with the sound off. Unfortunately, there's no parallel way to read a book, other than by not thinking while your eyes scan. There are parts of *Count Zero* which echo *Neuromancer's* odd inertia, a static quality of staring precisely at one object after another without anything more than a spectator's eye.

Literature finally demands involvement.

It will come as a surprise to some, reading *Mirrorshades*, *The Cyberpunk Anthology* (Arbor House again, edited by Bruce Sterling), that Gibson apparently belongs to a "movement" — since, surprise, here is its manifesto. The surprise comes from seeing how little these writers have to do with each other.

"Technology is visceral," Sterling says in his preface. "Not for us the giant steam-snorting wonders of the past: the Hoover Dam, the Empire State Building, the nuclear power plant. Eighties tech sticks to the skin, responds to the touch: the personal computer, the Sony Walkman, the portable telephone, the soft contact lens." Other signatures are "‘crammed’ prose: rapid, dizzying bursts of novel information, sensory overload that submerges the reader in the literary equivalent of the hard-rock ‘wall of sound.’"

Some of the stories in this anthology do try to teach old dogmas new tricks, but likewise some don't seem to have tumbled to the fact that it's been a while since anybody wrote about the Hoover Dam. Marc Laidlaw's "400 Boys" is a colorfully told fantasy of urban violence, all punk but no cyber. Greg Bear's "Petra" is urban horror, neither punk nor cyber. James Patrick Kelley's "Solstice" reads like an edgy story written by Ed Bryant fifteen years ago: jet-set *ennui*. Tom Maddox's "Snake Eyes" succeeds reasonably enough with a fairly standard story which could have been published thirty years ago, offering a sheen of hyped-up prose that does (as promised) ricochet off polished surfaces. "Tales of Houdini" is an I'll-top-that-one jape by Rudy Rucker, who has all the cited

trademarks of a cyberpunk — but you couldn't prove it with this story, since it's just a tall tale.

I found most astonishing in this collection not the stories, but the assumption that much about them is fresh. Gibson's least interesting story, "The Gernsback Continuum," stands alongside "Red Star, Winter Orbit" by Sterling and Gibson — showing what happens to Gibson's kinetic style when it's loaded down with background material cribbed from James Oberg's books about the Soviet space program. The result is an *Analog*-feeling story without the verve we expect of either author separately.

And this leads on to the appropriately placed last story, "Mozart in Mirrorshades," by Sterling and Lewis Shiner. It comes over as parody of a form which is supposedly just being born, making the root assumptions (nasty old capitalism will exploit everything, debase Mozart, atomize experience, etc.) sound like ideas shouted down an elevator shaft.

What we have here, folks, is a marketing strategy masquerading as a literary movement. Most of the attention paid to cyberpunk comes from Gibson's sound contributions and Bruce Sterling's manifestoes, wherein he sounds nickel-plated clarion calls and comes over as Bruce Brassy. ("Roused from its hibernation, SF is lurching from its cave into the bright sunlight of the modern Zeitgeist. And we are lean and hungry and not in the best of tempers. From now on things are going to be different." This from his introduction to *Burning Chrome*.)

Yet Sterling is a sound writer of considerable range, the last person you'd expect to steamroller writers into a bland, doughy movement.

What *do* these writers have in common? Stylish Gibson, wide-ranging

frazzled Sterling, liberal and literary Kim Stanley Robinson, true-punk Shirley, inventive Laidlaw, able Lewis Shiner — all promising and productive and interesting because of their differences, not their similarities. I see no great commonality of vision. Be-dazzled by technoglit, sure; maybe showing some preference for ravaged landscapes — but this also links them with plenty of other SF writers.

I think we'll appreciate the writers who come to their strengths in the 1980s more if we see them as unique visionaries, and not try to box them in before they've hit their stride.

Even if you grant the existence of a certified subgroup called cyberpunks, how does Greg Bear get included? Most of the list-makers busy handing out signet rings and practicing secret handshakes want to enlist Bear because he's good . . . and he wrote *Blood Music* (Ace, \$2.95).

That must be why Bruce Sterling included "Petra," a fantasy about gargoyles, in his collection. For otherwise Bear is a very *Analogy* type, solid and rather systematic, with few stylistic flourishes which don't have assignable motives in the content of the text. He does his homework and thinks about it, rather than copy notions from Alvin Toffler's *The Third Wave*. His recent big success, *Eon*, reminds us more of his father-in-law, Poul Anderson, than of Bester and Ballard.

Blood Music, though, takes an idea already in the scientific literature — what if we could encode information directly into cells, making DNA the template for fast data processing? — and runs with it. Cells interact speedily. Evolution among them zips along. Smart blood starts getting interested in higher matters. And pretty soon our

world disappears up its own assumptions.

It's a nifty notion, powerful enough to make the first half of *Blood Music* pound in your ears. However, as clever little cells take over the world, Bear succumbs to a prevailing temptation of hard SF writers: the transcendent blowout finish. Olaf Stapledon is the grandfather of this, writing books which immediately sweep us into huge vistas and remorseless astronomical perspectives of time and space. (Try *Last and First Men* or *Star Maker*.)

Arthur C. Clarke saw that a hard-science, linear tale of rising expectations could be resolved by the transcendent blowout, and first used it in *Childhood's End*. His success at this (and a similar one later in *2001: A Space Odyssey*) led many to believe that this was a keen way to tie up threads and get the reader off. Economical, too.

It's now a debased coinage, though. Not that the effect can't be gotten again — nothing truly wears out forever in literature — but it has become like that Chanderlesque ending, "I never saw X again" — yawn-provoking if obvious. And devastatingly unworkable if it's literally transcendent, as John Varley proved in constructing the ending of his *Millennium*. There, God Himself steps in and settles accounts, making good all the checks which Varley has been cashing all over town.

Greg Bear goes for the *ad astra* solution. Man and his biosphere cease to exist as such, and everything proceeds beyond our mere mortal understanding. Clarke's *Childhood's End* had humanity stream upward and outward to the enveloping stars, etc., etc. The reason Clarke's solution worked lay in the groundwork. Clarke plainly has in that novel a clear distaste for the body and its processes. (Kubrick certainly

caught this and used it to good effect in the sterile surfaces and life-as-chemistry feel of *2001*.) Liberation from the body is true salvation, a place where intellects can think cosmic thoughts and construct elegant philosophical arabesques, without perpetually processing (ugh!) moist ol' matter.

This is precisely why, for me, Bear's *Blood Music* blowout doesn't work. He doesn't despise the messy state of the body, and every sentence of the novel says so. His final cellular liberation doesn't have the emotional heft and surge of Clarke's. The novel still works, but less well than it could have.

Clarke himself has clearly seen this long before, and in *The Songs of Distant Earth* (Del Rey, \$17.95) maintains a stately narrative hewing rigidly to hard SF constraints. Faster than light is a remarkable convenience, allowing us authors to zip among stars and even whole galaxies with the drop of a semicolon. Time travel — which is implied by faster than light, incidentally — is another seductive temptation for even the hardest SF writer.

Nature is not so obliging. I don't believe in faster-than-light travel, really (though I've used it) — and neither does Clarke. He shows in this novel just how hard it is to get to the nearby stars, even given a new reaction engine based on as-yet-undiscovered energy stored in quantum vacuum fluctuations.

Constraint often lends hard SF its charm and power, and that's the case here. Time and space are vast and we are small, this book says, and yet we can be noble in our clear-eyed facing of such seeming absolutes.

Clarke has never been a dramatic writer. He pulls some punches and underplays many scenes which could do with a tad more brisk pacing or hormonal surge.

But in this tale of the arrival of a spaceship at a distant colony, its crew's momentary and melancholy connection with the colonists, and the inevitable departure, he attains a quiet movement and genuine emotion. It is not his best work, but it speaks with unassuming intelligence, some clever and amusing ideas. He is perhaps our purest hard SF writer, and he continually reminds us of the deep issues we should, as SF writers, address in the fullness they demand.

The Second Creation: Makers of the Revolution in Twentieth-Century Physics by Robert P. Crease and Charles C. Mann (Macmillan Publishing Company, \$25) is the real thing: science without fiction.

It abounds with deep issues, but unlike any other book about science you ever read, it has a great in-the-lab feel, and a certain science-fictional *frisson*. Fred Hoyle gave a new slant to hard SF thirty years ago with *The Black Cloud*, showing how scientists work against a fantastic backdrop. This book has a curious feel of being a cousin, for some of the ideas seem equally bizarre.

If physics can be said to have a Holy Grail, it is Unification. This book adroitly depicts both the abstruse and the human side of modern particle physics, blending lucid description with gossipy verve.

Unification seeks a "theory of everything" — why matter has its present form and why the universe is as we find it. Physicists have always felt the impulse to knit up the world with a single, simple, elegant thread. "Newton's recognition that the force that made apples fall was identical to the force that kept the earth in its orbit was a Unification, as was the approximately contemporaneous realization

that lightning, static electricity, and St. Elmo's fire were all manifestations of one phenomenon: electricity."

Later, James Clerk Maxwell showed that oscillating electric and magnetic fields in wires radiated waves which moved at precisely the speed of light. This unified circuitry and the spectrum we see, two seemingly different phenomena. The thrill of discovery that brought is akin to the sensation good SF tries to evoke: the strangeness and beauty of the world.

Lofty aims do not rule out a warts-and-all attention to how physicists work. The book abounds in tales of intense rivalry, cutting criticism, and rueful failure. As Freeman Dyson has said, "The ground of physics is littered with the corpses of unified theories." Einstein ruminated on a theory uniting gravity with particle physics, following a blind alley for his final decades.

Crease and Mann are able to pick their way through the thicket of abstractions by perceptive, well-timed analogies and visual pictures. They report the many spectacular failures of the last century along with the triumphs, never neglecting the delicious gossip:

Heisenberg launched . . . a unified field theory that started as a collaboration with Pauli. When Pauli withdrew, Heisenberg pressed on. To Pauli's fury, Heisenberg claimed during a radio broadcast in February 1958 that a unified Heisenberg-Pauli theory was imminent, and only a few small technicalities remained to be worked out. . . . Pauli responded by mailing his friends a letter consisting of a blank rectangle, drawn in pencil, with the caption: "This is to show the world that I can paint like Titian. Only

technical details are missing.”

Yet great progress has come in the past twenty years. Electromagnetism was unified with the nuclear weak interaction, showing them to be two faces of the same coin. Now the quest pushes on to higher energy particles, which means that the implications for cosmology reach farther back in time, to when the universe was compact and far hotter. This is truly the final problem, though it deals with initial instants, when “matter and energy were one . . . at the dawn of time, in the ravening fire of the Big Bang. Thus the phenomena they seek to describe existed only at unimaginable energies that can never be reproduced in the laboratory. Experiment consequently seems almost hopeless.”

This does not deter the particle physics community from pressing for a new, giant accelerator to push on to still-higher energies. The superconducting collider would use superconducting magnets to ram beams of particles into each other. This accelerator would be fifty miles in circumference and cost about \$4 billion — a huge fraction of the science budget.

The physics community seems divided about the utility of this machine and whether it would in fact settle any truly fundamental issues. The major budget battle in the scientific community now looming is competition between the superconducting collider and funding for the space station. In a way, it is a contest between two different frontiers of discovery.

While space is an infinite frontier, the prospect of a final Unification may close the heroic era of particle physics. As long ago as the 1920s, theorists forecast “the end of physics as we know it within six months.” Many

hold that a complete theory would mean that science would continue, but “all of the fundamental questions that physics can pose would have been answered, and our knowledge of force and matter would henceforth change only in particulars and not in outline.”

Such hubris will probably go untested because there are serious doubts about whether we can ever do experiments at high enough energy, or observations of the large-scale universe in enough detail, to ever confirm or deny the candidate unified theories. Once the supreme empirical science, physics could then become mere “recreational mathematical theology,” telling us in the end more about ourselves than it does about nature.

What is more, this book is shaped toward a special definition of what is fundamental. Basically, it assumes that once we know the forces between particles, and find a mathematical expression which generates their properties from some general assumptions, the program of physics is over.

Yet many profound philosophical questions stem from the gritty particulars of the universe, not just the building blocks. (Is life an *unavoidable* outcome of complicated processes? How prevalent is it? Does intelligence inevitably arise?) It is as though a gourmet maintained that what matters in a meal is the raw ingredients, not how they are to be cooked and savored.

For example, we’ve known the laws of mechanics and electromagnetism for a century, but we still cannot describe the deep dynamics of our own sun, whose conditions determine whether life is possible on planets like ours. Plasma physics, which seeks to understand the interaction of highly energetic matter such as the sun, is in its infancy. Some theorists have seriously

proposed that life in the form of plasma beings may be possible. If so, this raises fundamental questions unrelated to Unification theories. The position of life itself in the universe depends on complex interactions, not just basic pieces.

Then too, even the grail of Unification will not solve the genuine riddles of how quantum truths impinge on mortal consciousness. One thing SF has done better, and more complexly, than the mainstream is confront the philosophical puzzles of modern physics. The founding emblem of SF is the rocket, a totem pointing outward to larger scales and grand adventures. Our unique problem was and is how to make the slow, vast scales of modern science act on the human-sized stage so vital to living fiction. Yet the opposite is also true: quantum mechanics affects microscopic events, and propelling it to our human-size center stage involves difficult dramatic strategies.

A much-mined way is the use of the alternate universe interpretation of quantum events. This appears in as varied works as Phil Dick's *Ubik*, Fred Pohl's *The Coming of the Quantum Cats*, and my own *Timescape*. Alternate universes are fun and terribly handy, though their fashion is waning in physics and such universes are probably not allowable in newer theories (see, for example, John Cramer's remarkable "The Transactional Interpretation of Quantum Mechanics" in

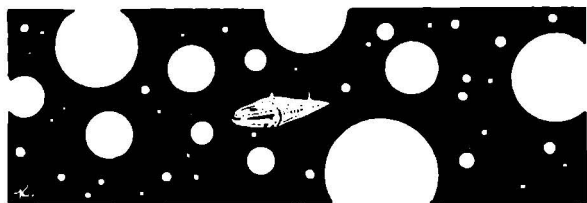
the *Review of Modern Physics*, 1986).

Making particle physics matter dramatically is even harder. Paul Preuss's *Broken Symmetries* does it with a fully realized setting in a new accelerator. Asimov's *The Gods Themselves* used a parallel universe in which the nuclear force was stronger. My own *Artifact* makes the particles come to us, by invoking the recent models in which quantum interaction lengths are kilometers, not microAngstroms. I think many SF writers aim to give the reader a sense of discovery which is more approachable than the rather dry offerings of the science magazines. That's a worthwhile goal.

And what of SF if a unified theory appears? Will we want for material? Perhaps some of our wilder speculations will have to 'fess up to being fantasy. But there will still be lots of room for inventive ideas on all scales from the microscopic to the cosmological. We writers face no unemployment crisis.

And Unification asks questions as deep as one could like. Very science-fictional riddles indeed. Will matter itself last? ("Are diamonds forever?") What happened on the far side of the Big Bang? One suspects the joy of asking may be more lasting and important than the problematic answers.

Hard SF is a way for us to participate in that joy and follow the grand adventure of our age. Science is too important to be left to the scientists. ●



THROUGH TIME & SPACE WITH FERDINAND FEGHOOT I

by Grendel Briarton
art: Roger Raupp



Once while playing the Scrabble® game, Grendel Briarton randomly selected the letters: E, F, G, H, O, O, and T. What — or rather, who — emerged from said combination of letters has already been documented in these pages.

"I'm terribly worried, Ferdinand Feghoot," sighed Ronald Reagan during the last week of his presidency. "The minute I'm out of the White House, Congress is going hog-wild. Spend, spend, spend! Where will the money come from?"

"Never fear," said Feghoot. "By 1991, genetic engineering will have solved the whole problem."

"Do you mean by changing the people?"

"Not at all. By growing completely new trees — leafless, burgeoning with Federal Reserve notes in every denomination."

"Come, come!" Reagan protested. "Money doesn't grow on trees!"

Feghoot smiled. "Just let me get to my time shuttle."

In eight hours, he returned, bearing what looked like a small maple tree, except that instead of leaves it was covered with hundred-dollar bills.

"There you are!" he announced. "Each with its own serial number. There'll be an unending harvest to divvy up with every branch of the government."

"It's a miracle!" Reagan cried. "What will they call it?"

"It will be known," said Ferdinand Feghoot, "as the great dividend, Ron."

**THE ENGINE OF SAMOSET ERASTUS HALE
AND ONE OTHER, UNKNOWN**
by Avram Davidson
art: George Barr



Avram Davidson is the author of 21 books, including the novel The Phoenix and the Mirror and the collection Or All the Seas with Oysters. He has edited 4 books, as well. His short fiction has recently appeared in Amazing® Stories, Ellery Queen's Mystery Magazine, Isaac Asimov's Science Fiction Magazine, and Night Cry.

His current projects include a novel to appear in 1987, Vergil in Averno, and a collaboration with Grania Davis entitled Marco Polo and the Sleeping Beauty.

The Witness [H. Nickerson, accused]: Debts which I had first incurred in order to keep my family whilst I was at sea a-hunting parmacety whales. Which trade I wish to my Redeemer I had never left off, nor settled ashore into another.

The Coroner [Mr. Salathiel Adams]: Best leave off such vain wishings. Where be my notes. Now, in regard to an electrical or magnetical engine of sorts. You worked on it.

Nickerson: Yes. He called it a radiating engine or such.

Coroner Adams: The deceased freeholder was the sole inventor?

Nickerson: He and one other. I don't know the other.

Coroner: You merely performed mechanical work upon it as directed by the Deceased?

Nickerson: Yes.

Mr. Saltonstall, the First Selectman: Had it been told you by the Deceased that he believed the said invention or engine might be of considerable use to this Nation in the event of a pretended dissolution of our Federal Union —

Mr. Quincy Slocumb, the Second Selectman: Which must and will be preserved.

The Jury and Sundry Others Present: Hear, hear! Huzzah! et cetera.

First Selectman: A secession. Had you?

Nickerson: Yes. He said something about sending intelligence. Communications, an audible semaphory. Whatever that be. I didn't much reckon what he meant. A trumpety music-box sort of thing, I reckoned it. The Negro pumped it like a church organ. I sot the fire to hide my traces.

Second Selectman: Were you prompted by those in favor of dissolving the Union?

Nickerson: No, no. I have never sot my hands to commit sedition nor treason.

Coroner [Mr. Adams]: Then how come you to set your hands to commit a crime as most would say be almost as bad?

Nickerson (after some silence): Not having the fear of God before my eyes, I was seduced and instigated by the Devil.

*from Records of the Township of Tusquokum,
100th Folio, 2nd Series, 1861 (2nd Quarter)*

Samoset Erastus Hale stood at his window. The weather vane was still and so was the strip of muslin which served as gage for lesser and more trifling breezes. Hale made a very slight sound. In weaker men it might have been a grunt; in far weaker ones, an oath.

"Esau," he called. "Esau, Esau." Gradually his voice rose. Stopped.

"Why, what is the matter with you, Esau," a female voice asked below. "Don't you hear Professor Hale a-calling of you? Why bain't you already in his cabinet, or 'office' as some will say it? Esau? What? What? Why no, it is not neither the hour for midday meal, it lacks a full quarter-hour thereof,

and you may be certain, Esau Freeman, that I will give you no midday meal if you do not get body, boots, and breeches up the back stair directly. Go, now!"

Feet were heard, laggingly ascending. Esau stood at the stairhead by and by, with hands at sides and lower lip outthrust.

"Time passes," said Professor Hale. "Time passes. To work, Esau. Connect the wires to the lightning rod, as thee calls it. Good. Pump the engine, now. Pump the engine."

"Some people think that I am a mere beast of burden," Esau said. "I say, some people thinks I be a mere beast of burden. Am I not also a man and a brother? I asks, am I not also a man and a brother? I asks —"

Professor Hale's features did not shift. "Thee is not a mere beast of burden," he said. "Thee is also a man and a brother, Esau Freeman. And as a man and a brother, thee must work. Also. Does thee not see that there is no breath of air to turn the windmill? Does thee not see that I am twisted with age and infirmity? Does thee not know this, without seeing? Get thee to the pump, Esau Freeman."

"Directly."

Nothing in the back room where Professor Hale had his engine was in the least gaudy or worldly; everything was solidly wrought and of the best substance, though some of his natural history equipment was certainly most curious. Hale thrust out his stick and opened the double doors of the large polished maple-wood box which housed the mysterious engine; the engine itself, behind the doors, was concealed by a stretched-taut cloth on the face of which was embroidered, THERE IS NO SPEECH NOR LANGUAGE WHERE THEIR VOICE IS NOT HEARD. A creaking sound began, died away.

"I doesn't *like* this work," Esau said. "I ben't *used* to it. I doesn't *like* them huge cylinders as drips acid sometimes. I doesn't *like* them spook voices. I doesn't *like* —"

Hale's gnarled hands moved on his walking stick. "Thee will become used to it if thee does thy duty as befits a man, Friend Freeman. And as for *like*, why, what has *like* to do with life? Has thee not heard Professor Longfellow say with his own lips that life is real, life is earnest? I swear no oath, as thee well knows, but I assure thee, Esau, that if thee does not directly commence to pump I shall directly commence to prod thee with my walking stick, even as my own father did me, for my own good, when I dalled, which was not often. Pump."

In the cabinet, or office, the bitter reek of chemical substances mingled with the smell of furniture polish, the scent of slightly damp wood and slightly damp plaster, the smoke from the Franklin stove, and a whiff of cinnamon and clove from the downstairs kitchen of Emma Coolidge, who was baking the pie for tomorrow's breakfast.

Esau's mutters continued, but so did his pumping. By and by a crackling sound came from behind the taut embroidered cloth. Samoset Erastus Hale

took out his pocket watch, looked at the grandfather clock in the corner. A small bell sounded, somewhere else.

"I wun't *do* it! I wun't *do* it! I be afeard of this irradiator magnet ingine."

Hale's time-carved face moved slightly from side to side. "Thee speaks as one of the foolish people, not as one to whom I have given my word that he shall have my second-best broadcloth coat this coming First Day if he continue to work well. Continue pumping. Thee is working well. I am proud of thee."

Suddenly a burst of melody, as though from a Swiss music box, was heard behind the cloth covering of the great maple-wood chest-front on its sturdy legs. Esau gave a squeak of fear, thrust his head out from the other side of the strange engine. His eyes stared imploringly. But Professor Hale was looking at his watch. All at once a pair of voices were heard singing. As though automatically, Esau's lips began to move. Slowly his head withdrew. His voice was now blended with those of the others, as they hailed Columbia, Happy Land.

A moment after the song ceased a voice began to speak. "The President had audience this morning with the retiring Minister of the Two Sicilies," it said. ("Popery," said Hale. "Tyranny.") "The President had audience this morning with Chief Red Fox of the Pashimauk Nation and with Captains Bobcat, Several Spots, and Medicine Wolf of the Up-River Tacsabac Nation. The President presented the Indian Allies with the customary silver medallions, and assured them —"

"Stuff," said Hale. "Graven images. Shining baubles. Gew gaws. What of their *souls*, Friend President? What of them, I say?"

"I says so, too, but another thing I doesn't like is that them voices is never respectable, they never gives you a civil answer no matter what you may ask, Friend Professor Hale, does —"

"... first-chop hyson is down one cent," the voice declared. "First-chop first gunpowder stays stable at four and one-half cents. At the haymarket, well-cured hay is down one quarter of one cent, with sufficient supplies coming in from the country districts. Sassafras continues strong, as does summer-strained whale oil at one dollar, with winter-strained oil asked for at one dollar and a quarter of a dollar but not available. Sea-island cottons including nankeen or slave-cotton —"

Samoset Erastus Hale's hands again shifted on his cane. "'... no man might buy or sell, save he that had the mark, or the name of the beast, or the number of his name,'" he murmured.

Esau implored, "Oh, Friend Samoset Erastus, *please* don't talk mention of the number of the beast, for it —"

Implacably the other voice continued, "In Richmond, prime men field hands fetch \$1100 as per report of the magnetic telegraph, while the same fetch \$1300 in Montgomery. In New Orleans —"

Esau said nothing whatsoever, but Professor Hale said "'My heart shall

cry out for Moab; his fugitives shall flee unto Zoar.' ”

By and by the voice stopped speaking. A throat was cleared. Then the voice, in a different tone, said, “That’s all on the paper.”

Another and an older, a much older and much weaker, voice said, “Then that is all for today.”

“Then I’ll have my dollar.”

“I am getting it, Mr. Booth. Be patient.”

“Patient? I think I am patient. I come here three times a week and sometimes there is a brief dramatic recitation and sometimes we accompany the music box in a song and whatever you have written I always read into the pipe, very patiently, but I’m blamed if I understand.”

Was there a sigh from . . . somewhere? “The time will come, sir, when I trust you will understand. In the meanwhile, you are not being paid because you understand but because you have a strong, clear voice, as befits an actor. And here is the dollar. Thank you. I will see you on Monday.”

“Monday.”

A door was closed, but not in Professor Hale’s back room. The very old voice said, and it was difficult to hear it against the background of crackling sound, “Professor Hale, if you are listening, kindly note the time and quality of the speaking.”

Professor Hale was already noting it in a small, leather-bound book. After a moment or so the very old voice resumed speaking. Hale leaned close and cupped his ear. “In two weeks I hope to take the train of cars and meet you in Philadelphia, as planned. We have much to discuss. I am not feeling well these days, not at all, but I trust that a merciful Providence will spare us both to complete the work on the irradiodiffusion machine, as I am increasingly confident it may be of much service to our nation in the dark times ahead which I foresee. Though you may not agree.”

Hale said (to whom? perhaps to Esau) that he did agree, indeed. But still hoped the machine would be used “Mainly for spreading the Gospel of the Peaceable Kingdom, as well as for mercantile intelligence, especially for such as dwell where there is no telegraph office.”

The old voice spoke for about a half-minute more, but it was no longer possible to make out more than a word here and there through the continuous crackling sound. “Needs more work,” Hale said. “Needs more work. Must speak to Mechanic Nickerson when he comes with my money.” As he finished saying this, a sound came clearly over and through the crackle, as though a small signal-bell had been struck.

“Can I stop pumping now, Friend Sir?”

“Thee may stop now, Friend Esau.” A sigh of more than mere relief came from behind the big box on legs, and Esau stepped forward. “Thee has done well, Friend Freeman, and may go to get thy midday meal, not forgetting that tonight is a school night.” Samoset Erastus Hale had stipulated that his hired boy must continue in learning as a condition of employment; one

third of the expense he bore himself, one third came from Esau's wage, and the Whipple school discounted one third more. Esau declared later that Hale had said nothing more on that occasion. More concerning this entire conversation, later.

(The entire conversation has been principally reconstructed, though with difficulty, from the evidence — some of it hearsay — subsequently provided by Schoolmaster Dwight Whipple and his two sons, as well as from Esau's own testimony, though, of course, Emma Coolidge was not silent.)

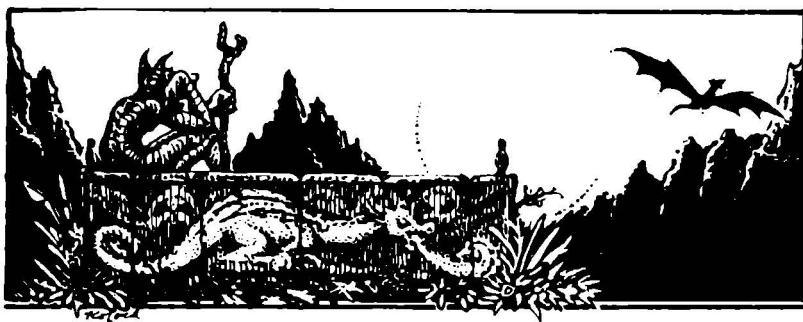
Esau declared later that Hale had said nothing more on that occasion. Hale, to be sure — Someone came and visited Hale that night and quarreled about a debt and when someone left Hale did not leave with him. No eye saw for a while what else was left behind as it crept here and there, silently and uncertainly at first, then leaping forward with a great roar. The papers, purposely scattered, went first, then the well-polished furniture and the philosophical equipment and then the walls and floors. No one saw vanish into flames the sampler-like embroidery with the citation from the Psalms which covered the front of the engine behind its paneled doors, and no one saw the melting of the copper wiring and the aerial rod perhaps (though who can say more than *perhaps*. . . ?) not intended entirely to deflect lightning; no one saw the liquefaction of the battery of large cylinders and their zinc plates, and no one saw the acid vaporize. Every tangible evidence of what the engine, the "sending intelligence," the "audible semaphory" and "trumpery music-box sort of thing," "irradiator magnet engine" and "irradiodiffusion machine" — every tangible evidence of what the singular-sounding device might really have been — was gone in the immense conflagration which brought fire fighters from ten townships roundabout. Details are to be found in the document entitled *Office of the Coroner of the County of Mitchingham: Inquisition into the Death of Samoset Erastus Hale, a freeholder in said County*.

It was well for Esau Freeman that he had spent the entire evening at the Whipple school, as it was far from well for Hannibal Nickerson, Mechanic of Tusquokum Township, that he had (as was well-proven) called that same night upon Samoset E. Hale in the matter of the overdue note for one hundred and thirteen dollars. Nickerson wanted this extended. Hale declined. Nickerson showed a proper and edifying repentance before he was hanged, but the records do not show that he said, or was asked to say, much about the curious "magnetical irradiofusion machine" destroyed in the fire he admitted setting.

The question of the identity of the "one other" still remains "unknown." Both Professor Bell and Mr. Edison have recently [1883 — Ed.], and entirely independently, made investigations, but have not been able to find whomever it may have been in Washington City and with whom S. E. Hale was concerned in the perhaps joint invention. Still, we must ask ourselves, Who *was* this person of mystery, allegedly there at that time? A fragment

from the correspondence of General W. Scott refers to "Cranky old Smith and his talk of Message Injines to run without wires," but as the facts seems to be that there can be no such engine, the reports purporting to describe one man or one hundred men can after all be nothing but phantasies, however ascribed, and it is vain, were it possible, to seek for any "Smith" among multitudes. What we have collected and placed in apparent order here must be a fiction, tastefully tricked out to while away the dull night moments when the outside world cannot divert.

It is certainly true that some doubt has been cast upon parts of the testimony of both the hired man Esau Freeman and the housekeeper Emma Coolidge, these parts seeming (until not long ago) so very improbable, even phantastical; but it is unlikely that anything further will ever be learned. Emma Coolidge was drowned at sea six months later whilst returning from a visit to Nantucket. Esau Freeman (who it will be remembered was not subject to the draft) fell in an attack by Rebel sharpshooters upon United States Colored Troops in the course of a nameless skirmish somewhere in the Carolinas during the year 1865, in the month of April. May the dogwood and the crepe myrtle gently drop their fragrant flowers upon his grave. ●



Kleinisms

A pilot's right arm is the only reliable power supply in an airplane.

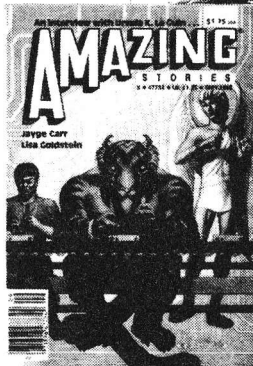
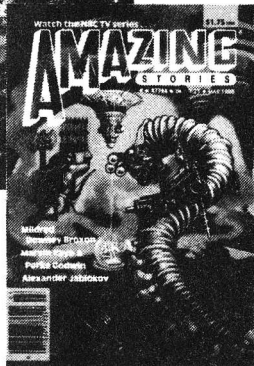
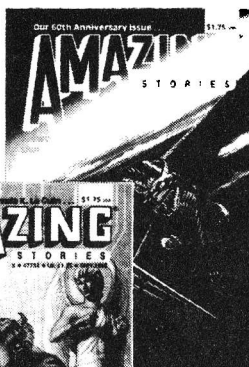
When you get two test pilots together, you have three opinions.

In an airplane, the only person more nervous than the pilot is an engineer.

— Professor Arthur L. Klein (1898-1983)



You'll be
amazed...



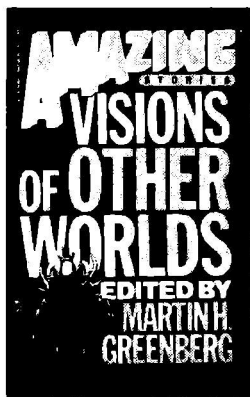
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A LETTER FROM BUBBA: EXTRATERRESTRIALS

by Hollis Fletcher

art: Roger Raupp



When asked for biographical data, the author told us, "I am real flattered that you want my biography in your magazine. The only biography I ever took to was Florence Nightingale: Girl Nurse, which I did a report on in school because someone had done stole the copy of Ed Gein: Boy Serial-Killer, but this Florence Nightingale did something even though she was a girl and I have not done much. . . ."

When not corresponding with our offices, the author works as a paranormal consultant to several important businesses in the Standoffish, West Virginia, community. His wife, Nadine, however, wonders how he maintains his job, considering that there have been no paranormal advances in the design and packaging of the six-pack in the last several years.

Dear Amazing Stories,

It was lucky I saw your news magazine on account of we do not take it at home, but you can get it down at the Convenient where my wife, Nadine "Mrs. Bubba" Fletcher, gets the newspaper, except she did not get the newspaper this time on account of the headline was about some woman being Big Foot's love slave and Nadine said she did not want to read about some woman who had to be trashy just to get in a position where she might have to be Big Foot's love slave, not to mention bragging on it, which probably meant she was dating above herself in the first place. So Nadine got your magazine instead, and I knew it was the answer to our troubles.

For you see, we had a true-life space-thing visit us down here in Standoff-ish. I got in on the tail end of the business, but I want you to know my source is the reliable Mr. Wayman Hicks, who is a veteran and my neighbor and not given to stretchers, except back in high school when everyone lied about their girlfriends, but he married his anyway.

Wayman and his wife, LaTina "Mrs. Wayman" Hicks, had gone out on their patio where he said he was having a Budweiser tallboy, while LaTina was having something with a fern in it, but as Wayman says, one tallboy does not a flying saucer make. What they saw was not really a saucer, but kind of like a princess phone, and it lit in their yard next to the bird bath. LaTina looked at the saucer, then down amongst the ferns, and said, "What's that out in the yard, Daddy?"

Wayman said he couldn't imagine, and the phone opened up and the space-thing come out.

Now I saw it, and it looked like a spider, except it had too many legs, maybe thirty of them, but by the time I got a look, it was shot up so a fellow couldn't count them, which is the sad part to my story.

LaTina is what my wife calls high-strung but what up north you call unbalanced. When the space-thing come out and started whistling at the bird bath, she had conniptions because she was sure this thing carried every disease known to man and some known only to space-things.

So she screeched and carried on until Wayman saw that she had gone past the usual screeching and carrying on, and he figured he had better run the space-thing off. But LaTina would not settle for that, throwing her fern drink at the space-thing, who shied away from it like any creature with self-respect would do. Wayman went in the house for his shotgun because LaTina threatened to leave him if he did not destroy the space-thing utterly, and Wayman preferred the aggravation of what he knew to the danger he did not know.

It was dead by the time I heard the shot and got over there. Wayman was standing over it, still holding his shotgun, and I took in the flying saucer and the space-thing and the bird bath which was also destroyed utterly, and I asked Wayman what it was and he said he couldn't imagine.

We put the space-thing in a Mason jar and had planned to send it to the Ripley Believe It Or Not museum or one of those other ones in Washington, but we stocked the jar in our cellar, and Nadine supposed it was kraut and took it over to her Uncle Wade Hampton Mizell's. We have not had the heart to tell Uncle Wade and Aunt Lura, but I figure they will know it is not kraut when they open it, even though Nadine has reflected on Uncle Wade's cigarettes and bourbon, and says that if something is bad for you, a Mizell man will put it in his mouth.

We still got the flying saucer, and it has taken the place of the bird bath as LaTina Hicks's lawn beautification, but the birds will not touch it and LaTina will not leave the house. Wayman called Ripley Believe It Or Not in hopes they would take it, but they said they didn't believe it and Wayman said that's your privilege. So we are asking you, since the paper scooped you on the love slave, if you might want to scoop them back by buying some photographs of the saucer or better yet putting it on display in your offices. It's real educational if you handle the hauling and put a little DONATED BY W. AND L. HICKS sign on it. If not, that's your privilege. ●

Your Friend,

Bubba

Hollis "Bubba" Fletcher
Standoffish, West Virginia



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Exhibit

John Lakey

John Lakey was born and raised in Miami, Florida. He later attended the Miami-Dade Community College as an art major and enrolled in assorted art courses at the University of Miami. Though unable to graduate from either school, John began his career as a television illustrator, working in film and television for the next twelve years. Many of the illustrative techniques he currently uses were developed during this time.

After leaving his art director's position in television, John moved to Otto, North Carolina, to found Artifact studio. Here, he began working editorially for about a dozen different publications on a regular basis.

John's first love in the art field is cartooning, and he personally finds it vastly more challenging than straightforward illustration. However, science-fiction and fantasy themes have always held a special interest for him, and as he claims, "I've been fortunate enough to work with most of the best SF publications over the past eight years."

Those who are interested in commissions or purchases, or in finding out more about John's artwork, can contact him at his studio. Write to: Artifact Book & Magazine Illustration, P.O. Box 232, Otto NC 28763.



"Snorkelling in the River Lethe," 1985

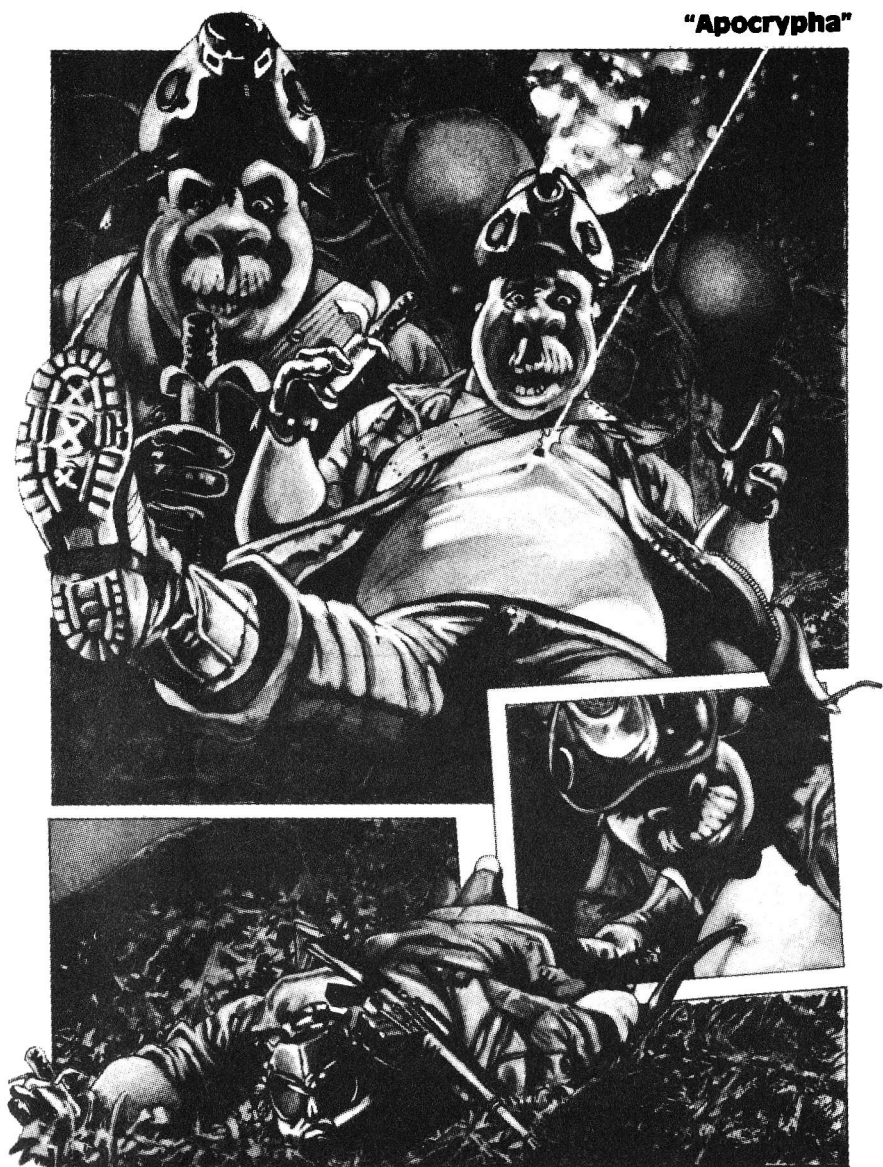
"Lover"



John Lakey



"Transdimensional Bikers," 1986





CATSCAPE
by Roberta Grant
art: John Lakey



(The cats are arranged just right.

The landlord doesn't know that; he stands in the studio door two weeks too late, jiggling the key chain in his soft white hands, making little noises in his throat. Ahem, ahem. Anyone home?

He has flat jumpy eyes like a bird, and he swivels his head to stare all around the studio. No wonder he's confused. He sees all the wrong things: the thumbtacks in the posters, the litter on the floor, the lumpy shadows on the bed in the window. Gulp.

The landlord doesn't have time to wonder at the walls. He's wondering about his overdue rent. Where's Catherine Lowe? At least her daughter should be here; after all, the retard never goes anywhere.)

1.

I will become a cat, a big cat, with golden eyes and dense, tawny fur to love with my tongue.

Huntington's the doctor had called it. That was the second — no, third — doctor, two years ago, in Cleveland.

I will live in the savannah, will sleep through the long, hot day — a golden cat dreaming in the golden grass.

The waiting room was white and had no windows. Danielle prowled the perimeters, slowing each time she passed the office door. Inside, Catherine sat and watched the rain sliding down the window of the third doctor's office. The rain was soft and grey like the doctor's mustache, which, as he talked, didn't move at all.

I will have a fierce yellow mustache that quivers as I dream.

The brain damage is extensive, the doctor was saying. Amazing she's functioned so well this long. He sounded interested. As Catherine turned her eyes from the window, the doctor scratched his mustache with a pencil dented by teeth marks.

My teeth are pointed, and in my sleep I flex my claws.

The ventricles have invaded both hemispheres, the doctor said. See these large shadows in the CAT scan? And the doctor reached his pencil behind him to tap Danielle's brain.

Danielle stopped pacing and lifted her head. Her red hair was already tangled, the receptionist noted, and one green knee sock had sagged down the

child's skinny leg to reveal a green and blue shin. Grimy fingers clutched a waiting-room magazine as the girl stared toward the doctor's door. Her eyes made the receptionist uneasy.

Unusual, the doctor was saying inside. To achieve such IQ scores with damage like this, her brain must be remarkably adaptive . . .

What are ventricles? Malcolm Lowe said.

Bird noises, high up in the sky. One ear notices.

Catherine glanced at her husband as Malcolm shifted his weight, making the chair legs creak.

The doctor turned his eyes from the printout, looked back at the father. The ventricles, the doctor said briskly, are sacks of fluid in which the brain floats. Malcolm frowned, and the doctor proceeded more slowly. We believe they function as shock absorbers for the soft neural tissue, the doctor said and waited. So did Malcolm. The ventricles are like liquid balloons, the doctor said suddenly.

Catherine felt amusement, not her own, as the doctor's pencil circled the shadows now wavering behind a faint rainbow, like party balloons . . .

However, the doctor continued, and Catherine blinked. In Danielle's brain, the doctor said repressively, returning his pencil to the desk, these balloons are inflating into the grey matter, disrupting the neural network, destroying irreplaceable brain cells —

Why? Malcolm said and cocked his head.

One ear covers the sky, the other listens to the grass. I dream that I am sleeping on a heart with many echoes.

Why? the doctor repeated. He shrugged. We're only beginning to understand this disease, Mr. Lowe —

Why are you talking about a *disease*? Malcolm interrupted. I thought you were a shrink, he said, making his voice jolly, tucking his hands between his knees. The doctor looked at him. For kids? Malcolm asked, his voice fading.

That's a psychiatrist, the doctor said. I'm a neurologist, he said with dignity, pencil standing to attention. Your daughter's problems are physical.

Silence again. Only the hot dry wind. Only the grass whispering secrets. Only my purr as I dream.

The doctor looked at Catherine, sitting silent and removed. The Huntington gene is quite rare, he commented. And for the disease to trigger in a child is — his pencil gave a minute, enthusiastic flicker — even more unusual. Almost always, the gene remains passive until adulthood —

Adulthood? Catherine interrupted, looking at him at last. My daughter is

ten. She kept her voice calm as, in the waiting room, Danielle turned her head.

I'm sorry, the doctor said. The woman was intense, had oddly colored eyes, like the girl. He looked down. There's really no doubt, the doctor said firmly. Picking up the manilla folder, he leafed through the pages with his eraser as rain hurried down the window.

Shadows in my head, wing shadows on the grass.

Well, but it's not . . . I mean she's not — and Malcolm attempted a worldly chuckle — it's not fatal, of course?

The doctor closed the folder. I'm sorry, he repeated.

Malcolm was silent.

The doctor hesitated, then looked at Catherine. You should both know, he said, that within the next year, two at most, Danielle is going to need institutional care.

In the waiting room, Danielle stopped, stared intently at the door.

No, Catherine said.

Could I have a glass of water? Malcolm said.

A white bird lands at the water hole and begins to drink.

Malcolm drank as the doctor studied him. The father had a soft mouth and cheerful blue eyes which were beginning to look terrified. His wife, despite her tight chignon, was more like the girl: same hair, same jawline, same genes, of course. Mrs. Lowe, the doctor said, do you remember your own mother at all?

Beside me her eyes open.

No, Catherine said. Father never talked about my mother, she said, and the doctor noted she was fingering a gold charm at her throat. Father never talked much at all, Catherine added with an air of discovery.

(You have no mother! Father shouts, but Father never shouted.)

Suddenly, Catherine dropped her hand to her lap. Outside the office, Danielle began to move toward the door.

I rise, very quietly.

The doctor was studying Malcolm. For the family of the patient, the doctor observed, Huntington's can be rather — frightening. Malcolm shifted uneasily. Loss of coordination, the doctor explained, failing motor control . . .

I glide one paw forward. Her whiskers notice.

Catherine's head came up. Outside the door, Danielle's hand was gently pressing against the wood panel, worrying the receptionist.

But more alarming for everyone, the doctor was saying inside, is the patient's progressive loss of emotional control as inhibitory tissue is destroyed.

Speak *English*, Malcolm shouted suddenly, hands clutching his knees as if to prevent himself from flying away. What do you *mean*?

She knows; my tail talks my excitement.

Catherine's eyes closed.

Feelings, Mr. Lowe, are generated by the brain, the doctor said precisely. For example, he said, thumb stroking the teeth marks in his pencil, the fight-or-flight syndrome is a basic, neural survival response that we, as social animals, have learned to suppress. When intra-cell communication is disrupted, however, this syndrome can without warning trigger a psychotic episode that —

A *what*? Malcolm's teeth were clenched. I *don't understand*.

Neither will Danielle, the doctor said after a moment, gently setting down his pencil. He shrugged. Who is there to fight? How can she flee from herself? He looked at Malcolm. She'll need help, Mr. Lowe. Medication, a place to stay . . .

Tranquilizers, Catherine said softly. An institution, she said, opening her eyes at last to stare at the door.

She looks at me.

Danielle made a noise in her throat and leaned her cheek against the wood panel. Inside the office, Catherine watched the door as the doctor repeated emphatically: Danielle will need our help.

Malcolm looked unhappily at Catherine, whose jaw was tight.

Mr. Lowe, said the doctor quietly, they may both need our help.

After a moment, Malcolm's eyes widened.

No, Catherine said without turning her head.

She looks at me, and I see myself.

No? the doctor said and scratched his mustache. Mrs. Lowe, your CAT scan was negative, but should the gene trigger —

We won't need your help, Catherine said.

I see myself in the yellow of her eyes, in the pupils black as space.

Danielle sighed and so — without knowing why — did the receptionist.

Inside, Malcolm's lids fluttered as he looked back and forth between his wife and the doctor.

I don't think you understand, Mrs. Lowe, the doctor said slowly. By the time symptoms appear —

I *understand*, Catherine said fiercely.

Of course, she didn't, two years ago.

2.

Now the other cats notice. Stretched out lazy in the late sun, they watch us through the grass.

Two years ago, Catherine began taking three, sometimes four, baths a day, scouring her skin until the blood vessels broke, until she could wear her red rash like a haircloth, like pennance, like a bargain. Of course, that didn't help anything.

Two years ago, Malcolm moved into the study. He was still kind, and he tried to be brave even after he was fired, but he seldom touched Danielle and only touched Catherine after he got home late and smoky with the perfumes of distant bars.

The breeze brings us the cool taste of bird.

Two years ago, Danielle insisted on continuing at school. Her intensity began to burn away the baby fat, and her chin grew pointed, her cheekbones too prominent. Her red hair was always in tangles and her lids drooped, as if to conceal the complicated brilliance of those tilted eyes. Her growing clumsiness amused the other children, and her temper alarmed the teachers, but everyone had to acknowledge that Danielle kept up.

Then the principal announced that she would be teaching an afterschool aerobics class. Along with all the other girls, Danielle enrolled.

We begin our approach; the bird chatters to itself.

When the principal phoned the house, Malcolm answered. He answered optimistically, like the good salesman he had once been.

The principal had a sweet voice. I'm sorry, she said sweetly. We just can't cope with Danielle anymore.

After a few hearbeats, Malcolm responded: What happened?

Another pause. Then: Could you and your wife come to the school?

Now? Malcolm asked reluctantly.

Yes.

A fluffing of white wings. We crouch down low. We lay our ears flat.

Catherine answered brusquely when Malcolm phoned her office. Ten minutes, she told him. At the corner.

Two blocks from the school they met. Catherine looked competent in her secretarial suit, but her hair was escaping its bun, her eyes were fierce, and her left hand was hidden in her coat pocket. Malcolm was pallid and shaky but reasonably sober and soberly bundled against the spring air (spring again; a whole year, only a year had passed). Not talking, they hurried toward the school, shoes making sharp retorts to the pavement.

The grass crackles as it scratches our bellies.

Danielle was standing beneath a basketball hoop with no net. As usual, she was wearing her father's faded plaid jacket, and as usual, her hands poked out of the rolled sleeves to clutch each other like pale claws. The jacket still described Malcolm's more comfortable bulges, ballooning above Danielle's new pink tights which already sagged at the knees. One knee was jiggling even more badly than usual, Malcolm noticed. Otherwise, their daughter's indifference was queenly as she gazed beyond her approaching parents, beyond the empty play yard, ignoring the fingers of wind that tugged at her hair.

The breeze plays with us. The bird combs its many feathers.

From behind the wire mesh of the gymnasium windows, dozens of girl-faces stared out, eyes wide, fingers pointing, round mouths pecking with soundless excitement. Malcolm's heart stumbled.

Suddenly, a pretty woman wrapped in a white wool coat hurried from the brick building, averting her eyes as she passed their daughter to intercept them at the edge of the blacktop. I'm sorry, she said in the sweet voice Malcolm recognized from the phone call, but you'll have to make other arrangements for your daughter.

What happened? Catherine said, too sharply.

The principal's eyes were a vivid blue above the white handkerchief she held to her nose. Her feet were dainty even in tennis shoes. When a breeze caught her coat, Malcolm noted that she was wearing a leotard, pink like Danielle's . . .

What happened today is not the point, the principal said, firmly rewrapping her coat.

Wh-what happened? Catherine asked hoarsely.

She growls, deep in her throat. The bird doesn't hear.

The point, Mrs. Lowe, said the principal politely, is that our school is just not equipped to handle a child like Danielle. She turned to Malcolm. Surely you understand, Mr. Lowe? And she cocked her head.

The bird chirps. Its beak is long and sharp.

It's not just today, the principal said kindly, it's . . . A breeze fluttered the white handkerchief and Malcolm noticed that the principal's nose was too pink. Puffy, in fact.

What *happened*, Catherine said.

She hit me, the principal snapped.

A small silence. The principal's handkerchief re-covered her nose, Catherine thrust her other hand into a coat pocket, and Malcolm dropped his eyes to stare at the pavement. The asphalt was webbed by cracks running away incomprehensibly like lines in a map he couldn't read.

But what's important is Danielle, the principal continued smoothly. What's best for *her*. Her tennis shoes moved closer to Malcolm's feet. Surely, Mr. Lowe, Danielle would be *happier* elsewhere? Her voice was kind again. When Malcolm looked up, she patted his sleeve. Perhaps, she suggested, in a *controlled* environment.

Catherine made a noise in her throat, and the principal's fingers trailed away.

I, uh . . . Malcolm faltered and looked toward his wife, but Catherine was staring across the courtyard. Like Danielle, her square jaw was clenched, her shoulders trembled, and her streaky eyes were wide and opaque. He hardly recognized her.

Yes, Mr. Lowe? the principal prompted, and he looked at *her*. Blue eyes were easy to read, like the sky on a good day. I've got blue eyes, Malcolm thought and looked down at his shoes, but the toes were too badly scuffed to give back any reflections. A sudden pain in his heel made Malcolm's toes curl. That pesky nail again . . .

I didn't mean to hu-hurt her, Danielle said, and Malcolm started.

When had Danielle crept so close? His daughter's face was pale, her mouth pursed and quivering just a little.

I didn't do anything b-bad, Danielle said, and the breeze lifted fuzzy strands of hair from her forehead, revealing anxious lines. She'd frowned even as a baby, had little Danielle. He used to kiss her forehead and tickle her until she laughed.

Daddy! Danielle said, voice desperate.

Mr. Lowe, the principal said calmly, you *do* understand?

Catherine made another of those noises in her throat.

His feet hurt. Malcolm stared at his shoes. These shoes used to carry him everywhere. He'd worn them every day, back when he was selling door to

door. Why, he'd been wearing them when he first met Catherine, such a pretty girl she'd been, like her mother, the old man had said, bitterly, on one of those rare occasions when he did speak.

The earth smells of heat.

Malcolm's feet were beginning to throb, as if the asphalt were on fire. He shifted his weight and tried to remember the color of the old hermit's eyes, but all he could see was the burning brightness of Cathy's hair as she hovered behind her father in the hallway of that gloomy house. Malcolm felt perspiration breaking out on his face. He didn't want me to marry his daughter, Malcolm remembered as fire crept up his legs. I laughed and called the old man selfish.

Daddy, Danielle whispered.

He'd have to dump these shoes in the trash. It seemed a great pity. Tears welled and Malcolm blinked furiously. I've got to go, he muttered. He looked up. I'm sorry, I've got to . . . got an appoint— Suddenly, he turned and walked away.

He left quickly, with a rather uneven gait, shoes slapping the pavement, overcoat flapping in the wind. Danielle shivered as she watched him go, and Catherine's hands finally came out of her pockets. One hand rose to touch the glint of gold at her throat; the other reached out to draw Danielle close. It'll be alright, Catherine said tenderly. The principal tightened her lips, then looked away as Catherine kissed her daughter's hair. We'll all go home and talk, Catherine murmured into Danielle's ear, you and me and Daddy. It'll be all right, you'll see, she said.

But Malcolm never came home.

3.

The sun is getting larger, tipping our whiskers a beautiful pink.

It was raining again. The studio was dark, but Danielle, curled on the bed under the big window, continued to stare at the magazine as Catherine, still in her uniform, left the restaurant. She was hugging a grocery bag as she hurried along the wet street, unaware of her limp, unaware of the rain, unaware of anything but the pictures in her head.

The pride is starting to sit up now. I don't look at them. I watch the bird's eye, which is flat, like a stone beneath the water.

Rain rattled the window behind Danielle's head, but she didn't hear. Eyes still on the magazine, her lips were working at something that glistened gold

on her tongue, that sparkled gold down her chin. Absently, she sucked at the object as, breathlessly, her mother climbed the first flight of stairs to the studio.

Behind Catherine, a door at street level popped open and a shrill voice called up: Mrs. Lowe? Mrs. Lowe!

A cry, somewhere across the plains.

Catherine stumbled, and a can of tomatoes flew from the bag, began rolling down the stairs. She hesitated, then continued upward. The landlord craned his neck at her receding shadow.

The bird twists its head nervously; it looks, but it doesn't see us.

In the silence of the apartment, Danielle looked up, stared at the hall door. Then, leaning back against the headboard, one hand resting on the magazine, the other raised to touch the object on her tongue, Danielle closed her eyes and listened for ghosts. She listened to the old plaster walls, to the sky-light far above, to the high window behind her bed. The cats listened, too; their silence soothed her.

A breeze strokes my nose. The bird pipes a question, shifts its long legs like it wants to run.

After Daddy left, the ghosts in Grandfather's house had been noisy. Now that Danielle wasn't going to school, she heard all their voices, echoing through all seven rooms, repeating questions that had no answers, babbling soft advice she didn't understand. The new ghosts were the loudest, the ones that came with the visitors in the months after Daddy's car crash. Poor Catherine and Danielle, what will they do? the visitors had worried. Such a tragedy, they had agreed. A man rents a new Cadillac which then carries him straight through closed gates into the path of an approaching train! Such a *terrible* accident, they had murmured to the ghosts in the wall, don't you think?

I hold very still so my tail won't talk.

Silence was better; silence became a habit for Danielle. And still the old house echoed, even after Catherine stopped going to work and stayed home all day.

Her nose measures the distance we must leap.

Then one day, Catherine took Danielle out. They had ice cream and rode

the bus, and after that they went to the free clinic.

(Danielle, the doctor at the clinic says. We have a nice place, he says, bald dome shining earnestly. A home really, he says, just for children with — special needs. Your mother could visit you every day.

No! Danielle shouts, trying to hide the trembling of her hands.

And: No, Catherine agrees, trying to hide — what? Something . . .

Catherine, the doctor says quietly, I need to talk to you in private.

Catherine licks her lips. Why? she says as the doctor leans toward her with a flutter of his white coat.

Those tests we did, he says, your tests, Catherine, the CAT scan and . . .)

CAT scan? Danielle's giggle broke the silence of the apartment. C-A-T she spelled out, touching her necklace as she looked toward the door, as Catherine, grocery bag rustling, reached the second-floor landing.

I feel her lean forward.

Catherine had acted — different — after they left the clinic. First she cried, over a letter that came in the mail from the Trust Life Insurance Company. The next day she spent at Daddy's desk, furiously writing checks. The day after that, she was gone all day until suppertime, and the day after that, they moved.

(Boxes thumping, men swearing, Danielle sneezing as trunks undisturbed for fifty years are lifted from the shadows.)

The grass quivers.

They moved here, to this one big room. That was six months ago.

(The landlord's mouth gapes when Catherine hands him the last of the insurance money. Half a year in advance, he says at last. You're an — artist, Mrs. Lowe? The sun, working through dusty window glass far above, makes him squint.)

Each day while Catherine was gone, bussing dishes at the restaurant two blocks away, Danielle prowled the studio. She searched through boxes, listened to the high walls, restlessly positioned herself in different angles of light.

I test my teeth with my tongue.

She found the first cats hidden inside an old cardboard container. Small, grimy prints ornamented the magazine's yellow border, but there were none on the cover photograph, which was titled *Lions of the African Plains*.

I lean forward.

When Catherine came home that evening, Danielle didn't even look up. She was studying the magazine Catherine had put away so long ago.

Dust shimmers the air.

When Catherine awoke the next morning, Danielle was sitting motionless in bed, same magazine open on her lap.

The earth yields to my claws.

When Catherine came home that night, she brought with her a long tubular package.

Through webs of heat, eyes glow.

When Catherine taped the first cat poster on the first blank wall, Danielle raised her eyes. Nu-nu-nice, she said.

After a while, there were cats everywhere: black cats, white cats, tawny orange and striped cats. All were arranged just right on all the walls: staring, dreaming, crouching, hunting . . .

The bird sees us! It screams! And I am, I am . . .

" . . . home!" Catherine said breathlessly. "Danielle, I'm home."

Danielle's eyes flared open, and she frowned against the light of the overhead globe. Then she looked at her mother, leaning against the open door. The brown paper bag in Catherine's arm was torn, and a package of spaghetti stuck out like a white tongue. A strand of hair hung damply across Catherine's forehead, and her coat dripped water onto muddy white shoes. After a moment, Danielle blinked. Then she smiled. "W-wet," she said. "Yuh-you."

Catherine stared down at her shoes. "I don't remember coming home," she said thoughtfully. A drop of water fell from her nose, disappeared into a shoelace. Abruptly, she stepped inside, shut the door, and, resting her head against the wall, closed her eyes. She sighed. "It's been a — strange day," she said softly. "My boss . . ."

We leap! Claws out we leap!

"Danielle!" Catherine was staring, hands clutching the doorframe, groceries rolling forgotten on the floor. Danielle's eyes were a feral gold.

"Dan-i-elle," Catherine repeated, smoothing out the syllables like wind, gripping the doorframe with white knuckles as she waited for the vertigo to pass. "What — happened?" she whispered.

The magazine rustled in the claws of Danielle's left hand.

Catherine's hand trembled, and she pressed her shoulder against the hard edge of the doorframe. "The dreams are getting too strong," she said at last and bit her lip as, across the room, Danielle's lips moved on something gold, sending glitters down either side of the girl's sharp chin, framing her face like two wiry whiskers that disappeared into the mass of fur — no, *hair*, red hair on Danielle's neck . . .

The chain to my charm, Catherine realized, the charm is in her mouth. I'd forgotten she found my necklace. Why is she so angry?

"He fu-fu . . ." The magazine shuddered as Danielle struggled to speak. "He fu-fu . . ."

"Breathe deep," Catherine said quietly. After a moment, she slipped off her shoes, knelt to collect the scattered groceries . . . then froze, crouching, eyes locked on Danielle, whose chest rose and fell as the girl's brows wrinkled with concentration. Finally:

"He fu-fired you!" Danielle burst out. "He made you, made you . . ." Danielle was shaking again. "M-made you," she panted, and the charm spilled from her mouth to dangle on its chain. "Made you c-c . . ." Abruptly, her right fist came up, struck her own cheek. "Cry!" she said hoarsely. "You cried!"

Silence again. Unable to move, Catherine watched Danielle's fingers grope for the necklace, for the little gold cat in its silver hoop —

In its circle, Catherine corrected herself. Or is the circle a noose? Suddenly, she shivered.

Darling Cat, a woman's voice said, inside her head.

Go away! she cried silently. **Not now!** "Danielle," she said aloud, "it wasn't my boss's fault I got fired." Danielle's fingers were stroking the cat, tracing the circle, around and around. Just like I used to, Catherine thought, distracted. While my father looked away and the colors came closer and . . . I was *sure* I'd thrown it away. I *meant* to . . .

"It wasn't anyone's fault," she said aloud, wishing she could stand up. "I spill things," she said lightly. "You know."

(Water spilling into the tub, soup spilling out of the bowl . . . 'Moron!' the fat woman screeches, craning to see her silk-flowered shoulder.

Danielle showed me the necklace last night, Catherine remembers, while I was taking that bath.

'We don't need them,' Danielle had said from the bathroom door, but Catherine, inhaling steam, still hears the fat woman.

'You've ruined this dress — where's the manager?' the woman demands as Catherine hovers uncertainly, still balancing bowls of soup.

'Not in the sa-sa-savannah,' Danielle was saying as the bath water stroked Catherine's knees.

And the manager says coldly, behind Catherine's back, 'What seems to be the — oh, it's you, Mrs. Lowe.'

'It was in a drawer. I fu-fu-found it,' Danielle was saying as the water swirled and the fat woman shrieks, staring at her lap, at her warm, plump lap suddenly a soggy nest of niblets of chicken and tomatoes and . . .)

Catherine found herself laughing.

I wake. She is licking my ear.

Still laughing, Catherine unbuttoned her coat and let it slide to the floor. It all seemed so — impossible. She looked at Danielle, and Danielle smiled.

It really is sunset. Above me, wings make fading shadows on the grass. Beside me, she neatens her fur.

Catherine rose, stumbled, dropped back to her knees. Quickly, she lifted one hand like a claw. "Practicing my — my catlike tread," she said, making a fierce face.

Darling Cat, a woman's voice said comfortingly, inside her head. **You will rejoin us**, the woman said, and: **Go away!** part of Catherine cried like a baby to the figure standing over her crib.

"M-mommy," Danielle said. **Mommy** — she repeated louder and more clearly and Catherine started, looked around her. In the silence of the apartment, rain whispered down the glass; in the window, Danielle's reflection smiled.

I tease her with my tongue; she stretches.

Catherine shivered.

Cold, Danielle observed. When Catherine didn't respond: "C-cold," Danielle said aloud.

Catherine stared at her.

"Yuh-yuh-you," Danielle said emphatically.

And Catherine realized she was cold.

The sun sits on the grass like a hot orange balloon.

"S-s-sit," Danielle said. **With me**, she added. Or did she?

Yes! Danielle thought emphatically.

No, Catherine thought uncertainly and stood up again. It seemed a long walk to the bed. As she sat to tuck the cover around Danielle's legs, enigmatic cat eyes gazed up at her, and Catherine paused, her hand on the spread. Did I really hear her? she wondered. Not those others but — Danielle? My daughter?

Yes! Danielle thought loudly.

Catherine stared at the bedcover. The jungle print with all the feline faces

was another discovery of Danielle's. Catherine hadn't even known the material existed, buried as it had been at the bottom of a trunk untouched since the death of her father. Such an — exotic pattern, Catherine thought. Quite impossible to picture Father selecting it . . .

Mommy?

Catherine's hands were trembling.

Mommy! Danielle's hand left the charm, touched her mother's arm. "W-wuh-wuh—" she tried to say, and Catherine felt the quiver of her daughter's fingers.

"What, love?" she said gently.

"W-wu—" Danielle was struggling. "W-wu . . ." **With me**, she thought suddenly, **with me, stay with me, stay . . .**

Catherine's eyes were fixed on the jungle print.

With me, Mommy, Danielle thought urgently.

Funny thing about this material. The first time she laid it on the bed, Danielle had thrown herself across it, rubbing the fabric with her cheek, arching her fingers as she made sounds like purrs. Catherine had laughed, thinking: why not? It's just me who needs to keep a clear head.

Abruptly, Catherine lifted the cover to slide in beside Danielle. Her arm went around her daughter's shoulder, and the red fuzz brushed her cheek like a pelt. Shyly, she kissed Danielle's hair and through her uniform felt the girl's bony body radiating like a furnace. She closed her eyes, inhaled a faint musk, and saw a pink and gold glow behind her eyelids and the movement of hazy figures . . . her fingers were touching something metallic, the chain around Danielle's neck. **No!** she thought painfully and tried to open her eyes, like an adult. But Danielle's smooth child cheek rubbed against Catherine's arm, and colors kept flowing in gentle patterns behind her eyelids, and after a moment, Catherine relaxed again. Who would imagine, she thought sleepily, that such a thin cover could hold such heat?

Curiosity, not her own. **She feels the circle**, a voice murmured, not Danielle's, but faintly recognizable from somewhere.

About time, another voice agreed, rumbling with amusement.

The savannah holds heat, Catherine thought lazily, Then she thought: Why am I smiling?

She yawns vastly, with a glistening of sharp white teeth.

(Catherine never smiled when she was a child. It didn't seem — right, somehow, not in the silence of her father's house. But she did wear the cat charm, though the sight of it was enough to make Father's eyes angry. They never discussed her visions, but then they never discussed anything, her father and she. Sometimes she dreamed about the necklace, who had given it to her, how it worked. Once, when she was still little, she had asked Father about the pretty flashes of color, the voices she could never quite understand, but Father had

looked at her with such — such distaste that she never asked again.)

Mommy?

Danielle?

Mommy! You can hear me!

Yes, Catherine thought, ears ringing, though, of course, they couldn't be ringing.

Sorry, thought Danielle gleefully.

I stretch my tail, roll to scratch my back, legs straight up like a cub.

Through the pajamas, Danielle radiated heat, and Catherine could feel on her daughter's neck the chain pulsing rapidly under her fingers.

This better? Danielle teased, and Catherine felt a vibration, steady and soothing.

"Yes," Catherine said aloud, trying to build a wall in her head.

Don't be scared, Mommy, Danielle thought, nuzzling Catherine's arm. **They say you're catching up.**

They? Over the colors Catherine imposed faces, black-and-white photographs of the landlord, the doctors, Danielle's teachers . . .

Amusement, not her own and not Danielle's.

They say, Danielle thought uncertainly, **you're being — obtuse?**

Suddenly, the colors brightened, grew hotter, formed another face, a cat's — no — a woman's face, a strange woman with fearsome golden eyes and hands like claws hovering over the crib. *What* crib? With horror Catherine watched the woman smile and offer a necklace.

Our necklace! Danielle realized with delight. **You know her, Mommy,** she exclaimed. **She's got . . .**

"Huntington's!" Catherine shouted aloud, and the word echoed through the apartment.

And the rain whispered greyly and the cold pressed down and Danielle without moving began to shrink away.

Catherine sighed, released breath she hadn't known she was holding. **Huntington's,** she agreed silently. And the colors warmed, and Catherine was seized by a great languor as something inside her started to uncurl.

She lifts her head; I rise to my feet. Together, we stare at the horizon. It's almost time.

Hair tickled Catherine's chin, soft as a baby's fuzz; Danielle had been such a sweet baby.

('Spittin' image of her mom', Malcolm had said proudly when she was born, and by then Father wasn't there any longer to glare and walk away.

When Malcolm first came knocking at their door, one year before, Father had

been already ill; he didn't have the strength left — or the will — to repulse the friendly young salesman with the hopeful blue eyes. And Malcolm had entranced Catherine. He was like a bird, she thought, always moving, as if there were no obstacles but air.

They were married in the house while awaiting Danielle. Once after making love, Catherine tried to explain the necklace to him, but Malcolm's alarm alarmed her. Privately, she decided that her husband needed his Catherine calm, simple, a solid shore from which to launch his dreams.)

Mommy, Danielle thought, and Catherine realized her hand was trembling on Danielle's neck. **Daddy didn't understand**, Danielle thought, and Catherine became aware that her daughter was shivering now, too.

I know, she replied and hugged the thin shoulder, stroked the red hair.

He left us, Danielle thought, sounding small.

He couldn't come with us, Catherine replied, not sure what she meant but suddenly quite sure it was true.

Danielle was quiet, considering.

He loved us, Catherine thought.

Finally Danielle replied: **yes**.

And the heat began to build again.

So, the voice that was not Danielle's voice murmured, **she's beginning to remember**.

About time, growled the other voice. **You'd think she'd never linked before**.

In this time she hasn't, observed the first voice, mildly. **Anyway, her cub seems eager**.

The cub still dreams, disagreed the other. **And weeps in her dream**.

The pride is restless now, big cats circling in the red light.

4.

Danielle felt very calm. It was much better now, with Mommy so close and the pictures so bright. Entranced, she watched colors dance and shift, saw whiskers and tails appear and disappear, grass nod, and the sky . . .

We stand poised, watching the far sky run like copper as the pride swirls around us.

They're waiting! Danielle thought with sudden excitement. **They're waiting for us!**

An inverted rainbow, like a cheshire grin. Danielle heard the vibrating sound and felt herself relaxing again.

Mommy was soft. Her arm was as soft as fur, her fingers resting on the

necklace were dry and warm and padded . . . Danielle could feel just the tip of Mommy's nails, carefully sheathed, touching her pulse, thumpty-thump, thumpty-thump, time to go, time to go, we are going, I am . . .

('Hopeless,' the principal says. 'God, you're hopeless!')

Danielle! Catherine called in alarm.

But Danielle was silent as the birds swooped and darted, shrieking dissonance in voices like . . .

(The other kids, screaming excitement as they pluck at her arms and legs and lift her above the gymnasium floor, as the principal, up on her knees now, dabs her bleeding nose and calls directions.)

I didn't mean to hit her! Danielle cried.

Shadows. Wing-shaped shadows on the grass. We look up.

(Jumping Jack, thinks Danielle frantically, Jumping Jack, clap hands, slap feet. Jumping Jack clap feet, hands . . . no.

The other girls dart glances at her, giggle as Danielle's arms flap in confusion. Such a smooth, perfect dance line except for her.

Teacher's smile is fading, and her forehead gets little wrinkles. 'Jumping Jack, clap, hands, Danielle!' she chants, standing in front of Danielle as the other girls curve gracefully.

Danielle knows exactly what to do, but her body — won't . . . I'm falling. Right into Teacher's pink leotard, and Teacher sits down hard, clutching Danielle's shoulders, but Danielle, all out of balance now, jackknifes convulsively, feels with horror her head crunch against something . . . Teacher's nose?

'Damn' it!' Teacher hisses, her voice not gentle now. 'God! but you're hopeless!' she whispers, dabbing her nose, shuddering as her other hand pushes hard at Danielle's chest.

'S-sorry,' Danielle says, trying to wipe the blood on Teacher's chin, offering the sleeve of her own leotard. Teacher jerks back. 'S-s-sorry!' Danielle stutters desperately.

'Disgusting,' Teacher says through gritted teeth. 'Go! Out! God, you're so hopeful—'

'Shut up!' Danielle yells, snatching the teacher's wrists, noticing how cool her skin is. 'I'm not!' she yells, something inside slamming shut. 'It's you . . . you're ho-ho-ho—'

'Help!' shrills the principal, and suddenly the other kids flock in, screaming in high voices, hands plucking.

She kicks and kicks . . . air gets cold, she's outside, door slams shut, door opens again, and something flies out, flops on the steps . . . Daddy's jacket . . . 'Who n-needs y-y-you!' she shouts to the air, to the pecking faces behind the door glass . . . 'Wh-who n-needs —' Her throat keeps choking her.)

Danielle, a voice said, Mommy's voice, her new, warm voice. Danielle gasped, began to breathe again.

Little cub, another voice said tenderly.

The pride encircles me.

Danielle felt empty.

Sweet musk and in their fur the last of sunset.

The cub is ready, a voice murmured. **Prepare the joining.**

Danielle could feel the grass now, scratching against her paws, and the rub of fur as others pressed close. She looked up and saw that it was evening, a clear, wide evening.

Better, declared a voice.

Much better! agreed a second.

But the old one resists, grumbled another.

She still dreams, said a fourth impatiently. **We cannot wait.**

Where are we going? Danielle cried out in *her* new voice.

To close a circle, the first replied calmly. **It is time.**

And now we move together, flowing toward the horizon, flowing toward the moon as it rises, huge and round and white . . .

5.

Danielle sighed. Catherine felt the breath linger on her arm, begin to fade. **Danielle?** she called.

A pulse. Through the beating of her heart, Catherine listened for another pulse . . . there! But quick and very light, like departing footsteps. She became aware of their two bodies, lying still and silent, tried to open her eyes, became suddenly furious at her own immobility. **Danielle!**

I'm still here, little Cat. Not Danielle's voice, but the other, very strong now.

Stop calling me that! she shouted. **Where's my daughter?**

With some urgency: **Look at me, Cat.**

My name is Catherine, she insisted. She felt small and fragmented. **My name is Catherine!** she shouted, stamping a tiny, petulant foot. Explosion of colors — primal reds and blues and yellows made her wail and flee toward the Hiding Place.

Look at me, Daughter, the voice said sharply.

And suddenly Cat's eyes opened.

(The woman is there again. That same woman, hovering above her crib. Copper hair and amber eyes, lit by the nursery lamp as she reaches down, making the little cat dance.

'Go away!' Cat screams in her baby voice. *'Go away.'*

Look, Mommy, said that lighter, somehow familiar voice.

(No! Cat howls and waves her chubby fists as the woman extends hands like claws and behind the woman a man's deeper voice argues and the hands grope toward her and then there's a hot touch and a small weight drops onto her neck and arms are around her as the woman whispers: 'Too soon, poor C-cat. Can't wait.'

And the baby cries harder, heart racing, hands beating as though her new body is fighting an approaching cold and a darkness too vast for baby thoughts to comprehend.

Listen, little cat, the woman says then in a different voice, so strong that in surprise Cat stops crying. **Store this in your head**, the new voice tells her. **Your necklace can be a noose**, she says, **or it can be a circle**.

Dimly, Cat is aware that the man's voice has gone shrill, and that hands are pulling at the woman's shoulders.

Remember, the woman continues calmly, **and when dreaming is done, you'll rejoin us, darling Cat. And you will bring us another**. Clear and loud and full of echoes, the voice continues as crooked fingers fall from the crib rail: **Until the new joining, dream well, old soul**. The voice begins to fade. **And remember**, the woman says faintly.

And then she's gone. And Catherine is alone, in a silent house, with a father who grows more distant every day and a necklace that hangs so heavy sometimes —)

It wasn't fair, Catherine whimpered. All those voices and pictures — they were silly. They didn't make any sense. Father hated them; Father hated *me*. Colors flickered, the light gave no heat, and she couldn't breathe. Suddenly, something fluttered like shreds of white paper in the wind, and she saw they were the papers she had found as a child, the images hidden in a trunk in the attic.

*(Pictures. Of Father smiling at a woman who holds a baby, *me*, Catherine realizes. Holding the photographs carefully, she slides and bumps down the stairs to her father's study, crying: 'Daddy, look! I found Mommy!')*

And her father looks at the pictures and then starts tearing them one by one, tearing them into a million pieces as Catherine stares, clutching the neck-charm she wears without knowing why, feeling tears fall onto her fingers. Finally, Father looks at Catherine with such cold distance in his eyes that Catherine shivers. 'You have no mother,' he says. 'You have no mother.'

And she runs, runs away and finally hides in the very back of a dark closet.)

Humans, noted an amused voice, **are so dramatic**.

Morose, growled another. **If it weren't for the cub . . .**

Wake up, Mommy, urged that somehow familiar voice.

Lights, trying to invade the Hiding Place. **He hated me**. Catherine wept. **Like I hate her**, she whispered. And tried to wrap darkness around her again.

But the colors were persistent. They kept changing, rearranging, almost

like patterns. Father afraid? **Because I was *her* daughter**, Catherine thought suddenly. **Because she left him, and he was afraid that I'd leave, too . . .**

('You have no mother,' Father says, and his voice is like a coffin, sealing himself and his child into despair, which is a silent place where the corrosive years can work unnoticed.)

Catherine snarled. And suddenly was aware again, of her own heart beating, of her own daughter's pulse, light and steady against her fingertips, lifting the fine links of the necklace . . .

A noose or a circle, the woman had said.

Not a noose. **A noose is a straight line that bends and then ends**, Catherine thought. **Like time**, she thought. And the cold stopped her breathing. Reflexively, her fingers followed the warmth of the gold chain to the softest part of her daughter's throat, where the cat in its silver hoop danced to Danielle's pulse. The cold began to melt, and she inhaled painfully, found herself tracing the sharp feline ears, the hot little nose, the pliant paws . . . With dawning wonder, she traced the hoop around and around, felt the old pleasure as the circle began to expand, as time began to expand . . . yes . . .

She awakens, purred a voice.

The final link, murmured another.

Not final, chuckled the first. **Never final . . .**

Time a circle? Immediately, the images in Catherine's head began to rearrange themselves. She breathed easier. But more than a circle, she realized, and a breeze stirred, bringing the smell of distance. Links upon links, she observed with awe, arranging and rearranging to form now and was and will be and, and *may* be . . .

Catherine opened her eyes. The overhead globe was big and round and white. Then her vision blurred, and shreds of paper became grass in the moonlight, miles of silver grass, blowing as she was in a wind that went clear around the world.

Mommy?

Danielle!

Cat, said the voice of daughter-mother-other.

And Catherine, eyes open, rejoined the circle.

We come together where the moon touches the grass, all the generations of cat, flowing like stars into patterns of the necklace of night.

6.

(When the rent is two weeks overdue, the landlord does unlock the door. The

studio is cold. It feels empty. Cautiously, he leans inside and cocks his head to eye the walls. Cats stare back. Uneasily, he notes the litter on the floor: shoes caked with dry mud, a wrinkled coat, a broken bag of groceries — is that what he smells? Squinting against the glare, he glances at the bed near the window, prepared to look away at once, but the covers are in shadow, are lumpy outlines against the wall. Then sunlight strikes a pillow, glittering off something gold.

Gold? The landlord blinks, and when he looks again, the gold is gone.)

And the two cats awaken. Lifting their heads, they examine the day, which is gloriously hot. Far beyond the pride, as far as the hazy horizon, no winds mark the distance at which earth melts into sky.

And the light absorbs their golden stares, and the air breathes satisfaction. And the winds of the savannah wheel, considering new patterns:

For now, encircled by this landscape, the two are arranged just right. ●

Upon graduation from Wallace Stegner's creative writing school at Stanford, the author admits that she promptly came down with a case of writer's block that lasted twenty years.

During this drought, she did publish some poetry and did write unmemorable advertising copy, all except for one Dr. Pepper TV commercial which a then-young unknown named Johnny Carson insisted on misreading.

Well, finally, the block is over now, and the author is busy writing fiction. Her assistant, of course, is her cat, who makes good use of discarded drafts by sleeping on them.

MOVING?

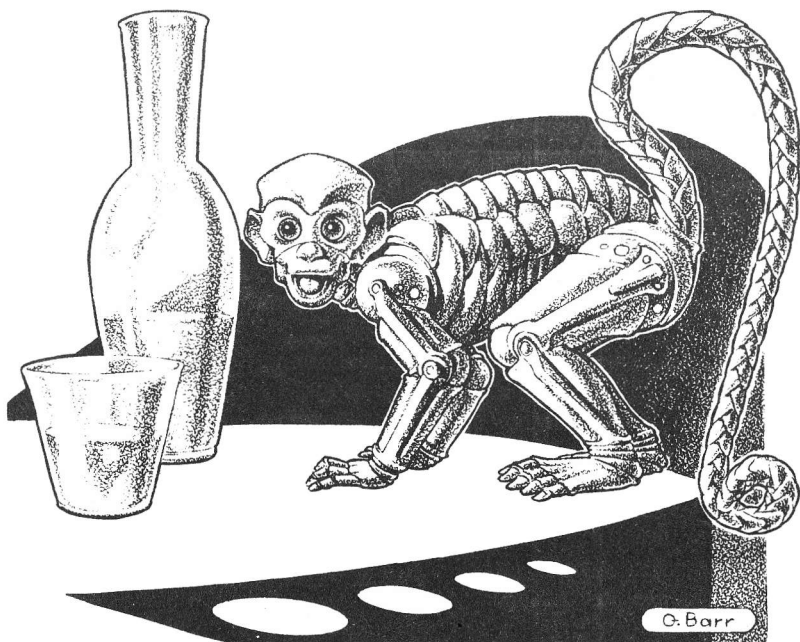
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THE HAND OF THE SURVIVOR

by J. M. Zeller

art: George Barr



A native Californian, the author lives in San Francisco in a pre-quake Victorian home with her three cats and a Commodore computer. When she's not busy being a registered nurse in the intensive care unit of a local hospital, she devotes her time to writing fanciful tales. Though she has published poetry in the Bay Area, this story is her first professional fiction sale.

“Why don’t you get a spoon and eat it, my dear?” he called to her.

Franklyn was referring to his sculpture into which Ruth had just thrown another beer bottle. Even the Space, a massive square cavern lined with five stories of artists’ lofts encircling the work area on the main floor, couldn’t dwarf the soft pink mountain of polysynth soaring three stories to the roof and quivering each time the tube train passed. Ruth fantasized throwing gasoline and a lighted match on the sculpture and walking out of the building forever, especially tonight. She tried to forget that Franklyn and it were there, except the times when she threw empty beer bottles on it to watch them sink slowly out of sight.

Today, she ignored the remark from Franklyn’s loft, for she had just bought another hand and was trying it on.

Excited, she plugged the interface in, fitted the zinc wristband over her right stump, and tried her first exercise: making a fist, thinking of Franklyn’s handsome, dark-skinned face. The hand was cobalt-infused zinc with ball-and-socket joints, long silver nails, and parallel chains of colored lights across the back of the hand that could be programmed to blink in any desired sequence. The hand closed immediately, and Ruth suppressed a snigger of glee. This one was very fast. She turned to see if Franklyn was watching, but the Levolors of his loft across from hers were down. Disappointed, she made the finger anyway, admiring the hand’s nimble response.

Taking it off and plugging it into its charger to save the serotonin stimulator, she put it on the shelf above her air bed, next to the seventeen other hands she had acquired in the last year since she had unwittingly stuck her living hand into the laser color-infuser she was using to make dyes. The infuser had dissolved her hand with a *psfff* of bitter-smelling smoke and had left her staring at her smoking stump. That same stump now held a neural connector nestled between soft folds of shiny scar tissue. For the past year, she had been searching for the perfect hand to connect to it.

And for the past year, she had turned out nothing for the Space and Sioux Rose’s galleries. Designing Cy-ans used to be art, not survival.

She set her last cybernetic animal — the unfinished swallowtail butterfly she had sacrificed her hand for — on the balcony. Its wings of yellow plastic filigreed with that rare ebon polymer so hard to get these days were closed like praying palms. Its furred claws clung to the rail. Patiently waiting to flutter away at a telegraphed command from a key pad, it was the final performer of Ruth’s choreographed Cy-an butterfly dance for the Space’s new gallery, a dance that would never be. It was not alive, nor was it dead. It could do nothing without Ruth, just as Ruth could do nothing without Sioux Rose.

Orange sunset showered through the Space’s filmy windows, turning Franklyn’s sculpture a sick salmon color. Ruth opened a beer bottle, ignoring the rattle of Franklyn’s blinds going up in the loft across the Space from hers.

"What a beautiful color," he commented, leaning on his rail. Even across the yawning Space, through the dim light, Ruth could see Franklyn's teeth gleaming.

"Heard you finally got an invitation to Sioux Rose's for dinner," he called. "What do you think it means? Will you be leaving us?"

Ruth lifted her right hand and flashed it at him. This one was green neon. It was pretty but too fragile to be practical, being made of real glass. She wore it to annoy Franklyn.

"Haven't seen you for a few days," he went on. "Hope you've been working on something good. Sioux Rose has been interviewing people again. Oh, by the way, have you noticed Peter Ten isn't here any more? He was invited to one of her dinners last week."

She heard him thunder down the back stairs. A few moments later he emerged three stories below and crossed the Space's communal work area, weaving between rising white globs and twisted metal and crimson plastic towers and yellow methane tanks and tubs of wax and paint. When he got to the bottom of the stairs on her side of the Space, he glanced up. Ruth leaned over her balcony, tilted the beer bottle at him, and watched the golden stream sparkle as it scattered into a million droplets. It was the only way to treat an ex-lover.

"Bitch," he said, and disappeared inside.

Ruth changed hands, grabbed her pack, and came down the stairs, getting to the hallway just as Franklyn stood before the door to Sioux Rose's flat. She raced to catch him and placed her right hand on his shoulder. He glanced at it, grimaced, and lifted it between thumb and forefinger as if it were a dead rat. Sioux Rose, a swarthy, bald woman with gold ear covers who owned the Space and rented it to her stable of artists, laughed condescendingly.

"I haven't seen this one before," Sioux Rose said.

"Evening wear," Ruth said. The hand was covered with synthetic snake-skin — cobra — and the slim pointed digits were ringed with diamonds at each knuckle. "Watch," she said, and the fingers undulated like snakes. A white forked tongue flickered from the pointer finger. "I wore it for you, Sioux Rose."

Franklyn raised one eyebrow. Sioux Rose smiled and led them into her silk-lined pit.

The man in the pit stopped the act of putting tofu slices in his mouth. He was very long; his hair was white, and his skin, pink. At once Ruth recognized him as her replacement. So Sioux Rose was putting both her contestants in the ring together.

The last dinner Ruth had been to, she and Peter Ten watched Cherry, a young, talented canvas artist who hadn't been there very long, burn a hole in her arm with a lighter after Sioux Rose told her she couldn't use her anymore.

"This is Karlo," Sioux Rose said. "He's an artist from Ohio." She laughed. She always laughed when nothing was funny.

Ruth laughed with Sioux Rose and smiled at Karlo. Ruth was pretty, and she loved to watch the reaction on men's faces when they saw her. She handed Sioux Rose a bottle of lemon water and a silver case of her favorite olives and watched Sioux Rose's face, which told her nothing. Briefly, Ruth stood paralyzed. She felt as if this very instant Sioux Rose could take a key pad and press a heatkey and Sioux Rose could make Ruth stand on her head or pick her nose or stop breathing if she wanted, just like one of Ruth's Cy-ans.

Karlo took the cup Sioux Rose handed him and nodded in appreciation. "Real plastic? And no scratches. Where —"

"My God, Sioux Rose," Franklyn shouted. Ruth stared at the metal monkey that dropped from the hanging lantern and scampered along the floor pit's rim, the monkey's crimson eyes sparking, making a whistling noise. "I thought you got rid of that thing long ago."

"I did," Sioux Rose said. "This is a new model."

Ruth stared at the little metal Cy-an. It was a replica of the one Ruth had made for Sioux Rose, except it was obviously made of dull earth aluminum rather than satiny cosmograft, the pure foil Ruth imported from Orbiter. One of its fingers had broken off. Sioux Rose settled next to Karlo. "I commissioned it last month. The artist is drowning in orders, but he does produce," she said to Franklyn.

"Artist?" Ruth said. "Where's the one I made last year?"

"I put it away," Sioux Rose said. "Karlo has generated hundreds of these. Cats, dogs, even birds. He's working on goldfish now."

Ruth offered her snake hand to the monkey. It looked at it.

Sioux Rose said, "A limited edition. One hundred models."

Ruth held up her real hand. The monkey stared at it. "Only one response? How many different sounds is it programmed to make?"

"Just one. Why does it need more?"

"The concept of my Cy-ans is interactive. People can't be limited by art. Each time they experience it, they must feel something new, something unexpected."

"But you hadn't quite attained that flexibility with your work before your accident, did you, dear?"

"I was working on it," Ruth murmured. She touched the seam of the mold on the monkey's arm.

"Karlo makes these at a reasonable cost," Sioux Rose said. "They'll make money for the Space. It's not getting any cheaper to run, dears."

"Of course not, Sioux Rose," Ruth said, expecting the monkey to bring her eviction notice. Sioux Rose had a strange sense of humor. Ruth downed her drink and held her cup out for a refill, which Karlo provided.

"That glove," he said. "You design that?"

"Yes, Ruth," Franklyn said, "tell Karlo about your hand."

Ruth sneered at him, then flashed a smile at Karlo. "You want to see it?"

Grinning like a nine-year-old, Karlo nodded. Ruth extended her arm. He took the hand in his own, turned it, inspected it, traced the diamonds. "How does it fit so well?"

Ruth sighed, unplugged the hand from her wrist, and handed it to Karlo.

His face went whiter than his hair. He dropped the hand, and it knocked over the bottle of lemon water, which spread in a yellow stain like urine over the floor.

"I'm working on a remote control model," Ruth said. "You know, like in the old movie where the hand crawls around theaters and streets and strangles people?" She shot a glance at Sioux Rose, who remained expressionless. "Art should evoke emotion, don't you agree, Sioux Rose?"

Karlo recovered masterfully. "I had no idea."

"Life's full of surprises," Ruth said. She reached for the hand, but Franklyn snatched it and held it over his head.

"Hold your monkeys," he said. "I love the feel of snakeskin."

"Real snakeskin?" Karlo asked.

"Of course not," Franklyn said. "It's impossible to get even leather these days. Besides, being a true artist, it's against Ruth's principles to use illegal products in her Cy-ans."

"I have no principles," Ruth said, trying to grab the snake-hand from Franklyn, who held it just out of reach. "I didn't make this hand, anyway."

"No, Ruth has done nothing since last year," Sioux Rose said. "You can see how her handicap is limiting."

Ruth got up and circled behind Franklyn, but he shifted the artificial hand to his other hand and leaned away. She pummeled his back.

"Give it to me, dammit!"

"What's this?" Franklyn turned to her in mock surprise. "A little emotion from the cyborg?"

They all stared at her, waiting to see what she was going to do. She felt like a dog in a viper pit. Instinctively, as she had the first months after she returned home from mediserv, she hid her stump under her vest.

"I've never seen your stump," Franklyn said. "C'mon, let's have a look."

"You bastard," she said, kicking him.

"You love to show us your hands," he went on, shifting away from her blows. "The ones that light up, the ones that absorb light, the expensive plastic ones, snakeskin ones, nickel, silver, and stainless steel. We've seen them all, and none of them twice. But you never let us see your stump. How come?"

She stood still, seeing her final chance rise in the faces of the three people staring at her, the people she fought so hard to be with. She ran into the food suite and heard them laughing. When she returned, holding a laser knife, Franklyn's smirk changed into puzzlement.

"You want to know what a stump looks like?" she said, pressing the tab on the knife. It flashed red with an electric snap. "Hold out your hand."

"You're crazy," Franklyn said.

Karlo laughed nervously.

"You can do it," Ruth said. "There won't be much blood. This thing'll cauterize it. That's why I didn't bleed to death while we waited an hour and a half for the medivac. And you'll like the pain, Franklyn. I know you're into pain." She came closer, waving the laser.

Kneeling beside him, she went on. "And then, there's all the advantages." He shrunk away from her, as if she smelled bad. "You don't have to cut ten nails. Polishing nails with only one hand is a real challenge. Jewelry costs less. Forget bracelets. They're always falling off."

Franklyn said. "Here's your stupid hand. This isn't funny anymore, Ruth."

"Who's laughing?" Ruth took the hand from him and plugged it in. "There was this old movie about a kid who felt that his mother didn't love him; so he went around pretending to commit suicide all the time so she would show she loved him." Ruth shifted the knife to her snake-hand. "So one time while his mother was introducing him to this vacuous girl as a potential wife, he sat down in an arm chair" — Ruth settled herself on her haunches — "laid his hand on the table beside him, like *this*" — Ruth laid her left arm on the rim of the pit — "took a cleaver out of his pocket" — Ruth raised the laser knife and stared at it with intense concentration — "and cut off his hand." As she spoke, Ruth brought the laser knife down on her left hand.

Karlo climbed backward out of the pit like a monkey. Sioux Rose dropped her cup. Only Franklyn didn't move.

Ruth continued, "And his mother stared at him with distaste, as if he had knocked over his milk glass or something." She looked at the motionless hand and the red and pink dots all over the silk floor. She held up her smoking left stump.

"Only, he didn't really do it," she said while Karlo ran across the room to throw up and Sioux Rose stared at her in shock. "He was just pretending."

Franklyn still had not moved. Peeling away the fake blackened stump, Ruth grinned. In her living, flesh hand, she held a small key pad. "Watch."

The hand lying on the rim of the floor pit began to writhe, its fingers digging into the silk. It dragged itself toward Karlo, who was just raising his head from the waste vent in time to see it struggling toward him, leaving a trail of blood and bits of bone and skin.

He screamed and ran out of the room.

"And the best part is," Ruth said, putting the gum-plast hand on the table, "this is model three; model five, which I finished last night, is even better."

Ruth took a clear glove out of her pack and put it on her left hand. She

made an OK sign, and after a second the gum-plast hand lying on the table did the same thing. "It's a little slow, but I'm working on that."

Franklyn laughed, showing the small even teeth that reminded Ruth how much she used to like to bite his lips. He got the metal monkey from the shelf to where it had climbed while Sioux Rose went to the kitchen. "Show us what else it can do," he said.

He set the monkey next to the hand. The hand on the table crawled toward the monkey, which stared at it. Ruth made a grabbing motion. The hand leaped forward and seized the monkey. The monkey turned its head, its metal arms flailing, its crimson eyes soullessly rotating. Franklyn laughed again.

Even though she knew Sioux Rose was now standing behind her, Ruth began to squeeze with her gloved hand. The hand around the monkey tightened. Then, with a crackle of metal, the monkey's torso popped, erupting with wires and little fluffs of insulation and tiny metal rods. The light went out of the crimson eyes.

Ruth opened her hand. The gum-plast hand dropped the shattered toy to the table.

"Your point is made," Sioux Rose said behind her. "Franklyn told me you wouldn't go quietly." She set two steaming plates of moussaka on the table.

Ruth sorted through the pile of mechanisms and held up a tiny screw. "I got a new hand for precision work. Look at this! Aluminum instead of lunar titanium! What a miser. No wonder he made them so cheaply." She looked up at Sioux Rose. "Were you really going to kick me out?"

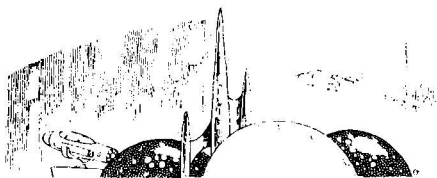
"You want to stay?" Franklyn said, stuffing eggplant in his mouth.

"You stay," Sioux Rose said, wiping grease from her chin. "I'll need enough Cy-ans for a show in two months." She smiled at Franklyn. "When will your piece be complete, dear?"

Waiting for relief to flood her, Ruth listened to Franklyn and Sioux Rose. Curiously, they seemed soulless and pseudo-dead, like Cy-ans. Experimentally, she flicked the snake-hand's forked tongue into a tomato.

"I made the Cy-ans, didn't I?" she said suddenly. "Nobody makes them like me. It's my art, isn't it?"

"Survival is an art, dear," Sioux Rose said.



The author is a consulting geologist with a special interest in early forms of life and their appearance in the fossil record. His most recent appearance in our pages was with "The Cambrian Explosion," May 1985.

As SF fans and authors, we all know what life on Earth is like. Some Earthly life ingests sulfate and exhales hydrogen sulfide; other critters use oxygen to oxidize sulfides, getting their carbon directly from atmospheric CO₂ while living in dilute sulfuric acid. Still others breathe in CO₂ and exhale methane, while a few metabolize nitrate to yield nitrogen gas. And, of course, we have all heard of photosynthesis, the well-known process in which hydrogen sulfide is split by sunlight and the hydrogen combined with carbon dioxide to make sugars, while elemental sulfur is discarded. . . .

Wait a minute. *Earthly* life? You must have the wrong planet. On Earth, plants use photosynthesis to combine water and carbon dioxide into sugars, and release oxygen. Then, animals inhale the oxygen, using it to oxidize food back to water and CO₂.

Well, OK, a lot of terrestrial life uses that cycle, too. The more complex life forms do, anyway: the multicelled plants and animals with which we're most familiar, and to which we belong. But simpler life forms — bacteria — from Earth also carry out everything cited in the first paragraph. It's really parochial to think that oxygen respiration and photosynthesis are all there is to Earthly biochemistry, or that we multicelled beings — metazoans — are the lords of the Earth. Life As We Know It (LAWKI; yet another scientific acronym! I should be ashamed of myself, but I couldn't resist) is a lot more diverse than many people realize.

In fact, the oxygen cycle is only the most recent of a number of element cycles that support entire ecosystems. The oxygen cycle was superimposed on the others, and now coexists with them; but it is not independent of them.

Repeat: not independent. In fact, if all higher living things were swept away, most of the ecological communities that these bacteria form would survive. Similar communities did so throughout most of the Precambrian time. If *they* were swept away, however, higher life forms would rapidly perish.

You've probably heard of James Lovelock's Gaia hypothesis, the idea that

in some sense the entire biosphere is an organism. These lowly bacteria keep Gaia alive. They're the janitors, the custodial service, the hewers of wood and drawers of water that keep the Earth fit for the rest of life. They keep important elements, such as nitrogen and sulfur, in circulation so that they don't end up buried and useless. They break down organic matter, changing it back into simple life forms that can be used again.

Their activities even maintain the atmosphere's composition. Take nitrogen, for example: Some bacteria release it into the atmosphere. But as the nitrogen level rises, it becomes easier and easier — that is, less costly in energy — for other bacteria to extract it again to make necessary biological materials. (These extractors are the nitrogen-fixing bacteria you've probably heard of.) So a balance is reached.

On the other hand, the atmospheric nitrogen also dilutes the oxygen. If the level of atmospheric oxygen were slightly higher, even wet vegetation would become highly flammable — and land life would be threatened with incineration. But things would never get to this point because a rise in oxygen content is also self-limiting; as fires become more common, they consume more oxygen and thus throttle their source.

These are just two of the thousands of feedback loops that keep our planet livable. Like the governor on an engine, which keeps it from spinning itself apart, such automatic, self-adjusting mechanisms keep things from getting out of hand. And bacteria are responsible for most of the feedback mechanisms.

It's a house that Jack built. We self-styled higher forms of life come last — but we are higher because we (to change the metaphor) stand on the shoulders of giants, the little critters of gigantic importance that existed eons before metazoans emerged. But how did our familiar oxygen-breathing biosphere get perched atop all this seething activity? Not by happenstance; but to see where it came from we have to backtrack first. Let's start with some distinctions.

Eukaryotes and Prokaryotes

Of late, it's become conventional to divide living things into two great groups, eukaryotes and prokaryotes, on the basis of their cellular structure. Eukaryotes have large cells with a distinct nucleus where the cell's DNA resides. Eukaryotic cells also have a number of specialized cellular structures, or organelles, outside the nucleus. All eukaryotic cells are efficient, oxygen-using metabolizers; their biochemistry is what you think of as "typical" of Earthly life.

The eukaryotes include all metazoans (plants, animals, and fungi), as well as protozoans like amoebas, and all algae (except the blue-green "algae," as I discuss below). Despite their obvious differences, all these living things run on fundamentally the same oxygen-consuming biochemistry.

Prokaryotes have small cells with no separate nucleus; the DNA is just

distributed throughout the cell. They also lack the organelles that eukaryotic cells have.

The prokaryotes comprise all the bacteria, and despite their small size and seeming simplicity, their biochemistry is vastly more diverse than the eukaryotes'.

(Indeed, more recently the prokaryotes themselves have further subdivided, into eubacteria, or "true" bacteria, and archebacteria. The detailed biochemical differences between these superficially similar "bacteria" are turning out to be as profound as between either one and eukaryotes. As with many other shape similarities in biology, the details are vastly different. Porpoises and sharks look similar at first glance, too!

Some biologists have even proposed that the eukaryotes, eubacteria, and archebacteria should each be treated as a biological kingdom; the differences between the two types of prokaryotes are *that* fundamental! Such a system would replace the five-kingdom classification — plants, animals, fungi, protozoa, and bacteria — that has become standard since the early '70s.)

But, at the most fundamental level, all Earthly life is highly related; the DNA is essentially the same, ATP (adenosine triphosphate) is used for energy transfer, and the same fundamental set of amino acids, by and large, is used to build proteins. The differences are in the superstructure. There is no doubt that all came from a common ancestor.

Who Needs Oxygen, Anyway?

To build proteins, organisms need energy. We, of course, get it by combining atmospheric oxygen with the substance of plants (and even other animals). In turn, the plants had liberated that oxygen in the course of photosynthesis, building themselves with the energy of sunlight. But before there was free oxygen, bacteria met — and many still meet — their needs with other, mostly less energetic processes.

The most familiar anaerobic respiration is fermentation, a general term for a host of different processes in which complex organic molecules are broken down into simpler ones with the release of energy.

Bacterial fermentation is vastly more varied than the fermentation like yeast's that you've probably heard of. (Yeasts are fungi — eukaryotes. Eukaryotes also carry out a few kinds of fermentation as the first step in oxygen metabolism, and occasionally, as with yeast, they stop there.) Different kinds of bacteria can break down many carbon compounds other than sugars, including nitrogen-containing compounds like proteins (ammonia is a by-product of such fermentation).

Diverse as fermentation processes are, there's a lot more to anaerobic lifestyles. Many are chemosynthetic, in which *inorganic* materials are reacted as a source of energy. In many cases, these bugs use chemically bound oxygen to oxidize organic matter, such as: Reacting carbon dioxide and hydrogen to methane and water; reducing sulfate ion ($\text{SO}_4^{=}$ — a sulfur atom with

four oxygens and two electrons) to sulfur, or even to hydrogen sulfide; reducing nitrate ion (NO_3^-) to molecular nitrogen (N_2 — nitrogen gas). (All these reactions release energy — as, of course, they must to be useful.)

There are even strictly anaerobic photosynthetic bacteria. Anaerobic *and* photosynthetic? Yup — like the bacteria described at the beginning, their photosynthesis does not release oxygen. More on this anon.

Anaerobicity also comes in degrees. Strict, or obligatory anaerobes cannot tolerate any O_2 at all. Other bacteria can tolerate a little oxygen, and still others, like the lactic-acid bacteria that sour milk, can tolerate oxygen but don't need it.

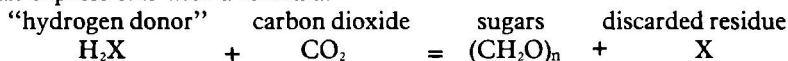
Aerobic, or oxygen-using, bacterial lifestyles are not as diverse as anaerobic. Nonetheless, they are more varied than you might have thought. Once oxygen became available, a lot of prokaryotes learned how to take advantage of it, too. Oxygen is horribly corrosive, but if you can learn to use it, it releases vastly more energy than most anaerobic processes.

Some aerobic bacteria oxidize organic matter, as do eukaryotes, but in more diverse ways. They can handle many things, like methane and cellulose (wood, cotton, and so on) that eukaryotes can't.

Other aerobic bacteria, the aerobic chemotrophs, have more bizarre tastes; they oxidize things besides organic matter! Sulfur is a favorite food-stuff, but some can also oxidize a few metal ions (charged atoms).

Photosynthesis: Light Matters!

Let's take a look at photosynthesis. Photosynthesis is a general term for processes by which living things trap the energy of sunlight to make biological materials. On Earth, most photosynthetic organisms use this energy to combine hydrogen atoms with carbon dioxide molecules to form sugars. We can express this with a formula:



X can be a lot of things. In the case of the photosynthesis we learned about in grade school, which we usually think of as *the* photosynthesis, the hydrogen donor is water and the X is oxygen.

In the case of green and purple photosynthetic sulfur bacteria, hydrogen sulfide, H_2S , is the hydrogen donor and X is sulfur. (Hydrogen sulfide is the familiar "rotten-egg" gas.) As I mentioned, these photosynthetic bacteria are also strict anaerobes, which in a way is not too surprising since H_2S is rapidly destroyed by oxygen. If they weren't anaerobes, they couldn't get any H_2S anyway. But it seems a different problem to get adequate sunlight for photosynthesis while remaining shielded from the O_2 in the present atmosphere. How do they manage to avoid O_2 , find a source of H_2S , and yet receive sunlight?

Actually, in quite a number of ways. One way is to grow in mats, shielded from oxygen by a translucent layer of cyanobacteria ("blue-green algae")

above. Such mats are an example of an entire prokaryote ecosystem. Different bacteria live in well-defined layers, each in its special microenvironment. In fact, similar prokaryote communities formed *all* of Earthly life for most of geologic history.

Other places where photosynthetic sulfur bacteria can grow are in stagnant water (either marine or fresh), sulfur springs, or organic-rich mud exposed to light. (Yeah, the gluey black mud with the awesome stench you find in duck marshes, tule ponds, and such.)

Different photosynthetic bacteria, the purple non-sulfur bacteria, use simple organic compounds or hydrogen itself as hydrogen donors. In this case, X, the leftover, is an even simpler organic compound.

(As an aside, one speculation about the evolution of photosynthesis is that it arose from sunscreen pigments — pigments evolved to shield cells from destruction by sunlight. Then, it turned out that the solar energy absorbed by those pigments could be put to use. This is an example of what evolutionary biologists call preadaptation — a simple feature evolved for a straightforward purpose turns out to be readily adaptable to a more complicated and very different purpose.)

Enter: A Toxic Chemical Waste Product

These sorts of photosyntheses, using hydrogen sulfide or simple organic molecules as the hydrogen donor, were the first. But finally, at some point, some organisms “learned” to use water as the hydrogen donor. This step took so long because although water is abundant, the hydrogen in it is very tightly held. Further, oxygen is an extremely reactive gas and would be very difficult to deal with once separated. In a totally anaerobic environment, there would have been as yet no need to evolve oxygen tolerance.

With these difficulties, what incentive was there to bother with water as a hydrogen source? Because water is the predominant hydrogen reservoir on our planet. Other sources of hydrogen are very limited, but water is for all intents and purposes infinite.

The organisms that finally accomplished this feat are the cyanobacteria. Cyanobacteria use chlorophyll A, one of the chlorophylls found in higher plants, as their photosynthetic pigment. Indeed, the chloroplasts, the organelles in higher plants’ cells where photosynthesis occurs, probably originated as cyanobacteria symbionts. (A symbiosis is a mutually beneficial association of organisms.)

Formerly, cyanobacteria were called “blue-green algae,” but that terminology is now as outdated as 23-skidoo. They are no more like true algae than a red Ferrari is like a red steamship. They are prokaryotes; they are bacteria. True algae are eukaryotic, with chloroplasts like those of higher plants.

Oxygen-releasing photosynthesis evolved from the more primitive photosynthetic paths. An extra chemical pathway, to concentrate the additional

energy needed to split water, has been tacked on to the original pathway used by the green and purple photosynthetic bacteria. (This original path is still present in cyanobacteria; indeed, a few cyanobacteria can still use H_2S instead of water if they need to.) Biochemical mechanisms to detoxify the oxygen, and ultimately to use it, also slowly evolved. Even now, some cyanobacteria are poisoned by their own excreted oxygen. They must live anaerobically, in proximity to other organisms that consume the oxygen as fast as it's formed.

All the above photosynthetic bacteria are eubacteria: All, even the sulfur-photosynthesizers, use some form of chlorophyll as their photosynthetic pigment. A group of archebacteria, however, the extreme halophiles ("salt-lovers"), also includes photosynthesizers. The extreme halophiles are just that: They live in concentrated brines, such as in tidal salt flats, and in saline lakes like the Dead Sea and Great Salt Lake.

The extreme halophiles employ a different, primitive photosynthesis. It is not based on chlorophyll but on a pigment similar to rhodopsin, the "visual purple" in vertebrate eyes. Their photosynthesis is not based on combining CO_2 with hydrogen, either. The energy absorbed by the rhodopsin is used to set up chemical gradients that drive the cell's metabolism.

Chemotrophs I — Fermenters and Their Coworkers

I have brought oxygen-releasers onto the scene, who set the stage for us high-living eukaryotes. But there are yet other chemical pathways life can — and does — exploit, and these pathways are also vital to the biosphere as a whole. Let's look at a few of them.

Fermentation, one type of chemotrophism, is a general term for the breakdown of organic molecules to release energy. In the decay of organic matter, once fermentation has gone to completion, you end up with simple organic compounds such as acetate ion (CH_3COO^-), formate ion ($HCOO^-$), methanol (CH_3OH), as well as carbon dioxide (CO_2) and even hydrogen (H_2).

Enter now the methanogenic ("methane-producing") bacteria. These strange, primitive microbes are all archebacteria and obligatory anaerobes. They reduce CO_2 and some other simple carbon compounds with H_2 (or hydrogen from other simple organic molecules). Like this:



Methane bacteria live in marshlands and the guts of higher animals; the methane in cow farts is from methane bacteria that live in the cow's digestive tract. In fact, entire ecosystems of bacteria do most of the cow's digestion; without its internal symbionts, the cow would starve if it ate just grass.

Another interesting example of symbiosis is that of a methanogen and a fermenting, anaerobic eubacterium. The "true" bacterium releases hydrogen from fermenting ethanol (ordinary alcohol), and the methanogen then consumes the hydrogen. As with the anaerobic cyanobacteria that must dwell by an oxygen consumer, the ethanol-fermenter would be poisoned by

its exhaled gas if it weren't gobbled up by its methanogen partner. The association of the two bacteria is so intimate that for a long time they were thought to be a single organism that made methane from ethanol. (Remember, archebacteria and eubacteria look alike under a microscope; their differences are in biochemistry.)

Chemotrophs II — Nitrogen Producers

A different crew of organisms attends to nitrogen. As I said a while back, one product of bacterial fermentation is ammonia. If the ammonia (usually as the ammonium ion, NH_4^+) drifts into an area where oxygen is available, other bacteria can oxidize the ammonia into nitrogen gas — or even into nitrates.

Yet other microbes, the denitrifying bacteria, break down nitrates and nitrites. They use the bound oxygen to oxidize organic matter, and release nitrogen, like this, for example:

bicarbonate

$$4 \text{ NO}_3^- + 5 \text{ CH}_2\text{O} = \text{CO}_2 + 3 \text{ H}_2\text{O} + 4 \text{ HCO}_3^- + 2 \text{ N}_2$$

nitrate sugar (part) the usual ion and nitrogen gas.

Most of these guys are anaerobic, but some aerobes can also denitrify if they're desperate.

The activities of these bacteria is why we have nitrogen in the atmosphere! Otherwise, the nitrogen would get locked up as nitrate (or maybe ammonium, depending on where it got buried). By cycling nitrogen back to the atmosphere, rather than allowing it to become buried, these bacteria ensure that nitrogen can move to where it's needed. (As I mentioned, there are still other bacteria that fix atmospheric nitrogen; that is, they use energy to force nitrogen to combine back into organic matter. And, once again, the nitrogen dilutes the oxygen enough to keep things from freely burning up.)

Chemotrophs III — Sulfur Oxidizers

Stranger groups of bacteria have lifestyles that revolve around sulfur. Some are sulfur-oxidizers. They attack elemental (or "native," as the geologist says) sulfur as well as sulfides, direct compounds of sulfur with other elements. Besides the gas H_2S , natural sulfides include many compounds of sulfur with metals. The most common is pyrite (FeS_2), an extremely important and widespread mineral. Others include pyrrhotite (approximately Fe_7S_8), chalcopyrite (CuFeS_2), sphalerite (ZnS), galena (PbS), covellite (CuS), pentlandite ($(\text{Fe},\text{Ni})_9\text{S}_8$) and many more. Some of these sulfides, when sufficiently concentrated, are important ores.

The sulfur oxidizers produce several intermediate sulfur-oxygen compounds, but the final product of complete respiration is sulfate, SO_4^{2-} . (A few can also oxidize metal ions. *Thiobacillus ferrooxidans*, for example, can oxidize ferrous iron, Fe^{++} , to ferric iron, Fe^{+++} .)

Many sulfur-oxidizing bacteria are somewhat acidophilic ("acid-loving");

indeed, some live in solutions with pH values of 1 or 2 — about like concentrated sulfuric acid! Such adaptation to acid is useful because metals, particularly ferric iron, stay dissolved in acidic solution. Under less acidic conditions, they would precipitate out as oxides and hydroxides and gum up the works.

Lots of sulfur oxidizers are also thermophilic (“heat-loving”) and can survive in hot springs where other life forms would be quickly killed. *Thermothrix*, for example, lives in neutral (neither acidic nor basic) water — but at temperatures between 60 and 75°C!

Sulfur oxidizers are diverse. One important group is the thiobacilli (Greek *theion*, sulfur). Another is *Sulfolobus*, which is extraordinarily heat-tolerant even by the standards of sulfur-oxidizing bacteria; it dies of the cold below 55°C! (It was discovered in hot springs in Yellowstone National Park.) *Sulfolobus* is an archaebacterium, and thus is completely unrelated to the other sulfur-oxidizing bacteria.

Most sulfur-oxidizing bacteria are strict aerobes, although a few can use nitrate or metal ions for oxidation if no oxygen is present. Thus, these bacteria rely on oxygen as much as any eukaryotes — but they have very different foodstuffs. (They are called “chemolithotrophic,” from *lithos*, stone.) Many are also autotrophic: They can get all the carbon they need just from atmospheric carbon dioxide; they don’t need any organic matter at all. In this independence, they’re like most photosynthesizers.

Thiobacilli are responsible for acid drainage from abandoned coal mines. Pyrite is a common accessory mineral (trace constituent) in coal; the low-sulfur coal in demand for powerplants contains little pyrite. When a mine shaft is opened, air containing oxygen can get to the coal and its pyrite — and thiobacilli find the resulting conditions a paradise. They happily oxidize the pyrite to ferric iron and sulfuric acid. Alas, most of the creatures living downstream from the old mines do *not* like acidified water. One man’s meat is another’s poison. . . .

Moreover, the iron dissolved in the water tends to precipitate out downstream to make those ugly orange stains you often see in the creeks draining mining areas. The stain is the mineral goethite (GER-tite), a ferric oxyhydroxide with formula FeOOH . You probably know it better as rust.

Thiobacilli are also important in mine leaching, a method for recovering metal (generally copper) from low-grade sulfide ore. The ore is stacked up in great heaps called leach dumps, and water containing dissolved atmospheric oxygen and carbon dioxide is percolated through. Thiobacilli living in the dump oxidize the dispersed sulfide ore minerals, thereby releasing metal ions. Thus, the water exiting the bottom of the dump (the “pregnant liquor,” as the miners call it) is full of dissolved metal ions. The metal is extracted with simple chemical techniques and the now barren liquor pumped back to the top of the dump.

A fascinating ecosystem built upon sulfur-oxidizing bacteria has been dis-

covered recently at some “hot springs” on the sea floor. Here, at certain places where the Earth’s crust is being forced apart and new magma (molten rock) is welling up, circulating seawater is heated by the magma before it exits. This hot, saline water becomes charged with dissolved material, including much hydrogen sulfide, during its trip through the rock. Bacteria living in the hot springs oxidize the sulfide to sulfate with oxygen dissolved in seawater. In turn, filter-feeding mollusks and worms situated around the vent strain out bacteria from the water passing by.

Chemotrophs IV — Sulfate Reducers

At the opposite extreme from the sulfur oxidizers are sulfide bacteria, such as *Desulfovibrio*. These critters derive energy by stripping the oxygen from sulfate to oxidize organic matter. For example:

lactic acid
sulfate
acetate
hydrogen sulfide
the usual

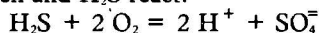
$$2 \text{CH}_3\text{CHOHCOOH} + \text{SO}_4^{=2} = 2 \text{CH}_3\text{COO}^- + \text{H}_2\text{S} + 2 \text{H}_2\text{O} + 2 \text{CO}_2$$

(Lactic acid is a common product of fermentation by other bacteria, so it’s generally available.) All such bacteria are obligatory anaerobes. Like many other anaerobes, they live in black, stinky, organic-rich muds. Many are marine, because sulfate is common in seawater.

Generally (as with *Desulfovibrio*), the sulfur ends up as H_2S , but a few bugs stop at native sulfur. I’ve already talked about the photosynthetic sulfur bacteria, which use the energy of sunlight to split H_2S , releasing native sulfur. These sulfate-reducers make native sulfur from the other direction, by splitting oxygen off sulfate.

Sulfate-reducers, like sulfide-oxidizers, participate in a number of outré ecosystems on our planet. One such occurs in the Dead Sea. The Dead Sea is a body of highly concentrated brine. Most of the salts in the brine are chlorides, but some sulfate is also present. Under the fierce heat of the Mideast sun, the surface waters of the Dead Sea become concentrated enough, through evaporation, for crystals of calcium sulfate dihydrate ($\text{CaSO}_4 \cdot 2 \text{H}_2\text{O}$ — the mineral gypsum) to form. Once formed, the gypsum crystals slowly sink to the bottom.

The gypsum doesn’t last when it gets there, however. It gets eaten up by sulfate-reducing bacteria. The Dead Sea is extremely — several hundred meters — deep in most places, and below a surface layer at most a few tens of meters thick the brine is anoxic. There’s little circulation to stir in air. Therefore, brine-tolerant sulfate-reducing bacteria (which, remember, are anaerobic) can thrive on the floor of the Dead Sea. They continually consume the sulfate brought down by the gypsum rain. In turn, the hydrogen sulfide exhaled by these bacteria permeates the deep anoxic brine. Where the H_2S finally encounters the thin, oxygenated upper water layer, the oxygen and H_2S react:



to make sulfate again!

The net effect is that no gypsum accumulates on the floor of the Dead Sea. (Some does accumulate around the edges, out of the oxygenated surface layer where the sulfate-eaters can't live.) Mostly, though, the sulfur just shuttles back and forth between sulfate ion and hydrogen sulfide.

The Effects of Prokaryotes

Well, as I've probably convinced you by now, the varied lifestyles of prokaryotes maintain the biosphere for us eukaryotes. But their influence extends even beyond their profound biological importance in decay, digestion, cycling valuable nutrient elements, and so forth.

The character of the very rocks you stand on, for example, owes much to prokaryotes' activities. These anaerobic cycles are extremely important in sedimentary diagenesis. Diagenesis (dye-uh-JEN-eh-sis) is the general term for the host of chemical and physical changes that sediments go through after they are deposited, the changes that begin changing sediment into sedimentary rock. Bacteria make a living by catalyzing many diagenetic reactions. Without the prokaryotes little would happen even though the reactions are energetically downhill. The activation energies, the "kicks" needed to start the reactions (like the match needed to start a fire), are just too large.

What happens after sediment has become buried on the bottom of a body of water? First, of course, all the dissolved oxygen in the entrapped water is consumed. Then, nitrates are reduced to nitrogen gas, after which sulfates are reduced to hydrogen sulfide. Finally, methane is generated from CO_2 and from the remaining small hydrogen-bearing molecules. (This picture is highly simplified; there are lots of side reactions.) Such processes are highly important in forming economic deposits such as petroleum and certain metal ores.

So Why Oxygen?

So, life on Earth is much more diverse than you probably thought. But with all these processes around, why do eukaryotes, the higher life forms, invariably employ O_2 ? For two reasons.

The pat reason, the one everyone's heard of, is energy. Oxygen is big-league, energywise. Most of these offbeat respirations don't release very much energy. They're fine for running a relatively simple, single-celled organism, but they couldn't cover the much larger energy overhead of a metazoan. (Either on Earth or elsewhere; don't write about sulfate-reducing aliens!)

But the energy released by oxygen respiration is only part of the story. The second, and equally vital, reason is supply. Not all anaerobic respirations release little energy; nitrate reduction, for example, releases almost as much energy as oxygen respiration. However, there's not much nitrate lying

around, and nobody has any incentive to make it. Oxygen, on the other hand, is a continually generated by-product from those diligent little cyanobacteria (who just wanted the hydrogen — to begin with, anyway).

(Note that oxygen was at first just a toxic, undesirable by-product from using water as a hydrogen donor, to assure a steady supply of hydrogen! It then turned out that oxygen allowed much more energetic sorts of respiration . . . there's probably a moral here.)

The Future

Prokaryotes also have some more prosaic economic spinoffs. I've mentioned the leaching (and formation) of sulfide ore, and their possible role in preparing the ground for oil. Additionally, some sulfur deposits are also due to bacterial activity.

But more immediate economic spinoffs are pending. In the near term, such things as the removal of pollutants from wastewater and the cleaning up of natural water bodies, even the desulfurization of coal, will become practical. Biomining low-grade ores, or even "mining" seawater, will also become more sophisticated — particularly as genetic engineering becomes more sophisticated. (SF writers, take note!)

In the longer term, when we can genetically tailor "bacteria to order," prokaryotes will maintain the environment (as they do on Earth) in closed, artificial living quarters. Space colonies will follow soon after. Prokaryotes may even help with extraterrestrial mining. And major alterations of the environments on other planets — even terraforming — are in the cards eventually.

Weird LAWKI is nonetheless vital LAWKI. The strange lifestyles of these minute organisms support our familiar, oxygen-respiring biosphere. And there is little doubt that they will be among the pioneers as terrestrial life leaves its home planet.

Some Further Reading

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BILLY JEAN AT SEA
by Sharon N. Farber
art: George Barr



Sharon Farber is training to be a neurologist; who but a neurologist would have wanted to name a cat Tabby Dorsalis? (You wouldn't want your neurologist having to explain this to you, and we won't, either.)

Billy Jean's adventures began with "Rolls Rex, King of Cars" in our September 1985 issue.

There was something in the air at the yacht harbor, a feeling of mystery, of nervous expectation, as if a big storm were coming, or a red tide, or a Grateful Dead concert. The boats huddled close to the wharf, mingling their whispers with the slap of water against their sides.

Billy Jean waited until Miss Phosphor had paused before yet another painting of yet another ship. This one showed a rowboat and a whale studded with harpoons, reminding the child of the pincushion her great-aunt had sent her for her fifth birthday. "Never too young to start, Billy Jean," Great-Aunt Matilda had written. "How can you follow in my footsteps as a world-renowned neurosurgeon if you can't sew?"

"Whaling was important in the early 1800s," Miss Phosphor began. "Las Pulgas and Cetacea were centers of the industry in California. . . ."

Billy Jean saw her chance. The other kindergartners were pushing up near the picture and going, "Oooh, look, yucch," or "Gag me." The little girl backed away silently, finally reaching a corner. Then it was only a few feet until she was out of the maritime museum and down to the nearest boat. They were still gossiping urgently.

"What's up?" she asked a large pink-striped pleasure boat. Billy Jean had been able to converse with internally-combusting engines ever since she'd rescued Rolls Rex, King of Cars.

The cabin cruiser hummed absently, then answered, "We're just discussing the new ship."

"It's a beauty. More masts than someone with mastocytosis," added a speedboat (which was owned by an immunologist).

"Check it out," said the cabin cruiser, rocking against the tide so his prow pointed into the distance. "Now is that impressive, or what?"

Following his direction, the child gasped. The ship, far down the wharf, looked like something out of the Horatio Hornblower movie she'd seen last week with Moondog. It was huge, all dark wood, with three masts and a noble squared bow.

"Who is it?" she asked.

"I don't know," replied the cabin cruiser. "Floyd here" — he referred to a small yacht with a single mast as well as an engine — "Floyd's bilingual, speaks fluent Sail, but he says the guy's stuck up and real bizarro and won't talk much; when he does talk it's hard to understand."

"If I didn't know better, I'd think he was speaking Old Sayle, the language of our ancestors," Floyd interjected. "Not really stuck up, either, just weird. Not all there, you know?"

"Far out, I can dig what you mean," agreed a small craft involved in imports.

"Wow," added Billy Jean, and she trotted along the pier and then out along the boards until she was close to the mysterious ship. A pair of women were sitting in deck chairs below it, sunning themselves and sipping mineral water.

"Like it was absolutely grotesque. Every full moon some poor woman in town would get snuffed, but would Larry stick around to protect me? No way. He'd just disappear for a few days. I don't need to hang around with selfish creeps like that, so I split. I'd finished the photo assignment anyway. Then I met Dries."

Billy Jean cried, "Mommy?"

The women glanced up. One was Aunt Barbara, in her usual Mexican peasant blouse, Indian bedspread skirt, and Japanese sandals. The other, tall, thin, tanned, and dressed in a swim suit brief enough for the French Riviera, took off her designer sunglasses and asked, "Billy Jean?"

The little girl flung herself at the woman. "Mommy!"

"Well," said her mother. "How nice to see you. I think you've grown. Have you been a good girl, brushed your teeth, and helped your aunt's commune with the chores?"

"Can we go home? Can we, huh?"

The woman laughed. "Oh no. See, I'm a photojournalist now, and I leave tonight on an important assignment."

"Can I come too?"

"No, it's too dangerous. It's for the Society to Free the Sea for Cetaceans. We're going to stop people from killing porpoises."

Aunt Barbara laughed. "You and what army? And when'd you get into causes?"

"Dries and his crew have agreed to help. His ship is so photogenic, I thought this up the moment I met him. We'll simply get in front of the fishing fleet and block them." She gestured grandly up at the ship, looming above them. Barbara followed her finger, staring up at a dark form watching them from the deck. She shuddered, then noticed the ship's freshly-painted name.

"*The Flying Dutchperson?*"

"I insisted they make it non-sexist."

"Well, be careful. Remember the *Rainbow Warrior* — ocean-going activism can be hazardous to your health."

Billy Jean, realizing that a decision seemed to have been made, began to cry. "Don't leave me," she hollered. "I wanna go! I wanna go!"

"Aha, there you are." Miss Phosphor and the rest of the kindergarten class had found her. "It's a week's detention for you, young lady!"

Everyone at Aunt Barbara's commune seemed to be feeling sorry for Billy Jean (except for Fluffy the cat, who said he liked to mind his own business, and if a kitten didn't know when her mom was kicking her out of the den, tough luck. Billy Jean had been able to understand the speech of mammals since helping out an associate of the King of Beasts, and she had found the conversation of cats to be generally unhelpful.). Sunflower and Jeff were all solicitous behavior, Tony and Barbara insisted on giving the girl extras on

carrot cake, Bambooshoot promised to get her some Vitamin E and kelp all her own, and Moondog just grumbled. "A kid should be with her mom, y'know? Unless she's in jail or on a bad trip or something."

Billy Jean waited until everyone seemed to have gone to bed, then got up and donned jeans, a Grateful Dead T-shirt, and moccasins.

Moondog was in the living room, lighting his pipe from the woodstove.

"Am I dressed okay for sailing?" asked Billy Jean.

Moondog sucked on his pipe. "I guess. Like, I don't care much for water. See, back in the sixties I was like a subject in these scientific experiments where we'd all drop acid and try to communicate telepathically with animals. I spent like weeks in a swimming pool communing with dolphins — or were they porpoises? I dunno. But then the guy in charge got off his bumper and set the dolphins free and got committed, so I had to get a job driving a dynamite truck."

He took a long drag on his pipe, filling the room with the odor of burning rope. "But I think you'd probably need a jacket."

"Okay, thanks," said the girl, going back to her room. Putting on her leather jacket with all the fringe, she climbed out the window and snuck up to the parked '62 Valiant.

"Prince?"

"Yeah kid?" replied the car. "Shouldn't you be in slumberland?"

"Naw, it's no fun there. Prince, my mommy's in town."

"I heard. That airhead. I was her car in high school, and she never rotated my tires. And *now* she leaves you in this dump."

The Volkswagen van stirred angrily. "Whaddaya mean, 'dump?' This commune is an excellent example of Aquarian philosophy in actualization, with . . ."

"Ahh, grow up. This is the future. Whatcha gonna do, kid?"

"Will you drive me to the yacht harbor?"

Prince pondered the question. "I shouldn't. . . ."

"I'll tell!" said the van.

"That does it. Disconnect his horn, kid, and go grab my key."

Prince dropped her off at the harbor and then drove home. "Hi, Billy Jean," called Floyd. "What are you doing up so late?"

"I'm gonna stow away," she answered.

"Hear that, guys?" The other boats stirred.

"Lemme sleep," muttered Floyd's neighbor, the one in imports. "I start for Chile at first tide."

"Bunch of wet blankets," Floyd muttered, and then explained to Billy Jean his best understanding of how one went about stowing away. "Have a nice trip," he called after her. "Watch out for worms and barnacles, and don't let them make you walk the plank!"

Far down the pier, *The Flying Dutchperson* gleamed in the moonlight.

Billy Jean could hear distant voices calling in an unknown language as she climbed up a rope and found a niche to hide in, curled up inside a large rope, the coils as wide as her hand. It smelled like old seaweed. She fell asleep . . .

. . . and woke to a pale, cadaverous face examining her in bewilderment. "Wat hebben we hier?"

"Hi," she replied. "I'm Billy Jean."

She stood up, only her head and shoulders visible above the coils. "Where's my mommy?"

The pale, thin faces of the sailors continued to scrutinize her.

"Mommy!" she hollered.

They began muttering amongst themselves. " 'Mommy?' *Wat is een 'mommy'?*" until one said, "*Ach! Mama. De amerikaanse vrouw,*" and a sailor left, returning with the captain and Billy Jean's mother.

"Billy Jean! You shouldn't be here. Bad girl!" She turned to the captain. "I'm so sorry, Dries."

"Is that a child?" asked the captain. He was a tall, thickset man with a weather-beaten, timeless face and a neatly trimmed goatee. "Your daughter? I haven't seen a child for . . ." He paused. "Well, for many, many years." He reached over and picked up the little girl, studying her carefully at arm's length. Then he smiled. "A real child. How marvelous."

"Now, we'll expect you to behave and not bother us," Billy Jean's mother said. "Our work is very important."

Billy Jean soon loved sailing. She climbed the masts, explored the musty holds, and watched the sailors at work. They were very interesting. If you looked at them straight on, in a good light, they were plain ordinary seamen, albeit surly and uncommunicative. But if you saw them in the twilight, or out of the corner of your eye, they were different — articulated skeletons, strange red fires glowing in their eyes. One of them looked just like the skull on Billy Jean's Grateful Dead T-shirt. She took to following him around whenever possible. She especially liked it when it got hot and he took off his shirt, so she could see the sky through his rib cage.

Billy Jean had heard about skeleton crews, and she was glad she'd finally seen one.

Her favorite sailor, Wim, eventually got used to her presence and even started teaching her to repair sails. Billy Jean was sure her new sewing skills would make Great-Aunt Matilda happy.

For the most part the sea was quiet; they were long out of sight of the California coast, and passed only a few ships, far in the distance. The other ships did not hail them, almost seeming to avoid their presence. Once they passed a small boat, drifting, its solitary occupant wearing a large dead bird about his neck. The crew lined the rails and shouted encouragement to the man, who waved back.

The captain shook his head. "You'd think with all the publicity, they'd

learn to leave the damn birds alone," he muttered.

The fourth day out they sighted a trawler, and began to close with it. Billy Jean went forward to where the captain was steering the big wheel.

"We're busy," her mother said, checking all her camera lenses. "That boat fishes for tuna by following the porpoises, and then they lay out a big net that catches the tuna and kills the porpoises too."

"She's no bother," the captain reassured her. "Well, little one, do you want another story?" He like to put Billy Jean on his knee and tell her about storms, and pirates, and Holland during the Renaissance.

Billy Jean asked, "Why does Wim have a snake in his eye?"

"What!" the captain let go of the wheel, quickly regaining both it and his composure.

"Billy Jean, don't be rude. . . ."

"No — a snake, you say?"

"Yeah, only sometimes it just curls up in his ribs 'n' stuff."

"What about Hans?" He pointed to the boatswain. "Is there anything about him?"

"Don't encourage her, honey."

The little girl looked sideways at the boatswain. "He glows."

"And Pieter?"

"You mean the guy with no head?"

"Ach!" The captain turned away, muttering to himself.

"What kind of manners have you learned from your aunt and her lowlife friends!" her mother said angrily. "Now go below, young lady. We have to get out the boats and stop the fishermen before they kill the porpoises."

"Can I go too? Can I?"

"No."

The captain turned back. "No, let her come." He continued to stare at Billy Jean.

The fishing trawler was rapidly closing on a herd of porpoises, themselves following a school of tuna. *The Flying Dutchperson* hovered at a fair distance while lowering the three ship's boats.

Billy Jean's mother leaned against the railing, aiming downwards at the boats. "Don't smile," she called. "Look dedicated and determined. We'll do more closeups later."

"Ja," agreed the captain, falling backwards onto a seat as Billy Jean barrelled down the ladder and tumbled into his arms.

"Let's go."

He chuckled, tousling her hair, then shrugged up at the woman on the deck. "Your little one is quite the battle maiden."

"I'm gonna talk to Flipper!"

The rowers headed toward the trawler. Suddenly they were surrounded by laughing, leaping porpoises, cavorting about and splashing the humans.

"Got one," an albino porpoise called.

"Oooh, he's soaked."

A large porpoise belly-flopped beside them, showering Billy Jean and the captain with salt spray. "Two with one blow!"

The first boat was now very near the trawler. The second mate (Pieter, the one who really had no head) help up a bullhorn and began to read a statement which Billy Jean's mother had prepared.

" 'On behalf of the environmentally conscious individuals of Starship Earth,' " he read with difficulty, " 'we urge you to cease your genocidal actions against our sentient brothers of the sea and . . . ' "

The manifesto ended with a loud smashing noise as the fishing ship clove the boat in two, scattering sailors into the sea.

"That's not fair," Billy Jean howled.

The captain waited while the second boat picked up the drifting seamen, signalled them to return to the ship, then sat dejectedly. "Your mother said they would stop. . . . We must go back to the *Dutchperson*."

"They'll kill Flipper!"

"There's nothing we can do."

Already the trawler was starting to lay down its nets. Billy Jean ran to the stern and shouted at a nearby cavorting porpoise.

"Hey — run!"

"Huh?" asked the puzzled animal. "Run?"

"You have to get away."

"Why?"

"They wanna kill you!"

"Why?"

"Because," she shouted. "Now run!"

"I can't. I don't have feet."

"Then swim."

"I am."

Another porpoise, an elderly one with slightly manic eyes, swam over and chittered at the girl. "Hey, calm down kid. Mellow out. Go with the flow."

Pleased to have a stationary target, she leaned over the edge.

"Those fishermen are going to put out nets."

"My name's Harvey."

"I'm Billy Jean." She was conscious of the captain and crew staring at her as she conversed with the beast. "You have to escape."

"I know it's weird, but I like people, I really do. I mean, it's not your fault you can't swim well. It's just poor evolution, dig?"

"Harvey, you gotta . . ."

"In fact, some of my best friends are human. I was a scientist, did research into communicating with people in swimming pools, but I guess I did a little too much acid and — oh wow, gotta go catch up with the gang."

"You guys have to escape."

"Goodbye," Harvey called as he leaped away, flipping water in her face. "Goodbye, Billy Jean, and try to learn to unwind. Hey, wait for me, fellas!" She sat back, beginning to snuffle. "They won't listen. . . ."

The captain patted her on the shoulder. "Of course they won't."

They gazed sadly at the trawler and its nets.

"All the creatures of the sea avoid us," said the captain in a melancholy voice. "Throughout the long years, only the dolphin has kept us company, swimming with us awhile on our ship's endless voyage. . . ."

"Ship!" cried Billy Jean. She grabbed the captain's jacket. "I gotta get real close to the other ship."

"You saw what they did to Pieter's boat."

"Please? Pretty please?"

The captain looked into her eyes, then stared at the horizon. Finally he sighed. "The years must be affecting my mind. To have agreed to this task, to have let you stay aboard — all the actions of a crazed and desperate man. All right."

He began issuing orders in staccato Dutch. Grumbling, the sailors bent their oars toward the trawler. They could see the fishermen looking down, laughing at them.

Harvey flipped into the air before them. "Hey Billy Jean," he called. "Ya dig tuna? Why did the tuna cross the shoal?" and landed with a joyous splash.

Ignoring him, Billy Jean stood tall, shouting, "Hey, you! Fishing boat!"

There was only the sound of engines and the sea, and the grinding motors of the nets. Then the trawler rumbled, "I'm a ship, not a boat."

"Well, you'd better stop."

"Who's going to make me?" Already the ship had started swinging in their direction.

"You'd better not hurt any dolphins. Or us either," she added belatedly.

"Give me one good reason," the ship said, beginning to head straight at them.

" 'Cause I'll tell Rolls Rex!"

There was a sudden screech of metal on metal, and the noise of the engines promptly died. The ship swung with the waves.

"Everything's okay now," Billy Jean announced.

The captain rumbled her hair again. "You are an amazing but very odd child," he said.

"Lucky their engines failed," he told her mother later. "And why does your daughter yell at ships?"

They left the becalmed trawler, setting off to follow the school of tuna and its cheerful shepherds. The next dawn they spotted another masted ship, silhouetted against the sunrise. By noon they met, and a boat from the other ship came over. Billy Jean thought she could see the horizon through the

other ship.

A dreamy-eyed man clambored aboard. "Have you seen a white whale?" he asked the crew.

"*Wat?*"

"Whale," he repeated, shaking his head and going to the captain's cabin.

An hour later they emerged, Billy Jean's mother wearing her best yachting clothes from the Land's End catalogue. The man from the new ship was carrying her suitcases.

"Bye, Billy Jean, be good," she called. "Be a dear, Dries, and take her back to her aunt's commune in Las Pulgas."

"But you can't leave," the captain said.

"I have to — what a chance! Dolphins are photogenic, but whales . . . whales are awesome."

The captain stood, incredulous. "I had hoped that you loved me."

She stopped, turning with a surprised look on her face. "Now Dries, I thought we were beyond those boring old possessive concepts. Give us a kiss. . . . Bye, all."

The captain stalked over to the stern, taciturnly watching her departure. The sailors slumped about dejectedly, or else stared at the little girl with less than pleasant expressions.

Finally the child went over and tugged on the captain's sleeve. "Are you mad at me?" she asked.

He forced a smile. "Angry at my little Valkyrie? No, little one. I am merely sad." He stooped down and looked her in the eyes. "You see, we have been cursed. I thought your mother might free us from the curse, but I was mistaken.

"We must sail for all eternity, until I can earn a woman's love."

Billy Jean said, "But I love you, Mr. Captain."

He cried, "What? You do?"

He stood up, flinging his hands up towards the sun. "She loves me!"

The sailors stopped in their tracks, gazing hopefully toward their captain.

"I said, 'She loves me,' " he repeated.

There was silence. Even the howl of the wind and the roar of the waves ceased.

Suddenly a pillar of light issued forth from the sun, cutting through the clouds in its arc, ending on the forecastle. A figure formed in the light: winged, immensely tall, robed in white.

The captain walked over to the manifestation and stood before it, hands on his hips.

"Well? Will it do?" The crew looked on anxiously.

The figure held up a clipboard, scrutinizing it for a moment.

"I know I'm trying on a technicality, but it's been so long, and I've tried, I've really tried. . . ."

The glowing figure of light took out a gold Cross pen and made a mark on

its board. Looking up, it nodded, reemerging with the pillar of light, which blinked up and back into the sun.

"Hoorah!" the sailors cried.

Then everything changed. The sailors were unabashed skeletons now, and the ship was a framework of rotting timbers.

The captain, transparent against the sky, looked at Billy Jean. "*Tot weeziens*," he said. And then captain, crew, and ship disappeared; and Billy Jean was in the sea, tossed along the peak of a wave.

Gasping for breath, the little girl spat out salt water and tried to stay afloat. She felt something under her feet, and a porpoise surfaced, buoying her up.

"Everything cool?" asked Harvey. "Okay, groovy. Hold on."

He dove, the child clutching a fin and holding her breath. They emerged from the deep green into an area of glowing azure. Mermaids giggled at them. Billy Jean gulped, and found she could breathe normally. An honor guard of mermen, astride huge orange sea horses, escorted them to a bejewelled cavern.

A huge green man with wildly flowing beard grinned at her from his throne of shells. "Hello, Billy Jean," he said, pointing a sharp trident at her. "How do you like my undersea realm?"

"It's neat," she replied.

He held out a hand, a nereid slapping a scroll into it. More merpersons blew fanfares on conch shells as he unrolled it and read. "For services rendered to porpoisedom and for meritorious performance far beyond your years, I, His Majesty etc. etc., hereby grant you that henceforth and forthwith and hereafter you shall be able to breathe underwater as well as above water. Thank you, that will be all — enough trumpeting already. Take her home, Harvey."

"Thank you," the little girl said, but the regal gentleman had already turned to a mermaid holding a stenographer's pad. "Next item — it has come to my attention that there is a certain tuna with a pronounced death wish. . . ." He paused and called, "Oh and Billy Jean? Don't try this during your water safety test. Miss Phosphor wouldn't like it."

Moondog was seated on the pier watching the sunset over the Pacific when the porpoise arrived, making a large splash to attract his attention.

"Moondog? Gimme a hand."

"Beej, that you?" The old hippie leaned down and pulled the child out of the water, then put his jacket around her. "Where've you been all week? And what were you doing in the water?"

"I was talking to Harvey."

"Harvey? Is that Harvey? Wow, I haven't seen him in years."

The porpoise rose on his tail and danced away, chittering his goodbyes.

Moondog waved as the porpoise disappeared from sight. "Gone. Geeze,

and I really loved the guy.” He shrugged. “Well, you know what they say, ’tis better to have loved and lost than never to have loved at all.”

“Uh huh,” said Billy Jean. “Can we go home now?”

“Okay,” Moondog picked her up, then stopped and looked back at the ocean. “Hey,” he yelled. “Harvey you turkey, you still owe me for that last batch of acid!”



WHEN THE VIKINGS OWNED THE MYTHOLOGY

When the Vikings owned the mythology,
only giants were made of ice.

Now dwarves, cretins, even politicians
can be quick-frozen
like bags of bacteria wrapped for storage.
No doubt,
when they come out of the cold,
like divine retribution,
they will be greeted like celebrities
and lionized like Watergate criminals
on a lecture tour.

When the Vikings owned the mythology,
the frost giants came out of Niflheim
at the end of the world
and killed everything
that had been brave, or noble, or good.
More than likely,
the Vikings were right.

— William John Watkins

MULTIPLE ORIGAMI

by J. B. Allen

art: Roger Raupp



Herewith another of those slightly out-of-the-ordinary tales from our favorite bar, McGuffins No Apostrophe. A couple of the regulars have recounted odd stories in our March 1986 ("Wash and Were") and July 1986 issues ("Street Talk").

As for this one, well, we caution you against spending too much time at your local Kentucky Fried Chicken, K-mart, or. . . Enough said: read the story, and you'll understand.

"My first teleportation," the newcomer said solemnly, "occurred in the second stall of the men's room of the Howard Johnson's in Duluth, Minnesota."

I glanced over my shoulder at him, and realized that I hadn't seen him come into the bar. "This has a decidedly Freudian ring," I said offhandedly. Sure enough, he *looked* like the kind of guy that would get teleported from a men's-room stall. He was so skinny he could tread water in a test tube, and if his eyes were any closer together, they would have been on the same side of his nose.

I was about one gin and tonic away from the little man that sneaks across your tongue in muddy sweat socks. Russ O'Neill was on the stool next to me and completely preoccupied with something under his fingernail. So far he had exhausted our supply of things small enough to jam under it.

Aquinas, the Zen master of the margarita, didn't break pace as he coasted his cloth down the varnished bar. He just glanced at me with a half-wink and a quarter-smile. He always knew when there was an incredible tale in the air.

Slow nights at McGuffins No Apostrophe will do strange things to you. Everybody was ready for a story.

"I'm really glad I found this place," the stranger said as he looked around, his head bobbing like a hungry pigeon. "I searched everywhere for a place that was unique, that didn't look like anyplace else."

"That's one way of putting it," I said. The walls were a gallery of unusual things, some very innocent, some that only looked innocent, and others still that would raise hackles on Atilla the Hun. Whenever someone has a really memorable story, he'll leave behind a McGuffin, a memento of sorts, that captures the essence of his tale. It also gave a tiny shred of credence to tales that needed all the help they could get. Like the pair of steam-powered pace-makers or the Jell-O pipe wrench (lime, of course).

"Never would have gone into that bathroom, had I known. Although I'd suspected for a long time." He lit a Chesterfield and took a long draw, gesturing with it as he spoke. Like he was doing a bad Rod Serling impression.

He spoke slowly, mostly addressing his scrawny image in the mirror over the bar. "I think it happened to me a couple of times earlier, but I can't be sure. A couple of times when I walked out of a bookstore I could have sworn it wasn't the one I'd gone into."

Russ nodded absently, his cuticle vendetta the only thing on his mind.

Great, I thought. A guy who gets lost in bookstores. If that's strange, I'm the strangest guy on the planet.

"Not a regular bookstore, the kind with personality, but a chain store. Where all the same titles are in the same place as they are in every other store in town."

"Or another part of the country," Russ mumbled without looking up.

"That's it," the stranger said, waving a finger at us enthusiastically. "That's exactly right."

Russ had his Swiss Army knife out, unfolding a very arcane-looking blade. If he tied it to a long stick, he could use it if the Crusades ever came back.

"I took a philosophy course once," the stranger said, making it sound like a trip to Stockholm for the Nobel Prize. "The guy who taught it made a really interesting point. Several, actually, but one sticks in my mind. Especially after what's happened."

I rattled my glass, trying to coax a last couple of drops off the ice cubes. When I stopped, I realized that another drink had appeared by my left elbow. I looked around for Aquinas, and found him clear at the other end of the bar. Before I could do anything about my amazement, the odd little man spoke again.

"This professor said that if two things were completely alike, that is, perfectly identical, then they were the same thing."

"Well, yes," I said slowly in my most tactful voice. "Of course, one of the things they'd have in common would be location."

"Yeah, that fooled me too," he said with a quizzical scratch of the chin. "Think about, say, Kentucky Fried Chicken outlets. They all have the same seats, the same wallpaper, the same *everything*."

"Except location."

"That's what I tried to tell myself until I found out about *them*."

"Them?" I queried. "Like the movie with James Whitmore about the giant ants?"

"No, stupid. Magenta holes."

I heard a Swiss Army knife clatter to the bar behind me. One mention of comic-book cosmology and Russ was hooked.

"Every time a cosmologist opens his mouth," the man said, "the geometry of the universe gets a little less stable. At first I thought magenta holes belonged to the Bermuda Triangle crowd. But I've been through them."

"Makes sense," Russ muttered behind me. "Black holes suck up matter, white holes spew it out. Naturally, all the chintzy plastic pastel places would produce some kind of infinite connectivity."

The odd man gave a confident half-sneer and leaned toward us on one elbow. "I thought I was crazy," he said. "I went into the bathroom in Duluth and came out in an identical Howard Johnson's in Little Rock. It was four days before I convinced myself that I hadn't gone into some kind of trance and driven there."

"What finally convinced you?" I asked.

"My Buick was still in Minnesota," he said with an ominous leer.

"You could have caught a bus, say, while you were in a trance."

"Alex, you haven't tried riding the bus in a while," Russ said behind me. "It takes all your concentration just to get around the winos in funny-colored shirts."

The man continued, oblivious to our debate. "I went back into that stall

and sat until I had a permanent second crease in my backside. Nothing happened."

He waved Aquinas down and ordered a Manhattan.

"I caught a bus home, and after the expected harangue from my wife, I slowly but surely forgot about the whole thing." He shook his head reflectively. "Forgot it, that is, until a couple of weeks later when I caught an east-bound K-Mart headed for New York."

His drink arrived. After a noisy sip, he set the glass on one of those napkins with a cartoon of a hitchhiking nude. I couldn't read the caption, but I'm sure it was about as funny as those things usually are.

"I wandered around the city for a couple of days and saw the sights. Then tried to get back the same way I'd come. No dice."

He took another long drink, the ice already peeking through the dusky liquid.

"Back on the bus I went. This time when I got home, I got more than a stern warning from the missus." He finished the drink. Record time, I think, if we kept records on that sort of thing. "She promised me that if it happened again, I was out.

"I stayed away from places that looked too much like other places. I got gas at off-brand stations. I never set foot in fast food establishments or a convenience store. And forget malls."

Aquinas gave him an inquiring glance, which he answered with a request for a Singapore sling.

"I spent a lot of time reading up on relativity and so forth. Like how three-dimensional space has its own surface geometry and the way it gets distorted like two-dimensional objects."

As he spoke, he folded the napkin in front of him. A twist here, a pinch there, ends gathered just so.

"I began to wonder if there were places in the universe that I could visit if I could just find a spot that was enough like them." He gave the napkin a final triumphant fold and opened it out. It looked like a hunchbacked aardvark.

"That's supposed to be a swan," he said despondently. He took a sip of his Singapore sling and smacked his lips.

"Anyway, while I was riding high on these celestial thoughts, disaster struck.

"As an act of appeasement, I took my wife to dinner. We very carefully avoided all the chains and restaurants in look-alike hotels. She suggested Chinese. I said it sounded delightful.

"We headed down to Chinatown and found a place we hadn't visited in years. It was terrific. Like being newlyweds again. Space-time tensors were the last things on my mind.

"Then, with a mouthful of quickly cooling Wan-ton, I realized what a fool I'd been. How could I be sure that there wasn't an identical restaurant in

Hong Kong?

"Without a word, I bolted for the nearest door. Which happened to lead into the alley behind the restaurant.

"It ended in a dead end. Frantically, I ducked into a tailor shop. It was dark and dirty, filled with haggling in a language that sounded like somebody tuning up a guitar. But I thought I was safe, at least. I hustled through the shop and into the street and the next thing I knew —"

"The Far East," I finished for him.

He sighed. "Sixteen and a half dollars in my pocket. No passport. Not even a believable story I could try on the American embassy. It was hopeless.

"I wandered the crowded streets in despair. There aren't any Radio Shacks or Motel Sixes over there. Every building was a potential portal to Tibet. Or worse.

"I called home, reversing the charges. It was answered by a tennis-instructor-type voice, and the call was declined."

He looked into his drink and smiled wistfully. "I blew the money I had on a really exotic dinner that had probably been somebody's German shepherd that morning.

"As I ate, I began to reflect on my problem. I couldn't hold down a job, since I'd never know if I was going to teleport before I could collect my paycheck. Stealing to live was out, since I couldn't count on when or where I could escape.

"And what if I got caught? The inside of prisons are a lot alike everywhere, but a world tour of jails wasn't exactly an idea that appealed to me.

"It came down to something that was a thin cut above prison. I found the cheapest, noisiest night club in town and planted myself on a stool.

"As the days passed, my clothes got pretty gamey, so bad in fact that the waitress quit asking me if I wanted anything. I lived on greasy cocktail peanuts and water for two weeks. But I didn't teleport.

"Then, one morning, I stumbled into the street, but it wasn't the street I'd come in from. Success at last. I was in L.A."

Aquinas lifted a bowl of peanuts off the bar and poured them into a trash can. If another cocktail peanut ever shows its face in McGuffins again, I'll let you know.

The little man caught his eye. "A universe. Please."

I inclined my head toward the man. "Aquinas has some great stuff up his sleeve, but —"


"It's a drink," he explained. "Ounce of vodka," he said. Behind him Aquinas had already gathered up some bottles I couldn't identify. "One and a half ounces of pineapple juice, half-ounce of pistachio liqueur, ounce and a half of melon liqueur, half-ounce lime juice." There was a mechanical buzzing sound from the end of the bar. "Run it through the blender with some ice." As he finished, a glass filled with slushy green liquid came to rest in

front of him. He took a tiny sip and smiled broadly.

Aquinas bowed a microscopic bow.

"That's it, then," the stranger said. "That's how I got here. But I'm done. Finished. If the great Travel Agent in the Sky wants to move me, it'll have to be by hand. Cause I'm never going into another —"

Later, and on into the night, we established that, the moment he'd vanished, everyone had been looking in some other direction. All that was left was that strange green drink, now the official drink of McGuffins, or the McGuffin of McGuffins.

We all wonder, and everyone has his own theory about that final, eternal question: Where is the other McGuffins? 

DAEMON

Draco van Gogh swirls from the ember's tip
Of a cigarette in a Pont Arles café,
Leads the dreamer's eye to claw-scratched fields
And trees that sprout like green flames from its throat,
Swirls the blue sky in a tunnel of hypnosis
Toward the moon (that high lagoon of fury),
Lets him hear the beating of its tail and wings
In the sullen thumping of a peasant's fist on wood,
Cracks the mouth of time wide open, hangs
The sun in a scream, flushes decibels of crows
To blunder the artist homeward toward his brushes.
These he dips like dragon's teeth
Into molten gold, and carbon, and vanadium,
Until his retinæ glow with forging worlds;
And when the painting knife requires red,
The dragon whispers in his ear with torching pain
That van Gogh, in defense, must amputate,
But with the swirling color paints the hat
That covers someone else's burning ears.
Noticing a sound in the shell of flesh,
He sends it calmly through the mail
To eavesdrop on the crickets
And his true love's merry voice.

PRIMITIVES

by Robin W. Bailey and Rob Chilson

art: John Lakey





I became a man the day the spaceship landed.

The Naabutari stood on the bank of the river and watched me as I waited knee-deep in the shoals. Six lonely years on the fringes of their lives; now I had taken the plunge, and stood ready to perform the deed required to make me one of them.

I waited for the *loh* to come. The Tenkranah River was their spawning ground; at certain times, it churned with them. Now was not that time. But one would be enough.

The village lay back from the river's edge, somnolent under the immense trees that shaded it from the enervating sun. The Naabutari men squatted naked in the mud, inhumanly patient, silent. Behind them stood the females and the children.

The enduring quiet was broken only when a sharp-toothed *lix* looked out of the leafy jungle on the far bank and squawked derisively at me. It stuck out a long, slender tongue and disappeared in the foliage.

I looked back at the Naabutari, so different from myself and so similar. Did my bronze skin still seem so odd to them? Or my bare back, so different from the braided dorsal hair trailing down their spines from the napes of their necks? The sunlight that filtered through the branches shimmered on their saffron flesh. If I was still odd to them, to me they were beautiful.

Something brushed my ankle. I peered into the dappled, slightly roiled water. This time the hairs rose on my neck; a cool gliding oiliness slithered between my feet. I drew a slow breath to steady my nerves.

The *loh* was a monster of its kind, nearly a meter long. I felt a tremor in my hands as it snaked over algae-covered stones to coil around my ankle. Its gills fanned gently, its mouth opened in what might have been a yawn. It was actually a tooth-sharpening gesture: even through the water I saw its three fangs gleam.

I did my best to imitate a tree while wishing to hell I had one to climb.

The *loh* looked mean and slick, evil. To the Naabutari the venom of its bite was not usually fatal, though for three or four days the victim wished it were. Me, with a different blood chemistry? I couldn't be sure.

If I backed out now, they would treat me with contempt, good-natured contempt, but contempt all the same. Except perhaps for Nichityi. I couldn't guess what she made of me, though she followed me constantly, always asking questions.

But six years was hard on an outsider. I wanted to be one of the Naabutari. Today I could change it all.

The *loh* moved, nosing up and down my calf. It slid forward a little to wave its fine whiskers over my other ankle. The native fauna often found my alien smell curious.

In my mind, in dreams that bordered on nightmares, I had practiced this a thousand times. I knew what I must do, what the Naabutari expected of me. The *loh* seemed unaware. I looked for the place right behind its head.

I quivered with the effort to remain calm. If I missed, or if it sensed my quivering and struck. . . .

Lunge!

The *loh* twisted wildly, coiled around my arm. For a panicky moment I feared it would wriggle free of my grip behind its head, turn, and bite me. I squeezed harder, trapping its gills shut, and dragged it from the water into open air.

A cheer rose from the Naabutari.

But the *loh* uncurled suddenly and gave a terrific flop. Out of the water the creature was unexpectedly heavy. It thrashed again, and I fell with a whooping splash, hearing as I sank how the cheers from the bank turned to dismayed cries.

I still had the damn thing, though. It thrashed and pounded, and its tail caught me a ringing blow on the left ear. I grabbed it with both hands as tightly as I could. Its gills couldn't function. It would weaken soon — it had to!

I barely got my feet under me and my head above water. The Naabutari screamed with excitement. A chant rose from the exuberant women: "The Brown One! The Brown One!"

My breathing was ragged and fast, and my ears roared with the pounding of my blood, but I heard them! I squeezed the *loh* tighter still, gritting my teeth, until its struggles finally began to weaken.

I took a moment to let the heaving of my chest ease. This wasn't over yet.

The tumult on the bank quieted suddenly. They knew what I had to do, and they waited again with that inhuman patience. I scanned the imperturbable faces and saw her, then. Nichityi crept forward almost into the ranks of the men. She smiled.

Had I taught her that, I wondered? Did she smile before my coming? It was such a human thing to do. Why did she smile at me like that? And why did it stir me so?

I looked at the *loh*. It wriggled halfheartedly in my grip, no longer much of a danger. Every adult Naabutari male had stood where I stood now. Each had captured his *loh*. It was the test of his manhood, like killing a lion among ancient Masai on Earth. In the eyes of the Naabutari I was almost a man now. I looked back at Nichityi and returned her smile.

I had thought the next part would be the hardest of the rite. In dream after dream I had turned away. Now, it was not so difficult. One hand slid down the length of the *loh*'s slick form. I lifted it to my lips. It had no odor, nothing to wrinkle my nose at as I had done so often when I thought about it.

I bit sharply into its flesh just behind the gills. Its tail lashed my arm, my shoulder, and the back of my head in sudden throes of pain, and I nearly fell again. The Naabutari shrieked enthusiastically as I tore a large bite free and yellow blood splashed my face and chest. I gulped convulsively. The *loh* tasted of mud, warm and bitter.

Its blood ran down my hands and arms and stained the surface of the water. I closed my eyes, fighting the urge to vomit, and sent my front teeth deep into the raw meat, finding the spine. A kind of madness came over me. The rite didn't require a second bite. Yet I bit and chewed until the spinal cord snapped. I bit again and swallowed, choking it down.

Then, in a fit I jerked and strained until the *loh* separated. In one hand I held its head; in the other, the slack length of its body.

The Naabutari threw up their arms and surged into the river, dark braids swinging, the vestigial gill slits under their chins gleaming and swelling with emotion, transparent membranes nictating over roundish, wide-set eyes as they splashed water, yelling. Rensitya, the village headman, rubbed a hand over the sex slit on his belly and took the *loh*. The men pummeled me lightly, and the women crowded in, making strange moaning sounds: singing. A boy-child grabbed me about the knees and put a hand playfully up to my slitless stomach.

Nichityi appeared before me, raising a tawny hand to touch my face. She smiled again, took the *loh* from Rensitya, and carried it proudly ashore.

Rensitya clapped an arm about my shoulders and led me out of the water. Six years, and at last I belonged again. Earth had abandoned me, but it didn't hurt so much now. I had a people again. I was the Brown One. I was Naabutari.

I felt good.

Surrounded by my new brothers and sisters, I strode into the village. Pots of the native brew, *queraln*, were brought out while the older women prepared the meal. Nichityi emerged from the hut where single women slept, carrying a sharp, stone-flaked knife. Carefully, she fileted the creature, putting the pieces in the communal pot, and rose to return the knife to the hut.

I thought of introducing them to hamburger. If they mixed the *loh* meat with other, better-tasting meat, it might hide that bitter flavor and make it more palatable.

But no, they'd have to make that advance on their own. And what the hell — perhaps, to them, it tasted just fine. Rensitya clapped my back again, raised the *queraln* to his lips, drank, and passed it to me. It was worse than fire, and I didn't care!

Even as we sat laughing and talking, looking out over the river, the *Belverius* landed.

Rensitya jumped up in alarm. "Brown One! What was that?"

I'd caught the gleam of the repulser fields as the ship dropped rapidly through the sky, appearing and disappearing intermittently among the high branches of the trees. I leaped to my feet. Six years! Six years they'd stranded me here, then to return on this day of all days!

It was only to have been a year, time enough to start an ethnological study and draw a few conclusions while the *Belverius* sped home to report our dis-

covery. A new planet, and an inhabited one at that! I didn't mind the first year. I'd been trained for that, and the study had absorbed all my time and interest. The second year passed, and the third. Maybe they didn't make it home, I'd told myself. Maybe there was an accident.

Well, here they were at last, and I was in a red rage. They were homing in on the transceiver in my hut, of course. But to land openly like that in broad daylight where the Naabutari or any of the other tribes on the planet might see! That was clear and flagrant violation of Council policy on primitive worlds!

The rest of the tribe, including Nichityi, had gathered closer, all staring at the sky or upriver where the *Belverius* had last been visible. I turned to Rensitya, too disturbed to make a proper excuse. "I'll be back before night-fall," I told him. The jungle was not safe after dark; he needn't remind me. "Save some of the *loh* for me," I said to Nichityi.

Rensitya regarded me. His face wore a troubled expression, almost human, that had become readable to me after years among them. Uncertainty flickered there, and fear. For me? I was Naabutari now, and it was permitted to embrace him. Yet, I restrained myself.

Nichityi watched as I left them. I could feel her gaze on my back. As I passed among the huts, I glimpsed the face of the Pale One, the wise woman of Rensitya's Council. She stood naked in the entrance of her hut, the oldest woman in the village, bent and gnarled as any tree in the jungle. She eyed me as I passed, but said nothing.

I had built my hut in the jungle some hundred meters from the village. I went inside long enough to check some items I hadn't touched in years. No warning message had arrived on the hidden transceiver buried in the floor vault. The channel was still open; I'd always kept it open in silly, vain hope that someday they'd come. Well, they'd come, but they hadn't bothered to call first.

I left the hut and headed upriver.

I met six of the crew on the way. Not only had they landed in daylight, but they'd set the damn ship down in easy walking distance of a native settlement. The stupid, stupid fools!

Four men and two women came down the path in bright uniforms of synthacloth, bristling with scanners and recorders and sidearms. They saw me and waved enthusiastically, calling my name.

Stivit led them. He bounded forward, and I had time to notice that he was wearing command-rank insignia.

"Baker!" he cried, holding out a hand and grinning like an ape. "You old son of a —"

I swung, nearly connected on his mouth, but he pulled back faster than he could've in the old days. He caught my arm. I tried a left for his gut, but one of the women was there, turning my blow, locking the wrist. I'd been among the Naabutari too long; I'd forgotten human women will fight as

readily as the men.

They had me pinned, helpless, and they weren't even angry.

"What the hell, Baker? You all right? Don't you know us?"

"*Captain* Stivit it is now, huh?" I said, raging. "What the hell do you mean landing so goddamn close to my study village! Rensitya could've hit your ship with a rock before it touched down. I'll wring your ass before the Council —"

"Hey, now, buddy, relax. You don't know, of course." Stivit scratched his chin. "Matter of fact, knowing you, you're not going to like a little piece of news." He looked shamefaced.

"What news?" I said, easing off, suspicious.

Stivit looked around in an appeal for help, and one of the women — I didn't know her — answered for him. "They disbanded the Native Worlds Policy Council five months ago. System Security Agency is now the authority for outsystem."

It was like a blow to the belly. Stivit gave me a few moments to adjust. I'd known — six years ago when we first departed Earth System — that there was pressure on the government to liberalize colonization rules. Yet, we never expected the Council to lose its charter!

Six years was a long time. I blinked, drew a slow breath. "How long has it *really* been, Stivit?"

He knew instantly what I meant. "For the *Belverius*," he answered, "eight months. We had a drive rupture on the way back. We had to patch it up and then limp home." He let go of the arm he'd been holding and signaled for his female strong arm to do the same. "I'm really glad, Baker, to find you alive, still young. . . ."

FTL travel has some funny side effects. I'd fully expected to live out my life with the Naabutari. I figured the *Belverius* had been lost, never made it home to report our discovery. It had gotten home all right. Seven months late. Only for me, it was six years.

"Six years," I echoed. "How much time on Earth?"

"About the same," said one of the other crewmen.

Stivit grinned sheepishly. "They've re-established the old Expansionist policies. And our little side jaunt through time didn't keep us off the rosters for promotion. They gave me the *Belverius*! We're here to scout a colony site."

I nearly took another swing at him. A sudden vision of the Naabutari twenty years from now filled my brain. Another vision at fifty years. There was a small sound back down the trail. An animal? Or were the Naabutari already sneaking up to see the strangers and their fantastic technologies?

"Damn it, Stivit, you know what happened on Alpha Delphini Two!"

"Art," he chided. "Speak Earthan."

In my anger, I'd slipped back into Naabutari speech. In fact, when I calmed down a bit it surprised me how much it made my throat hurt to use

the polyglot we jokingly called Earthan. I'd gotten unused to it. My own language had become the alien tongue.

"We don't make the rules, Art," Stivit continued, "but we've got a job to do."

The female strong arm looked at me disdainfully. I was still wearing the undress uniform of my jungle lifestyle, a sort of loincloth with a very brief leather skirt and a fish-scute necklace Nichityi had given me. Dual patches on her sleeve indicated she was an engineer's assistant aboard ship; planet-side, she was a geophysicist, volcanology specialist.

She stripped a handful of leaves from a low-growing plant and let them sift through her fingers. "Primitives don't count except to bughouse ethnologists. These people aren't human. We need this world."

I stared at her, and she looked a lot less human to me than Nichityi. "If Alpha Delphini Two wasn't lesson enough — remember Casey's World?"

There was a hostile silence.

I didn't need to remind them. The Delphini colony was the first to find another sapient species on its world. The colonists had hunted some bird-like creatures for food and sport. But how could they have known? The gentle natives hadn't used tools, hadn't built anything. Those were the usual descriptions of intelligence.

But Casey's World . . . Stivit looked at me. I hadn't shown anything, but he knew. I'd lost my wife, Lana, and our daughter, Laura, there. I'd been wounded myself in the civil war that destroyed the colony.

"You can't remember if you weren't there," I said bitterly. "I was. I headed the contact team, and I wrote the survey report. Some contact man! It was my go-ahead that brought the colonists in. I announced in that report that the natives were nonviolent and would be *glad* to have us join them on their planet. We never should have set foot on that damned world! We ruined it!"

There were very few natives alive there on Casey's World now. They'd had a philosophy that had captured my imagination, and that had been my mistake. I should have stayed more detached. Maybe I could've anticipated what finally happened. Some of the colonists adopted that philosophy as a religion. Other colonists rebelled, seeing their children seduced away, their wives. . . . When Laura shaved her head, I thought I'd cry.

Then, the fighting started, and civil war brought an end to a beautiful dream, and nearly to a species.

"That led to the formation of the Native Worlds Policy Council," said Stivit patiently. "And for years now we've kept a strict hands-off policy for cultures with less advanced technologies. But Art, we've learned a lot since Casey's World. We can handle that kind of contact now."

One of the male crewmen spoke. "Come on, Baker, we're not dumping colonists without support these days. No bunch of stone-age bums will knock off a modern colony."

I smiled sadly. He chose to believe one of the official stories about Casey's World. But I knew the truth. I'd been there.

"Maybe, maybe not." I pointed to the female volcanologist. "Maybe they won't have to 'knock you off,' as you put it. You better wash your hands right away, like two minutes ago, preferably with a strong soap or alcohol. If you want to use your hands tomorrow, listen to me." I grinned at them. "Oh no, the natives don't necessarily need to do anything. Stupid people can get rid of themselves."

The volcanologist snorted. "I don't believe it; he's bluffing." But she wiped her hands on the seat of her pants. I grinned again. That wouldn't help, in fact it might make it more embarrassing. Synthacloth was not a perfect shield. . . .

I gestured at the jungle around us, feeling suddenly better. Yes, and a bit malicious. "Large animals, too," I added. "Dangerous ones. Hope those sidearms are charged." I scratched my chest and looked around into the foliage. "The Naabutari have taught most of the diurnal creatures to leave them alone. They're terrific hunters." Some branches stirred in the wind, a limb snapped conveniently. "That might be them now. They're quite curious."

Stivit frowned and looked a little worried. His hand strayed toward his gun butt. "Hostile?"

I'd scored my point. "Not yet, Stivit, but how long before people with your attitudes provoke them?" I looked at the volcanologist. She was still rubbing that hand. "Got any shipboard docs who can deal with native toxins?"

Her hand was obviously beginning to itch. It didn't take long with certain plants. Fortunately, there weren't that many bad ones. A person could walk around naked if he knew what to avoid.

Stivit moved to her side to examine the large red welts that were only just beginning to show. "There's an autodoc on the *Belverius*. You come back with us, Art."

I hid a smirk and followed.

The *Belverius* was big on the outside, but it only crewed fifty-six. Fifty-seven if I went back with them as Stivit seemed to expect. It was only a glorified scoutship fitted with a lot of survey equipment. It looked exactly as I remembered, big and dirty on the outside, cramped and dirty inside.

"What happened to Captain Belov?" I asked finally, recalling Stivit's new position.

He frowned. "I mentioned the drive rupture. Belov was inspecting a small fault in the tube flux when it gave. He never knew when he bought it." Stivit looked at me, and there was an old fondness in his gaze. "It's been a long time, Art. Longer for you. And I know it's been a hell of a shock to you. But we're ready to make allowances."

He shrugged when I didn't say anything. "Incidentally, the Expansionist policies were not reinstated without a few new wrangles. It's not pure Ex-

pansionism really. A lot of care will be taken to prevent exploitation or extermination of the natives. I don't think your Naabutari have anything to worry about."

We entered a small mess area. Stivit waved me toward a table. Then, my nose nearly walked off my face and straight toward a machine where he was punching buttons. That was coffee I smelled, real Earth coffee! He placed the cup in front of me, and I drank it with something approaching reverence. It burned my mouth, but I didn't care.

"You don't get the point, Stivit," I said finally, taking up the argument. "The natives may survive, but their culture is washed up. You think their manhood rites or marriage laws are going to seem meaningful to them when they observe our technologies and the wonders we can do? We'll be like gods to them. They'll emulate everything we do. A way of life will just vanish."

"We have the same rites," Stivit said defensively. "You told me so yourself when we were bunkmates. Ours just may not be as formal or stylized. Even so, what's such a big deal if their culture goes down the drain? Face it, we have a lot to offer. And as time went by and they developed their own technologies, the old ways would have faded whether we came along or not."

I shook my head. "At least they'd be making the choices. They wouldn't wind up a carbon copy of us. Doesn't the freedom to choose mean anything to you?"

"Not a hell of a lot, or I wouldn't be in the Service." He laughed at his little joke, slapped me on the back, obviously determined that we should be old buddies again. "Come on, I listened to the Council debates, too," he continued. "Cultures borrow what they want from each other and keep what they want of their own."

He slapped his thigh. "Japanese culture back in the twentieth, remember? It wasn't a carbon copy of American, but an amalgam. Years later, other nations started copying the Japanese. Hybrid cultures have hybrid vigor. That's what they said, and it sounds right."

Stivit looked at me, suddenly shrewd. "Matter of fact, I'm glad we found you, Art. Aside from liking that beaky face of yours, you can help us break the ice with the natives, gently, so to speak. You can prevent any hostility from growing. We can do a lot for them, and I'll bet there are things they can teach us. Those plants, for instance. The colonists who come here are going to need a lot of help and advice." He winked. "You say it's mostly okay in the daytime?"

I answered seriously. "Far as the big predators are concerned. But the plants — the Naabutari can't help you there; they don't know what compounds are poisonous to us."

"But you've got a good idea. You've been here long enough to learn from experience." He leaned closer, intense. "I'll need all your notes and recordings, of course. Tomorrow is soon enough." He leaned back and locked hands behind his head. "Tonight, though, let's hang one on. Hey, I'm *glad*

you're alive! I really felt, you know, guilty. . . ."

Despite myself, I warmed to him. I'd liked Stivit a lot in the old days. We'd gone woman-hunting together; never caught any women, but what hilarious times!

"I promised Rensitya I'd be back before dark," I said apologetically. "I don't want them to come looking for me."

Stivit tried to hide his disappointment. "Sure thing, then. Come back tomorrow, though. We'll be pretty busy. Anything you want to take back? Coffee? Some good Irish of our own make? Hangover tabs?" He grinned suddenly. "We've been aboard about two hours, and I've seen the women eyeing that loincloth thing. Bet I could find a junior ethnologist who'd be willing to sit through a few lectures from a local expert."

I thought of Nichityi. "Don't know how I'd explain it to the Naabutari. They're not prudish, but their habits are different."

Still, it was tempting. I'd been a leg man before Captain Belov had put me down here. But I'd spent the last six years dreaming of breasts. Naabutari females don't have them. And of course, humans and Naabutari are physically incompatible. Sex was something I'd learned to do without.

Still, sometimes I'd dreamed of just curling up with Nichityi and holding her.

Stivit talked me into one more cup of coffee, then into a complete tour of the ship. It really wasn't any different or any cleaner than before, but now it was his. He introduced me to crew members, and to my surprise I noticed how right he'd been. The women did react to my loincloth. Part of me wanted to believe it was the lean, utilitarian muscles my extended vacation had developed. But I knew most of them were just bored with the men they'd shipped with and were looking for something different.

We call it anthropomorphizing. That's what we do when we assume that other things or beings are essentially like we are. In some ways, that is usually true. After all, we all exist in the same universe. In other, important ways, however, everything and everyone are different, unique.

They taught us clearly that an ethnologist must always maintain a detached, emotional distance from a study race or species. Nothing so muddles a survey as sympathies and biases. We were trained to observe and scrutinize and analyze in the quietest, most unobtrusive way possible and not to color it with our own experiences or knowledge, certainly not to contaminate it. In that way, maybe we could avoid another Casey's World.

So, okay, maybe I identified too strongly with the Naabutari. No Service lecturer taught me how to live *for six years* without human contact. I'd long ago given up a formal study of the natives in favor of just learning to survive with them. I needed to talk, so I learned their language. I needed to eat, so they taught me to hunt. I needed friends, so I learned their ways. I needed love. . . .

Nichityi.

Who were the primitives, the *real* primitives?

I sat in my hut alone, drank *queraln*, and brooded. Rensitya came by late and stood silently by my door, waiting for me to bid him enter as was the Naabutari custom. I said nothing, though, and finally he went away. I couldn't face my people right now.

I took another drink and looked around the home I'd made for myself. It was too sturdy to be called a hut. The tough, siliceous reeds from the river were stronger than bamboo, and I had weatherboarded the outside with shags of stripbark. Fish scales glued to leaf skeletons made translucent windows. The floor was also stripbark, wetted and pounded into a continuous mat laid on puncheons. It was cool and airy, and I kept it as clean as the jungle allowed. I kept a *lix* on a leash under the bed. It slept in a box of shavings and ate the bugs and vermin that wandered in.

For light I had an oil lamp. That was the one mistake I'd made. My hut, furniture, everything was constructed according to the Naabutari way. But in those first few years I'd grown to hate the long darkness and the loneliness; I'd made myself a lamp from mud pottery and grease drippings. The natives saw it, of course. Now they all had one.

I sat for a long time, watching the small light, petting the *lix* when it curled on my lap. Then, I stood up and started gathering things from the secret places around my hut, from the hidden floor vaults and the hollowed legs of my handmade table. Ethnologists were not allowed much equipment for fear the natives might discover it: two minicameras, two tiny recorders, plenty of blank recording boards, a couple of reusable notepads. Usually, I set down my thoughts at random on one pad, transcribed a fair copy on the other, and recorded that on boards with the minicam. There was a small sound recorder to help with languages when I came, but that was smashed, lost somewhere in the jungle.

I hadn't used any of the stuff in a long time. I gathered it, then retrieved one last item, a small, powerful beamer that fit in the palm of the hand and could fell a tree at one stroke. Ethnology or not, I never went into the jungle at night without it.

Stivit wasn't getting my notes. I'd made up my mind about that. Destroying everything was the best idea, yet I couldn't quite bring myself to do that. It all represented too much of my life. I could hide it, though, and I knew just the place. Not far from the hut a boulder rested between the roots of a giant tree. The beamer could burn a vault. . . .

Something stirred in the foliage. I whirled, bringing up the gun. Nothing. Yet, I could have sworn something shifted in the darkness, watching, following. Just nerves, I decided, and my imagination.

I burned a deep hole close to the rock, stuffed in all my data and equipment, then carefully widened the edge of the vault until the boulder rolled forward and settled into a new resting place.

I went back to my hut. The *lix* curled up on the bed with me, and I rumpled its soft fur. Sleep was a long time coming that night.

Nichityi was standing patiently in the doorway when I woke up. I didn't know how long she'd been there. I sat up stiffly, wishing I had a cup of Stivit's coffee, and waved her in.

It was cool. Morning was the only really comfortable time so close to the planet's equator. In the warm, sticky night I'd wrestled free of my garment. I snatched for it. The Naabutari enlivened courtship with games, such as getting a poor fellow in a compromising position like this. He then found himself living up to expectations that inevitably led to marriage.

Nichityi wasn't playing games. The gill slits beneath her chin weren't gleaming in sign of sexual excitement; they had never gleamed for me. I stared at the sex slit on her belly, wondered as I had so often what it would feel like to press my body against hers as a real Naabutari man would, slit to slit, exchanging seminal fluids.

"Your people have come," she said, jarring me from my thoughts.

I nodded.

"Will you go away with them?"

"No." Until I said it, I hadn't realized I'd made the decision.

She smiled humanly. "I'm glad. Rensitya and the Pale One were very worried. We want you to stay and teach us about your tribe. You never talk about them. You ask many questions, but you never answer any."

I opened my mouth, then shut it. I'd answered their questions with lies, building images of a tribe not too different from their own, yet strange enough to explain my ignorance of their customs. Of course, the briefest glimpse of *Belverius* in the sky had turned my story into so much dust in the wind.

Worse, she was hinting that the Naabutari had seen through my lies all along.

"It was forbidden to tell you more," I said lamely.

She sat on the stool and pondered that. I'd known Nichityi since I started observing her people. The *Belverius* team I was part of had observed them electronically, and we'd picked up a smattering of their language. When the ship left, I'd stayed behind to finish my study, and moved closer to the village. She was one of the first natives I'd met. She'd been a child then. Now, she was of marriageable age.

I looked up to find her watching me with those strange eyes that were so fishlike, yet so full of beauty, and I wondered again about the evolution that chained them so closely to their beloved river.

I saw it then in her stare, in the careful, patient way she regarded me. Nichityi had made a study of me! I'd come to take her presence for granted, but the ethnologist had been the subject. I might have smiled if it hadn't been so serious. I began to examine my past behavior. Who knew what I might have

betrayed so far?

"Why would they forbid you to tell us such things?" she probed.

"To preserve your culture, your way of life," I answered bluntly.

For the first time in years I found it difficult to express important concepts in the Naabutari tongue. I tried to make her understand about cultural identity and group values, about the freedom to choose and the freedom to make mistakes, about the essential worth of Naabutari ideals and beliefs, and about the confusion that could result if those ideals were suddenly shattered.

She regarded me for a long time in silence. Then, she shook her head. "Brown One, how may we have freedom to choose if you hide the options from us?"

She hesitated, then swallowed. "That day when you cut your foot on a river reed stalk . . ." she hesitated again. "I followed you back here in secret. I saw you put medicines on the wound, and the next day there was not even a scar. But when Lixlityi was bitten by the crawler, you did not help her with your medicines. We feared she would lose her leg, even die. I would have asked you myself, but the Pale One said, 'No,' that you must offer it."

"I couldn't help," I said, uncomfortable. "I didn't know how my medicines would affect you. My blood is red, not yellow like yours. Don't you remember when I lay down to nap among the creeper leaves, how my face swelled and turned red? The creepers don't do that to Naabutari. My medicines may be as dangerous to you as some of your plants are to me."

She stared at me, and I squirmed inside. "Is that true?" she asked. "Would you have saved her if you could, or did you fear that your medicines might corrupt us in some way?"

I started to answer, then stopped. I'd told enough lies, and she'd seen through them all. What could I have said? The Naabutari prayed to a river god for healing. In turn, the god required things of them: disciplines affecting sex and reproduction, in turn affecting marriage and courtships, in turn affecting population. Population affected food supply, leadership roles, housing. . . .

How could I make her understand? It was a domino chain. One drop of my medicine might have toppled it all.

It was late when I got to the *Belverius*, for Nichityi and I had talked through most of the morning. I couldn't tell whether I had gotten through to her or not.

Nichityi had argued hard about the medicine, and I had to admit to some guilt feelings about the woman Lixlityi. Still, that didn't erase the tragedies of Casey's World and Alpha Delphini Two. We always fight the devil we know; we ignore the devil we don't. God help me, I knew what devils she and her people would confront if Stivit's crew succeeded.

Someone was at the monitors inside the ship. A sensor notified them I was

approaching, and the port irised open. A crew woman waved and flashed a smile as I entered.

Stivit's bellow rattled the hull as I stepped out of the lift onto the bridge. "Get the man some coffee!" he called, grinning. "Don't you have any human clothes?"

I frowned. "You know I wasn't allowed any when you left me here. Strict native dress."

"Oh, well, let's go down to the rec area," he said. "More comfortable there. The rest of the survey team is being assembled now, and they'll meet us. What kind of people are your primitives?"

"Naabutari," I corrected dourly. "Surprisingly human in some ways, but the differences are startling." I gave him an absentminded lecture as we passed through the corridors to the recreation area.

"Not too different from some human cultures in the pre-tech era," he said. He punched up some coffee from a dispenser and passed me a cup. Somehow, it didn't taste as good as I remembered. "I want to meet them, you know. It's no longer forbidden."

He was testing me. I nodded without the protest Stivit expected. He lifted an eyebrow at that.

The survey team arrived one person at a time until we were seven. I downed the last of my coffee and set the cup aside. The synthacloth patches revealed their groundside specialties: a physician, a linguist, two botanists, a generalist.

"No geologist?" I queried with mock surprise.

One of the botanists tapped his patch. "Newly certified last flight. I haven't sewn it on, yet."

"My regular man is on another assignment with a team to the north. They left last night." He must have noticed my expression. "Nothing to do with your natives, and they're armed against the carnivores you mentioned."

We left the *Belverius* and headed single file down the trail toward the village. The jungle was full of eyes by the time we stopped at my hut, but the Naabutari stayed out of sight. I doubted the crew was even aware of them; they seemed enthralled by the jungle wonders, thoroughly enjoying their outing after their time in space. I hoped the other team Stivit mentioned was more alert.

It was cramped with so many in my home. The *lix* hissed resentfully and curled up under the bed, watchful. Stivit looked around, unsure where to sit. I pushed the stool over for him, motioned the two women to sit on the bed. They tucked their legs under them, probably for fear of the *lix*. The rest of us stood or took the floor.

Suddenly I was aware of just how skimpy my loincloth was. I folded my legs together and winked at the two females. "Guess I haven't gone completely native," I said as I tucked myself back in.

"Obviously not," the generalist commented dryly.

There weren't enough cups, so I passed around the jug of *queraln* for them to sample.

"What is this stuff?" the physician, Niekro, asked. "'s good!"

I tipped the jug next. "It's made from the *nichikitel* root. The women start it by chewing mouthfuls of the roots and spitting into a vat. They ferment it, adding a number of other herbs that grow wild around here. Not really that potent for the Naabutari, but it does strange things to humans." I took another small drink. A calming warmth spread through my belly.

"Caffeine, alcohol, cannabis. What the hell," said Stivit, reciting a list of our favorite poisons. He took a sip and passed the jug. The other woman, the linguist, started to decline, then shrugged.

"Let's try another," the physician suggested, reaching to take the *queraln*.

"Not too much," I warned.

"Hangover or hallucinations?" he asked.

"Nightmares," I answered. "Bad ones. If there's anything at all on your mind, this'll bring it out in its worst aspects." I couldn't repress a shudder. It had taken me a while to learn to drink the stuff without going too far.

Stivit rose from the stool. "Well, you come back to the ship tonight. You promised to tie one on with me, and we make an Irish that'll melt your mouth." He looked around the hut and drew a deep breath. "You can bring along your notes. How much do you have?"

It was time to lie. "Not a hell of a lot, frankly. When I thought you weren't coming back, I had — uh — something of a breakdown. A real screaming tantrum." Well, it wasn't completely a lie, yet. It had been a terrible time of depression that second year when they didn't show up. "I accidentally set fire to my first hut. Lost all my recordings and equipment. I've got it all up here, though." I tapped my temple.

Stivit looked askance and shrugged. "Well, you can record for us later. No problem." He licked his lips, studied his boots sheepishly. "You know, Art, Dr. Van Atta" — he nodded to the linguist — "thought you might have thoughts about staying here permanently, that it might take weeks or even months to get you to change your mind —"

"Re-socialize him," Dr. Van Atta interrupted.

Stivit shot her a look, and she shut up. "I haven't put out the official word yet, but it looks like we'll be leaving within a day or two."

I locked my hands around my knees and regarded him evenly. "You did some high-altitude scanning, didn't you? You've already chosen your colony site, and your north team has gone to confirm it."

He nodded, pursing his lips. "Can you introduce us to the headman of the village?"

So, the colony would be close, a few days away at most. Contact between Earther and native would be certain. I swallowed hard, saying nothing.

"Look, don't get upset," Stivit said. "We just want to say hello. Haven't you noticed? We didn't even wear weapons. Real contact is your job until

the first colonists arrive. They'll bring their own experts, of course. But you can set it up. You know these people. Make it easy on both groups."

I sealed the jug of *queraln*. My little *lix* rustled under the bed in its box of shavings. I caught its eyes for a moment and shocked myself. If I undid its leash, it wouldn't be nearly so docile.

When I stood up, my hands were shaking. But I led them to the village.

Rensitya greeted us. His hair was freshly braided. His saffron skin gleamed, washed and oiled. Everyone had bathed. The entire village looked cleaner, neater. I would have been proud if I hadn't been so sad. The humans were already having an impact.

The Pale One emerged from a hut behind Rensitya. Two younger women supported her on either arm. She said nothing — but her eyes watched everything.

"Greetings, noble leader of the Naabutari."

I spun, shocked. Dr. Van Atta spared me a glance and a haughty smile. She spoke the Naabutari tongue. Of course! The tel-audio recordings my team had made before the *Belverius* left me.

I fumed, but there was nothing I could do. I made some brief introductions, then Van Atta took over, translating for Stivit. Amenities were exchanged, and, of course, Stivit slipped in a bit about other humans coming and building upriver — if the Naabutari didn't mind. As if they had a choice, I thought, disgusted.

Rensitya was quite agreeable. In fact, I got the damndest sensation that all this had already been worked out in advance, that it was being played back for my benefit. That was silly, my own paranoia, perhaps.

"Where you have set your wonderful house," Rensitya said graciously, meaning the *Belverius*, "was once the land of the Tenkraatari tribe, but they departed long ago. No one will turn you away. It will be a delight to have the Brown One's people so near."

It occurred to me that I had never seen or heard of a war among the tribes of this world. They had weapons; they were excellent hunters, but there seemed to be no strife, no conflict.

I wondered if they could learn in time.

Stivit's team split up then, and it turned into a hectic afternoon. I wanted to keep an eye on them all to minimize the damage the survey team would do. But Van Atta and I were the only interpreters, and the physician, the botanists, the generalist, and Stivit were full of questions as they went about their examinations and explorations. I walked a little way upriver with Rensitya and Stivit, prowled the jungle edge with Nichityi and the botanists. The Naabutari children were full of questions for the wonderful humans. On top of that, Stivit gave me a mini-recorder and a stack of boards. He needed my observations, he said.

Only the Pale One had no questions. But those glittering old eyes missed

nothing.

Late in the afternoon the crew was ready to return to the ship. I retired to my hut, mentally and emotionally weary. I still had the recorder and the boards. Stivit had suggested they'd like to have my notes before they left, but would settle for my getting them in shape by the time they returned with the first builders.

In two or three months.

Probably, it was the effect of the *quernaln*, though I hadn't drunk that much. It was some dream. A nightmare that woke me from a troubled sleep.

I'd seen the *Belverius* lifting from the surface . . . then it shimmered, expanded . . . exploded! I heard the screams and accusing wails and knew it was my doing, though I didn't know why. . . .

I sat on the bed for quite a while, brooding.

The generalist appeared in my door. She knocked on the rough wall.

"Yeah?"

She stepped inside, then stopped. She pushed over the empty *quernaln* jar with a toe and regarded me wryly. "You all right?"

"Well, I could use some air-conditioning," I snapped. "What do you want?" I looked out the fish-scale window. It was bright morning. I looked back at her, trying to recall her name. Valerie.

She sat down on the foot of my bed. "You could explain to me why the captain won't let me show the natives at least a half-dozen ways to improve their diet, or rainproof their huts, or . . ."

My head ached. "Stivit said something about the Expansionist programs being modified. This time, they plan to make a little effort to learn what will be helpful and what will be harmful." The fools. Push one domino, and they all fall down. "The colony experts will make those decisions. You're just here to observe and report."

She was eyeing me in a very unprofessional manner, and it occurred to me I hadn't told her anything she shouldn't know already. She hadn't come for advice.

But it was hot, and I didn't feel good. She did, however, make me think of Nichityi. I hadn't seen my little shadow since the meeting yesterday. I missed her.

"Do you need any help getting your notes in order, Art?" She moved a little closer. "Any help at all? I'm free all afternoon."

"No," I answered harshly, standing up.

She stiffened. "I didn't mean anything . . . but if I *could* help. . . ."

I tried to be more polite, but I was still rejecting her, something shipmates almost never did. Well, we weren't really shipmates; I didn't know her at all. "Why don't I see you back at the ship?"

Her hips swung angrily as she strode out.

But her anger was only a reaction to my own. I felt used and isolated. I

wasn't really Naabutari and never could be, no matter how many *lohs* I caught and ate. The reaction in my groin to Valerie's nearness reminded me of that, though I hid it from her. Yet, neither was I one of them. I couldn't be. *I wouldn't be.*

In that hot instant I knew what I had to do.

Inside the *Belverius* the crew bustled in preparation for departure. The north team had returned with affirmative survey results. Samples were being packed, equipment checked and stored. Stivit was busy running a pre-flight checklist. It was easy to slip away.

People stared as I went by in the corridors, but they didn't stop, too intent on their tasks. Not at all like the Naabutari, I noted. They were never too busy for a greeting and a friendly word.

Six years had changed nothing about the *Belverius*. I made my way back toward the drive engines. My shipboard assignments had often been in that section, and I knew every inch of it.

I was surprised to run into Leo Tho, a senior engineer when I left the ship, now chief of section. We chatted long enough to discover he was as dull as I remembered. Fortunately, like everyone else, he was extremely busy.

This section with its readouts and controls and monitors was not what I wanted. In an unobserved moment I slipped between two of the grid monitors and through a door marked RESTRICTED.

The barest throb of power trembled through the deck. Groundside, there was no need for the massive stardrive engines; they would remain shut down until free of the planet's gravity well. Still, the crystalline contact tubes where the matter and antimatter particle explosions occurred glowed with a dull azure radiance.

That radiance came from the magnatomic bubbles inside the tubes. They contained and channeled the energy release, converting it into usable power. A separate set of engines maintained those bubbles, increasing their cohesive strength as the particle flow increased.

Those engines were my target. They were easy enough to locate, as they occupied the entire south part of the chamber. The energy they transmitted to the bubbles was contained in a special series of force fields. But the fields were down now.

I slipped the beamer out of my loincloth and removed its charge pod. Opening an inspection hatch, I placed the pod directly in the path of the energy flow. At the first touch of the fields the pod would explode, interrupting the power flow to the bubbles, weakening them. When the stardrive was activated. . . .

I'd see it from the planet's surface.

I sneaked out as fast as I could, grateful that no one paid much attention to me when I regained the corridors. I was shaking. I kept seeing images from

my dream, hearing those accusing voices . . . they were all my own.

I felt like a ghost wandering the ship. I could no longer flog my hatred for humans back into flame. There was no point in continuing this torture, however. I went straight to the port and exited. Fresh air was what I needed most.

It didn't help.

When I got back to my hut, I found a reception. Nichityi and Rensitya were waiting. Between them they supported the Pale One. I had never seen her outside the boundaries of the village. I invited them inside, trembling all over.

They asked many questions about my people and how we lived, where we came from, our rules, our customs, our beliefs. They scarcely mentioned technology, but from Nichityi's expression I concluded it was because she knew I was reluctant. They planned to take this a little at a time.

I realized I was too late. The contamination had begun.

About midafternoon Stivit, a few members of his crew, and the villagers met before my hut to say farewell. Van Atta interpreted. Her command of the language had rapidly improved, I noticed with some bitterness. Stivit made presents of cloth to Rensitya and the Pale One. To everyone else he gave colored marking pens. The villagers quickly decorated themselves.

He said good-bye to me in public, even embraced me, and I thanked God for that. In private I might have broken down. But we were very formal before the Naabutari. I almost confessed anyway. I liked Stivit, I realized, and I knew the long wail of accusation would never leave my dreams. But what had to be done had to be done.

Then, they were gone. I waited outside my hut, my *lix* in my arms for comfort, its leash wrapped around one hand, and waited for the roar of the *Belverius* to fill the sky.

Nichityi came then, and she had food. I realized how long it had been since I last ate. How had she known? Still, I wasn't very hungry. She was insistent, though. "Eat," she ordered. "You have not been treating yourself well."

I transferred the *lix* to one arm and nibbled at the fruit she offered.

"Tell me, Brown One," she said softly. "If it is forbidden for us to know your shiny things, why did Captainstivit give us the thing-that-talks?"

The fruit fell from my hand. I must have squeezed the *lix*, for he gave a sharp squeal, jumped out of my arm, and ran. The leash slipped from my grip before I could catch it. My pet vanished into the jungle foliage, free. I stared after it, numb.

"He gave you a recorder?" I managed. God knew what information was on it or what the natives would do with the knowledge it imparted. I looked up, but the *Belverius* was still groundside.

"Eat," she said, offering another piece of fruit.

Then, through the trees we saw it. It lifted slowly. *To give a good show, I*

thought. Just like Stivit. The *Belverius* moved over the river and the village, then soared straight up.

We'd see the flash if Stivit energized on this side of the planet. For an instant there would be a second sun. I prayed, instead, that he'd circle away. My guilt was heavy enough to bear.

I jumped when a familiar burr sounded. Rensitya came down the trail carrying the transceiver I'd buried beneath the boulder nights ago. One of the survey team must have picked up an echo from its circuits and found where I'd hidden it. That meant they had my notes.

"Captainstivit," Rensitya said, "told me to bring this to you when it made this noise."

Shivering, I took it from him and opened the case.

"Baker?" came Stivit's voice. "Art? Don't kick yourself too much. We found your charge pod." There was a pause. Maybe he expected me to answer. I didn't know what to say.

"We know you've been through a lot down there. Six years is too long a time to be alone. And we know you're upset about what you think will happen to your Naabutari. But you can make the difference. Be the go-between; help these natives to accept us, and help us to understand them. There doesn't have to be another Casey's World."

Another pause. "I wish you'd answer me, Art." Another pause, longer. "Well, we'll be back in three months, I swear. Maybe that'll give you time to adjust to the idea." Another pause. "Bye, Art. Oh, and Art? That pod incident won't show up on your record, I promise."

The signal ended. I closed the case and stared at Nichityi, then Rensitya.

"Captainstivit says good-bye."

I blinked, feeling an intense pain. Nichityi had spoken those words in Earthan. The Pale One's old head bobbed in approval.

"We have talked much with him," Rensitya said in his own tongue. "He is a good man. You are a good man, too, Brown One." He reached out and touched my belly where a sex slit would be, then the more human gesture, he put an arm around my shoulder. "Art."

I don't know how long I laughed as I brushed off Rensitya's hand. I don't know how long I cried. I do remember the way it frightened Nichityi. Perhaps she had an inkling of my fear in that moment, for she turned and ran back toward the village.

I needed *queraln*, lots of it, and I wasn't worried about its aftereffect.

The nightmare had already begun. ●

THE LITERARY CAREERS OF ROBIN W. BAILEY AND ROB CHILSON Current Directions . . .

Robin W. Bailey is the author of three novels to date, *Frost*, *Skull Gate*,
156 **AMAZING**

and *Bloodsongs*. He is also a regular contributor to the enormously successful *THIEVES' WORLD* series, where the schemes and antics of his female gladiator, Chenaya, continually stir up trouble. In addition, Robin has contributed a number of stories to Marion Zimmer Bradley's *Sword and Sorceress* anthologies. All these stories and adventures about women have led a lot of readers to assume that Robin W. Bailey is also female. **Wrongo**, though he usually considers it a compliment and a measure of his success as a storyteller.

"Primitives" is his first collaboration with fellow Kansas Citian, Rob Chilson, whom he met at a science-fiction convention about nine years ago. Both are members of an increasingly successful SF writers' group that includes authors William F. Wu and Bradley Denton.

Though a full-time writer, Robin has the opportunity to perform weekly at a local restaurant as a singer/guitarist. Like many other writers, Robin has held the usual assortment of unusual jobs, including a five-year stint as a planetarium lecturer. Besides an abiding interest in anthropology and primitive cultures, subjects in which he minored in college, Robin's pursuits and hobbies are far-ranging and include Eastern philosophy and the martial arts, New Age music, soccer, tennis, and good food and fine wines.

Robin currently lives in Kansas City, Missouri, with his wife, Diana, and one cat, Jones.

A Kansas City area writer, Rob Chilson has been writing since the age of eleven and selling since somewhat later, mostly to *Analog*. He was one of the last generation of writers to be trained by John W. Campbell, Jr., and still prefers technological and hard science fiction. Two of his favorite writers are Jack Vance and Gene Wolfe.

Currently, Rob is doing a series of collaborations with Lynette Meserole about a near future in which a healing device (Electro-Neural Therapy, a.k.a. the White Box) has largely replaced doctors. Two novelettes have appeared in *Analog*, and at least three more stories are planned. After these stories, Rob and Lynette hope to write a final episode, not for magazine publication, and sell the package as a book, to be titled *The White Box*.

William F. Wu and he are also preparing a series of short stories for *Analog*, around which they hope to frame and sell a novel, to be titled *Distant Tigers*. Bill has also interested the editors of the Millennium series of juvenile books in an old shared idea, working title *The Windy-Spinners*.

Rob has also collaborated with Tulsa writer Mercedes Lackey on a Conan burlesque for which there seems to be no market. In addition, Rob is working with Jan Gephardt, whose novel *Torr* is on the publisher's desk at Questar.

On his own, Rob is writing a series in *Analog* about pocket brains and their effects on society, and has been working on a book, *The Man from IBM*,

set 60 million years in the future.

**... and Past Achievements:
Robin W. Bailey**

Frost. Pocket Books, 1983; re-released by Tor, 1987.

Skull Gate. Tor, 1985.

Bloodsongs. Tor, 1986.

Rob Chilson

As the Curtain Falls (French edition: *Cimetiere de Reves*; Argentine edition: *Antes del Fin*). DAW, 1974.

The Star-Crowned Kings. DAW, 1975.

The Shores of Kansas. Popular Library, 1976.



Inflections

The Readers

Readers and writers, take note! Please be aware that all materials — manuscript submissions, letters to the editor, subscription problems — should be sent to our Wisconsin office: Amazing® Stories, P.O. Box 110, Lake Geneva WI 53147.

— Patrick Lucien Price

Dear Pat,

Thank you for returning my “Castaway” manuscript with my author’s copies of *Amazing Stories*, March 1987. This unsolicited bit of niceness is new to me. What other magazines do with published originals is a mystery, but fans are known to collect them, so conceivably those who follow the other policy make a modest income from their sales.

You have deprived yourself to my benefit. If someone aches for the very copy of “Castaway” you edited with such care, it is now my privilege to satisfy him. Meanwhile, I get to learn something about the business of editing.

If I haven’t embarrassed you enough with praise, may I add this? With stories published in three different magazines, my breadth of experience is nothing remarkable, but yours is the first Phil Jennings tale to be totally free of word substitutions or typos. It’s not that the others were noticeably flawed, but how pleasant to read and find zero defects!

I suppose almost everything else an editor does is more exciting than sitting down with a pencil and manu-

script and scribbling all those jots and tittles. I hope you have time left over afterward to enjoy all the fast-paced life and VIP perks Lake Geneva has to offer.

One final thing: the illustration. Do you have Roger Raupp’s address? Would [the artwork] be for sale?

Sincerely,

Phillip C. Jennings
32130 County Road One
St. Cloud MN 56301

Thanks for your kind letter, Phil. Since we consider the manuscript the author’s property, once we have published the story, we return the original manuscript his way. You’ll probably make more money selling a Phil Jennings original than a piece edited by Patrick Price. If this is not the case, please return all materials — correspondence and edited manuscripts — to us, as the fast-paced life of Lake Geneva requires a little extra pocket money.

As for our infallibility as a proof-reader, well, alas, can you find the obvious typo on page 131 of the March 1987 issue? Mea maxima culpa!

And if you wish to contact Roger Raupp, just send a S.A.S.E. to our Lake Geneva office, and we’ll forward the letter to him. And best of luck with the sale!

— Patrick Lucien Price

Dear Pat:

I want to compliment you on the “On Exhibit” feature you did on Janet Aulisio [January 1987]. I’m stunned by

the amount of time and effort she puts into her work, and you've published some gorgeous examples. She makes me feel like a hack.

The feature you did on me [September 1986] has resulted in a number of very nice fan letters and even a couple of job opportunities. It's nice to get a little feedback occasionally, and extremely flattering to learn that there are people out there actually looking for what I do.

Thanks again,
George Barr
904 Toyon Avenue
San Jose CA 95127

We're glad, George, that you have received recognition from both fans and those who seek to commission artwork. Our whole intent with the "On Exhibit" feature has been to recognize the merit of our SF and fantasy artists, and we're delighted to discover that our efforts here have had an impact.

— Patrick Lucien Price

Dear Mr. Price,

Thank you for the letter that you included with my returned manuscript. I don't know if you take as much trouble with every story you read, but I wanted to let you know that in my case it was appreciated.

No, I'm not a masochist; and yes, your criticism stung, at least at first. But if criticism is to be effective it must be instructive, even at the price of bruising the writer's pride a little. Thanks for bruising mine.

In one sentence you were able to bring to light two glaring weaknesses in my story that I should have been able to see myself. You are good at what you do.

I won't take any more of your time, but I'll just say thank you again and keep up the good work. Who knows,

maybe I'll try *Amazing Stories* again one of these days. And then . . . well, I'll let you be the judge of that.

Sincerely,
Bill Ronat
Cape Canaveral FL

We receive, on the average, about 300 manuscripts per week. Such volume makes it difficult to respond personally to every submission. So personal responses are given to those submissions we feel have potential and can benefit from our criticism.

— Patrick Lucien Price

Dear Mr. Silverberg:

I thought that your "Reflections" column in the January 1987 issue was great until the last line: "Unless, of course, AIDS has made the 28th century an irrelevant concept."

Really, Mr. Silverberg, I thought you'd know better. According to the same column, approximately 25,000 people have been diagnosed as AIDS victims. I compute that to be less than 0.1% of the American population. You stand a far greater chance of dying from a heart attack or cancer than from AIDS.

Yet AIDS strikes a nerve in the mundane public; after all, the disease has its roots in so-called "unnatural sex acts." But that is no excuse for the media to scare people needlessly.

In Knoxville, too many people believe that you can contract AIDS from *giving* blood — and this is just one example of the misinformation that gets passed along in every media-generated crisis.

As a writer, I can imagine how you searched your brain for a "snappy ending" to your column. Don't misunderstand me. I agree with the main points in your column.

However, that last sentence ruined

the whole thing.

Sincerely,
Karen D. Morton
7608 Luscombe Drive
Knoxville TN 37919

You've obviously missed the intent of Mr. Silverberg's comment. If AIDS is being passed from person to person because of careless medical practices in Africa, if AIDS research is being hampered by threats of litigation in the U.S., if the geometric rise in AIDS victims continues (take a look at how the rate has increased within the last five years), then this serious health problem currently facing us will indeed worsen.

Basically, there's no way of accurately predicting how far this viral syndrome will go. Perhaps it will mutate into a non-deadly form; perhaps it will become resistant to any vaccine.

In the meantime, we agree: people need to be informed, not misinformed, about the nature of the AID Syndrome. Unfortunately, most people also need to be shocked into becoming concerned about their own health, as unpleasant as that may be.

Readers, please continue to send us your letters. We'd like to read about your likes and dislikes; this way we can better serve your needs. After all, you are reading this magazine for personal enjoyment. Also, feel free to respond to other issues — be they about writing, the SF and fantasy community, or the state of affairs in the world at large. We do value your opinions, though we may not agree with them. So, write us!

Till next issue.

— Patrick Lucien Price



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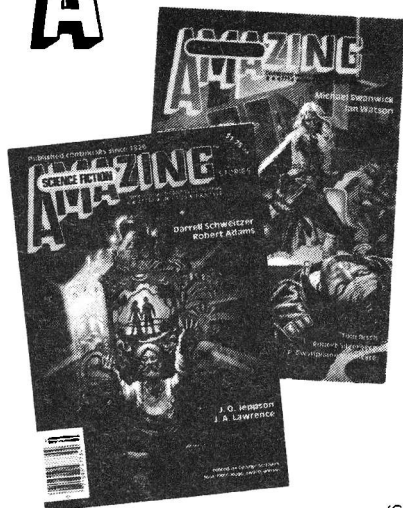
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— M. B. Simon

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INTRODUCTION BY
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This second volume of chronological anthologies presents fiction from the rapidly developing technological years in American society as indicated in science-fiction magazine publishing. The years 1936 to 1945 were, in fact, "war years," as the fiction of this period reflected the growing paranoia of the times and the emphasis on human concerns due to technological advancements. Experience space exploration, robotic developments, and strange and bizarre encounters with alien life. Some of the great science-fiction writers represented in this volume are Isaac Asimov, Eando Binder, Ray Bradbury, Edmond Hamilton, and W. K. Sonneman. In addition, each tale is fancifully illustrated in the style of the period.

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