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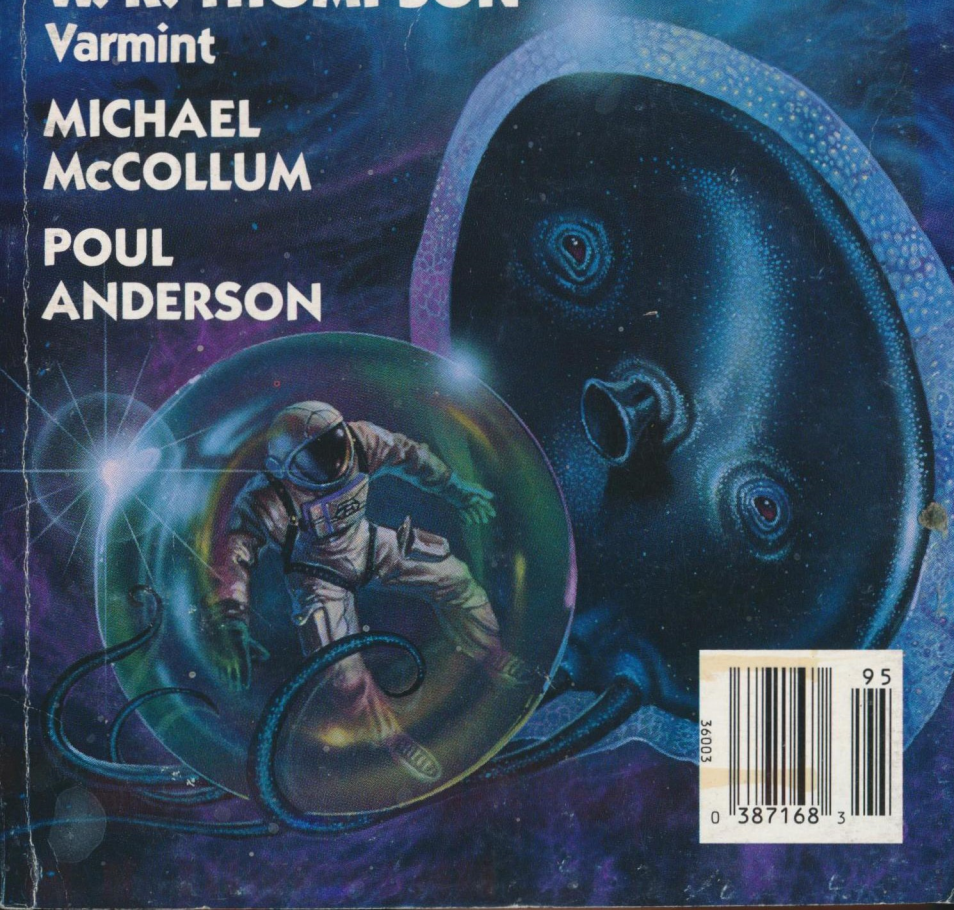

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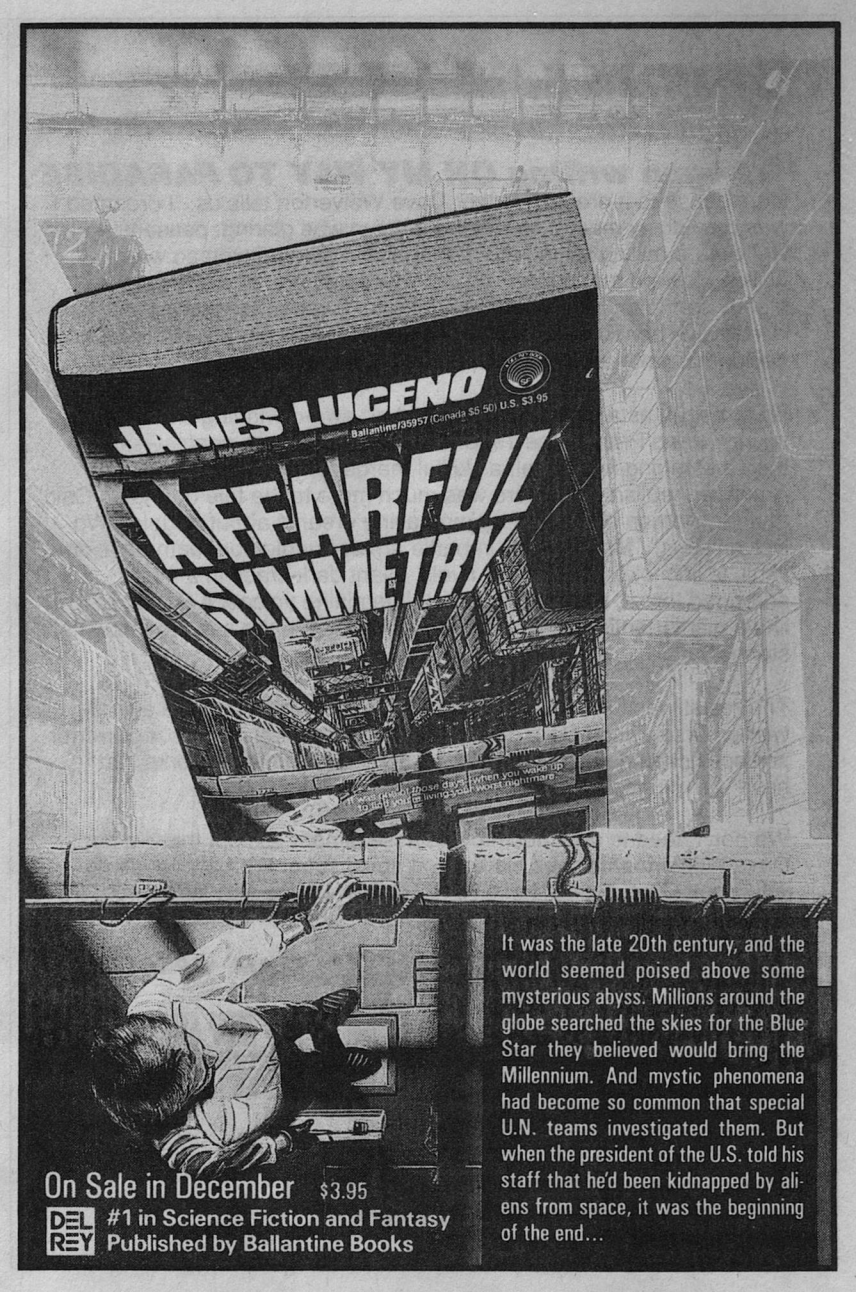

It was the late 20th century, and the world seemed poised above some mysterious abyss. Millions around the globe searched the skies for the Blue Star they believed would bring the Millennium. And mystic phenomena had become so common that special U.N. teams investigated them. But when the president of the U.S. told his staff that he'd been kidnapped by aliens from space, it was the beginning of the end...

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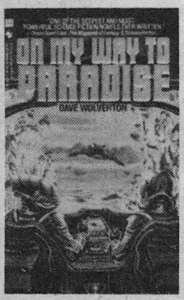
THE
TEAM SPECTRA
REPORT

"I began writing ON MY WAY TO PARADISE in response to a dream," author Dave Wolverton tells us. "I dreamed I was on a dusty market street and the sun was glaring; peasants in white were milling about, and a horribly emaciated woman was walking toward me, boring her dark eyes into me, and she held a bloody stump at the end of her right arm. I wanted desperately to help her, to give her something. When I woke, the dream haunted me, and I decided to write a story in which I'd give her a new hand."

What began as a dream became first an award-winning short story — taking Grand Prize in the 1986 Writers of the Future contest—and then a stunning first novel, a skillful merger of cyberpunk and Latin American realism. For there was much more to the tale of Angelo Osic and the woman he aids. "I began having dreams about Angelo," Wolverton says. "Mercenaries in battle armor huddled beneath an alien skull, telling jokes about their rivals. Giant dark crabs in a mist-shrouded forest, whispering with soft feminine voices. A Desert Lord, like a giant mantis, bursting from a hidden lair in the sand to throw its stones."

The result was ON MY WAY TO PARADISE, which multiple award-winner Orson Scott Card calls "One of the deepest and most powerful science fiction novels ever written," adding, "Many fine works that have won Hugos and Nebulas pale beside this book."

We don't need to add much to this assessment, except that we hope Dave Wolverton finishes his second novel soon. We believe, along with Scott Card, that ON MY WAY TO PARADISE may be indeed "the first book by the finest science fiction writer of the 1990s."



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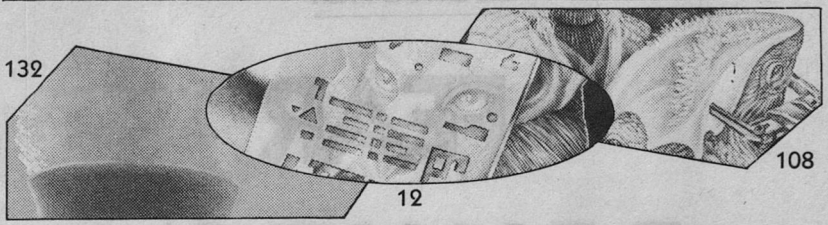

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Indicia on Page 6

Editorial

FEAR POLLUTION

Stanley Schmidt

When a country has long cultivated the habit of designating national birds, national anthems, national pastimes, national this and national that, I suppose a national neurosis is just an inevitable extension of that tendency. There may well be *several* national neuroses, but there's one in particular that I've been very much aware of recently—and from the response I get when I mention it, I gather many others have, too.

What started me thinking along these lines was a huge front-page story on a recent Sunday edition of my local newspaper, under the title HAZARDS OF HOME. A blurb above the title read: **Home Pollution Inspections: Wave of the Future?** The article itself began, "The home, once considered a haven from the world's woes, is fast becoming a mine field of toxic hazards. . . ."

My first reaction, after quickly scanning the boxed chart of fashionable household pollutants such as asbestos, formaldehyde, assorted water contaminants, lead, and radon, was to toss the paper aside, disgusted that it had failed to mention one of the most important pollutants currently clogging our environment: fear. I didn't actually do so; I do recognize the value of a healthy regard for real dangers, and I know that everything on that list can be one. So I read the article, to see whether it contained either information I didn't already know about them, or anything that seemed to warrant editorial comment.

I found far more of the latter than the former.

The major point of the article was a prediction that widespread fear of the items listed (and presumably others, as fast as people can think of them) will

soon make testing for a wide range of contaminants a routine part of buying and selling houses. That in turn will raise the cost of a standard house inspection from hundreds to thousands of dollars, and add weeks to the already exhausting process of buying or selling a house. My overwhelming impression after reading the whole article was that the prediction is probably correct—but not because it deserves to be. I see the whole business as yet another manifestation of the recent deluge of "fear pollution," the rampant proliferation of Things We Are Supposed to Worry About. (And, no doubt quite incidentally, people who make a living trying to allay those worries.)

Other examples abound. A trace of poison found in two (count 'em, two!) grapes led to a nationwide panic that kept millions of people away from fresh fruit for weeks. Articles in newspapers and magazines advise people never to eat eggs with the slightest trace of runniness about them, because there's a slight chance that they may get sick. Many people won't eat eggs at all because they're terrified of cholesterol. Cholesterol is, of course, only one of many fashionable food worries; if that one doesn't appeal to you, or you want to cover all the bases, there are plenty of other ingredients you can find someone eager to warn you against. Eating has become, as one columnist recently observed, more like taking medicine than enjoying good food. Many people have decided, commendably enough, that smoking is not for them—but they don't stop there. They hoist militant banners and sally forth to create "a smokeless society by the year 2000," lest they be exposed to the faintest trace of someone else's smoke. A new tick-borne ailment, Lyme disease, becomes fairly common in the northeast and some people sensibly learn to recognize it and take routine precautions against it—while others swear off all outdoor activity and moan about how dreadful the world has become. One space shuttle explodes and the entire space program of a nation once famous for its courage and initiative grinds to a halt for a couple of years.

And a disgruntled editor cries out in the wilderness: C'mon, folks—enough is enough! Let's try to get at least a little sense of perspective back into things, hey?

It first occurred to me a good many years ago that worrying about all the Things We're Supposed to Worry About has done far more harm than the Things We're Supposed to Worry About themselves. I had no trouble at all finding at least one psychologist who agreed with me, and time has done nothing to change my mind. I repeat: I'm all for being alert to real, significant dangers and taking reasonable measures to alleviate them—but not making an obsession with them the central focus of everything. Collecting possible dangers, magnifying them, and worrying about them seems to have become a very serious contender for replacing baseball as "the national pastime." For now, I'll settle for calling it "the national neurosis." But I won't back down from that—and I will suggest that the national neurosis is a problem that needs treat-

ment at least as much as most of the others.

If "the home is becoming a mine field of toxic hazards . . . ," the change is less in the home than in the occupants' attitudes. True, some homes, such as those built next door to toxic waste dumps, really do face some new and unnecessary hazards. But most of these things have been around all along. Radon, for example, was not suddenly invented in this decade. People have been eating soft-boiled eggs, pork, and assorted cholesterol sources for a long time, and many of them have lived to ripe old ages. In fact, more of them have been living to riper old ages recently than ever before.

We hear a great deal about the dreadful incidence of cancer and heart disease. Seldom does anybody mention that a major reason for this apparent increase is the dramatic increase in lifespan over the last century or so. Cancer

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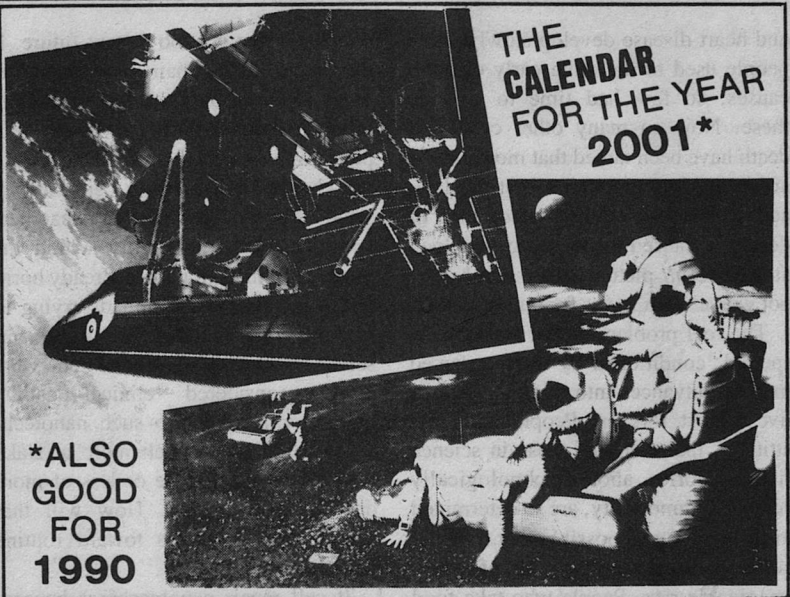

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and heart disease develop slowly; most people used to die quite early of other causes, so few had time to develop these. Now so many other causes of death have been tamed that more people are living long enough to get the late-acting ones, so a larger percentage of deaths is caused by those. If you look at the *overall* picture, it's much *better*, not worse, than it was for our ancestors.

The real problem is that we've been spoiled, conditioned by unprecedented medical advances into thinking we can live almost forever. People with that attitude, like many of those in science fiction stories about technologically achieved immortality, are so determined to live as long as possible that they become pathologically afraid of every imaginable risk. People who take food like medicine, even though they have no particular medical need to do so, and spend thousands of dollars having their houses inspected for every conceivable pollutant, may live a few years longer than those who don't. But they may also realize, sometime near the ends of those long lives, that they've sold so much potential *fun* for the added time that it hasn't been worth it. In the end, 80 years spent looking over your shoulder and avoiding every pleasure that might contain some risk may be worse, not better, than 75 years of facing the world squarely and savoring life in big bites.

But suppose the trade-off is *not* just a few years versus more or less caution. What if you really *could* live forever?

That ability, or at least a fair approximation of it, is looking more and more like a real possibility, for at least a few people, in the not too distant future. If molecular cell repair machines like those foreseen by K. Eric Drexler and others become a workable option, people who live carefully may actually have the chance to live many centuries instead of one or less. Some researchers consider that a possibility within the natural lifetimes of people already born, and some people are already trying to improve their odds by having themselves cryonically suspended upon what is now considered "clinical death." People with access to such nanotechnology will have much more at stake than a few years more or less of more or less pleasant life. How will that change their attitudes toward routine risk-taking?

If cell repair nanomachines become good enough, of course, the definition of careful living may change, too. Machines that can repair virtually any damage at the cellular level may consider cancers and heart muscle or artery deterioration just another routine maintenance problem. If that's the case, people may go to the opposite extreme from the one I'm now grumbling about. It may become fashionable to eat, drink, and be merry with little concern for any danger short of sitting on an atomic bomb.

But it's easily conceivable that at least the first cell repair machines may be a bit more limited in their capabilities. Maybe they'll be able to repair relatively small deviations from normal physiology, but only if the body's owner makes some effort to maintain a basically close-to-optimum operating environ-

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ment. Suppose, for the sake of argument, that you have access to nanotechnology which can let you live for a thousand years, if and only if throughout that time you take care of yourself in a way approximating what many people are advocating in 1989. Is it worth it?

We've all read those stories about future societies with more or less immortal inhabitants, stagnating because their inhabitants placed such a high value on surviving every possible minute that they were afraid to risk *doing* anything. We haven't quite reached that point; we don't yet have technology that lets most people believe seriously that they are likely to live much more than a century. We do have technology that lets them believe they can live a few more years if they're very, very careful than if they're not. When I see how many of them react to that option, and extrapolate the trend, I can easily imagine that the familiar picture of cowardly stagnation is eminently plausible. If people are going to react that way to the possibility of even slightly longer life, the chance for *much* longer life may pose a very real, and large, psychological threat.

I think that possibility warrants concern and consideration—but not resignation. Remember, we're new at this. It's only quite recently that human beings have been able to consider even present life expectancies a realistically achievable goal. They haven't had much time to think through, and sort out their feelings about, how such options should affect their fundamental outlook on living. It may be that, with more time, people will work those things through to saner philosophies than any of us have yet imagined for living with their new potentials.

In the meantime, though, as I look around me at what people have done with their opportunities so far, I can only hope that the attitudes I see are a passing phase and people *will* grow beyond them. I see people digging diligently to find things to worry about, and taking every precaution anyone suggests might conceivably gain them an extra minute of life—and I wonder why many of them *want* every possible minute of life. They don't seem to enjoy the ones they already have; *joie de vivre* seems foreign to their natures. I can easily understand taking reasonable precautions to live a long time because you love life so much you want all you can get. But it seems to me that a great many people are now taking every possible precaution not because they love life, but because they fear it slightly less than they fear death.

But only slightly. And that seems to me a terribly sad way to live. ■

●It isn't that they can't see the solution. It is that they can't see the problem.

G. K. Chesterton

"Kid Afrika came cruising into Dog Solitude on the last day in November, his vintage Dodge chauffeured by a white girl named Cherry Chesterfield. Slick Henry and Little Bird were breaking down the buzzsaw that formed the Judge's left hand when Kid's Dodge came into view, its patched apron bag throwing up brown fantails of the rusty water that pooled on the Solitude's uneven plain of compacted steel."

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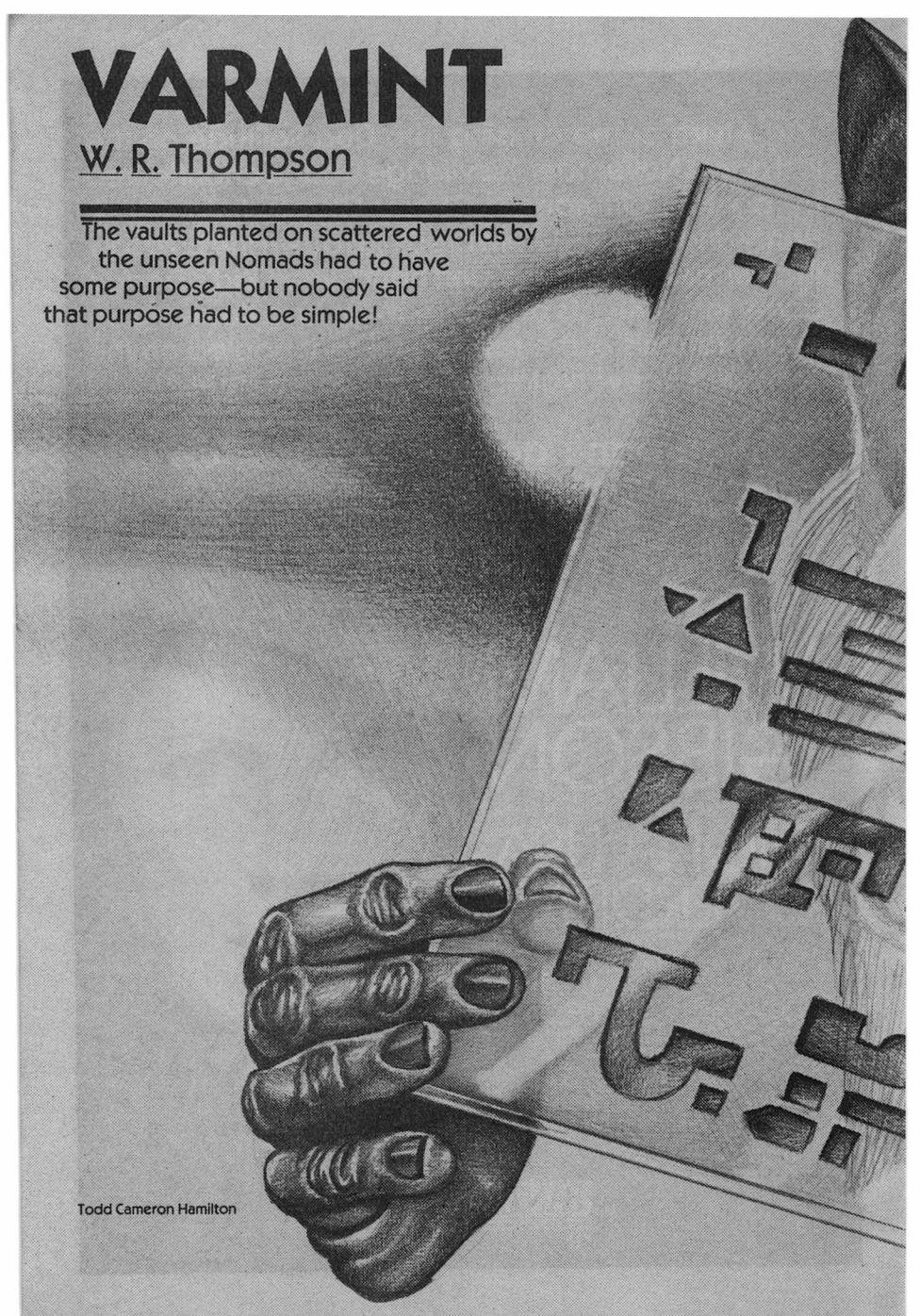

Todd Cameron Hamilton


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The newspapers said that the Kya Crisis was over, which only proves that you can't believe everything you read. Sure, the trouble with our research base on Kya was over, but we still had problems—at least, I'd call the possible extinction of the human race a problem. You might agree with that, even if you aren't human, or even if you're a UN politician.

I'd been back on Earth for two weeks, following a four-year stay on Kya. I had started out as a field biologist at our base, and ended up as a participant in what was politely called a "socio-psychological aberration of unique proportions." Isolation and stress had taken more than their toll on the base; the crisis came when Dr. Kittrick, our leader, went berserk and declared independence from Earth. This was insane—if nothing else, we needed food from Earth to stay alive—but almost the entire staff joined the revolt. It was a lemming charge into insanity.

I know some people still don't understand what got into us. I'm not sure I do, either. However, the effects of isolation and sensory-deprivation are well documented, and I checked them after I got home. Back in the 1950s, for example, the Air Force did some experiments with isolation chambers; men would sit in these little booths, cut off from the outside world, until they'd start to hallucinate. That was nothing new. Prisons once used the same technique to break recalcitrant prisoners.

Groups of people aren't immune to such breaking, either. Insulate a group from the outside world, let it stew in its own ideas and problems long enough, and you'll have a problem as bad as ours. The classic case was some fifty years ago, in a place called Jonestown. A thousand people established a jungle colony—and committed mass suicide when things fell apart.

I hadn't joined the revolt, although that was no tribute to my mental state. The pressures of base life had been as hard on me as on anyone else, and when I got back to Earth the psychologists decided I could use a rest. They didn't ask me about it, but when they sent me to a resort on the Yucatan coast I didn't protest. After four unbroken years of work I knew I needed to unwind.

I was working hard to relax when a courier arrived, spoiling my morning sunbath. Even at a distance, I could tell she was a UN employee: who else would wear a business dress on a tropical beach? I pulled on my shorts and went to meet her.

"Doctor John Baxter?" The woman neither sounded nor looked happy to see me. She was carrying a portfolio which she pushed into my hands. "Here are your travel orders and briefing papers. How soon can you be packed?"

" 'Packed'?" I felt bemused—but not displeased. "What's going on? I'm supposed to be on medical leave—"

"Nancy O'Donough had it canceled. She's requested your presence. Your *immediate* presence," she added.

"Really? Why?"

She was frowning. "I don't have that information."

"I see." I'd first met O'Donough on Kya. The UN had sent her to investigate our diplomatic relations—or lack of them—with the kya. O'Donough had

diagnosed the problem and found a solution, although there'd been nothing overtly diplomatic in her actions. A peremptory summons was her style, bless her.

I went to my hotel room, showered, put on my good suit and packed with a speed which may have surprised the courier—what sort of maniac is in a rush to leave a tropical paradise? But she said nothing as she led me to her car and drove me to the flight plaza. She boarded the shuttle with me, then scuttled into the crew cabin instead of sitting with me in the passenger bay.

The shuttle took off for New York and I settled back to read my briefing papers. O'Donough was now part of a team which was negotiating a comprehensive treaty with the kya. We were offering the kya diplomatic benefits, technological aid and foreign-exchange credits. We wanted access to the vault which the Nomads had left on Kya. The kya weren't happy with our proposals, and were holding out for better terms.

I put the papers down, feeling puzzled. The Nomads have been wandering around the Galaxy for at least the past fifty megayears. They leave their vaults everywhere, sometimes on inhabited planets, sometimes on empty worlds. At present we know of six vaults. The vaults contain glass plates, etched with alien writing, and no two plates are alike. So far we've deciphered very little of their contents. The cryptologists say that we'll need many more plates before we'll have enough raw material for full decipherment. One undeciphered plate is as useless as one piece of a jigsaw puzzle—so why were the kya holding out?

I looked up at the entry to the crew cabin, wishing that the courier had stayed with me for questions. The briefing papers didn't tell me the things I wanted to know, and they omitted one important fact.

Correy III. It's an Earthlike world, about fifty light-years from us, and it used to have inhabitants. A few centuries ago the Nomads returned to this part of the galaxy, visited Correy III—and wiped out the native race. Their motive is a mystery, but we *do* know that the extinct race was a lot like humanity, mentally if not physically. If one of our common traits was the thing that had caused the Nomads to devastate Correy III, we wanted to know about it before the Nomads found us. There was no question that they *would* find us; they'd left a vault buried on Earth.

The public knew nothing about the Nomad genocide; the UN feared that the truth might cause a panic. The official story was that the people of Correy III had destroyed themselves through biological warfare. That fib had made people smug—aren't we clever for not having killed ourselves yet?

The repulsors thrummed quietly as we dropped into Manhattan, straight onto the UN headquarters' flight plaza. I waited for the courier to emerge from the crew cabin while the hatch opened and the ramp lowered, but she stayed hidden away. With a shrug I picked up the briefing papers and left the shuttle.

There was the usual crowd on the UN grounds—tourists and a few hucksters, along with the diplomats and UN staff. I saw an iron-haired woman striding toward me, and I had just enough time to recognize her: Ambassador Wilkes, the

new American delegate to the UN. Wilkes had taken the post a few months ago, replacing the man who'd been impeached in the aftermath of the Kya Crisis.

"Doctor Baxter," she said. Wilkes shook my hand and turned me toward the glassy tower of the Secretariat Building, talking all the while. "I'm sorry your vacation was interrupted, but Miss O'Donough insisted on your presence. She has the kya convinced that that we need you, and we couldn't persuade her or them to let you finish your rest. So I do apologize."

I nodded and mumbled something gracious; if she wanted to feel beholden to me I wouldn't complain. "Exactly why am I here?" I asked as we entered the building. I gestured with the papers. "These didn't tell me much."

Wilkes looked at the tourists crowding the lobby. "We're planning a mission with the kya," she said quietly. She took the papers from me, and waited until we were in an elevator before speaking again. "It's the only thing we've managed to agree on—a cooperative investigation of Correy III."

"Interesting," I said. And dangerous, I thought. We had translated a bit of the message found in the Correy III vault, and it wasn't reassuring. "The Nomads put that world off-limits. Isn't a return trip risky?"

"The risk is acceptable," Wilkes said. "The Nomads are gone. And the payoff—one of the items we'll study is the plague which the Nomads used to kill the people on Correy III. We want a defense against it, or anything similar."

"And you need a biologist for that," I said.

Wilkes nodded. "A biologist who can deal with the kya . . . and with O'Donough." She said *O'Donough* the way most people say *plague of locusts* or *root canal work*. Wilkes may have risen in the course of the Kya Crisis, but she had risen into a debacle, and a lot of people at the UN blamed O'Donough for the mess.

Then again, Wilkes's distaste for her may have predated the Crisis. O'Donough is a maverick, which is a cardinal sin in conformist, corporate America. Let's face it: we Americans only respect geniuses and individualists when they have a load of money.

The elevator stopped, and Wilkes led me down a corridor to a conference room. It was a small room, obviously sound-proofed and shielded, and there were quite a few people in there, standing around in small knots. I knew two of them by sight: O'Donough and Vse. O'Donough was busy talking with a burly Slavic man, while Vse was gronking away with a kya I didn't know. Wilkes wandered off and cornered some diplomat, leaving me to look at O'Donough.

Nancy O'Donough. Thirtyish and trim, she had kept the Mohican haircut she'd sported on Kya. That cut had been part of her strategy to ease our diplomatic relations with the kya. I don't know if she kept her head shaved to spite her fellow diplomats, or because the Mohican was now back in fashion, or for some other reason. I'd known O'Donough for several months on Kya, and she had always kept me guessing. The woman had pretzels for brains, with

not one straight line in all her thought processes. Maybe that's what I liked about her.

OK, there were a few other things to like. Seeing her for the first time in several months, I realized how well the Mohican look suited her face. It emphasized her bright green eyes, which made her look fascinated by the world around her.

I walked across the room to her, awkwardly wondering what I was going to say to her. O'Donough took that problem out of my hands; she took the Slav by the elbow, turned him toward me and said something in Russian. My Russian is awful, but I caught my name, something about sharp wits, and a suggestion that we switch to English.

"Certainly," he said. "Doctor Baxter, I am Captain Lev Ilich Akhmetov, of Glavkosmos." Because there were kya present we bowed Japanese-style, instead of shaking hands. The kya have that gesture, but among them the handshake has sexual overtones. Touching palms means an intermingling of sweat and body oils. That means nothing to humans, but the kya have a superb sense of smell; the mixed scents practically shout to them that you're intimate with someone. "Nancy has told me a great deal about you, Doctor," Akhmetov said.

"Oh, call him 'John,' Lev," O'Donough said. She smiled wryly. "Or at least 'Academician.' I think we can concede that much to the kya without endangering human civilization."

I only caught part of that. Most human cultures use "Doctor" as a title of academic accomplishment, while the kya limit it to medical specialists. But why would something that reduces confusion turn into a diplomatic sticking-point? I would have asked O'Donough about that, but Vse must have caught my scent. I saw her approach us, accompanied by another kya. "Baxter," she said, sniffing politely to greet me. Vse was young, but the crouching kya posture and muzzle-wrinkles give most humans an impression of old age. "It's good to see you again," she said in English.

"And you, Vse." I sniffed back, getting an equal whiff of kya and O'Donough's perfume. Vse had a vague cinnamon odor, while O'Donough—the scent was faint, but delightful. Dizzying? I can't describe it, but I loved it.

I made myself look at the kya with Vse. He was male, past middle age, and possessed of a rather aloof bearing. I sniffed and said, "I don't believe we've met."

"Correct. I am Mrih." No sniff; perhaps he thought the kya greeting was inappropriate with humans. "I am told you and Vse will work behind me as scientists."

Vse took over for me. "Being a recent recruit, Baxter may not be fully aware of the situation."

"But he *is* part of my crew," Akhmetov told Mrih. "Ambassador O'Donough assures me—"

"I have heard her claims," Mrih said. "Vse, we must discuss final arrangements with Akhmetov. Alone," he added, glancing at O'Donough. He exhaled through his nostrils—not loudly enough to be insulting, but enough to suggest he thought something stank.

"O'Donough and I have things to discuss, too," I said, feeling miffed.

Mrih was going out of his way to act rude. O'Donough and I threaded our way through the crowd to a corner of the conference room. "What's going on?" I asked her.

"I was going to ask you that, John. Did you get any of my messages?" I shook my head and her eyebrows arched up, making her entire scalp wrinkle. "I've sent you several 'graphs since you got home. Strange."

"It may be the doctors' fault," I said. "They wanted me to take it easy. But I did see some briefing papers on the shuttle. O'Donough, are the kya really as difficult as I hear?"

"That depends on what you've heard, John." She sighed and looked at the crowd. "We've offered them some attractive things—but with strings attached. Short, thick strings."

"Let me guess." I thought about what I'd read. "Massive loans that they'll never be able to repay, technical assistance that makes them dependent on us, a subordinate position in the UN—how am I doing?"

"You've summed up the situation nicely," she said. "Most of the Security Council members want to make sure that the kya don't turn into our rivals. A lot of them babble about the Japanese and the West—Pearl Harbor, Japan Incorporated, and all that."

"So they want to keep the kya under our thumbs." I felt disgusted.

"I know." Her voice was quietly vehement. "It's plain, fucking *evil* . . . and any government that subjugates outsiders will enslave its own citizens, sooner or later. That's history, not opinion. I didn't join the UN to help it destroy civilization." She sounded like she was spoiling for a fight.

She wouldn't get one from me, not over this. At one time the UN had planned to raid Kya—just a quick, victorious battle to take the vault. When leaked, those plans had caused an uproar that added to the Crisis. I had no trouble understanding the outrage; crime is crime, even when you call it *Realpolitik*. "What about the rest of the delegates?" I asked. "Are they on our side?"

"They're on the side of profit," she said. "They know we can only sell information once, so they want to charge all they can. The kya aren't stupid enough to accept their terms." She shook her head, making her blonde haircrest rustle like grass in the wind. "Even the Correy trip is in trouble. Mrih claims we only invited the kya to join it as window dressing. Vse persuaded him that you can cooperate with kya scientists."

"Which is why I'm here." I'd worked with Vse on Kya. She was hampered by Kya's underdeveloped technology—they still used optical microscopes and other high school-level junk in their labs—but when given access to our equipment and knowledge, Vse had proved herself to be a capable, talented biologist. "Wilkes said you drafted me for this job."

"She told you that?" O'Donough looked thoughtful. "Strange. I wanted to persuade you to volunteer; that's why I was writing to you. I know you were on, er, vacation. . . ." Her voice trailed off in embarrassment.

I would have sworn it was impossible to embarrass her. "It's all right. You've saved me from a load of boredom."

When I saw her surprised look I went on, "The Yucatan is a nice place to spend a weekend, but two weeks with nothing to do is enough to drive anyone crazy. So to speak," I added. The psychiatrists might frown upon my cavalier attitude toward a therapeutic rest.

O'Donough looked relieved. "I *would* have drafted you, but I'm glad you're willing. You know how much is riding on this."

"Yeah." How long would it be until the Nomads reached Earth? Correy III was fifty light-years from Earth, but we knew that the Nomads traveled in a swarm which spread across several hundred light-years, moved at sublight speeds and took millennia to pass any given point. Perhaps the leading edge of the swarm had passed Correy III long ago; perhaps it was nearing the Solar System right now. Perhaps that was why I hadn't enjoyed my rest.

Strike that final "perhaps." Enforced idleness is hard to take when you know there's a crisis.

I had something else to consider. "Are you on the expedition, O'Donough?"

"No, I'm working as an advisor to our negotiators. I tell them about kya attitudes and customs—when I can get them to listen." To judge by her frustrated tone, that wasn't often. I felt flattered by that tone; how often does a professional diplomat expose her feelings to someone? "But Mrih will be on the trip," she added. "He's the Expedition Director—a sop the Secretary-General threw him when he complained we looked down on the kya."

I grunted. Mrih would make a rotten shipmate and a worse boss. "He seems hostile as hell," I said.

O'Donough nodded. "To be fair, he's in a difficult position. The kya expect him to negotiate the best possible deal, and he can't afford to look weak. I think his bad manners are meant to show the folks back home that he won't take any crap from humans. Their politics are a lot like ours—um." She looked across the room, where a tall man crooked a finger her way. "The Under-Secretary wants me. Catch you later, John."

I watched her walk across the room, and then I realized someone was watching me. I looked around, just in time to see Wilkes, who quickly turned her head. She had looked baffled, as if some plan of hers had misfired.

Hmm. She'd certainly given me a slanted view of O'Donough's handling of my situation. Link that with O'Donough's missing 'graphs, with my being yanked out of the tropics and with the uncooperative attitude of the courier. It looked as if someone was trying to get me upset with O'Donough.

After a few seconds I decided that was paranoia. Why would Wilkes bother playing games with me? It was more likely that the old bat had just realized that I liked O'Donough, and in her book that was enough to downcheck me. I'd already noticed one sign of the UN's displeasure with O'Donough: although the Mohican cut was coming into style, no one at the UN wore it. They were *not* going to follow a trend O'Donough had set.

I was so busy mulling this over that I almost missed the incident.

Under-Secretary Engels was a big,

backslapping Texan, complete with booming laugh and matching voice. He had O'Donough at his side as Mrih walked up to him. My jaw dropped as he extended his hand toward Mrih.

O'Donough grabbed his wrist. Good reflexes, I thought, mentally applauding her. Engels and some of the people around him looked shocked, including Mrih—I'm sure he was thinking that he wasn't *that* kind of alien. Still and all, O'Donough had kept Engels from doing something that would have added a whole new meaning to the term "interstellar relations."

Mrih was obviously determined to take offense. "I—I *demand* an apology! This obscene suggestion—Engels, apologize!"

Engels looked confused and angry. "What the devil are you talking about?"

Mrih glared at O'Donough. "Can you explain this to him? Have you nothing to say?"

"I do." O'Donough looked straight into Mrih's eyes. Her nostrils flared, and even across half the room I could hear her exhale, long and loud.

I had a week to prepare for the expedition. When you have an unlimited budget that's plenty of time to get all the equipment you need. I just pointed at anything and everything that might prove useful, said "Gimme," and let the UN handle the details. Even so, this involved a lot of work. I was expected to study the physiology of an extinct race, discover the disease which had exterminated them, and see if we could find a way to counter a similar disease. Like the White Knight in *Alice in Wonderland,* I tried to bring along everything I might need; I couldn't hop back to Earth for, say, an isotopic resonator if I suddenly found a need for one.

This left me some free time—about two and a half minutes—to wonder why O'Donough had insulted Mrih. She was up to something, of course—but what?

Her behavior on Kya had been just as outrageous as this. She had been rude and crude, and some of her actions had verged on the psychotic. I think her best performance had been at a kya protocol-buffet, when she had devoured a paper napkin. She had convinced everyone at our research base that she was either insane or incompetent, and most of us had treated her that way.

That had been exactly what she wanted. The kya hadn't understood humanity and were scared of us. They saw us living on a bleak, spartan base, and they saw our conduct grow more and more deranged as time passed—witness our eventual revolt. The kya had reached the conclusion that humans were soulless, militaristic beings, and that we had plans to conquer or exterminate them.

O'Donough changed that perception with her antics. The kya are herd beings, and she had realized that description applies just as well to humans. We had reacted to her in the same way that the kya would react to one of their own mavericks, and that had led the kya to reevaluate their opinion of us. O'Donough had deliberately exaggerated her behavior, so that the aliens could not miss her as the source of the trouble.

I'd come to know her fairly well during her months on Kya, so I was convinced that her insulting of Mrih served a purpose. I would have done a lot for

a chance to ask her about it, but our paths didn't cross again before the expedition's departure date. I did send her a message, but evidently she didn't have time to answer it.

Ah, well. The flowers had been a good idea, and a few months in space would give me the time to make my plans. When I came back—well, we'd see.

After a week of shopping I had a massive pile of equipment, a truckful of boxes which Vse and I accompanied to the Newark Flight Plaza. We rode up front with the driver. He had a cold, and Vse spent the time asking him about the disease. He couldn't tell her anything about its biological aspects, but I understood her horrified fascination—imagine how we humans would feel about a plague that causes temporary blindness.

A Russian shuttle, an oversized silver gumdrop squatting on three landing legs, waited for us at the plaza. A ground crew supervised the cargobots as they loaded my junk. The kid who ran the crew had her hair cut in a Mohican, I noted, although she wore it in an exuberant plume. Evidently the hairdressers had adapted to the new trend.

The loaders had almost finished when a limo floated up to the ramp. O'Donough got out, looked around and walked over to me. As she stepped up to me she held out her hand and I shook it. "I loved the roses, John," she said with a smile. "And your note."

"I, uh, thought you would." I felt flustered. I hadn't expected to see her again for months . . . and we'd just shaken hands in front of Vse, who was watching us with amused curiosity. "Did you come to see me off?"

"No. I'm going with you." She faced Vse and sniffed a greeting, which Vse returned. I followed them up the ramp into the shuttle. The shuttle crew—just a pilot and a flight engineer—made sure we were strapped in before they climbed into the control cabin. Maybe it was my imagination, but they didn't seem happy to have passengers.

Meanwhile it was head-scratching time. "Why are you here, O'Donough?" I asked, as the repulsors started and the shuttle began its ascent. "I thought the negotiators needed your advice."

She snickered. "They decided I'd be more useful on the expedition, thanks to my flexibility, imagination and experience with the kya. I'm now the Expedition Co-Director, which I'm told is a choice job."

" 'Co-Director'?" I repeated blankly. "After the way you insulted Mrih? What in hell is going on?"

"I've been set up," she said. "Everyone knows Mrih and I will fight like cats and dogs, so I'll make a convenient scapegoat when the expedition fails—and the Security Council wants it to fail. The talks have been suspended—"

"What!"

"—and the Security Council would like to cancel them altogether." She took pity on my confusion. "Look, John. How many vaults are there? Total?"

"I don't know. The estimates say there's over a hundred million vaults in the galaxy."

"With that many vaults waiting to be found, why should we negotiate with the kya for the one they have? It looks like a bad deal for us, and only public

opinion has kept the UN talking this long. So when Mrih insulted Engels, I was afraid the Council would use that as an excuse to break off the talks."

"When did Mrih insult Engels?" I asked. "O'Donough, the way I saw it, Engels was the one who held out his hand, the idiot. Then you insulted Mrih. What's going on?"

She looked sly. "John, why did you shake hands with me?"

"Huh?" Quick changes of subject don't bring out the best in me. I glanced at Vse, who was staring out the porthole, watching the flat horizon turn into a planetary curve. "Well, you put out your hand, and I just naturally took it."

"Hearing that, I concede the bet, O'Donough," Vse said absently. "This cultural reflex is as ingrained as you claimed."

O'Donough nodded. "Especially in Texans. If you walk up to one and stick out your hand, he'll automatically reach for it. Even when you've warned him what the gesture means to the kya."

"You mean . . . " I felt scandalized. "Mrih held out his hand first?"

"He did," Vse said. "It was subtle, almost subliminal, but I saw it. A quick, short extension of his right hand, pulled back at once. Disgusting!" she added virtuously.

"You're sure you saw it?" Mrih had the hots for Engels?

"I am certain." Vse turned her head, and I saw her muzzle had wrinkled in amusement. "Being not unattractive, more than one fellow has offered me his hand. I know our signals well."

"And Mrih knows ours," O'Donough said. "Or some of them, at any rate. He wanted an incident to poison human-kya relations—and he's been working to obstruct the talks. Why, I don't know; I didn't even realize it until after the incident, but it explains some odd things he's done.

"And that's why I insulted him." The deck seemed to shift as the shuttle tilted toward orbit; O'Donough paused and adjusted her seat. "I hoped that getting both sides mad at me would keep this mess from getting out of hand. It did—Mrih demanded the UN sack me. They settled for a reprimand and loss of seniority."

I swallowed hard; she'd paid a high price. "I'm sorry."

O'Donough waved a hand. "It goes with the job. The talks will go on now . . . and this suggested the perfect way to dispose of me."

"By sticking you and Mrih in the same ship."

"Yes. You can guess how the Security Council pressured me to take this assignment. They wouldn't let me squirm out of it."

"I'm sure." O'Donough, the victim of political arm-twisting? Preposterous. "You maneuvered the UN into sending you. Why?"

"Because joining this expedition was more important to Mrih than staying on Earth and wrecking the talks. He tied himself in knots to get here, and I damned well mean to find out why."

"I am with her on this," Vse told me. "Mrih claims we can duplicate your technics in a century, but he doesn't explain why we should wait a century for engineering and starflight. I want to know what the *hlak* is plotting."

" '*Hlak*'?" O'Donough asked. "I don't know that word, Vse."

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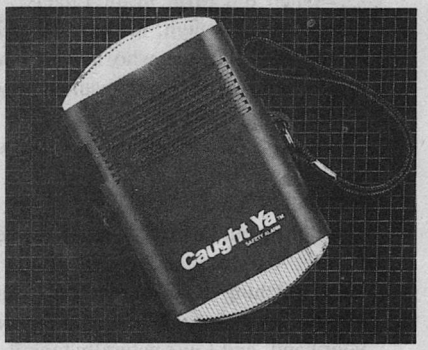

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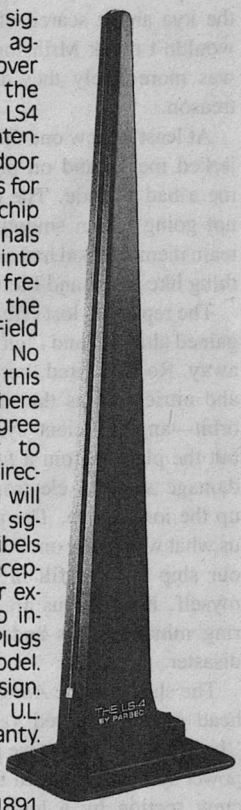

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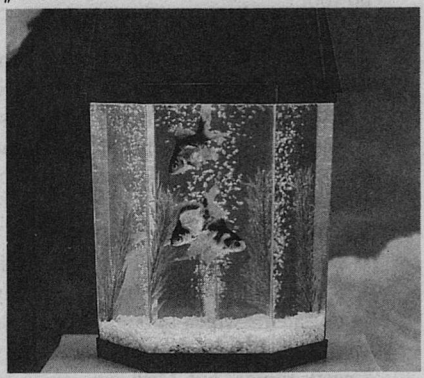

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Vse fumbled to explain. "A slang word. A *hlak* is a small, annoying animal, an—amusing nuisance, perhaps? Being a vague term, it could imply a rat, a skunk, a worm, a snake—"

"A varmint," I suggested. I'm from Oklahoma, and while I've never seen a cowboy or a horse, people still expect me to utter the occasional Western archaism. Such is life.

"A varmint. That's Mrih," O'Donough said. "But he's more than an 'amusing nuisance,' John. He's wealthy, politically well connected, and no fool."

"And more," Vse said. "There is a rumor. . . . he was not our leading candidate for an envoy to the UN. As it happened, one quit because of business difficulties. Another had to leave the race due to injuries from a traffic accident."

"Was Mrih involved?" I asked.

She hesitated. "Possibly to the business trouble, Baxter. Mrih's company holds patents which his rival's business needed. As for the accident, that is only a nasty rumor, but Mrih *was* quick to exploit the lady's bad luck."

I thought things over. What did Mrih stand to gain by messing up our relations? Protecting his business investments? Maybe—but he was in a position to get in on the ground floor of any trade agreements. Why stay in the buggy-whip business when you can have a Ford dealership? And if he could cut a deal which kept Kya independent of Earth, so much the better for him.

I could only figure that Mrih was some kind of reactionary, afraid that an influx of human ideas and technology would ruin kya society. Possible, but it sounded too simplistic. Besides, my four years of Kya had taught me that the kya aren't scared of change. They wouldn't thank Mrih for his actions. It was more likely they'd hang him for treason.

At least I knew one thing: Wilkes had jerked me around on purpose, to give me a bad attitude. The expedition was not going to run smoothly if the other team members had had experiences anything like mine, and I felt sure they had.

The repulsors lost effectiveness as we gained altitude, and I felt my weight ebb away. Rockets fired, burning hydrazine and nitric acid as they nudged us into orbit—an inefficient system, perhaps, but the plasma from a fusion drive can damage satellite electronics and mess up the ionosphere. The pilot didn't tell us what was going on, but once I spotted our ship I could fill in the details for myself. Rendezvous are all alike, barring minor hitches and the occasional disaster.

The ship was the *Aurora*, a hammerhead over a hundred yards long. The "head" was the massive propulsion and power system, separated from the lighter crew section by a long, open lattice. That separation helped shield the crew from the radiation, and it allowed *Aurora* to provide artificial gravity—a convenient tenth of a gee, as the ship spun once a minute around its center of mass. The ship had been despun for rendezvous and orbital departure, however.

O'Donough was breathing slowly, her eyes shut. Spacesick, I decided, or close to it. "You OK?" I asked her.

She swore weakly. "How much longer?" she asked.

Until we had gravity again, she meant.

I glanced at my watch and started to figure our time to departure, before I came to my senses. "It won't be much longer," I said.

"You lying bucket of kangaroo pus," she muttered. Vse gave her a puzzled look; the kya are immune to motion sickness, and don't understand the problem.

Eventually the shuttle latched onto the *Aurora* and we swam through the docking adapter. Lev Akhmetov was there to greet us, bowing and sniffing as appropriate. He didn't seem surprised by O'Donough's presence, so he must have been told to expect her. "You'll wish to see your quarters first," he said, after seeing O'Donough. "I would offer you a tour of my ship, but we will be busy until we make the transition. This way, please."

I reflected upon Akhmetov's diplomacy as he led us to our quarters. He was giving O'Donough an excuse to forego amenities and be sick in private. His consideration struck me as a good sign. When a ship is going to spend endless months on a voyage, it *needs* a skipper with a heart.

Tour or no tour, Vse looked dazzled by the insides of the ship. Considering the level of kya technology, I couldn't blame her—when we contacted the kya they were experimenting with jet aircraft, and they thought a computer was a mathematician with a pencil and a notepad. Only a few wild dreamers believed spaceflight was even possible. . . . and Vse's eyes said she had been one of those romantics.

So after O'Donough bedded down I took Vse to the recreation room. It was crowded with a dozen people, human and kya, watching Earth through the main viewport. The scientific team, I decided. I didn't know them, but I understood that they were sociologists, anthropologists, and archaeologists. They were going to study the dead race for some clue as to why it had been killed. With any luck they'd find that the aliens had made some elementary blunder that we could avoid.

Blunders. *Aurora* was passing over Brazil and the Amazon basin. I'd done field work there as a graduate student, and I found I still knew the terrain. . . . as well as some things that might interest Vse. "We call those small green spots the Drizzle Forest," I told her. "That's a bad joke. A half-century ago the whole area was known as a rain forest. You can see how it's shrunk."

She nodded, copying the human gesture. "The joke being bad, something unpleasant must have happened."

"Yeah. The area was deforested in the Eighties and Nineties, for farmland and urban growth. It made short-term economic sense, but it destroyed a large percentage of Earth's biomass. It upset our ecological balance—carbon dioxide levels rose, and rainfall patterns and agricultural zones shifted. Besides that, nobody knows how many plant and animal species went extinct when we cut down the rain forests. Perhaps a million?"

The figure stunned Vse. "Foolish. Ignoring esthetic losses, your ancestors deprived you of a vast resource."

"I know." We still get more of our new medicines from plants and animals than from test tubes. What did we lose with the rain forests? A cure for leukemia? The key to immortality? Some-

thing we don't know yet? It's too late to lose sleep over it. I watched the shriveled rain forests slide below us.

Why had I mentioned that? Simple. I didn't want Vse to feel daunted by our technological prowess. Maybe she needed a reminder that we're, well, human. . . . and maybe the kya could learn from our mistakes. Experience is no good if it isn't used.

The acceleration alarm sounded and a voice on a speaker ordered us to take our seats. One bulkhead was equipped with pads and handholds, and everyone anchored themselves while the voice gave us a ten-second count in Russian.

Thrust climbed quickly to one gee and held there for a minute. That had nothing to do with escaping Earth's gravity; speed isn't important, but you have to enter transition space with just the right directional vector to reach your destination. Don't ask me why. I once heard a physicist lecture on transition space dynamics, and he sounded like a politician explaining that he'd actually kept a campaign promise by breaking it.

Earth had slid out of the viewport by the time the rockets shut down. The attitude jets gave the ship a few final nudges, and then the stars outside the viewport vanished. We were in t-space, traveling at arbitrary velocity towards Correy III—arbitrary because t-space contains no matter to serve as a reference point, not even other ships in simultaneous transit.

We were back in zero-gee. When one of the crew came in with a tool kit I drifted up to her. "When will they put some spin on the ship?" I asked. I was thinking of O'Donough.

"We will do that when the schedule requires," she said.

"When is that, please?" I asked.

She looked sincerely puzzled. "You do not need to know that, do you?" She went to a bulkhead and began to work on a circuit panel.

Now I knew why the UN had picked a Russian ship for this mission. Given their history—everything from invading Mongols and Westerners through tsars and commissars to the Novaya Duma—secrecy and caution have become second nature with most Russians. Don't do or say anything that might land you in trouble, and because you can't always know what *that* covers, play it safe. What this meant was that *Aurora*'s eight crew members weren't likely to let slip anything about t-space apparatus, cybernetics, or anything else that the UN might sell to the kya.

After a while Akhmetov started to spin the ship. While centripetal acceleration built up I went to the galley, filled a flask and took it to O'Donough's cabin. I knocked on the door, and got an answering noise that I decided meant she had survived and was ready for company.

I was just barely right. O'Donough sat on the cubicle's bunk, looking wrung out. "Zero-gee," she grumbled. "Space sickness. Now I know what made the Crab Nebula so crabby. What the hell do you want?"

I pushed the flask into her hands. "Drink this."

"What is it?"

"Water, a little salt and bicarb, and flavoring. It'll help you rehydrate." Nobody ever died from space sickness, but the fluid loss is nothing to ignore.

She drank, shuddered, and drank some more. "Tastes like I'm puking backward," she said, and finished it. "Almost wish I'd taken some queaze-off."

"Why didn't you?" I asked.

"Because anti-nausea medications make me groggy for a whole damned day, and I have to be on my toes to deal with Mrih." She handed me the flask, got up and went to the wall cabinet. She frowned at the mirror and started brushing her crest. "I take it we're on our way?"

"We went into overdrive about five minutes ago." O'Donough looked and sounded better, so I decided to get down to business. "I take it you want me to work as your spy again."

She looked annoyed. "No, I'd like you to do what you did on Kya. Keep your eyes and ears open, and discuss ideas with me. That isn't spying."

"What's the difference?" I asked.

She shook the brush at me. "Three things, John. One, *real* espionage is always done by one side at another's expense, but if things work out here the kya will benefit. Two, this is all above-board. Everyone will know I'm consulting you."

She paused, and I knew she was using me as a straight man. Well, sometimes you have to go with it. "What's the third thing?"

"You can't be shot for this. Good enough?"

"I suppose so." I wouldn't have said *no* to her for anything.

"OK. Let's go ask Lev for that tour."

Now that we were in t-space Lev Akhmetov had plenty of time to serve as a guide. *Aurora*'s habitation volume consisted of six cylinders, each about twenty feet wide and fifty long, arranged in a tight hexagonal bundle around the ship's core: command and control, crew quarters, life support and logistics, laboratory, hangar and cargo modules. Akhmetov led us through them all.

O'Donough and I did a lot of ladder-climbing, which is no problem at one-tenth gee. I kept my eyes open, not because I expected to uncover any secrets but because I'd never been aboard a Russian ship. Akhmetov was proud of the *Aurora,* although he never mentioned anything we didn't need to know. That didn't mean he wouldn't answer questions, or decline to volunteer information; by the time we'd been through the lab module I knew all there was to know about it, except the number of rivets in the bulkheads.

(Right: rivets. The Russians have a simple design philosophy: if something works, stick with it. Don't waste your efforts on "unnecessary" improvements like electrostatic melding. It was logical, but it still looked funny.)

One compartment in the lab module held the most sophisticated computer I'd ever seen. It was fitted out as a translator, and it had been programmed with everything the first expedition had learned about Correy III's languages. That was meant to aid our field work, although I thought it would swamp us with more data than we could handle.

Akhmetov cut the tour short for dinner. The conference room was designed to double as a cafeteria, which allowed crew and passengers to eat together, rather than in shifts. It was crowded, though—two dozen people in a round

room twenty feet across. Even with minimalist chairs and lap trays it was a tight fit. As I came into the cabin I noted how people had formed into cliques: Russian crew here, UN scientists there, kya over there. Dinner did not look like an exercise in interstellar amity.

A dispenser gave out randomly selected trays, and while Akhmetov joined his crew I sat down with O'Donough. . . . and wondered what to say to her.

Look. I'd known her for several months on Kya, but only as a quasi-adversary and a puzzle. In time I'd come to see her in a different light, and that was the problem. I could deal with her as a co-worker or a boss, but as a woman? I felt like a kid on his first date.

Luckily O'Donough started things. "I want to ask something," she said. "This plague the Nomads used on Correy III—is there any chance we can catch it?"

"What?" For a moment I thought she was kidding. "Impossible. The first expedition didn't have any problem. It's because the amino acids are all different."

"Meaning what?" she asked. When I hesitated—I didn't want to be a bore—she said, "I need to know, John. I heard that cross-infection could be a problem."

And she was worried; it showed. There's a special place in hell for people who start such rumors. "Well, amino acids are the building blocks of proteins. There are many possible types of amino acids, but the life-forms on different planets only use twenty or thirty of them. The odds against duplications are unbelievable." I gestured at the kya. "That's why we can't infect one another—the viruses and bacteria can't find the material they need to reproduce. The same thing applies to Correy III."

"I'm glad to hear that." She toyed with her food. "I was told there was a danger because Correy III's life uses DNA."

I couldn't laugh. "Somebody fed you a line, O'Donough. *All* life uses DNA. That has nothing to do with contagion."

"Wilkes," she said, scowling. "That mouse-fart is a disgrace to evolution. She made it sound like a real threat when she briefed me last week. I should have guessed. Everything really uses DNA?" she added, as if suspecting a trick.

"Everything that we know of, on fifteen—no, sixteen planets. Apparently the self-replicating double helix is the simplest way there is to handle genetic data, and you can only form that structure with four specific nucleotides." I had the good grace not to go into detail.

"Sixteen planets." She looked interested. "I'd think the odds would be against them all evolving DNA on their own."

"You're right; it didn't evolve on planets." I smiled at the surprised look on her face. "DNA comes from comets. The thought now is that either comets impacted on the primordial planets, or that material from their tails blew into their atmospheres. Either way, they seeded the planets with life."

"I'd always heard that life started in the seas," she said.

I had to shake my head. "That theory went out of style. The organic chemicals in the primordial seas probably were too dilute for the necessary reactions, but comets are rich in organics. Whenever

one swings reasonably close to a star, it gets enough energy to run the reactions. Finding cometary DNA back in '19 clinched the theory.''

''I . . . see.'' I was sure she did. Awe and understanding are a matched set, and O'Donough looked awed by the idea that life had come to the planets from between the stars.

After a moment we remembered our trays and began to eat. I was aware of the kya speaking with one another. Their voices were quiet, but not hushed, and I caught snatches of their dinner conversation as I ate. They were comparing notes after a busy day; Vse was still impressed by the truck driver and his cold, while somebody else wanted to talk about the shuttle—how could something smaller than a cargo plane possibly fly into space?

''That being trivial, don't worry about it,'' Mrih said. ''These funny-scented *hlaket* aren't the only ones who know things, Tsyu.''

''Interesting,'' O'Donough murmured. I nodded. Mrih had spoken in amusement, not contempt or resentment. He obviously didn't have much regard for human varmints. And—did he think the kya could find a way to circumvent humanity's technological lead, leapfrogging a century of progress?

Maybe he did.

After dinner O'Donough and I went into a lab compartment for a private discussion. ''I think I know why Mrih is here,'' I said. ''He wants to study Correy III's science. It's more advanced than what the kya have, isn't it?''

''Somewhat,'' she said. ''The reports say it's similar to American state of the art, *circa* 1980, 1990. Call it a half century behind ours, and about that far ahead of the kya. But is it possible for Mrih to learn anything useful?''

''I think it is. The locals would have needed some way to summarize their knowledge, to pass it on to the next generation. That means we're bound to find college textbooks, or their equivalent, on engineering and science. The computer can translate them into kya, and we've agreed to share everything we learn at Correy III. That'll give the kya concepts, theories, processes—''

''You may have something, John.'' She ran a hand over her scalp, as if brushing vanished hair. ''But it would still leave them 'way behind us. I can't imagine Mrih settling for that.''

''But it explains why he's in such a jolly mood,'' I said. ''He's put one over us.''

''Possibly. We agreed to share everything we learned on Correy III, but we never thought to exclude native technology. . . . '' She looked thoughtful, then shook her head. ''It doesn't explain why Mrih himself came along. He won't do any field work and he's no more a scientist than I am. He isn't needed for this.''

''No, you're right.'' I felt let down. I'd been sure I had the right answer for her.

O'Donough patted my cheek. ''Cheer up, John. We know he's confident about something. That's progress.''

I suppose it was, but I'd have given a lot to know what we were progressing toward.

Mrih made his first move the next day, during lunch. The kya had seated

themselves near the Russians, and Mrih had taken a seat next to Akhmetov. O'Donough nudged my ribs as we entered the cabin; it was less than likely that they were chatting about the lack of weather. I saw two empty seats next to them, almost as though they were reserved for us. We got our trays and took the seats.

Akhmetov greeted us. "Co-Director Mrih has been telling me of his political experiences. Most intriguing. You were speaking of how you earned this directorship, were you not?"

"Indeed," Mrih said. "There being several qualified people, the rivalry was intense. I was fortunate to have the support of an influential legislative group, as well as an academic body and a business consortium. Even so the choice was trying. Being different from us, perhaps you humans have a better method." He looked at O'Donough. "How were *you* chosen?"

"The Security Council was impressed with my experience," she said. "I had several difficult assignments before I was sent to Kya, and the Council appreciates my role in the Kya Crisis."

Mrih looked polite; he knew the difference between the official story and the truth. "Yes, your handling of the Human Crisis was—unorthodox. But was this the only factor? Being curious, I looked into your background. Your parents are influential people, aren't they?"

Akhmetov looked alert, and I wondered what Mrih was getting at. O'Donough's mother had been a singer in a punk-alloy band at the turn of the century, and her father was some sort of music-company executive. They were wealthy, and wealth is by definition influential. But what did this have to do with anything? And why did he pretend not to know why the UN had picked O'Donough?

"I wouldn't call my parents influential," O'Donough said. Her mild tone surprised me. I had expected her to blister Mrih.

Her mildness may have encouraged him. "It is well known that they contribute large sums of money to political campaigns. This must create certain amounts of—gratitude, shall we say?"

"Not really," O'Donough said. She forked a bite from her tray. "My folks usually end up backing the losing candidates. Their friends may be grateful as hell for the money, but they can't do much to pay back the favor. Their opponents do even less."

"And I'm to believe that your wealthy, clever parents are so inept?" Mrih asked.

"Believe what you like," O'Donough said. "Mom and Dad support candidates who believe in the same things they do. They could be more pragmatic, but they'd rather do what they think is right. Or is there something wrong with that?"

Mrih had no answer. The whole cabin was dead silent, and after a moment Akhmetov chuckled. He started eating his lunch again, and the rest of the compartment followed suit.

The silence dragged on, however, making me nervous. I looked at Akhmetov and said the first thing that popped into my head. "You know this is the second time I've been on a ship named *'Aurora.'* "

"Truly, Academician Baxter?" He

looked bemused. "We have no other spacecraft named—oh, *that Aurora*."

"Right." The first *Aurora* was a naval ship. It's a museum piece now, a monument to one of Russia's revolutions. "I saw it when I was in Leningrad for an exobiology conference, back in '26. Quite an interesting ship."

"To say the least," Akhmetov said, launching himself into a cheerful monologue about something he called the October Revolution. His talk engrossed me, and it helped ease the tension in the compartment, which is what counted. I'd said just the right things to Akhmetov, and I planned to feel smug for the rest of the day.

O'Donough also seemed pleased, if for a different reason. "Mrih made a nice little power play in there," she said, after the two of us left the compartment. "It almost worked."

"A power play?" I asked. "I thought he was just being rude again."

She looked surprised. "You really don't know? Russians don't approve of corruption, especially nepotism. That kind of crap cost them a lot in the last century, and they still have some draconic laws against it. Mrih was trying to make it look like my folks got their cronies to put me here."

Which was funny, in a way. "But what makes it a power play?" I asked, as we climbed into the living quarters area.

"Well, if Mrih can cut me down enough, no one will take me seriously. That will leave him in charge of the expedition. So now we know that's what he wants."

"But what can he do with it?" Commandeer the *Aurora*? Mrih and O'Donough were in charge of the expedition, but Akhmetov commanded the ship itself. He wouldn't tolerate any hanky-panky. Lead a mutiny? We humans outnumbered the kya better than two to one. Besides, what could Mrih do with a stolen ship, aside from die in it? It takes an experienced crew to run a starship. "Have you got any idea of what he wants?"

O'Donough shook her head as we came to her cabin. She opened the door, and after a few seconds I followed her into the cabin. She reclined on the bunk while I perched on the writing table's stool. "O'Donough? What good are we doing here?" I asked.

"What do you mean?"

"The UN expects this mission to fail," I said. "I don't know how badly they want data on Correy III, but you said yourself they're hoping for trouble."

"True. They want to 'prove' that humans and kya can't get along. That would end public pressure to deal with them. It's why they gave Mrih power—he's doing the job for them." She shrugged. "So I have to keep things running smoothly. I don't give a goodly goddamn *what* Mrih tries, John. I *will* make things work."

"But even if you can fix Mrih's wagon, that still leaves the UN free to block things," I said.

"Does it?" She curled her legs under her. "What's the price of oil?"

"About two thousand bucks a barrel. Why?"

"On Kya it costs a thousandth of that," she said. "The kya haven't drained their reserves the way we did. We still make a lot of things with

oil—some drugs, for example—but scarcity inflates the prices and limits production. Now, how much would Upjohn or Lekarst-Fabrik pay to have a pharmaceutical plant on Kya?''

''Plenty.'' Pound for pound, medicines are the costliest substances in existence. For all the ones we make from plant and animal products, we still have to synthesize some out of petrochemicals and other substances. ''Given cheap oil, they could cut prices by half and still raise profits, even with the shipping costs.''

''The kya would profit, too,'' O'Donough said, ''And not just by running factories for us, although that would let them learn firsthand about our technology. A fair contract would give them the money to hire human advisors, buy more technology, lease space on starships, and so on.

''All this is to our advantage, in the long run. As the kya industrialize and their economy expands, they can buy more from us, and we can buy more from them. Prosperity is like knowledge, John. It grows when you share it.''

''But as long as the UN can block trade with the kya—oh.''

She nodded. ''When there's profit to be made, legal barriers can be forced down. The trouble is that drug manufacturers can't generate much pressure by themselves. They aren't big enough.''

''So the problem is to find other interests who could do business with the kya.'' I couldn't think of anything, but then I'm no businessman. . . . and O'Donough looked smug. ''What have you got in mind?''

''Something that involves the one real difference between us and them—their sense of smell. Could you teach Vse to do a chemical analysis with her nose?''

''I—hey!'' We have machines to do gas analyses, but they're limited and unreliable. Vse could walk through a chemical plant, judge reactions, find leaks, and make informed suggestions on what she smelled.

''Here's another thing,'' she said. ''Kya artists handle scents the way ours handle colors. Did you notice the perfume I wore at the UN?''

''I . . . uh . . . '' The only other answer that came to mind was *hell, yes,* which didn't have quite the urbane sound I wanted.

She laughed. ''It was a kya product, John, tailored to the human nose. Specifically, the male nose. Some kya did a little development work at our research base, and now they'd like to market their product on Earth.''

''And you were doing some field-testing for them?''

''At Vse's request; she brought some samples with her last month.'' She frowned, almost to the point of pouting. ''Lev warned me not to bring any along—you know how spacers are about closed air systems—otherwise you and I could do our own testing.''

''Sure.'' I gulped. Butterfly time. All at once her cabin seemed a lot smaller. ''Anything to further the cause of research, that's me. Uh—could the kya really make a profit this way?''

O'Donough seemed annoyed with me for sticking to the subject. ''You've never seen perfume prices, have you? A quarter-ounce of something exotic can cost as much as a barrel of oil. Luxury goods always mean good business,

John. Spices and silks are what opened trade between Europe and the Orient, 'way back when."

Which prompted Columbus to try sailing west, and that *really* changed things. We kicked around some more ideas on commerce and the kya, then called it quits for the day.

Life aboard *Aurora* wasn't quite as boring as it might have been, although things came close to the limit. Aside from Vse, I found the kya pretty unsociable; Vse told me that was Mrih's doing. The old boy had picked the kya team, and he'd chosen people with a dislike of humans. Vse was here only because her knowledge of exobiology had made it impossible to omit her.

The UN team seemed unfond of me. Partly it was animosity toward O'Donough and anyone associated with her. Beyond that—it's hard to say. They had a patronizing attitude toward the kya, and they thought I was nuts to regard Vse as my equal. As far as they were concerned the kya were a bunch of fumblefingers, not to be taken seriously. If the UN wanted the expedition to fail, they'd stacked the deck properly when they chose these people.

At least I was a hit with the Russians. Every so often I'd get Akhmetov or one of his crew to start talking about Mother Russia and her history, and they loved me for that. They never guessed that I had a motive beyond my usual curiosity. I had tried to explain what little I understood of the Russian psyche to Vse, with indifferent results; I figured she and the other kya would learn more if they heard things from the Russians.

O'Donough had troubles of her own, Mrih continued his back-stabbing efforts, indirectly aided and abetted by the UN team. Our senior anthropologist, a Beijinger named Wong, flatly told me he would not take orders from a bastard like O'Donough. Someone had told him that she was born out of wedlock—a capital crime in overpopulated China—and he was outraged that the UN had put him in that position. I couldn't persuade him to unbend, and he wouldn't even talk with O'Donough.

So life aboard our happy ship put O'Donough under pressure. She needed to unwind, and we spent a lot of time talking in private. "I can't talk like this with many people," she told me one evening in her cabin. "A lot of the folks I know don't keep their mouths shut. They gossip, or they brag, or they sell what they know to interested parties. And there's always someone waiting to take advantage."

"Politics," I said. "It seems like your job is more bother than it's worth."

She was quiet for a long moment. "Sometimes I think so," she said at last, "When I have to deal with anal-retentive nationalists, or power-hungry crooks. But the times when I can accomplish something—there's nothing like it, John. But it isn't easy."

"Especially with those scoundrels you have for bosses."

O'Donough sighed. "I almost wish they *were* scoundrels, John, but they aren't. They made the UN an effective instrument of peace, and that only happened because they could put the human race ahead of their countries. They still put humanity first—I think they hate me because I don't, not the way they do."

She sounded demoralized. Maybe

that's the curse of being a good diplomat: you learn to appreciate everyone's viewpoint, even your enemies'. Having the UN against her didn't help. Every so often she needed a pep talk, something to remind her that she was the best in her business, and I was glad to deliver.

I hope I made her life easier, but beyond that I had a job to do. Vse and I moved our equipment from the shuttle to the lab, and I trained her in its use. This, naturally, meant teaching her some of the deep, dark secrets of human science. You can't expect someone to use a cellular electrophorimeter without understanding electrophoresis, which means explaining that variations in the electric charge on a cell's surface can influence the movement of different chemicals. Thrilling, isn't it? The stuff of espionage?

Well, yes. Electrophoresis is a key part of certain industrial processes. I was giving Vse the sort of things the UN wanted to sell. That was one of the paradoxes of the expedition, and it gave me some uneasy moments. The UN had recently passed a resolution against just this sort of thing, and the penalty clause was explicit. Doing my job could get me in trouble.

So I was less than thrilled when, a few days before we were to leave t-space, Vse brought another kya into the lab module. He was Tsyu, an archaeologist; lately I'd seen them together a lot. "Vse says you can be trusted," Tsyu said, after Vse had closed the door.

"I try to be trustworthy," I said. We were speaking in kya. Their word for *trust* has connotations lacking in the English equivalent; among other things, it implies that you respect the person who trusts you.

"I want to know things about vault worlds," Tsyu said. "Having a theory, I need facts to test it."

"What's this theory?" I asked.

"That the vault worlds are *gzif 'cha majet*."

Huh? "I don't know that term, Tsyu."

"It's an archaeological phrase, meaning a place with attracting resources, a node for commerce."

"Like a gold mine?" I asked. *Attractive* might have been a better translation, but we had learned one another's languages through computer-augmented hypnolessons. My subconscious insisted on hearing the word as *attracting*, and I was stuck with it.

"Or fertile farm land, or a good coastal bay for shipping," Tsyu said. "Wishing to exploit the resource, people are attracted to the place. I think the Nomads placed the vaults on certain worlds because they have attracting resources."

"I'm not sure I understand," I said. "I'd think the vaults themselves would be enough of a resource, wherever they were."

He looked pleased with himself. "I think they are an *additional* resource, something to make the vault worlds more attracting."

I thought that over. It made as much sense as anything else about the Nomads. You can't ever prove a theory, but you can disprove it . . . or show that the evidence strongly supports it.

I went to the terminal and keyed in a request for data on vault worlds. Before the machine would pay off it

flashed a warning at me. *The requested data is covered by UN Security Council Resolution 1453. Unauthorized disclosure. . . .* I skipped that; the UN has no courts or prisons, but it could prosecute me under American law. I punched in my name and ID code, thereby promising not to do what I was about to do.

"You'll have to read it off the screen," I said, as I stepped back from the terminal. "The machine won't print out secret information." Tsyu didn't answer. He seated himself and read as information scrolled across the screen. He was a bit clumsy, but he knew how to search the data files, and he found what he wanted in short order.

At length he inhaled, a slow, luxuriant sound. "It fits. It does fit, but I never expected it to smell so sweet." Tsyu looked up as though remembering our presence. "There are six known vaults. Two are on worlds much like your Mercury, Baxter—small, dense, metal-rich, with peculiar formation histories."

"Strugatsky I and Simak I," I said. I looked over his shoulder and read. When a planetary system reaches the final stage of creation, its star goes through something called the T Tauri phase. It burns hot and bright, and it generates an enormous, powerful solar wind. This blows the dust and debris of creation out of the system, leaving behind only planets, asteroids and the larger meteors.

This phase is hard on the innermost planet. its outer layers melt and boil, and the vaporized rock is blown away on the stellar wind. Mercury lost its crust and much of its mantle this way. Strugatsky I and Simak I, which have closer orbits to hotter stars, were boiled down to their metallic cores.

"You see the value," Tsyu told us. "A bare-metal planet, easily mined by a starfaring culture, rich in many metals."

I saw it, all right. "This could be more convenient than asteroid mining, Tsyu. You don't have to prospect thousands of rocks, and the local sun can supply energy for smelters."

"Such planets are too hot for life," Vse said.

"That doesn't matter," I told her. "Robots can handle the temperatures."

"Of course! What of the other vaults, Tsyu?"

"The third is on Wells IV. This world has little animal life beyond meta-insects, but it has an unusually rich botany—"

"Medicines," I said, looking at Vse. No need to tell us about the economic value of plants. The research base on Wells IV had already discovered some potentially valuable substances. "And the other three vaults—"

"Kya, Earth, Correy III." Kya don't smile, but I could see Tsyu's pleasure. "*Their* resource is people, industry. They had none such when the Nomads first visited, but they could expect intelligence to evolve in time. Higher forms were already present.

"The facts being as I suspected, here is the full theory. The Nomads wish to encourage interstellar commerce. The vaults exist at least in part to motivate star travel. Finding one vault, it is desirable to find more, correct? And one finds a vault on a *gzif'cha maj*."

I translated that as *resource node*. "One question," I said. "Why would

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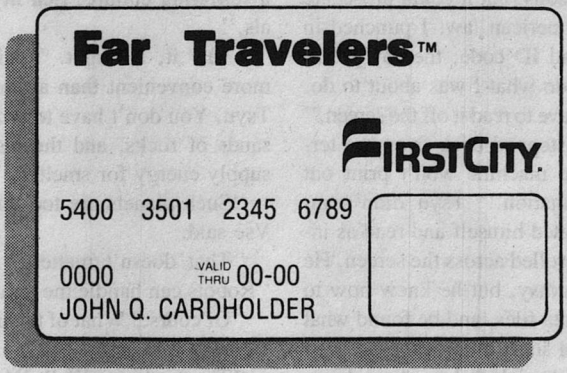

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the Nomads want to promote trade? It's right thoughtful, but what's in it for them?''

Tsyu gave a very human shrug. ''Being ignorant, I speculate. Perhaps they find it convenient to trade with native races as they migrate. Dragging around their own factories might not be worth the trouble. The information in the vaults would tell locals how to make items the Nomads wish to buy.''

''Items we'd want, too, I suppose,'' Vse said. ''Desirable items would encourage production. And mass production would make costs lower, wouldn't it? The Nomads would prefer low prices for their whatevers. A booming economy would benefit them.''

Tsyu looked surprised. ''I hadn't thought of that, fragrant one. Yes on all points. Whatever their coin, traders are never open-handed. And trade flourishes in proportion to production.''

''I think you have something,'' I told him. ''Have you discussed this with anyone else?''

''With Vse, and Mrih. Mrih suggested I keep it to myself, but Vse had different thoughts. I tried to discuss it with the rest of your UN team, but they expressed indifference,'' he added, resentment in his voice.

''You might tell this to O'Donough,'' I said. ''She—''

''O'Donough? A UN deputy?'' Tsyu exhaled. Loudly.

I did my best to remain patient. ''She's looking for a way to break the deadlock,'' I said. ''This could help.''

''Break it?'' Tsyu asked. ''Sometimes I think your whole species wants the deadlock. The—''

''Swamp gas!'' Vse snapped. ''You know how O'Donough helped resolve the Human Crisis. If it hadn't been for her, Earth would have attacked us, to steal the vault. She kept us out of a stinking war.''

Tsyu looked shocked, and now I knew how to swear in kya. ''So she's a maverick,'' Tsyu said. ''So what? The rest of the humans—''

''—admire her for her deeds. Have you noticed how many of them have copied her hair-removing?''

He made a gesture of dismissal. ''Hero worship.''

''Right! They admire her for preventing trouble, for working to improve relations between us and them. Would they make a hero of her if they didn't approve?''

Tsyu acted like he did not want to be convinced—or maybe he wanted to sound me out, to see how much I differed from the other humans on the *Aurora*. He rounded on me. ''What of you, Baxter? How do you feel about us?''

''I favor a partnership between our races.''

''A partnership? Why?'' Tsyu leaned forward in the chair. ''Borrowing a question, what's in it for you?''

Me personally, or humanity in general? ''You know what happened during the Human Crisis,'' I said. The kya phrase felt funny in my mouth, but when you got down to it, it made more sense than calling it the Kya Crisis. ''Our base was isolated, and badly designed, almost like a prison—nothing to do there but work and wait. Eventually the strains caused us to crack up. Base-director Kittrick declared independence from Earth and appointed himself dictator. Everyone got behind him.''

"This has a point?" Tsyu asked. He tapped one splayed foot against the lab floor.

I nodded. I'd thrashed this out with O'Donough, and she'd helped me to refine my thoughts on the subject. "Think of the base as a microcosm of the human race. Our world has been isolated from the beginning. We—"

"I find it hard to call a world 'isolated,' Baxter," Tsyu said. "Being a rather large item, a planet—"

"—is tiny compared to space," Vse finished. Evidently I wasn't the only one to have my perspectives changed by space travel.

"And much of our behavior has been strange, even to us," I said. "We act like the victim of isolation stress."

"Yes, I see that," Vse said. "For example, the things the Russians say about their past suggest they have been isolated by geography, fear, and hostile neighbors. Perhaps it is no coincidence that much of their internal history is so unpleasant. Then there is the lunacy of destroying the rain forest. Isolation-mad people often damage their surroundings. And your own nation, Baxter—your strangest people believe in 'isolationism.' "

"Yes . . . " When I got the Russian crew to talk about their homeland, I'd only wanted to show the kya that the Russians behaved as they did for good reason. Good scientist that she was, Vse had found other lessons in what she had heard.

I plowed on. "You people are our first chance to break our isolation. I don't want to see a herd of idiots throw this away."

Tsyu seemed underwhelmed. "So you're looking out for the good of humans, not kya."

Vse snuffled: kya laughter. "Tsyu, it runs both ways. Kya is isolated. Recalling the mage-burials, the triads and pentads, the Stormlords, the Left-Hand Path and the child-changers, I find it hard to see ourselves as paragons of sanity."

I'd never thought of that. "We could help one another," I said, and got back to the main point. "But before we do that we have to end the deadlock. Tell O'Donough your theory—"

"No."

"She is trustworthy," Vse said.

Tsyu made an odd sound in his chest. Giving in? "You tell her, Baxter. Let me know what she thinks." He left the lab compartment. Vse followed him, and I could swear she winked at me as she left.

This was definitely one of my better days. I hadn't expected any kya besides Vse to share ideas and listen to me, much less decide to trust me or partly trust O'Donough. This qualified as a major breakthrough, and I wanted to tell O'Donough right away.

She was in the rec room, watching the latest remake of *Anna Karenina*. She came with me when I said I had something important to discuss, and we went to her cabin. "Tsyu thinks the Nomads want to encourage interstellar trade," I began, and she listened silently while I ticked off the details.

"It's plausible," she said at last, "and it makes sense. The Nomads plant their seeds wherever they go, and by the time they come back civilizations have sprung up. If they need things, they'll have suppliers all over the place."

I nodded. If you need a restaurant or a machine shop, you'll do better in Boswash than you will in Antarctica. But I was just beginning to wonder what sort of beings could plan on such a time scale.

O'Donough had been sitting on the bunk; now she got up and started pacing. "And it explains why Mrih is here. He must have figured this out months ago."

"Figured out what?"

"Everything. John, where would you look for Nomads?"

"Uh . . . " I wasn't even sure I'd want to find them. "I don't know. Where?"

"Correy III. It's the one place we *do* know they've been recently."

"That was centuries ago," I said. "And the first expedition didn't see any Nomads."

She shrugged. "They weren't looking for them. . . . and the first expedition was only on Correy III for a short time before they evacuated. If any Nomads were around, they may not have had time to respond. It's not a sure thing that any Nomads are near Correy III, but it *is* a good bet."

"Maybe you're right." The Nomad migration could take thousands of years to pass any given point. . . . such as Correy III.

O'Donough nodded. "Now put yourself in Mrih's shoes—"

"The kya don't wear shoes."

She rolled her eyes. "Smart-ass. The Nomads are far more advanced than humanity, and they're traders. Suppose Mrih negotiates a trade agreement with them—"

"—one that favors the kya over humanity," I concluded. No wonder Mrih wanted to control the expedition. If things worked out Mrih could reverse the human-kya relationship, turning us into junior partners—or freezing us out altogether.

Maybe he was paying us back for our condescension, or maybe he was as race-centered as those dim bulbs on the Security Council. Maybe, but something else occurred to me. "The stakes are high, O'Donough, and you heard what Vse said about Mrih. If we run into any Nomads, how far will he go to take charge?"

"I don't know." She stopped pacing and leaned against the door. "He can't get away with killing me, if that's what you mean. He strikes me as ruthless, but not stupid. He wouldn't try anything that would make anyone suspicious."

"I hope you're right." Still, it's easy to arrange an accident aboard a spaceship—block a ventilator, fray a wire—and Mrih could have picked up some tricks just by asking what not to do. The crew would have told him what mistakes to avoid; Russian secrecy is obsessive, but not demented. "But it might be a good idea to keep an eye on Mrih. You never know."

"Oh, don't be paranoid—" She bit off her words and swallowed. "I'm sorry, John. I didn't mean that."

"It's all right." What was the problem—oh, of course. The therapists had sent me on my Yucatan vacation for good cause. From anyone else, her words would have sounded tactless . . . . but not from her.

"No, it's not all right, John." She sighed. "I'm not a natural diplomat. If I don't watch myself, I say things I re-

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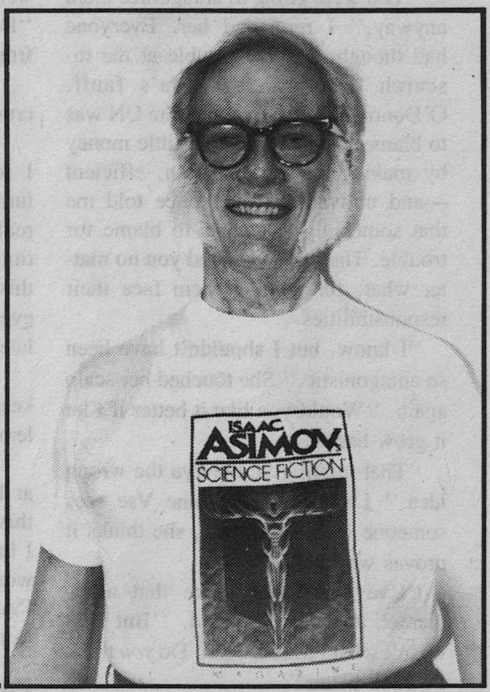

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gret. It's easy for me to act rude when there's a reason, but . . . '' Her fingers brushed the top of her scalp. ''I should have let this grow back when I left Kya, but the Security Council tried to set me up as a scapegoat, and this was the only way I could rub their noses in it. All *that's* done is to antagonize them.''

''You were going to antagonize them anyway,'' I reminded her. Everyone had thought that the trouble at the research base was the kya's fault. O'Donough had shown that the UN was to blame; they had saved a little money by making the base spartan, efficient —and unlivable. ''You once told me that somebody is always to blame for trouble. They'd have hated you no matter what, for making them face their responsibilities.''

''I know, but I shouldn't have been so antagonistic.'' She touched her scalp again. ''Would you like it better if I let it grow back?''

''That might give the kya the wrong idea,'' I said. ''Every time Vse sees someone with a Mohican, she thinks it proves we like the kya.''

''I've heard her make that argument,'' O'Donough said. ''But that wasn't what I asked, John. Do *you* think I'd look better?''

''I never thought about it.'' I suddenly realized she stood between me and the door. ''I mean—''

''John, *why* am I making you nervous?''

''Nervous? Me?''

She nodded. ''It happens every time I get you alone. What's the problem?''

''I . . . '' I let out a sigh, stalling for time. ''I don't know if I can explain it.''

''You can try, can't you? And I can listen.''

The hell of it was, I didn't know if I could explain the problem to her; O'Donough was probably the most self-assured person I'd ever met. But I told myself that if I could communicate with Russians and kya then I could damned well manage something with this woman. ''Do you remember Aelita Krupskaya, from the base?''

''That linguist, the one you had a crush on?''

''That's her.'' Even under a tenth-gee I felt heavy, weary. ''It could have turned into more than a crush, but I really blew it. And that wasn't the first time I've botched a relationship. I have this habit of letting things drift. I don't even notice I'm doing it until it's too late.''

''You haven't drifted, John. You keep backing off. What's the problem?''

''Well, I figure I only get one chance at this.'' Strange, I'd never talked about this with anyone—I now realized that I barely understood it myself—but the words came easily as I spoke with her. ''And this is the one time I don't want to make a mistake.''

''So you pull back before you have a chance to mess up?'' She walked over to me, bent down, and kissed me. ''Now will you stop worrying about making some damned mistake?''

As I said, this was one of my better days.

Correy was an F8 dwarf, a bit larger and hotter than our Sun. *Aurora* exited t-space some two hundred astronomical units away from it, well out in the star's

cometary cloud. That wasn't bad astrogation on Akhmetov's part; the distances between stars aren't known all that accurately, and quantum uncertainties in the overdrive make pinpoint accuracy impossible.

Two more jumps put us within five thousand miles of Correy III, and a few firings of the main rocket put us in a final orbit some two hundred miles above the planet. O'Donough took some queaze-off and slept through the fun. Between the time we left t-space and entered orbit we were in zero gee, with the ship despun for maneuvers. The kya loved it.

We orbited Correy III twice before Akhmetov spun up the ship. I spent that time floating at the lounge window. By day Correy III looked a lot like Earth, or Kya. With binoculars I could spot cities and roads, and there was no way to tell they were abandoned.

The real difference showed on the planet's night side. The only light came from storms; the lightning made me think of flashbulbs wrapped in cotton. Maybe a civilization doesn't have to light up its night skies, but this darkness looked ominous.

The vault was still down there, its position marked by its own neutrino beacon and by a transponder left by the first expedition. We didn't plan to land there; our first target was a large city. The team wanted to rifle its libraries, and we had a vague hope that the city might be a political center. No time was wasted in getting down there. The shuttle was fueled and loaded almost at once, and I had a splendid view of the shuttle as it dropped away from the *Aurora*.

Why wasn't I aboard it? Well, the shuttle only had space for twelve passengers, which meant that two of our team had to stay behind. Being Mr. Popularity, I was everyone's first choice for that duty. At least the team was able to agree on that much.

Vse stayed behind as well. She joined me at the lounge window, and I noticed her forlorn expression. "Cheer up," I said. "We'll go down ourselves next week."

"I know, Baxter," she said. "But I miss Tsyu already."

I suppose she did; they'd been pretty close lately, and O'Donough told me they did more than shake hands. "He seems like an all-right fellow," I said.

"He's that," she said, and looked me over. "He's not the clogged-nose idiot that Mrih hoped he was, you know?"

"I didn't think you'd like him if he was."

She sniffed. "O'Donough is right. You say the nicest things. Well, I don't want to spend the next week moping around. I have an idea, but I don't know how to test it."

"Let's hear it."

She gestured at the planet. "The sentients were killed by a tailored disease. The question is, how was the planet infected? Unless the Nomads are omnipotent and invulnerable, they couldn't line up the entire population for shots, or release a spray on the surface. And if they're invulnerable, why bother killing an inferior race?"

"Good point." I thought about it, and saw the obvious. "They might have released their plague from orbit, and let it filter down through the atmosphere."

"Those are my thoughts," Vse said.

"Space being hazardous, and the process being slow, it suggests the organism is tough and long-lived. I would expect to find traces of it in the upper atmosphere, if not in orbit. Do you know a way to sample that part of the atmosphere?"

"Yes. Build a drogue, tow it through the upper atmosphere, and see what sticks to it. We've got some micropore filter that we could use for that." If Vse was right, our job had just become a lot easier. Down on the surface the plague would be one out of millions of species, but you find few microorganisms above the troposphere. "Let's get on the computer and do some simulations."

"Simulations? Why bother?"

We'd just hit one of the differences between us and them. Human scientists test everything on a computer, to see if things will work, optimize performances and so on. The kya don't have computers, so they just charge ahead and run their experiments. They miss things that way, but I'll bet they have more fun.

Still and all, we were going to do it my new-fangled way. "I've never done this before, and I want to make sure we do it right. Let's get started."

We got started. As it turned out we needed five days to get ready. Our design work and construction was no problem, not by itself; we settled on a fifty-yard square of micropore filter, held open by composite struts and towed at the end of a hundred miles of monofilament cable. The computer said that we could drag it through the upper atmosphere, below and behind *Aurora,* and seine thirteen cubic miles of air per hour. The air at ninety miles altitude was too thin to make the drogue burn like a meteor or collapse under aerodynamic loads.

Our only problem was a lack of time. The landing party had struck the jackpot within hours of touchdown, finding a public library. They estimated that a third of its contents were intact. They began zapping data up to us, just as fast as they could work their equipment. They concentrated on recent periodicals and newspapers, on the theory that these were most likely to mention Nomads and the early stages of the plague.

That slowed us down. The computer began churning out translations, crude ones at first, then smoother ones as it gained a better grip on the local tongue. Within two days it was fluent, and we were swamped with data. The computer separated wheat and chaff, but even after it had eliminated Crossback's latest divorce and Zerkpoint's championship game we had a lot to study.

We: six cosmonauts, myself, Vse, O'Donough and Mrih. O'Donough checked everything Mrih had read, not trusting him to mention everything he uncovered. Not that any of us understood everything. The natives hadn't been thoughtful enough to leave any self-explanatory messages for visiting aliens, and it took time to build up a feel for the context.

"I've found one thing," O'Donough told me one morning, as she sat in front of her mirror and whisked the stubble from her scalp. I'd moved into her cabin, which was larger than mine. I didn't want to leave her alone, out of bed as well as in it. "The locals were negotiating a business deal with the

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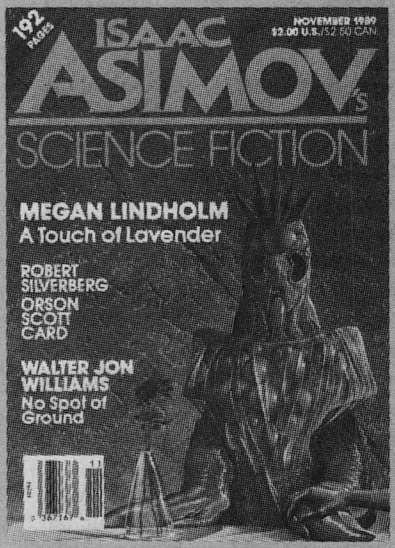

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Nomads when the Flashplague broke out.''

''Charming.'' I was glad she hadn't mentioned that last night. ''So the Nomads believe in sneak attacks. Have you found why the negotiations failed?''

''Not yet.'' She tossed me the depilator and I shaved my face. ''But the talks had gone on for several years. The natives thought they were going well.''

''Looks like the Nomads disagreed. Have you got any details of the treaty talks?''

''No. But the natives were enthusiastic about what they might get. They wanted to take up star-roving and spread through space. They hadn't translated what they had in their vault before the Nomads arrived, but . . . '' Her jaw dropped, and after a moment she spoke one awed, reverent word: ''Shit.''

''What is it?''

''Tsyu's theory.'' She slapped a palm to her forehead. ''Of *course,* I'm an idiot, why else would they do it that way?''

''What? Do *what,* O'Donough?'' I didn't like the look on her face. Not scared, but—not reassuring.

''The Nomads want trade. At least, they do things that encourage it. They put vaults on worlds where you'd expect intelligence to evolve. And you need the data in a lot of vaults before things make sense—maybe you need *all* of the vaults in a certain area. So what happens when two races each have a vault?''

''Well—''

She steamrollered me. ''They share what they have, and they both come out ahead. They learn to do business with one another. By the time the Nomads show up, people *know* how to trade with aliens. There's even a thriving interstellar marketplace—unless you can't learn how to do business.''

That shocked me. ''You don't think the Nomads wasted the locals because they wouldn't sign a friggin' *contract?*''

''No. The Nomads must be patient, John. A few years of negotiations can't mean much to them. It's more likely the locals did something *really* stupid.''

''Like we're doing with the kya?''

''I think so. . . . so we'd better not blow it, John.'' She sighed. ''Let's get breakfast.''

Now that the rest of the team and the shuttle crew were down on Correy III, the dining area was half-empty. Nevertheless we all clustered together, rather than spreading out. We didn't do it to make conversation easier; in a nonconscious way we were huddling together against the desolation below us. I wondered how the landing party got through the nights on the ghost planet.

Mrih spoke as soon as O'Donough and I sat down. ''Vse tells me that her experiment is ready,'' he said. ''When will you try it?''

''That depends.'' I looked at Akhmetov. ''We need to despin the ship for several hours. Could you do it sometime today, Captain?''

Akhmetov nodded. He'd grown a thick, bushy beard which gave him a ponderous look as he moved his head. ''There is no problem—Miss O'Donough?''

She'd made a noise in the back of her throat. ''I think I'll skip breakfast.'' She got up and left.

I could see Mrih's amusement. ''I, myself, am in excellent appetite,'' he said. ''Akhmetov, I understand that you

have mapped local space. What have you found?''

''Nothing of significance,'' he said. His voice rumbled; he was displeased with Mrih's attitude. ''Several hundred defunct satellites, a few large meteors, some dust.''

''Nothing else?'' Mrih asked. He gestured at Larissa Noskova, the communications officer. ''I understand you detected a few odd things last night.''

She looked at Akhmetov, and waited for his nod before answering. ''There were a few surges in the neutrino flux, but each came from dead satellites.''

''Ah,'' Mrih said. He took a bite from his tray, as if he wasn't too interested in this. ''Would you know what caused this?''

It took another nod from Akhmetov before she would speak again. ''I don't know. These were all very large satellites, perhaps meant to house crews. I suspect they carried fission power sources, which can generate neutrinos for millenniums.''

I could see what Mrih was getting at: the vaults are all equipped with neutrino beacons. Neutrinos equal Nomads. Jackass that I am, I decided to pump for data. ''What's the big deal?'' I said. ''Everyone knows how cranky fission piles are. Leave them untended and they can go wild. . . . although it's odd that they'd act up now, isn't it?''

''Coincidence,'' Akhmetov said.

''Yes, of course.'' I sipped my tomato juice. ''What else could it be?''

''Mere coincidence,'' Mrih said. He glanced at me and changed the subject.

Coincidence, hell. Human or kya, you don't give someone that hateful look for a few idle remarks. Mrih thought the Nomads were around, in virtually undetectable ships.

After breakfast I joined Vse in the lab module, where she was putting the finishing touches on our drogue. Experienced administrator that I am, I'd let her do the hard work. ''We can go any time,'' she said as I came in.

''Fine.'' I got on the intercom to Akhmetov. ''Can you take the spin off in one hour?''

He could. It doesn't usually take an hour to suit up, but Vse would need the time. The kya are humanoid and human-sized, but their crouching posture doesn't fit our suits well, and our gloves don't fit them at all. Vse could just accommodate herself to the largest suit in *Aurora*'s storage bay, and slip one finger into each thumb. By the time we were ready the ship's attitude thrusters were firing, checking our spin.

I thought of something, and paged O'Donough's cabin. ''We're taking the spin off now,'' I warned her.

''Gagh.''

''Are you all right, O'Donough?''

She made a retching noise. ''Go fly a kite.'' She clicked off.

Vse looked at me in amusement. ''Why do you still call her 'O'Donough'? Isn't her first name more appropriate now?''

''Yeah, but she likes the tough image.'' I knew that was bull as soon as I said it. Using someone's last name is a way of keeping an emotional distance. What was I doing, protecting myself against a potential break-up?

In another half hour we were weightless and outside. I anchored Vse's safety line to the hull, an act she never noticed. I heard her whisper something that

sounded like it came from a kya holy book. Then, in a normal voice, "Being ready, shall we begin?"

"Right." I pulled our drogue out of the airlock and started to unfurl it: an *X* of telescoping rods, covered with plastic, each arm tipped with a stabilization package. It was a finicky job, and given the size of the thing I couldn't always tell what I was doing. *That's* why Vse was there. She may have wanted a chance to spacewalk, but I needed a supervisor, someone who could stand back and guide me.

After a couple of hours I had the drogue deployed. Its nitrogen thrusters pulled it away from the ship, unreeling its monofilament line. "Biggest damned kite I ever flew," I said as we went back into the airlock.

"An interesting sight. Shall we stay in our suits? We'll retrieve the drogue in only four hours, and I'm not uncomfortable now."

"As opposed to that contortionist's act you did getting into it? OK." Air hissed into the airlock. Once it had stopped I opened our visors and removed our gloves. "There's no reason to live off suit air," I told her. I undogged the inner hatch and pushed it open. "Or to skip lunch—"

"Close it! Close it!"

I pulled the hatch shut at once, without thinking. Vse spoke as I snapped the manual latches down. "I smelled hydrazine."

"Hydrazine?" Thank God I hadn't stopped to argue with her. Hydrazine is one of the most toxic chemicals I can name. One good whiff can destroy your lungs. If Vse's nose hadn't caught the first hint of it at once . . . "How much did you smell?"

"Little. You smelled none? Then it must be a trace amount."

In other words, not enough to hurt us—I hoped. I radioed Akhmetov while I got our suits sealed again. "Captain. There's a hydrazine leak in the hangar module. Vse and I are in the airlock."

"Understood," Akhmetov answered. "We will decompress and decontaminate the fire. Fire in the hangar module." Weird. His inflection hadn't changed as he went from one disaster to another.

There was a small window in the inner hatch. I looked through it and saw smoke. Through my headphones I heard Russian voices: Fire in fuel tank bay. Ventilators sealed. Vacuum vents do not open. Failure in module control buss. Fire out of control.

"Captain," I said. If I'd stopped to think I would have chickened out. "Vse and I are both in suits. I can use my hands but Vse can't. What are your orders?"

Akhmetov didn't hesitate. "Open the inner door. Describe visibility."

I popped the hatch and smoke poured in. "Visibility is piss poor," I said, "But I can make out objects."

"Understood. Enter the chamber. Orient your feet toward the spin-floor and face the main hatch."

"OK." It was like wading through brown fog. I saw smoke spew from a cracked bulkhead pipe. "What now?"

"Open the circuit breaker box and push all red buttons in. They are emergency overrides."

"OK." I did that. I could feel warmth through my suit; the bulkhead between


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the cabin and the fuel tank section was heating up. "What's the pressure in the bay?" I asked. Once the pressure gets high enough any container will explode.

"Off the scale. Not to worry. We have an emergency pressure relief system. Are all the red buttons in?"

"Almost . . . done. Now what? Is the fire out?"

"Negative. Get into the airlock. You must—"

Bang-pwing-pwing-pwing-*bang*-pwing-pwing*bang*-*bang*-pwing-pwing-*bang*-pwing-*bang*-whump!

Rivets started popping out of the bulkheads, blasted loose by the pressure behind them. That must have been Akhmetov's emergency system. Geysers of smoke came from the holes the rivets left, while the metal chunks ricocheted around the compartment. One rivet caught me in the belly, knocking me back but not breaching my suit.

And O'Donough had promised I wouldn't get shot. I scrambled into the airlock before a rivet could hit my visor. The edge of the bulkhead had peeled back and reddish smoke roiled through the opening. I could feel gas pressure squeezing me through my suit. "What next?" I gasped.

"Open the outer airlock door, and hang on."

Vse braced herself in the corner next to the hatch, looping her arms through some restraints. I did the same thing with one arm, and popped the hatch with my free hand.

It was like standing in the mouth of a volcano. The blast ripped the door from its hinges and tried to suck me out the airlock. The smoke whipped past my visor, thick at first, then rapidly thinning. The roar of lost air faded.

"The fire is out," Akhmetov told me. "Can you move?"

"Yeah." I let go of the restraints. The smoke had fogged my visor a little, but otherwise I was all right.

So was Vse. "Interesting, Baxter, but I'd rather not do that again."

"Same here." She sounded as shaken as I felt.

"Baxter, bring Vse to the docking adapter," Akhmetov said. "Its airlock can admit one person at a time."

"OK. Vse, you can let go now."

"A moment." She disentangled herself from the restraints. "I'm ready."

I hooked her to me by a safety line and took her outside, crossing the hull to the adapter. Akhmetov told me how to use the emergency controls, and in a few minutes I had Vse back inside. I was ready to follow her when motion caught my eye. "We may have lost part of the ship," I said. "I see a white shape, at roughly ten o'clock high."

"I see it," Akhmetov said. "It—what *is* it? Grechko, get me some sensor readings on it."

"Understood," Grechko's voice said. "One minute."

I watched the whatsit get bigger. It was roughly disc-shaped. One side was white, while the other was black, with an assortment of cables flapping at its rim. Cables? That was when I saw its eyes and mouth. "It's a life form," I heard myself say.

"I agree," Grechko said. "Baxter, do not touch it—"

"Don't worry about *that!*"

"Its skin temperature is four degrees

Kelvin. Temperature is uniform—the skin must be a superconductor."

"Baxter." Mrih's voice sounded loud in my helmet. "You are to get inside at once. That is an order."

"What for?" My mind refused to accept the obvious. This *had* to be a coincidence. "You can't think that varmint is a Nomad! There's no ship, no suit, no—"

"John." O'Donough now. The bridge must have been jammed. She sounded hoarse and drained from space sickness. "Don't fuck around out there. It's a Nomad. It may not wear a suit, but it's carrying equipment. It just scanned us with a neutrino beam. What's the mother doing now?"

"Getting closer, that's what it's doing!" And it was already close. The thing looked to be ten or twelve feet across, and a yard thick. The mouth and eyes on its flat—belly? face?—ventral surface made me think of a stingray. The tentacles added to that impression; I found myself looking for stingers. "O'Donough, what do you want me to do?"

"Let it make the first move. Standard contact protocol."

"Yeah." And protocol had worked fine with the kya. This thing wasn't a kya. A tube extruded from the mouth, flared into a bell-shape and wiggled. I saw ice crystals condense and whisk away on an unseen wind. "The thing's got a natural rocket," I said. "Balanced right through its center of mass. It just exhaled and stopped moving."

Akhmetov: "We saw."

Mrih: "Being *senior* Co-Director, I command this matter. Get inside, Baxter."

O'Donough: "Mrih, shut *up*. John, what's it doing?"

"It's just floating there, big as hell. What do I do now, O'Donough? Say 'Take me to your leader'?"

Tentacles reached out and looped around me, and suddenly the blackness of t-space engulfed me. "I was *kidding!*" I shouted.

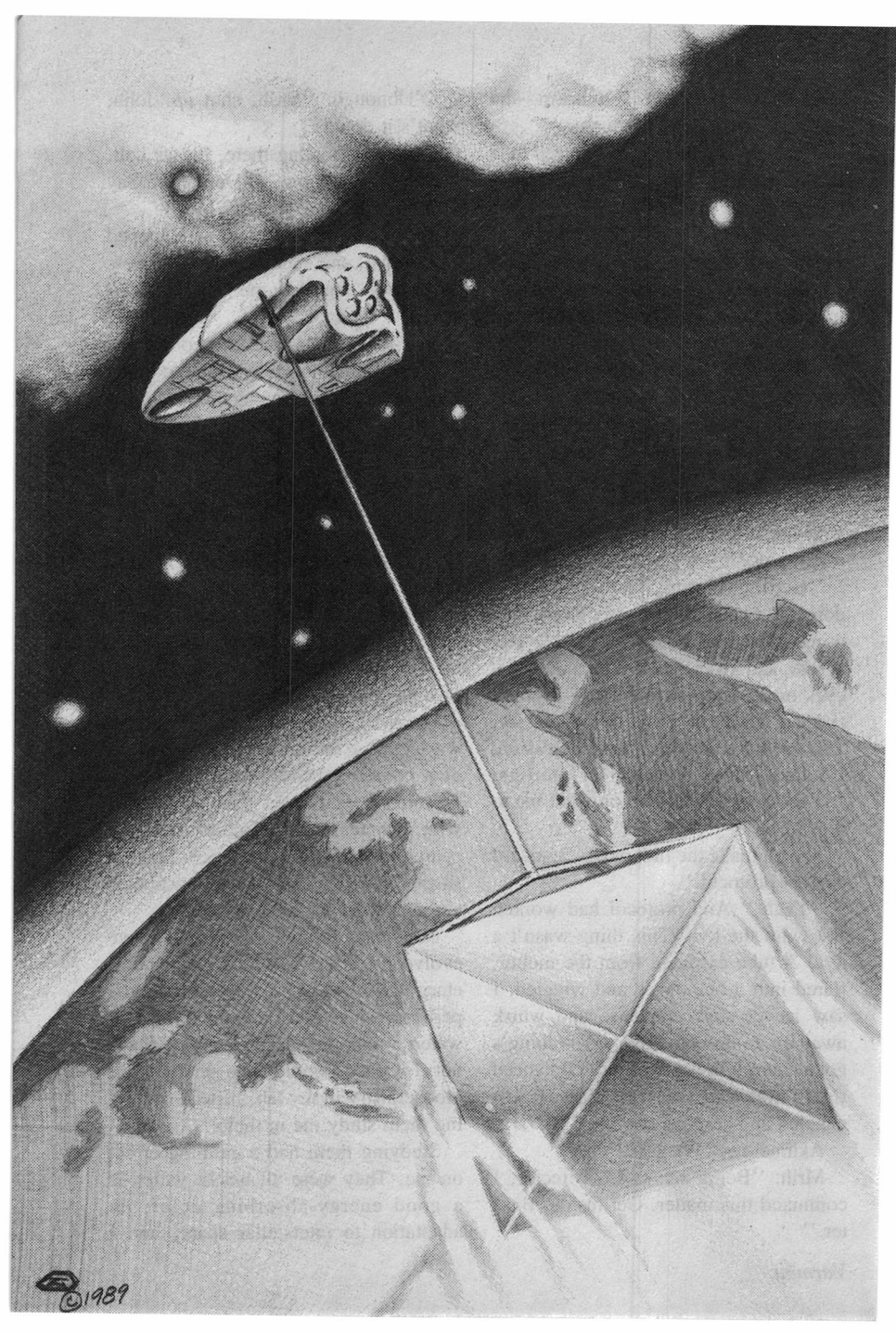
We stayed in t-space for two or three minutes, which is enough time to travel more than a light-day—unless this thing used a different type of transition gear. . . . and a backpack stardrive is sure as hell *different*.

We popped back into real space. I couldn't see anything; my eyes needed time to adapt to this darkness. Then my abductor stuffed me into a sphere and there was light. No, not quite—I could see my surroundings, which is different. My fishbowl must have been some kind of optical amplifier.

I was between stars. Part of the sky was eclipsed by the black, lumpy mass of a cometary head. A number of the creatures had moored themselves to it with their tentacles. Some of them appeared to be feeding on the ice. Smaller shapes drifted nearby. There must be an entire cyronic ecology out here!

Nomads, I thought. They must have evolved in space. I could imagine cometary DNA adapting to these conditions, perhaps using liquid helium instead of water or ammonia as a solvent, perhaps not. I wished I could have studied their biochemistry in my lab, instead of having them study me in theirs.

Studying them had a calming effect on me. They were all black, which is a good energy-absorbing color, an adaptation to interstellar space, and I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thought I saw signs of bilateral symmetry. I watched the one that had grabbed me disconnect itself from a white disc—a heat shield? I thought so.

One of them drifted up to my bubble. Its rim was edged with a thin membrane: possibly a vestigial solar sail. The Nomad held out something that looked like a radio; at least, it had a short whip antenna. A voice spoke in my helmet: *''Kak vy nazyvayetyes, chelovek?''*

I groaned. In every bad movie I've ever seen, the things from outer space always speak English. *This* thing just had to speak Russian—probably it had learned it from *Aurora*'s ground-to-orbit chatter. It wanted to know my name. *''Ya* John Baxter,'' I said, and added hopefully, *''Vwy gavoretee po-angluskii?''*

A tentacle fiddled with the radio. ''Yes, I speak English. Do you understand me?''

''Yes.''

''Good. Your people are on a reserved world. You have been here before; our detectors alerted us. Explain your presence.''

The thing wasn't in a mood for chitchat, I realized, and it probably felt the same way about evasions. ''You exterminated the native race. We want to know why.''

''This is acceptable,'' the Nomad said. ''We will explain and you will leave. The world is reserved so that sentience may evolve unhindered. We removed a species which failed to achieve sentience.''

'' 'Failed'?'' OK, stupidity has always been a capital offense, but nature is the usual executioner. ''How did they fail?''

''They had a desire to subvert and dominate commerce. They had just discovered starflight and would have conquered a vast region within a century. This and their militarism would have disrupted commerce. We could not tolerate that. Hence their removal.''

I stared at the thing. The translator voice conveyed no emotion, and I suspected there was none to convey. ''You—couldn't you persuade them to change their minds?''

''Attempts were made. They overestimated their cleverness and feigned cooperation. As I stated, they fell short of sentience.''

''In other words, they were too stupid to listen,'' I said.

''Correct. And now I am curious about your expedition. Describe it.''

That had the sound of an order. I could see the obvious: I'd been dragged here to answer questions about an unknown race, mine, and I had a good idea of what wrong answers would mean for us. ''Well—we're a mixed crew, human and kya. I'm human,'' I added. I didn't think this thing would know the difference.

''Kya,'' the Nomad said. ''They would be a not-human race. Describe your relations with them.''

Uh, oh. ''That's hard to assess,'' I said. ''Neither of us have ever contacted an alien race before, so we don't have any experience at this. We're working on trade and social agreements, but our progess is slow.''

''That should not be.''

''There are problems,'' I said quickly. ''Our technologies are radically different. In many ways we humans are more advanced than the kya. This makes it

hard to find equitable terms." I recalled something O'Donough had told me about negotiations: make the other side do as much talking as possible. "What would *you* advise?" I asked.

"Share all information. This costs nothing and ultimately benefits all parties. Why have you not done this?" Evidently this Nomad knew O'Donough's tricks.

"I said we don't have much experience." I hoped I could push the right button. If I didn't, these monsters would do something to humanity that would make Mrih real happy. "What if we accidentally make the kya subservient to us? We and the kya want to avoid that."

"Excellent. The best business is conducted between equals. Have you discussed plans for a mutual government?"

"We haven't got that far yet." That was misleading, if literally true. "I'm sure we'll think of something."

"Do so. Dealing with individual suppliers is a nuisance. Now I will return you to your ship and you will vacate the planet. Seal your helmet."

"Done." My suit went rigid as the bubble depressurized. "One thing. What are you in the market for?"

"A variety of artifacts." It opened my fishbowl. "Primarily, we need things which are made at dangerous temperatures, above the melting point of oxygen."

"I see. Things you can't make for yourselves."

"If necessary we could make them. The technology is not impractical." Tentacles pulled me out into the interstellar night, and I saw they were covered with insulating fabric against my heat. "But why bother? This is why God created planetary life."

That shut me up. I grew up in a town where people still say "evil-ution" and call Jews the Christ-killers. If the Nomads had that sort of mentality, well, I'd learned long ago that people who think their prejudices are natural laws are more dangerous than reasonable.

We went into overdrive. I watched the timer inside my helmet; the trip lasted two minutes and seventeen seconds. There was nothing wrong with the Nomad's astrogation. We came back into real space within a thousand miles of Correy III; a second jump and some manuevering with a repulsor unit made us co-orbital with the *Aurora*. I didn't wait to say good-bye. As soon as the tentacles let me go I jetted for the airlock.

"Baxter." Akhmetov didn't sound surprised to find me alive and back. "What has happened?"

"We had a talk," I said. "Captain, the Nomads want us off Correy III. You'd better order the landing party up here as soon as you can."

"Understood. Is there anything else?"

"Nothing that can't wait." I didn't want to risk saying anything stupid, not if the Nomad remained in earshot. Or radio shot.

I got a hero's welcome as I squirmed through the airlock. Everyone but Mrih cheered me, and as soon as I had my helmet off O'Donough kissed me. She was upside down relative to me, which made the kiss a unique experience, and one I recommend highly.

Then she grabbed my ears and looked into my eyes. "What *happened?*"

"Plenty. We have to get back to Earth

as fast as we can. I don't know when the Nomads are going to show up, but when they do they'll expect us to have signed a treaty with the kya. Or else."

She blinked. " 'Or else' as in Correy III?"

I tried to nod, a thing that you shouldn't do when someone has a grip on your ears. "Tsyu was right, the Nomads are interested in trade. They prefer to buy things ready-made. And you were right, too. They expect us to form an interstellar Common Market."

O'Donough let go of my ears. "And if we don't, we're dead? Is that what happened here? Wouldn't the locals give them what they wanted?"

"It's worse," I said. "The locals had a robber-baron mentality. The Nomads decided they were imperialists. If they'd got into space they might have stamped out all competition."

Akhmetov was nodding. "Thereby suppressing the development of industry on other worlds. The net result is higher prices, fewer goods, less variety and lower quality. So the Nomads made —what is the phrase? A preemptive strike?"

"Yes." It was chilling. The Nomads had removed a race that might have inconvenienced them. Maybe they'd done us an indirect favor—the locals might have conquered Earth by now—but it wasn't a favor I wanted to accept.

"Barbaric," one of the crew — Grechko—said. "Monstrous."

"I know," I said. "But the Nomads only care about their own good, and they take the *long* view. They expect intelligence to evolve down there, maybe in time for their *next* visit. As for the genocide—the way the Nomads see it, what's bad for business is bad for them. A race that won't play fair is dangerous."

"And they decide what's fair," O'Donough said. She was eyeing me. "John, did you tell them anything about—"

"It's more what *they* told *me*. They expect us to sign a treaty with the kya. Full exchange of information, industrial advice, equitable financial arrangements, a government body with the power to keep everyone honest—"

"Yes! Yes!" Vse started doing something that looked like a weightless war dance.

"That's why we have to get back to Earth at once," I told O'Donough. "We—O'Donough, you *have* to convince the UN to accept those terms. If they won't—"

"Earth will flunk the Nomad's IQ test." So help me, she looked *pleased*. "I don't think we'll have any trouble getting the Security Council to agree. Not if the choice is annihilation." My mouth made a small *oh*. There's nothing like an inescapable threat to get action. "They'll scream rape, but they'll do it."

"Let them. In the long run it's good for humanity—and for the kya." I looked at Mrih, who'd been abnormally quiet. "If you turn down what the Nomads think is fair, they might attack Kya—"

Mrih looked affronted. "Did I say the terms displease me? Being fair, I have only sought a balanced and honest—"

"OK, OK," O'Donough said, dismissing him. Mrih was lying, but at least he had the good sense to cut his losses. "John, we have to talk."

"We must discuss details first," Mrih insited. "The importance of—"

"Mrih, you're like vacuum," O'Donough said. Her face was turning pale, and I could see that she was losing her struggle against space sickness. "There's not much there and you really suck. C'mon, John." She belched slightly, and for a second I thought she was going to do more to Mrih than insult him.

Once in our cabin she swallowed some queaze-off. It's a fast-acting drug that numbs the nerve endings in the inner ear, and in a moment she looked as if her sense of balance no longer troubled her. She also looked, and sounded, groggy. "Before you say it," she said. "Mrih won't be a problem. He'll go along with any halfway decent agreement."

"You're sure? I don't trust him."

"Smart man. But he'll do wha's good for him. See, Mrih guessed right about the Nomads." She squelched a yawn. "Those spurts of neutrinos last night—"

"I'll bet that was our visitor, checking different satellites to see which was our ship."

"No bet." O'Donough anchored herself to the bunk. "Mrih won't say, but I *know* he expected the Nomads to show up an' negotiate, b'cause he took 'nother crack at getting me out of the picture."

"He—you're all right, aren't you?" If Mrih had even *blinked* at her . . .

"I'm fine, but you almost weren't. Mrih decided that I'd be too upset to negotiate if something happened to my lover, an' that you're too smart for his own good. So while you 'n' Vse were outside, he slipped into the hangar bay an' cracked a valve on a hydrazine tank. That's after he busted the leak detector."

"He did that? You're sure?"

Her head bobbed in a weak nod. "There's a video monitor in the bay, hooked into the flight recorder. The dumb cluck never noticed it, so we got some shots of him at work. Lev checked the tapes after you went bye-bye, an' played them back for Mrih. He claims he never expected a fire. That may be true, and he'd rather not have a judge decide."

I was silent for a moment, while she let me draw my own conclusions. Mrih was no better than a Nomad, trying to kill two people—and risking the ship—for his own ends. There had to be justice. . . . but like a Nomad, he was dangerously powerful.

Unlike a Nomad, he could be made to serve our ends. "You want me to keep quiet so you can blackmail him."

"Would you?"

"Would Vse? He tried to kill her, too."

"Blackmail was her idea. I was too busy barfing to think of it." I could see her chagrin at having missed that. "Mrih is eager to avoid criminal charges . . . . an' to keep Tsyu from finding out he almost killed Vse."

I was in no mood to be generous with Mrih, but the alternative was an ugly interspecies incident. What we needed now was harmony, cooperation and all that good stuff. I told myself to think of it as a kind of justice. "OK, the slime gets away with this. But don't expect me to pretend I like him, O'Donough."

"I won't. John?" Her eyes were half shut, but she raised one lid and looked

at me. "Isn't it time you started calling me something besides 'O'Donough'?"

"Good point." I knew what I had to say. Maybe this was the wrong time, maybe she'd resent my asking while she was sick—no, damn it, I was through backing off from her. "How does 'Baxter' sound?"

" 'Baxter'?" *That* opened her eyes. Then they closed again, and I knew I'd blown it. Even a maverick like O'Donough wants a classier proposal of marriage. She was going to say no.

Which she did . . . followed by: "Why don't we call you 'O'Donough' instead? It has a nobler sound."

"Uh . . . " I was disoriented. Time had slowed, stopped, then started again. "We could toss a coin."

"That sounds fair." She shuddered and took another pill. "Just as soon as we have gravity again."

EDITOR'S NOTE: This story is a sequel to "Maverick," which appeared in our December 1989 issue. ■

Stephen L. Gillett, Ph.D.

INWARD HO!

How can either Mercury or Venus be useful to us—and what do they have to do with each other?

Mercury's the ugly duckling of the inner system; it's been pretty much ignored both in SF and in space development scenarios. "On to Mars!" "Out to the asteroids!" have been the slogans. "In to Mercury!" just doesn't have a lot of pizazz. Charles Pellegrino and James R. Powell have bucked this trend a little; in *Analog* (Sep. '86), they proposed covering Mercury with a solar-cell farm to collect the vast power required for interstellar flight. But there's more to Mercury than *that!* Don't cover over the planet itself; we need it for other things. Build the collector farm off-planet instead, as Robert L. Forward suggested in *Flight of the Dragonfly*.

'Cause Mercury's got a lot of potential value, and not just because of the solar power there. So let me digress on a synergy between high-efficiency solar sails, Mercury, space development, and terraforming.

SOLAR SAILING AND MERCURY

"Light boats sail swift . . . "

—Shakespeare, *Troilus and Cressida*, Act II.

As a solar sail gets real thin, it can support its own weight—and then

some—while at rest with respect to the Sun. Obviously such an "ultrasail" is more efficient than a sail that can't support its weight. But its advantages run deeper than that. For one thing, as in the story "SunStat" by Oltion and Goodloe (*Analog*, Oct. '88), an ultrasail can hold a platform at rest with respect to the Sun (or another star, for that matter), which is convenient for many sorts of observations. But more than that, the closer to the star, the better the acceleration—despite being deeper in the gravity well! Explanations follow.

For a perfectly reflecting sail, the pressure of sunlight is given by:

$$P = 2S/c,$$

where P is the pressure, S the solar constant, and c the speed of light. The solar constant is the amount of energy that a given area receives from the Sun in a certain time, and has units of power per area (watts per meter squared, say). For a perfect absorber, the pressure is exactly half the above:

$$P = S/c.$$

At the distance of Earth, the value of solar constant is about 1,340 watts per square meter. Using c = 300,000 km per sec, we get a pressure of 4.5×10^{-6} newtons per square meter, or 6.5×10^{-10} pounds per square inch, for a perfect reflector. Not a lot! (The *total* force, of course, will depend on the total area of the sail.)

Now, for various materials we can calculate the critical thickness at which a sail would be self-supporting at the distance of Earth. To do this, we need the density and reflectivity of the material, and the gravitational field of the Sun. Such data are in standard tables. For aluminum (*not* a perfect reflector), the critical thickness works out to be about 0.25 micrometers (i.e., microns—millionths of a meter), or about one-two-hundredth the thickness of a human hair. (The actual calculation is left as an exercise for the reader!) Obviously, a useful sail must be even thinner than this, to have any capacity to hold a payload.

Furthermore, even though I specified "at the distance of Earth," it turns out this thickness is independent of distance. For consider: if a sail is in balance, the *outward* force of the sunlight on the sail and its burden must equal the *inward* pull of gravity. Now mentally move this sail inward. The attractive force on it increases substantially, according to Newton's law of gravitation; it goes up as the inverse square of the distance. But the sunlight pressure also increases substantially. In fact, it increases in *exactly* the same inverse-square proportion, because light intensity drops off as the inverse square of the distance. Thus the effects exactly cancel. So if the sail hovers at the distance of Earth, it hovers anywhere.

Now consider a sail that can support *more* than its own weight plus payload. It cancels out gravity and then some, so there's a small net pressure left. Then what happens when we bring the sail sunward? Again, the Sun's gravity and sunlight intensity both increase according to the inverse-square law, so the closer you are, the more the sunlight pressure exceeds the gravitational pull. For example, say you were at a distance

of 1 AU (astronomical unit—the average distance from Sun to Earth) and the light pressure on your ultrasail is 1.1 times its weight from gravity. Now move in to ½ AU. Gravity is now 4 times greater, but the light pressure is also 4 times greater. Now, 4 x 1 is 4, but 4 x 1.1 is 4.4, so the net force *outward* on the sail has also increased 4 times!

The upshot is that the excess pressure on the sail acts like an inverse-square *repulsion*. Obviously, then, the closer to the Sun, the stronger the force, and the better the acceleration. This has some bizarre consequences. For example, if you were going from Earth to Pluto with an ultrasail, it's far faster to drop in toward the Sun first. The extra acceleration near the Sun *much* more than compensates for the longer distance.

(To calculate travel times from point A to point B in an inverse-square repulsive field, you can either integrate the inverse-square potential from first principles, or else look up the equation—which is much faster. I'm *not* going to give it here; it's given in, e.g., Danby, 1964, p. 50. The equation is kind of messy, but that's what computers are for.)

So the closer to the Sun the better. Now, what's the closest planet to the Sun in the system? Right! Mercury is one dandy place to start ultrasails from.

MERCURY AND RESOURCES

"Mercury—A Mini-Earth in Moon's Clothing?"
—Murray, Malin, and Greeley, 1981

Mercury is probably one dandy place to *make* solar sails, too. Not only is it routinely the closest piece of matter to the Sun (and far and away the *biggest* piece, too), but it probably has an aluminum-rich crust. Why? I have to digress again, this time for a review of the state-of-the-art about Mercury.

As everyone knows, we found out in 1964 that the one thing we *knew* about Mercury wasn't true. It does not keep the same face to the Sun, but instead rotates with a 3/2 resonance (3 rotations in 2 revolutions). The error came about because the planet's very difficult to study from Earth. Although it's bright (I've seen Mercury, a sight Copernicus is said to have missed) it's always close to the horizon, visible only briefly after sunset or before sunrise, while the sky is still twilit. Now, with its true rotation, you see Mercury facing the same way every *other* orbit; but since it was very difficult to see Mercury at all, observers just saw Mercury facing the same way many times. They then naturally assumed it must always face the same way, and thus must be facing the Sun. The physicists have since shown that the 3/2 resonance is much more stable than the 1/1 resonance (Mercury always facing the Sun), and so we should have known beforehand there was a problem; but this sort of *post-hoc* analysis is not terribly impressive!

If from Earth you can't even be sure of the rotation period, you can figure that Earth-based telescopic studies are pretty useless. Thus, all detailed info on the planet comes from the Mariner 10 fly-by back in 1974. This mission was

originally intended as a single fly-by, with the spacecraft then continuing on in an independent orbit around the Sun. Fortunately, someone thought to calculate where Mercury would be when the spacecraft crossed its orbit again, and sure enough, Mercury would be there again, too! So Mariner 10 made three separate passes by the planet and took pictures each time, before it ran out of attitude-control fuel. Unfortunately, due to Mercury's slow rotation and the details of orbital mechanics, the spacecraft saw the same view each pass, so one Mercurian hemisphere is still unknown. At this point, though, there's no reason to think it's spectacularly different from the side we've seen.

The first impression from the Mariner photos is that Mercury looks like the Moon. It's pocked with craters upon craters, very much like the lunar highlands. And also like the lunar highlands, it includes some very large craters indeed—"basins," as the planetary scientists now term them, hundreds to thousands of kilometers across. We know from dating Apollo samples that the "late heavy bombardment" recorded on the Moon had essentially ceased by 3.9 billion years ago. If the massive cratering on Mercury reflects the same bombardment, which seems reasonable, Mercury is a pretty inactive place. No other surface processes have modified that ancient crater-pocked crust, other than a little bit of "faulting" (i.e., fracturing), probably reflecting slight contraction of the Mercurian core, and some subsequent desultory cratering.

There's also no evidence of any ancient atmosphere; as Murray *et al.* (1981) note, crater rays—bright streaks centered on the crater, consisting of a thin layer of powdered rock thrown out by impact—are not only common but preserved. It takes very little atmosphere to blow them away, or to keep them from being deposited in the first place.

So why like a "mini-Earth"? Mercury has no air, no water; it is inactive, unchurned by plate tectonics, unmarred by erupting volcanoes. . . . it hardly seems Earthlike!

It is "Earthlike" in its density. Mercury has a density of 5.42 grams per cubic centimeter (g/cc), little less than Earth's 5.52 g/cc. (The Moon's average density, by comparison, is only 3.3 g/cc, not much more than ordinary rock.) The high density indicates that Mercury must contain a lot of dense material, material much denser than silicate rocks. A very *un*-Moonlike characteristic.

Earth's high mean density results from its iron-nickel core. And similarly for Mercury; it has a large core. (It even has a small magnetic field, also in contrast to the Moon.) In fact, Mercury's core makes up about 80% of the mass of the planet.

But the core's relevance for near-term resources is not clear. Even this big core is still pretty deep, buried under silicate rock—a crust and mantle—500-600 kilometers thick. Digging that deep's going to take awhile. (There's a little slop in these estimates, since we do not know exactly how dense the core is. Murray *et al.* note, though, that even with generous estimates of the thickness

of the silicate crust and mantle, Mercury's core is bigger than Earth's Moon!)

So for the time being, resource-wise, we're going to have to settle for what's in the silicate mantle and crust atop that large core. As a working model, they probably are very similar to the Moon's.

Based on evidence from rocks collected by the Apollo missions, we now think the Moon was almost or completely molten after its formation—a notion picturesquely termed the "magma ocean." As the magma ocean cooled, minerals started to crystallize in it; most sank, but one in particular floated —plagioclase feldspar, a calcium-aluminum silicate. If things settled out undisturbed like a jar of salad dressing left in the fridge, you'd end up with a nicely layered planet; a plagioclase crust outside, and layers of denser, iron-magnesium-rich silicates inside. And to first order, that's a good description of the Moon. The top of that ancient plagioclase crust shows up as the lighter, densely cratered surface of the lunar highlands. (Of course, natural processes are *never* this simple. For one thing, the Moon's plagioclase crust is pervasively fractured by those mammoth craters, and bodies of iron-magnesium silicate rock squeezed into this fractured crust, like mud pushing up through a broken sidewalk. For another, some subsequent melting occurred as heat built up in the Moon from the decay of long-lived radioactive elements, and this led to some early volcanic activity—which caused the smooth dark lava plains, or "maria.")

So, if the silicate part of Mercury's like the Moon, there's bound to be a big variety of a lot of useful stuff right at the surface, all combined in silicates: oxygen, calcium, magnesium, iron, some sodium and potassium. Rarer elements that have an affinity for oxygen and silicates are also likely to be concentrated locally; useful things like uranium, the rare-earth elements, zirconium, tungsten, niobium. . . . (See my "Mining the Moon," *Analog*, Nov. '83).

And in particular, aluminum—the raw material for solar sails—is probably one of the most abundant elements at the Mercurian surface, bound up in that feldspar crust.

By the same token, however, Mercury is probably essentially volatile-free, like the Moon. So you will have to bring all your water, carbon, and organics. As on the Moon, there are probably some volatiles, especially hydrogen, stuck in the regolith as a result of being implanted by the solar wind (the tenuous stream of atomic particles continually emitted by the Sun), and they'll help keep life-support stocks replenished, but that's probably all.

(Oh, well. You can't have everything.)

Anyway, Mercury is also easy to get off. For all intents and purposes, there's no air, so mass drivers work fine. (If you want to quibble, there's a tenuous "atmosphere" consisting of a steady-state population of helium atoms detained a while from the solar wind. It's interesting only to particle physicists.)

And although Mercury has over twice the escape velocity of the Moon, it's about twice as easy to *leave*, if you use mass-drivers or some other electrical-

powered technology. Mercury has almost seven times the solar flux as the Moon (the exact amount varies due to the ellipticity of Mercury's orbit), and that more than compensates for the additional gravity. With just modest solar collectors you can get a lot of power. (To be sure, sunrise and sunset are a problem; solar cells don't work well at night. So you set up your fledgling operations near one of the poles; like the Moon, Mercury has little axial tilt, so there you can be in sunlight nearly year-round. And as a power grid spreads across the planet, the day/night cycle will become less and less a problem.)

And this echoes the point Pellegrino and Powell made: Mercury has *lots* of solar power. Its position is in stark contrast with the asteroids, which are a ballyhooed "obvious" destination for space development. Sure, there's lots of stuff out there in the Belt, volatiles and raw metal and whatnot, but there's *not* a lot of energy out there. From the ol' inverse-square law again, the ratio of solar flux at Mercury to that at a typical main-belt asteroid—Ceres, say—is about 160; over 2 orders of magnitude. Thus, to yield the same energy, solar collectors of the same efficiency must be more than ten times as long on a side. (Because the square root of 156 is about 12.5.) To get the same power, an acre of collector at Mercury blossoms to 160 acres—a quarter-section!—at Ceres. (All right, if you stick with near-Earth asteroids your solar power is more abundant. Near-Earth asteroids are a highly limited population, however, and we're going to be moving afield from there before too long.)

Ultimately, perhaps, we might even take Mercury apart. Reaching that gigantic nickel-iron core would be a big resource incentive. And, as a geologist myself, dismantling Mercury would have major scientific interest; dissection of a non-living planet would tell us *a lot* more about how planets work. (Of course, this would not happen for a long time.)

So why has Mercury's potential been so ignored? There's probably something emotionally disturbing about going in *closer* to the parent star. In part, maybe all that old SF about the hellish day side of Mercury has sunken into the collective subconscious, as a fundamentally irrational but very real fear. Or maybe going *inward* goes against the psychological grain; we're going into space to get away from the confinements of Earth, to broaden our options, and so to move out "toward" other stars — however minutely—is more satisfying.

But any worry *is* psychological. Keeping a Mercury base cool will be no problem for 21st-century technology, especially since all the actual mining and extraction operations will be robotic. For human habitation, just mound some regolith over the modules and it'll be just like the Moon. Mercury orbit is also an overlooked place for space colonies, if that's what you're into. And finally, two possible inner-System places, anticipated by George O. Smith in his classic "Venus Equilateral" stories, are the Venus L-4 and L-5 points. There may even be some asteroidal debris—"Venus Trojans"—accumulated

there, to bootstrap the Mercury operations.

MERCURY: THE KEY TO VENUS?
A curious shiny meteor eased into the planet's soupy atmosphere. As it plunged, atmospheric resistance heated it to glowing; then suddenly, as it slowed into the denser layers below, it ignited. Thick black smoke trailed the burning meteor as it fell through the thick CO_2 atmosphere . . . .

As *Analog* readers may remember, I discussed terraforming Venus in two previous articles (Dec. '84 and Nov. '85). At the 18th Lunar and Planetary Science Conference—the "LPSC," held at the Johnson Space Center, Houston, in March, 1987—Jim Oberg put together an informal conference called Terraforming II, and invited interested people to come give talks. So I did. (Alas, although the LPSC lent us a room, Terraforming II was not part of its formal proceedings. Terraforming's still too far out. However, progress is being made. Back around 1976, another associated meeting, on "Lunar Utilization," also was not a formal part of the LPSC because it was too far out. In 1987, though, the LPSC had a *formal* session on "Space Utilization"!)

Anyway, at Terraforming II I proposed a new notion for terraforming Venus, inspired by Freeman Dyson's Enceladus Project, a "thought experiment" for terraforming Mars (Dyson, 1979, pp. 199–200).

To briefly summarize Dyson's scenario: A robot package is sent to Enceladus, a large Saturnian moon assumed (for the sake of argument) to consist mostly of water ice. The package differentiates into several types of self-replicating robots, which eventually start launching packages of ice to Mars, guided by solar sails. As a steady stream of ice meteoroids warms the Martian atmosphere, water collects, rain falls, and *voilà*—a habitable planet.

But what about Venus? As I reviewed in my December 1984 article, the overwhelming problem with terraforming Venus is getting rid of its massive CO_2 atmosphere—about 90 atmospheres' worth. All that air keeps the surface near red heat because of a powerful greenhouse effect; the atmosphere acts like a blanket, letting sunlight in but hindering the escape of heat.

And till the CO_2 is gotten rid of, sending a stream of Enceladus ice to Venus would just make things hotter. Water vapor itself is a dandy greenhouse gas. In fact, Venus probably arrived at its present sorry state through the so-called "runaway greenhouse"; if a planet's surface becomes too hot, enough water vapor evaporates so the greenhouse effect gets more efficient, so things get even hotter, so yet *more* water evaporates. . . . The oceans boil soon, and for a while you have an atmosphere of steam. (Quickly, as geologists measure time, the steam atmosphere is destroyed by solar ultraviolet, which breaks up water molecules so the hydrogen can escape to space.)

Earth has just as much CO_2 as Venus, but conveniently, it's virtually all locked away in carbonates in the crust; as lime-

stone, mainly. Venus never had oceans (or lost them early on), so carbonates were never stable, so the CO_2 stayed in the air, so things got real hot . . . . And—if you were going to ask—we can't react Venus's air with its crust now; you'd have to garden the crust much too deeply, even if you could get quick and complete reaction. (And you'd get neither; the silicates making up rocks react too sluggishly.) In addition, things would need to cool for the rocks to react, but they can't cool till the CO_2's been removed! A classic Catch-22.

Seeding the Venus atmosphere with algae to break down the CO_2—Carl Sagan's venerable(!) terraforming suggestion, back in the '60s—won't work either, at least for the whole job. There's just too much air. Breaking up 90 atmospheres of CO_2 gives you over 60 atmospheres of oxygen, plus a layer of carbon over 100 meters thick. They won't stay separated long; $C + O_2 = CO_2$. Boom! We need to get *rid* of the air.

Well, can we remove the CO_2 bodily? That's very hard. We could maybe seed the planet with self-rep robots to gather up the atmosphere (which involves compressing it, perhaps a kilo or so at a time) and shoot it off into space. But Venus is a big planet; you need a *lot* of delta-vee to escape her, and because of her atmosphere, acceleration is difficult; catapults like mass drivers don't work because of air resistance.

What about precipitating out the CO_2 by reacting it with something from outside?

Ah! Maybe here's the key.

The best reactant would be calcium or magnesium metal. Both will tend to reduce carbon dioxide to carbon, stripping out the oxygen:

$$2\,Mg + CO_2 = 2MgO + C$$

and,

$$2\,Ca + CO_2 = 2CaO + C.$$

Magnesium actually burns in CO_2. It's a flashy lab demonstration; just poke a burning piece of magnesium ribbon into a bell jar full of CO_2 and watch the black smoke of carbon boiling off.

With both calcium and magnesium, moreover, the oxides further react with more CO_2 to make carbonate:

$$MgO + CO_2 = MgCO_3$$

and similarly for calcium. So, each atom of metal ends up removing a molecule and a half of CO_2. Not bad.

The problem? Not surprisingly, neither calcium nor magnesium occur uncombined in nature. They *are* reactive, after all. So the metal would have to be extracted, and that's hard; magnesium and calcium are both tightly bound into silicates and require a lot of energy to be broken out.

And, finally, a preposterous amount of metal is required, about 8×10^{20} kg calcium or 5×10^{20} kg magnesium. To give you a feel for *how* preposterous, this is approximately the mass of Ceres, the largest main-belt asteroid. If all this metal was formed into a sphere, it would be something over 1,000 km in diameter.

It's absurd to think we could *ever* refine that much raw metal, especially for an economically marginal proposition like terraforming Venus. Just another silly science-fiction fantasy!

Or is it?

Back to Mercury. (You thought I'd forgotten Mercury?) If its crust is really like the Moon's, it is fundamentally *made* of calcium-aluminum feldspar, abundantly invaded with magnesium-rich igneous rocks. So both calcium and magnesium are among the most abundant elements at its surface. Now, as I said, silicates are hard to break up, especially without a lab full of reagents. But it can be done. One simple (that's key!) way is to melt the rock. You can electrolyze it; stick electrodes into each side of your pool of molten rock, hook them up to a *big* battery, and watch. It's just like breaking water up into hydrogen and oxygen. Oxygen will bubble off the anode, and a mixture of metals will dribble off the cathode. And the melt's resistance to current provides the heating to *keep* it melted.

Well, of course it's not *that* simple. Silicate melts are *very* hot (over 1,000°C, in this case), which makes them tricky to deal with. You're dealing with lava, after all. (It's easier in a vacuum, anyway, because they're easier to insulate.) They're corrosive; things like electrodes tend to dissolve. Preventing undesired side reactions at the cathode is another sticky issue: Only the least reactive metal tends to separate, since any more reactive metal tries to displace a less reactive metal from the melt instead. (The anode also tends to plate up with gunk for similar reasons.) And we've ignored the question of collecting the dirt and melting it in the first place.

But none of these problems is fundamental. (To quote a fatuous phrase, "they're just engineering!") And refining silicates in this way has *lots* of advantages: You don't need crushing or sorting; your feedstock is whatever random bunch of regolith you scoop up. You don't need *water*, with an expensive and complicated wet-chemical extraction facility; your working fluid is just molten rock. And finally, some work is already being done on such processes, to determine their feasibility for lunar smelting. The technology will be available when we need it.

So, let's extrapolate. From what's learned from the Enceladus Project and a couple generations of Moon-mining, the Venus Terraforming Project builds a package and sends it to Mercury, where it differentiates into several types of self-replicating robots. Some scoop up dirt, some set up solar-power collector and power distribution networks, some set up electrolysis vats, some build mass drivers. . . . And they start electrolyzing regolith into raw metal, and fashioning it into chunks, each with a little solar sail and a guidance chip telling it how to get to Venus.

Soon, the auto-assembled mass drivers start throwing the chunks off the planet, where their solar sails deploy. The guidance chip then steers the way to Venus, where the ingot smacks itself into her air, a rain of artificial meteors each munching up another kilogram or two of CO_2. Eventually the job is done.

Of course, once the atmosphere's thinned down quite a bit we'll need to add some water, but that's *trivial* by comparison; toward the end of the project, when there's no danger of re-trig-

gering a runaway greenhouse, the Enceladus project will send some ice cubes to Venus as well.

There's some curious economics here, hinted at by Dyson in his thought experiment. Each chunk of metal is nothing more than a self-guided ingot (self-guided with exquisite accuracy), and trillions of such lumps of metal, each with a tiny sophisticated guidance system, will be sacrificed utterly to atmospheric incineration. Bizarre! Not a way to treat precision machinery.

But the destruction of that exquisitely organized ingot does not matter; what matters is not organization *per se* but how cheaply it can be made. And the cost is virtually zero. It's analogous to products from living things on Earth. For example, consider a piece of firewood. Look at the exquisite pattern of this wondrous stick, the phenomenal organization of thousands of cells—each itself a marvel of complexity—that generated it. And you're going to casually burn it for *fuel?*

But of course. We think of wood as a "natural" product, easily made and casually destroyed, and so it is. Biological self-replicators produce it cheaply as a byproduct of their existence.

Or consider an apple. It's just as marvelous as the firewood; but in addition, each one of those seeds, so thoughtlessly discarded, is a package that can build a whole new tree! But again, apples are made by the million; ironically, many fewer would be made if they *couldn't* be destroyed for food. Who's going to raise an orchard of fruitless trees?

Or consider a whale eating krill, filtering tiny organisms out of seawater by the ton. Each one of those zillion planktonic lifeforms is a marvel of complexity unto itself, a whole independent life form, but each is doomed to be disaggregated and reformed into whale-stuff.

The degree of organization is not important. The important thing is how cheaply you can organize. Given self-rep robots, their products are no more valuable, and no less valuable, than the products of living things. That is, they are valuable for what they *are,* with no value added for the organization that went into them.

How long might terraforming take? The lower limit is set by how much solar energy it takes to make all that metal and send it to Venus. There are two main costs; (a) busting it out of the rocks; and (b) sending it out of Mercury's gravity well. For magnesium, the minimum extraction energy is going to be about 25 kilojoules per gram (kJ/g); for calcium, about 18 kJ/g. And then it takes about 9kJ/g to get something off Mercury. In both cases, the total energy we need adds up to about that in *all* the sunlight intercepted by Mercury in 4 years! And this assumes best-case extraction efficiencies; no energy lost, and completely pure silicate feedstock, so for real-world efficiencies the time goes up accordingly. (Of course, we could help things along by gathering additional solar power with off-planet collectors.)

And how much Mercury did we chew up to send to Venus? A *lot*. If we figure out how much rock we had to process

to get that much metal, we arrive at something around 3 to 5% of the mass of Earth's Moon! This is not trivial; a great deal of Mercury's surface will be affected.

But this is not necessarily bad, either. By building extensive observational and recording capability into the self-rep robots, we could get unparalleled data on the internal constitution of Mercury as it was excavated. In fact, economics being what they are, probably much more scientific data could be gotten by piggy-backing onto such a project than could be obtained from a purely scientific investigation. (This also holds for the Enceladus project.)

And, if we're clever, at least one of the excavations could reach that iron-rich core, with all the scientific and resource potential *that* promises.

In fact, granting such a self-differentiating, self-replicating system, it turns out the big constraint is not how much metal you need but how much energy you're adding to the Venus atmosphere. If you're not careful, a tremendous amount of matter would be falling in from essentially infinity, and all that gravitational energy will show up as heat. My BOTE* calculations suggest the heat imparted in that case is about 100 times what's in the atmosphere already! (And, of course, one of the things we must do is *cool* Venus, not cook her.) To avoid this heat influx, you need some tricky guidance to decelerate *before* hitting the atmosphere. (And the deceleration can't involve atmospheric braking, because—after all!—that just dumps energy into the atmosphere.)

So. Would it work? I think so. Is it the best way? How should I know! And why terraform Venus anyway? That's a different question . . . but the reason *not* to terraform Venus is not "because it's impossible!"

(Dr. Bob Forward, well-known to *Analog* readers, also attended the Terraforming II conference. He gave the talk after mine. After I had finished, he said he thought *he* was supposed to give the science-fiction scenarios. I took it as a compliment!)

IN CONCLUSION . . .

A prospectus for investment in the Mercury Resources Consortium is available from . . .

References

Beatty, J. Kelly, Brian O'Leary, and Andrew Chaikin, eds., *The New Solar System*, Sky Publishing Corp., Cambridge, MA, 1981, 224 pp.

Danby, J.M.A., *Fundamentals of Celestial Mechanics*, Macmillan, New York, 1964, 348 pp.

Dyson, Freeman, *Disturbing the Universe*, Harper & Row, 1979.

Murray, B.C., M.C. Malin, and R. Greeley, *Earthlike Planets: Surfaces of Mercury, Venus, Earth, Moon, Mars*, W.H. Freeman & Co., 1981.

■

*Back-of-the-envelope

futures

Matthew J. Costello

The computer game world appears in turmoil. After a number of years of unprecedented growth, the entertainment software companies have hit a decided slump. And this is occurring after the personal computer has successfully invaded everyone's home as tool for everything from Junior's report on Millard Fillmore to trying to impress the I.R.S. with your family's budget.

The battle should be over. It should be the day of the computer game. But it's not.

What went wrong?

Well, *Computer Gaming World* magazine recently carried a report from the Computer Game Developer's Conference. The game designers had some explanations for current computer game malaise. First, there are the pirates, me bucko. Free-booters who take pricey-new games and liberate them for modem-users everywhere. This leaves an ever-smaller consumer base to reimburse expensive development costs for new state-of-the-art games.

Then there's the technology. Computer game players demand the best graphics and gameplay a machine is capable of, and the sophisticated games of today require thousands of person-hours of development and programming. And as this expense has risen, the profit base has shrunk for another, all-important reason.

The dedicated game machine has taken over. A dedicated game machine is just that, a machine dedicated to playing games. The descendent of the old Atari VCS (remember 'Pong'?), these machines have taken over the field. The Nintendo Entertainnment System (NES) has the lion share of the market. Sales have been absolutely incredible, breaking the 7 million mark, and the most popular game cartridges sell out as fast as a store gets them in stock. Sega and Atari are also reaping the benefits of the popularity of the games-only machine.

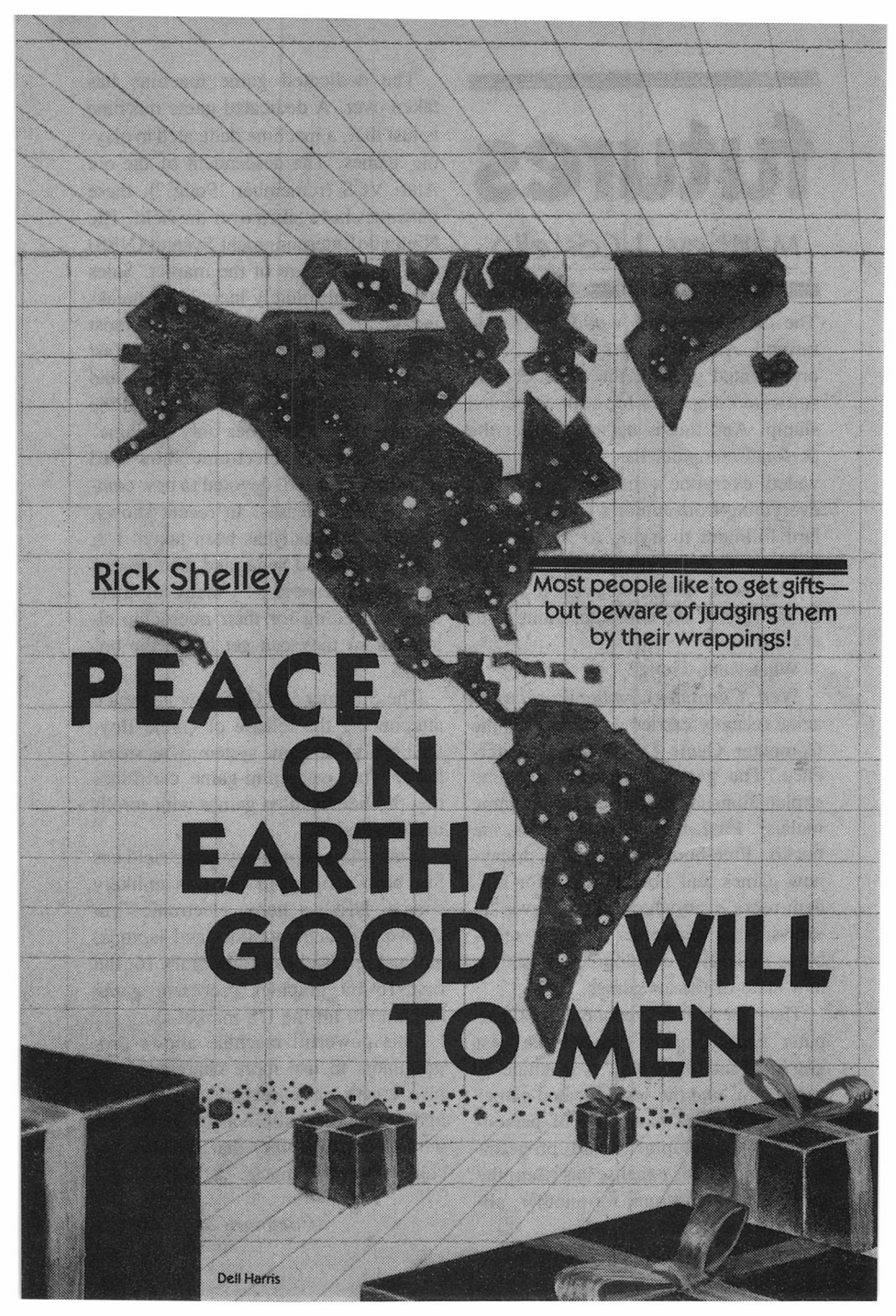
The Consumer Electronic Show used to have a large hall devoted to new computer game releases. In recent shows, much of that hall has been taken over by Nintendo and Sega, and their dozens of eager licensees . . . many of them eagerly waiting for their microchip allotment so they can get in on the bonanza.

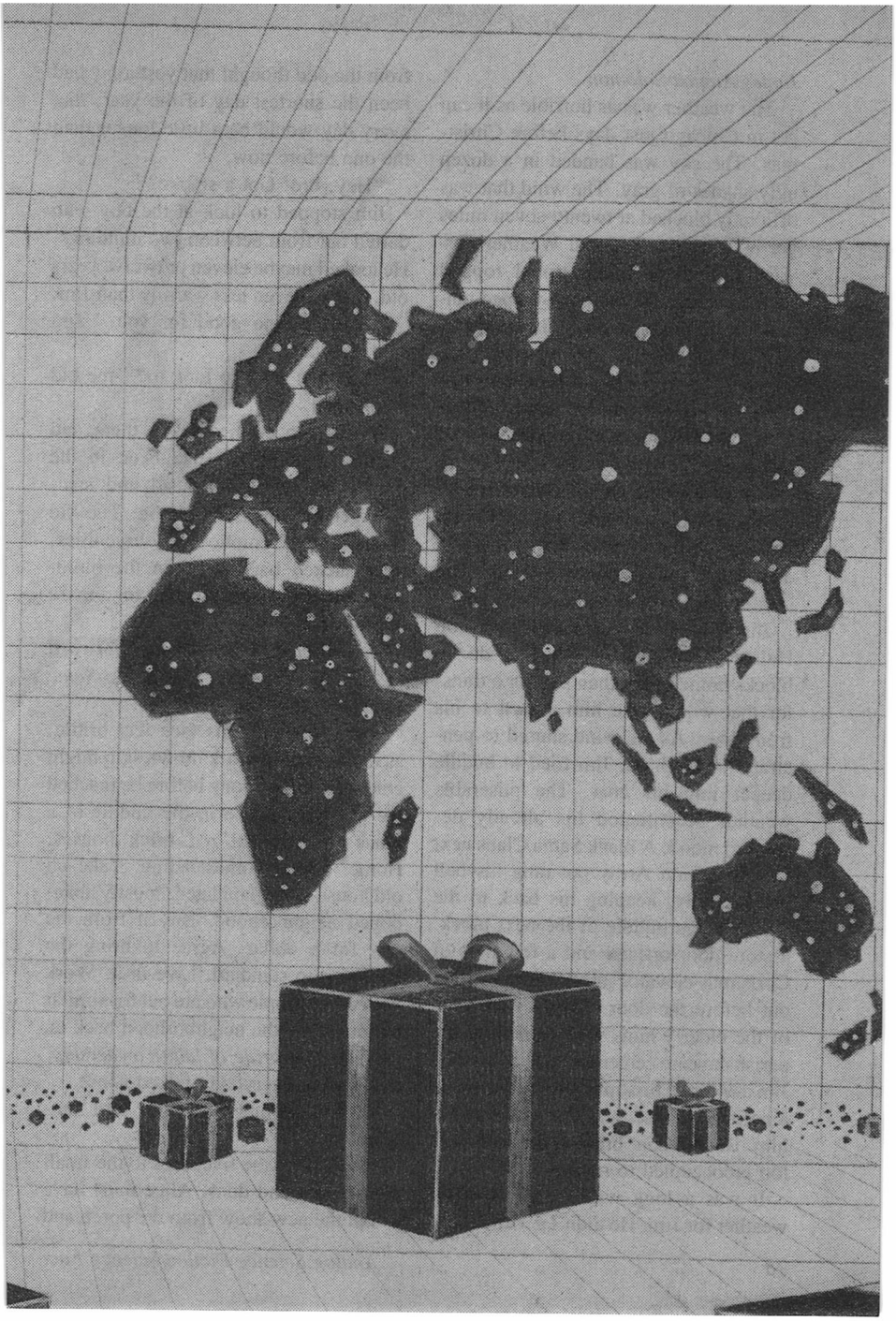
The Summer '89 CES saw Nintendo announcing the release of Game Boy, their hand-held game system, with stereo headphones and mini-game cartridges that provide detailed games with scrolling screens.

Nintendo's supremacy in the field has just been challenged from an unlikely source. NEC, a home electronic firm known for their monitors and laptops, has just released the Turbografx 16, the first 16 bit graphics processor game machine to hit the US market.

This powerful machine allows programmers to use more characters and also create more realistic-looking images. Sound is also vastly improved, with stereo-capability that lets the machine play real music. A Turbografx-

(Continued on page 107)


Rick Shelley
Most people like to get gifts—but beware of judging them by their wrappings!
PEACE ON EARTH, GOOD WILL TO MEN
Dell Harris



James August Solomon

The weather was as horrible as it can get in Chicago just days before Christmas. The sky was banded in a dozen ugly shades of gray. The wind that was officially clocked at twenty-seven miles per hour by the National Weather Service at O'Hare International topped forty mph through the open-topped tunnels of the city's streets. The temperature hadn't climbed above twenty-five degrees in a week. Night-time lows had been consistently below zero. There were patches of ice on streets and sidewalks. New snow was falling —blustery, hitting unprotected skin with the force of blasted sand. The only good thing about the weather was that it had driven the young toughs indoors. The streets were as safe as they ever got.

Jim Solomon got off the CTA bus on Halsted and walked the last dozen blocks home rather than pay for a transfer that would take him almost to his front door. As the wind started to penetrate his clothing, Jim tried to huddle deeper into his coat. The miserable weather accentuated his already depressed mood. A black Santa Claus next to a Salvation Army pot rang his bell perfunctorily, keeping his back to the wind. In the middle of the next block, a store door opened and a few bars of Christmas elevator music came wafting out before the door closed again. One of the elderly nuns who worked at the parish daycare center smiled and wished Jim a Merry Christmas. Jim had to force a polite response, and that was rare for him. But the nun, braving the cold, was too preoccupied to notice.

It was a long walk home in bitter weather for Jim. He didn't get any relief from the odd thought that yesterday had been the shortest day of the year, that every day would be a little longer than the one before now.

"Hey, bro! Got a smoke?"

Jim stopped to look at the boy who darted out from between two buildings. He looked maybe eleven or twelve years old, dressed even less warmly than Jim.

"Smokin's no good for you," Jim said, frowning.

"So what I got to look to?" the kid challenged.

It was too cold to stand there and lecture, even if Jim had been in the mood. He shook his head and said, "Forget it," then walked on. The kid shouted a few emotionless obscenities, then ducked back between the buildings, out of the wind, to wait for a more willing mark.

And what do I *have to look forward to?* Jim asked himself, mocking. *Some Christmas* this *is going to be.*

The cold made his face feel brittle, as if pieces of his dark brown skin might crack and fall off long before he reached the red brick house in the middle of a block of identical red brick houses. Home. Urban homesteading. Take an old house in a dilapidated, mostly abandoned neighborhood. Buy it from the city for a dollar. Agree to bring the house up to standard. Live in it. Work with other people who are out for similar bargains, get the neighborhood back on its feet. *The pride of home ownership,* that's what everybody talked about.

"Bills, nothing but bills," Jim muttered.

He climbed the five steps to the small front porch and door. Alice must have swept the new snow from the porch and

steps within the last hour, Jim thought. There was barely a dusting of snow on the gray-painted wood. He shook his head while he fumbled at his keys with long fingers that were stiff and almost numb from the cold. When he got the door open, he went inside, stomping his feet on the papers in the little entryway to get rid of the snow he had brought in and to get his circulation going again. His toes tingled from the cold walk.

"That you, Jim?" Alice called from the kitchen.

"It's me," he said, too softly for her to hear, as he stripped off his coat and brushed snow from his hair. His ear hurt when he touched it. Louder, he said, "What were you doing outside sweeping the porch? You know you're not supposed to be doing stuff like that now."

They met in the hallway leading back to the kitchen.

"I was only out five minutes," Alice said. "I have to get a little air now and then, and it's dry snow, not heavy at all."

"You can't get sick now. The baby's due next week."

Alice tilted her head back, ready for a normal greeting kiss. Then she noticed how upset he looked.

"I'm fine, Jim, really. I didn't work hard at all."

He shook his head, almost violently. "It's not that, dear."

"What's wrong?" She reached up and touched his cold face.

"They're shutting down two lines at the factory. I'm the black foreman with the least seniority."

"Jim!"

"All right, I'm the foreman with the least seniority, black or white. What difference does it make? I'm still out of a job."

"When?" She grasped his arms.

"Today. I'm out of work right now." He put his arms around Alice and held her as tight as he dared with her so far along in her third pregnancy. "It couldn't have happened at a worse time."

"We'll manage," Alice said. "I can go back to my job as soon as the baby's three weeks old, and you'll find another job fast. Right after Christmas. You're good, Jim. You've got a good work record."

"Huh. This time of year, I'll be lucky to land a job bagging burgers at McDonalds. That won't pay enough to help. All the bills will eat through what we've got saved in a hurry."

"We'll manage," Alice repeated, more firmly. "You know that. If nothing else, we can get a home-equity loan to get through any rough spots."

Jim sighed. "Yeah, and get even deeper in debt. Where are the kids?"

"At my sister's. Rae will bring them home in time for supper."

"We're going to have to put off buying that car again."

"So we take the bus a while longer. That doesn't matter."

"And Christmas will be pretty lousy for the kids."

"Don't get so melodramatic. We've been buying their presents for two months now. And anyway, I've got a surprise for you.

"You win the lottery?"

"You know I don't play that. We got a big package in the mail today."

"Package? Who from?"

"I'm not sure. But it's really some-

thing. Come on. I've got it in the kitchen."

The package was large, eight inches high and two foot by three.

"What the hell is that?" Jim asked.

"A letter came with it," Alice said. She picked it off the table and handed it to Jim.

"Merry Christmas,

We are delighted to present you with a free INSTANT CHRISTMAS KIT in order to help you celebrate this most joyous holiday. There is no charge. No salesman will call. No one will attempt to sell you anything. We only ask that you enjoy your INSTANT CHRISTMAS and pass the bonus pack on to someone close to you. Complete instructions on how to activate your INSTANT CHRISTMAS are on a separate sheet."

"This is crazy," Jim said, looking from the letter to the open package on the kitchen table.

"I know it sounds crazy, but there must be *something* to it," Alice said. She had the instruction sheet. "There's a large aluminum roaster pan—big enough for a twenty-five-pound turkey and then some, a smaller pan like for a sheet cake, five pounds of sugar, two quarts of motor oil, two smaller bags labeled simply *A* and *B*. According to the instructions, the only other ingredient is water."

"What's it supposed to do?" Jim poked suspiciously through the items.

"The big roaster pan is supposed to provide a full Christmas dinner for six people. The other pan is supposed to provide 'Christmas surprises,' also for six people."

"This has to be somebody's idea of a sick joke," Jim said.

"Well, we've got nothing to lose by trying it," Alice told him.

Suzette Ann Carrera

"The Red Sea really does look as brilliant as it does in those pictures from space," Suzy Carrera said. This wasn't her first time across the Red Sea by airplane, but she had her face almost against the tiny window on the side of the military transport. Travel by air didn't normally impress her, but this one route, over terrain shown from space so often, was different.

"What, you thought they faked all those shots?" Jeff Senna asked. Jeff was a new volunteer on the project, a college student taking a year off from his studies. In the week Suzy had known him, Jeff had seemed unwilling to take anything very seriously.

If you can get through the next twenty-four hours and still be like that, you're not even human, Suzy thought, glancing at him briefly. Jeff Senna dwarfed her, and Suzy was no small woman at five feet, ten inches.

"We're coming up to the Ethiopian coast now," the pilot said over the PA system. "If we're going to run into any trouble, it will probably be in the next few minutes."

"Hey, I thought this flight was cleared," Jeff said.

"It has been cleared," Suzy replied. "That doesn't mean much though. We wouldn't be the first cleared relief flight to be shot down by one side or the other." She quit looking at the sparkling water and looked toward land, wondering if she would see any sign of a missile

coming toward the plane—or toward one of the other two cargo planes following them. Parched ground flashed beneath the plane almost immediately after it crossed the shoreline. Suzy looked, but there didn't seem to be any significant areas of green in sight.

"Mars couldn't look any more desolate than this," she said.

"Well, what to you expect—drought year after year, senseless chopping of the forests, all the rest? They haven't had four good years worth of rain all told in the last thirty. Total. The way things are going, all of Africa will be a desert from the Meditteranean to Angola."

"You one of those young hotshots who thinks that since we can't stop the hell here we should stop prolonging people's agony by bringing in food year after year?"

"I wouldn't be here if I felt that way. We can't just let tens of millions of people die without trying to help. But unless somebody makes them stop cutting down the forests—hell, the whole continent could be as barren as Antartica in another twenty years."

"Maybe we can do something permanent to help now," Suzy said softly, holding back her sense of amusement at the way the young man was lecturing her.

"I've heard *that* number before," Jeff replied, turning away from her.

"Are you in for a surprise," Suzy whispered. Jeff either didn't hear or chose to ignore it.

"We're starting our landing pattern," the pilot announced. "Remember, I warned you that the landing might be rough. All we've got is a dusty plain to set down on, not a finished runway. Strap in tight."

Suzy adjusted her safety harness. The small passenger cabin in the military cargo plane didn't have the simple lap straps of a commercial passenger liner. Jeff didn't seem inclined to follow her example.

"Buckle up," Suzy said sharply. "We've got a lot of work to do when we land. I can't afford to have you all banged up if this gets rough."

Jeff stared at her for a moment, started to say something, then held back. He fastened his straps.

As the plane glided in toward the landing strip, Suzy gripped the armrests of her seat with all her strength. Before leaving the United States five days before, she had seen the latest intelligence estimates for the region. The fighting between rebels and government forces was near an all-time high, and both sides had declared open season on neutral relief efforts. Both sides had the weapons to knock the planes out of the sky. And any landing was hazardous enough in the rough country they were descending toward even without the threat of missiles up the kazoo.

Occasional dead trees marked the dusty plain. The lines of long-dry watercourses were clearly visible. The plane chased its shadow to the ground, over a cluster of buildings, past acres of rough tents, wattle and thatch huts, and thousands of refugees. The landing gear touched down and bounced the plane back into the air for an instant before they finally settled into the dirt. Clouds of dust plumed out, leaving a thick trail behind the plane. Braking started the transport skewing from side

to side. The near wing dipped perilously near the ground once. Even Jeff Senna grabbed his armrests and held on.

"Just be glad we're the first plane in," Suzy said through almost-clenched teeth. "The others will be landing through our dust."

"What's the big rush?" Jeff asked. "Planes don't land that close together even at O'Hare."

"Nobody's ever shot down a plane landing in Chicago," Suzy said. "It's happened three different times here."

The cargo plane finally stopped moving forward. The pilot didn't wait for anything more than that. He turned left and moved off to the side—over to a seldom-used roadway—and reversed course to taxi back toward the cluster of buildings and tents they had flown over on final approach. The second plane was already braking on the dirt landing strip, and Suzy and Jeff saw the third plane touch down.

"That's too damn close," Jeff said.

"Just be glad we got all three planes down safely," Suzy told him. "We'd be in a royal mess if we lost even one."

"What's so special about these particular planes?" Jeff asked. "There are loads of relief supplies coming in every week or two."

"Not like we're carrying. You'll learn more when we show the people here what we've got."

"We unload by hand?" Jeff asked as the plane turned and stopped. The engines were shut off. The dust didn't show any immediate tendency to settle.

"Every bit of it," Suzy said. "But we'll have help. Some of the refugees here are still strong enough to do a little work, and there are several dozen workers brought in from outside, volunteers like us."

The cargo doors at the rear of the plane opened with a mechanical whine and a ramp extended itself as Suzy and Jeff made their way back through the pallets of cardboard boxes toward the exit. Heat and dust found their way inside the plane quickly.

"Is it this hot here all the time?" Jeff asked.

That was a question Suzy had heard before. She had asked it herself the first time she flew in. "This is the cool season," she replied. The joke wasn't even worth an interior chuckle any longer.

A thin sunburned man, whose glasses had slid to the end of his nose, met them on the ramp.

"Reverend Abernathy, this is Jeff Senna, one of my new volunteers," Suzy said. Abernathy and Senna shook hands.

"We can use all the helpers we can get," the Anglican priest said. "Glad to have you, young man. And good to see you again, Suzy."

"You'll be even happier when you see what we've got for you this time, Reggie," Suzy said, smiling broadly as she first shook hands with and then embraced the clergyman who looked much older than his forty years.

"Oh, you brought me a genie in a lamp?" They started down the ramp together. "I wondered how we rated three planes at once."

"Genie in a lamp is pretty close, Reggie," Suzy said, laughing openly. "Pretty close indeed."

He stopped and put out a hand to stop Suzy at the bottom of the ramp. "You wouldn't be having sport with the old

vicar, would you?'' He wiped at the bald top of his head with a handkerchief. The fringe of hair around his crown seemed to be a mirror image of his sideburns and the thin line of beard that followed his jawline. Reggie Abernathy had been bald since divinity school.

''I wouldn't joke about this, Reggie,'' Suzy said. ''We're turning the corner with these loads. Once I show you the cargo, you might think it's manna from heaven and water from rocks.''

''I pray that you're telling the truth, Suzy, but *please,* don't talk like that around my people here. Some of them might think you were mocking God, and they don't have much more than their faith left.'' Hundreds of people were approaching the plane on foot—tired faces, filled more with resignation than hope. A few children came on ahead of the crowd, but not even the youngsters had the strength to hurry.

''I won't, Reggie, but I am telling you the exact truth. You're getting the first shipment of . . . well, just let me show you.'' She turned to Jeff. ''Grab one of the cases marked A-7 and bring it along, would you?''

''This is a whole new technology,'' Suzy said when she started to open the crate in Reggie's office. ''We're moving far beyond simply hauling in food to get each group of refugees through the next few days. We've finally got a way to start making the region self-supporting again.''

Abernathy stared at her for a moment, squinting—as if that might help him see inside her. ''You *are* serious,'' he said. When Suzy nodded, the priest said, ''Then you can only be talking about molecular engineering, factory bugs, right?''

''You might say that,'' Suzy said.

''There've been rumors for so many years, but nothing's ever come of them,'' Abernathy said.

''This is only a guess,'' Suzy lied, ''but I'd say that security concerns outweighed everything else for a long time. But the situation here—and in a few other critical areas—has become so desperate that humanity finally won out.'' She pulled three small packages from the crate, glancing briefly at Jeff. He was on a camp stool at the side of the office, his face drained of color after walking past a sampling of the emaciated residents of the refugee camp.

''Once this gets going, it will be virtually self-sustaining,'' Suzy said, turning her attention to the vicar again. ''Each of these packets will produce a day's food for four people, plus a starter kit for the next day's food. Horn of plenty. Genie's lamp. The initial packet merely requires three liters of water and two hours. After that, the following days' packets will need the water and certain organic materials.''

''Water is a problem, as you know,'' Abernathy said, his voice sounding tired suddenly. ''And just what do you mean by 'certain organic materials?' ''

''Don't look so dour, Reggie,'' Suzy said. ''We have the situation well in hand, as you might say. These molecular replicators can take carbon, oxygen, hydrogen, and nitrogen—basically in any available form—and construct the food. The air alone can provide a lot of the necessary raw material. The rest can come from virtually any organic

matter—trees, bushes, inedible portions of grain and other crops, weeds, scraps. It can also come from organic material locked up in the soil, or from human and animal wastes. Recycling.''

Reggie nodded. ''But that still leaves the problem of water. And some very serious religious concerns about using wastes, especially human, as anything more than fertilizer.''

''The water is simpler than you might think,'' Suzy said. ''All the oxygen is in the air. And there's more than enough hydrogen to be had in surface and subsurface compounds, and again in waste products. Scavenging.'' Suzy dragged the word out. ''Hydrogen can be liberated from a lot of different sources around here.'' She pulled a small notebook from her hip pocket. ''I didn't want to trust all this to memory. Chemistry's not my strong suit.''

''Mine either,'' Reggie said with a smile.

''The major surface sources here are clay, gypsum, shale, and mica. The Danakil is lousy with gypsum. The plateau and the Rift Valley have shale and mica, and there's clay all over. There are deposits of oil and natural gas that offer hydrocarbons for the taking. The desert areas, even where there's no real gypsum, have quite a number of hydrides and hydroxides available.''

''I'll have to take your word for it,'' Reggie said when Suzy looked at him.

''And there are sources people can help provide. Plastics, wood ash, organic waste. This system can liberate hydrogen and turn it into water from all of those. Our planes are going to start bringing in bales sof discarded plastics once the food packets get going around the area. We're going to start a self-sustaining water cycle, Reggie, really we are.'' She paused to give him a chance to say something, but he kept quiet.

''We start by digging a shallow hole and dumping 100 gallons of water in—water we've brought along that has been seeded with the assemblers to obtain the oxygen and hydrogen and combine them into water. We've brought enough to start a dozen of these breeder ponds to get the program off to a flying start. After a week, we figure that each site should have accumulated a decent small pond, close to 1,000 gallons under local conditions. And 100 gallons of *that* can be removed to start the next pond. Every week, each existing pond can start another similar pond. And the sludge at the bottom of each pond can be dredged daily to support three dozen food packets—about 200 people—and the waste the people generate will keep the process from slowing down markedly once the most-easily reachable levels of the soil are leached of their hydrogen.''

Abernathy sat heavily, making his folding chair creak. His mouth fell open. He stared at Suzy but didn't seem to see her. Suzy watched him for a moment, then continued.

''The molecular assemblers that grab oxygen from the air to make the water will also help minimize evaporation—almost like a sheet of plastic wrap across the surface. We can't eliminate evaporation completely, but we don't want to. Seepage will be held to a minimum by the sludge that will line each pond. The seepage and evaporation that *do* occur will help make the ground fer-

tile again and put needed water vapor back into the air. Once the region is thoroughly seeded with breeder ponds, we hope—we *expect*—to see a shift in the climate again to get a decent rain cycle established. Well, before the ponds have extracted the last available hydrogen from the soils and rocks. Careful planting around the ponds will help maintain the new balance."

Suzy had to shake Jeff's shoulder to get his attention. He was as mesmerized by the recitation as Reggie. Suzy sent Jeff out to get water for her first demonstration.

"The farther along we get with the ponds," Suzy said while Jeff was gone, "the less hydrogen we'll need from the ground. There'll be more organics available from the recycling, from the inedible parts of the new crops and so forth. And once the system is fully operational, we'll be back to almost entirely natural means, with the odds and ends added just to keep us on the plus side."

"It's a miracle," Abernathy whispered two hours later when he saw the result of Suzy's tinkering with the food packet—food, hot and ready to eat. He started praying, more fervently than he had in years.

Edward Henryk Witans

It was nearly midnight in Warsaw. The sky was clear, each star sharply etched against the black of space. There was a half meter of snow on the ground, but the streets and sidewalks had been cleared. The temperature was just below freezing. There was little wind. A pleasant winter night. Ed Witans got out of his car and cross the street to the church his grandparents had attended before leaving Poland eighty years before. Since being posted to the United States Embassy in Warsaw, Ed had attended the church himself—at least once a month when his other duties permitted. After three years, the priests and most of the parishioners knew him at least casually. Ed had a fluent, colloquial command of the language, and he recalled many of the stories his grandparents told him when he was young. Some of the same families still belonged to the parish.

There was little traffic on the street, and people came along the sidewalks singly or in small family groups, but there would be a full house for Midnight Mass. Christmas Eve was about to become Christmas Day. Ed went inside the church, exchanged Christmas greetings with some of the people lingering in the narthex, then went through to the nave, knelt by the font of holy water, dipped his fingers, crossed himself, and went down the aisle to the pew his family had occupied generations before.

Ed was comfortable in the church. The service reminded him of his childhood in Detroit. There was no Latin here, but much of the services back then had been in Polish—the sermon and lesson, all the little odds and ends, the announcements at the end. And in the parish hall in Detroit there had been more Polish than English spoken. Ed hid the smile that came when he pictured himself as a young boy, back when he believed every word that the priests—and the nuns who taught at and ruled the parochial schools he attended—said. And the almost inevitable period in his childhood (it may have lasted for nearly

two years) when he thought he might like to be a priest himself someday.

This is almost enough to make me believe it all again, he thought.

At the end of Mass, there was the special announcement that Ed had come to hear, about the Christmas presents sent from a group of Polish congregations in the United States. "Enjoy the Christmas dinner," the priest said. "Keep one of the two packets that are left. Give the other to a friend or relative who hasn't received one already." The priest spoke with a passion that was more than faith. He had witnessed a demonstration.

And outside, the parishioners went home with their presents, the new Christmas miracle that they were about to be astounded by. Many stopped to thank Ed or to ask him to pass on their thanks to the donating parishes in America. Ed wished every one of them a Merry Christmas and tried to imagine how they would react when they learned just what kind of present they had.

He couldn't suppress the upwelling of hope and joy in himself.

Alice Kersey Solomon

"Go on now. You just stay in the living room with the children while I do this," Alice told her husband, lightly pushing him away from the kitchen door. "You don't believe. You think this is a waste of time, so you get out there and watch 'How the Grinch Stole Christmas,' or whatever you've got on now."

"I thought this was for Christmas Day, not Christmas Eve," Jim said. He moved slowly, "letting" her push him. He tried to hide his smile.

"It's for Christmas, period. And we'll be at my mother's tomorrow, so we've got to have *our* Christmas here tonight."

"Or an early April Fool's Day," Jim said, teasing. He had set aside the worst of his depression over losing his job, at least for the moment. The children were too happy, too excited about Christmas, for him to remain blue. Alice was excited about the strange package they had received in the mail. And there had been an unexpected bonus from the factory, a small check, along with a letter suggesting that there was a possibility that the layoff would only last three or four months.

That hope was enough to get Jim through Christmas. There was a chance. It would be tight; Jim had spent much of the day figuring up bills, trying to see where they could cut expenses. *If it is just three months, I think we can do it,* he had decided. Unemployment benefits. Alice should be able to return to her teacher's-assistant job by February first. Jim's optimism might evaporate on December 26, but it would hold until then.

Alice shook her head at Jim and went back to the kitchen. She already had the two pans set out. The instructions were on the table. Everything was in the proper pan except the liquids. Pour in the water and oil, cover both pans with generous sheets of waxed paper, and wait for two hours. Simple.

"I think I'm gonna sit here and watch you," she whispered as she poured the water into the larger pan. "I'd hate for Jim to be right about this all being a crazy joke." She covered the pans and pulled up a chair.

Nothing seemed to be happening at first. Alice read the instructions again. There was nothing about stirring. After a few minutes, Alice mumbled, "I could fall asleep like this." She got up, set the wind-up kitchen timer at its maximum—one hour—and went to the living room. She chuckled before she left the kitchen though. She knew she would never manage to wait the whole hour before she came back to peek.

"Is it soup yet?" Jim asked when Alice reached the living room.

"Takes two hours now, the instructions say," she replied, sticking her tongue out at him. "What's on TV?"

When Alice returned to the kitchen after thirty minutes, the waxed paper was fogged over both pans. She stood over them for a couple of minutes, fighting the itch to peek. The instructions had cautioned against that. "I don't want to goof it up, give Jim a chance to laugh at me 'cause of that," she told herself.

After an hour, the paper on both pans had formed bulges. Alice could smell enticing aromas. When she went back to the living room that time, she was wearing a wide grin. "Looks like you're gonna have to eat your words, and then some, Mister Smartypants," she told Jim.

"The thing's actually working?" he asked, surprised, skeptical.

"It's doing something." Then, when Jim started to get up to look for himself, she said, "You just plant your pants back on that sofa and wait."

After another half hour, Alice went to the kitchen again, and turned around almost as soon as she reached the door. She brought Jim and their two daughters back with her.

"What's that?" seven-year-old Abby asked.

"Our Christmas surprise," Alice said.

"Smells good," five-year-old Debbie decided.

"Sure does," Jim said, unable to contain his surprise. "Can I peek?"

"No, sir!" Alice said. "We've got another . . ." She stopped and pressed a hand against her side, where her waist used to be.

"Alice?" Jim asked, noticing the way her eyes had widened.

"I think we may have an extra Christmas surprise," she said after a moment. She relaxed a little. "Strong contraction."

"Just the one?" Jim asked.

"I've been having little ones most of the day," Alice confessed.

"You call the doctor?"

"Not yet. There's plenty of time," Alice said.

"This is why we need a car," Jim said, remembering the earlier, forced decision to postpone that purchase again.

"Don't start now, Jim," Alice said. "Jess knows it's coming. He and Rae have a telephone right next to their bed."

"Shouldn't have to call a brother-in-law for this."

"Now hush!" Alice said. "It's Christmas Eve." She sniffed theatrically over the larger pan. "Abby, you want to help your father set the dining room table?"

All four Solomons were standing at the kitchen table when the two hours were up. The food smells were enough

to start all their stomachs growling, and Mama had to watch her daughters—and husband—closely to keep them from peeking under the waxed paper too soon. Alice had only turned away once, to hide the fleeting grimace that came with another strong contraction. Twenty minutes after the last.

I don't care how close it is, I'm gonna eat tonight, she told herself. The *Instant Christmas* food smelled too good to pass up or just sample.

The dinger on the timer went off. Alice peeled the waxed paper off the larger pan . . . and gasped. There was steaming turkey and dressing, mashed potatoes and gravy, corn and peas, and a whole pumpkin pie, each in separate open containers. There were also celery stalks, green onions, and cole slaw.

"There's enough food here for *two* meals," Jim said, staring at it. He shook his head, trying to dislodge a sense of unreality about it all. His words felt disjointed, abstract things to him. He had trouble believing his eyes and nose.

"And here's the starter for another meal," Alice said, lifting a compressed block the size of a meat loaf pan from another corner.

"What's in the other pan?" Jim asked.

"We'll have to look and see," Alice said, reaching for that waxed paper.

"Christmas presents!" Debbie said when she saw the brightly-wrapped packages in the other pan. "Where's mine?"

"We'll just have to open them all and see who gets what," Alice said. "There are no name tags on them." Alice closed her eyes for a moment. Personalized tags on the presents would have been one miracle too many. "After dinner," she said when both girls started reaching. "We've got to eat before the food gets cold."

"I'll carry it," Jim said. The pan with the food in it was far heavier than Alice was allowed to carry. Abby and Debbie ran ahead. "Afterwards," Jim whispered to Alice, "I think we should go to the midnight service at church."

Alice smiled. It was the first time Jim had ever suggested going to church. He would go with Alice and the children when he couldn't get out of it, but *this* was a first.

"That would be nice," she said, "but I don't think I can make it. I think I'll have to call Rae long before midnight."

Howard McMichaels Dawson

There were no Christmas decorations in the room, nothing more than a page-a-day calendar showing December 25 in red with *Christmas* in black block letters below, and a thin green and red wreath around the entire page. The one clock in the room was a 24-hour dial showing 0700. A map of the world covered one wall. Time zones were marked across the top. A large desk in the center of the gray-walled room faced the map. Behind the desk in place of a credenza there was a table with computer terminals, radios, printers, and a fax machine. The desk held only a lamp, an 8½″ by 11″ lined yellow pad, and three telephones.

Howard Dawson stretched and yawned. His chair creaked softly as he moved. He reached to the corner of his desk, picked up a telephone, and pressed the intercom button. "How we fixed for coffee?" he asked.

"I'll bring you a cup right away, sir," the clerk outside said. "Just brewed up a fresh pot." He didn't have to ask how Dawson wanted his coffee. He knew. They worked together often enough.

"Thanks, Bill," Dawson said. "And check to see if Matt Thomson's in the building yet. I want him down here as soon as he arrives."

"He signed in at the entrance three minutes ago, sir," Bill replied. "He should be down any minute now."

"Have coffee ready for him when he arrives. Black with three teaspoons of sugar."

"Yes, sir."

Howard stood and stretched again. He walked to the map and back, trying to get his blood flowing, trying to get alert again. The situation room—one of several in the lower reaches of the building—was silent. Calling the level *The Tombs* was an old joke, stale but appropriate. Dawson was deep below the agency's most recent headquarters building at Langley, Virginia. No one really believed that the deep level was safe against nuclear attack, but it was—mostly—proof against casual eavesdropping. Howard flexed his shoulders, thinking of the many nights and days he had spent in this room or one of the others, where no trace of the outside was visible or audible.

"Almost over," he whispered. Not just this operation, but his career, all the years of service—covert and overt. He scratched his head with both hands. His hair was short and white—whiter than it deserved to be, he thought. Thirty-plus years of intelligence work, of every possible kind of operation and administrative nightmare.

"But never anything like this," he mumbled. *This is a good one to be going out on.*

Bill Kent came in with both cups of coffee. "Mr. Thomson's in the elevator coming down, sir."

Dawson nodded. "Show him right in, Bill."

Matt Thomson was twenty years younger than Howard's sixty-seven. Matt combed his black hair straight back, accentuating a high forehead. He had a deep suntan, a reminder that he had been spending his time in places where December was a lot kinder.

"Morning, sir," Matt said, taking the hand Howard offered.

"You can knock off the *sir* crap," Howard said amiably. "A week from today, you'll have my job. That's punishment enough for anyone."

"I was a little surprised that you called me in so early this morning," Matt said, not mentioning that he hadn't anticipated coming in to Langley at all on Christmas Day. Working for the agency was guaranteed to bring surprises like that. "Is something wrong?" Matt asked the question hesitantly. Howard seemed much too relaxed for a crisis.

Howard's laugh threatened to get out of control before he reined it in. Matt looked at him with one eyebrow raised, and more questions springing to mind. "No, Matt," Howard said. "For one of the few times in the agency's history, nothing at all is wrong. Maybe nothing's ever been so right. Have a seat, and coffee. I trust Bill got it the way you like it."

"Fine," Matt said after he had taken the chair at the side of Howard's desk and sampled the coffee. He looked carefully at Howard's face. The air of joviality was . . . out of place. "So what's up?"

"Operation Santa Claus," Howard said, holding back another laugh, enjoying the consternation he saw on Matt's face.

"Sir?" Matt said. Howard's laugh came out.

"Sorry, Matt," Howard said. He took a deep breath. "You'll understand in a few minutes. Operation Santa Claus. It's probably the only ongoing operation you haven't been briefed on yet in our piece of the pie. Up to this minute, only three people in the country have known the full scope of it—the president, the director, and me. It's that tight. Now it's your turn."

Matt settled back in the chair and took another sip of coffee to cover any other reaction he might show. Howard's introduction hinted strongly at trouble, *somewhere* down the line.

"That's right," Howard said. He had been in the business too long to miss the concern in his successor's face and actions. "We bypassed the National Security Council, the Joint Committee on Intelligence, and the Congressional Oversight Committee. We had no choice at all. You'll know that once you know what Operation Santa Claus is all about. You'll have the complete file, but I want to give you an overview personally. Then you can study all the data and I'll answer any questions you still have."

Matt nodded. He had known that there would be problems when he became head of Covert Operations. He simply hadn't expected anything quite so major going in. And withholding an entire operation from the oversight apparatus—in American intelligence, that sin was even more deadly than failure.

"It has to be something of, ah, unprecedented importance to take that kind of risk," Matt said.

"It is," Howard said, nodding soberly. "*Unprecedented* is a very good word in this case. You know the way we've been sitting on molecular replicators so long?"

"I know," Matt said quietly. The knot that had been threatening his stomach grew more convoluted. "We've never been able to find a foolproof security system for the little buggers so we've held back any real applications here and sabotaged every foreign project." Matt had been control officer for several of those operations.

"We're not sitting on them any longer," Howard said. The lines of mirth had quietly disappeared from his face. He leaned toward Matt. "Maybe the security angle still isn't foolproof, but it's probably as close as we'll ever be able to manage. It came down to what most of us thought when we first started looking at the technology closely. Whoever is first to use the full potential of the technology will control . . . *it*." Howard and Matt both leaned back in their chairs at the same time. Matt allowed himself a long, slow blink.

"So," Howard said, drawing out the word, "in the last four days, we've distributed eight million food factories around the world—several different versions, tailored to specific needs—to needy people of all sorts, here and abroad." He paused for a few seconds.

"And some people who aren't so needy. From the inner cities of the US to the capitals of all the Communist bloc countries, on to the famine centers of the southern hemisphere and Asia and even into the centers of our staunchest allies. By the end of today, at least some people in virtually every country in the world will have sampled our molecular-factory food, with kits that'll keep right on providing food, and duplicate factories to pass on to others."

"We're going back to the Uncle Sugar image?" Matt asked. He knew that the answer had to be no, and he could already make a good guess as to what the real answer was. . . . but this was no time for guesses, no matter how well-informed.

"Well, we expect to receive some initial benefits along those lines." Howard said, smiling as he nodded, "but this time, we're not counting on free goodwill. We've had to wipe *that* off our faces too many times before."

"What *are* we counting on then?" Matt asked, determined to get a straight answer from Howard.

"Technology," Howard said, spreading his hands in an open gesture. "Little computers, to be exact. In a space the size of a sugar cube, we can pack more computing power than the human brain has—faster, smarter, more durable. And it will use all of its potential, not just the small fraction that people use. With very precise programming. In six months, half the people in the world will have our custom-designed molecular computers in their systems, interacting strongly with their own brains—informing, improving, *guiding*. The computer systems are self-replicating and able to spread very quickly through almost any casual contact—easier to catch than a cold. Inside eighteen months, the spread should be complete, worldwide. Put together your own dreams, Matt—universal peace, prosperity, no more hunger or disease, people reaching out to the stars. Your dreams can't be any more glowing than the reality will be." Howard couldn't repress a sigh of satisfaction. Many of his own dreams had gone into the programming.

Matt shook his head very slowly. "I've seen all the theories, of course, but it still sounds impossible, totally impossible."

"But it isn't," Howard said, tapping the desk in front of him. He leaned toward Matt. "This time, the *Pax Americana* won't be a joke."

"You're talking about mind control," Matt said. Then he turned to look at the map on the wall to escape the look he saw on Howard's face.

"I'm talking mind control," Howard said, evenly, emphasizing each word. "And there is no antidote, no immunity. We had no choice, Matt. Sooner or later, *someone* would develop this technology. And there is no room for a second-place finisher. It had to be either us or somebody else. And there is no 'somebody else' who would be acceptable." He leaned back and drew his hands down over the sides of his nose and across his mouth before he continued. "Utopia has a price, Matt."

There was complete silence in the room then, for far more than a minute. Howard stared at Matt. Matt stared at the map on the wall, not ready to face

the man he was scheduled to replace at the end of the year.

"But, *Congress*," Matt started lamely. He didn't finish the thought.

"There is no immunity, Matt," Howard said softly.

Matt felt a pressure at the sides of his neck, as if the arteries carrying blood to his brain had suddenly constricted. *I can't faint*, he thought. *That would be ridiculous*.

"Our preparations were very thorough, Matt. Every representative and senator received a box of Christmas candy from the White House. We catered the dinner the president hosted for Congress just before the holiday adjournment—*and* the meals for the last two days in the restaurants that most of our congressmen use around Capitol Hill."

The silence returned. Matt continued to stare at the map on the wall. *What am I walking into?* he asked himself. He looked for flaws, for escapes. He didn't see any. "Can it really work?" he asked.

Howard's emphatic affirmative was preempted by a buzz from the intercom. He picked up the telephone receiver.

"We have a call coming in from Buenos Aires, sir," Bill Kent said from the outer office.

"Put it through," Howard said, switching the phone to its speaker so Matt could hear. He gestured to Matt. "This will be another mission-accomplished call. I've been getting them for the last sixteen hours."

"Mister Dawson? This is Carl Alvarez." The name was phony, but both Matt and Howard recognized the voice of the Buenos Aires station chief.

"Go ahead, Carl."

"We just received a holiday wire. It reads, 'Yes, Virginia, there is a Santa Claus.' "

"Good work, Carl. Merry Christmas." Howard turned off the phone and looked straight at Matt. "There's no way it can fail to work." ■

●It is not enough to tell me you worked hard to get your gold. So does the devil work hard.

Henry David Thoreau

●Security depends not so much upon how much you have, as upon how much you can do without.

Joseph Wood Krutch

analog

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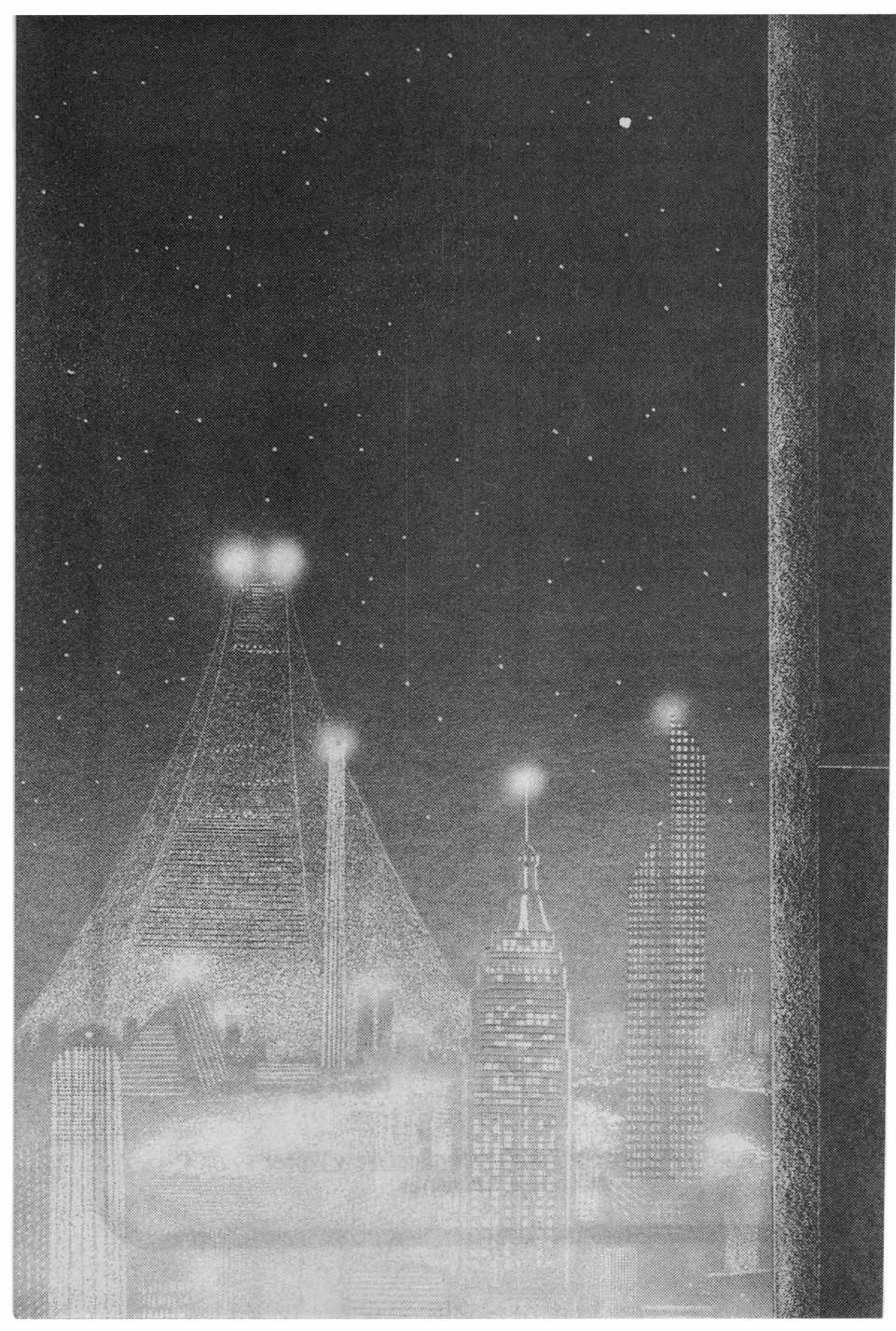

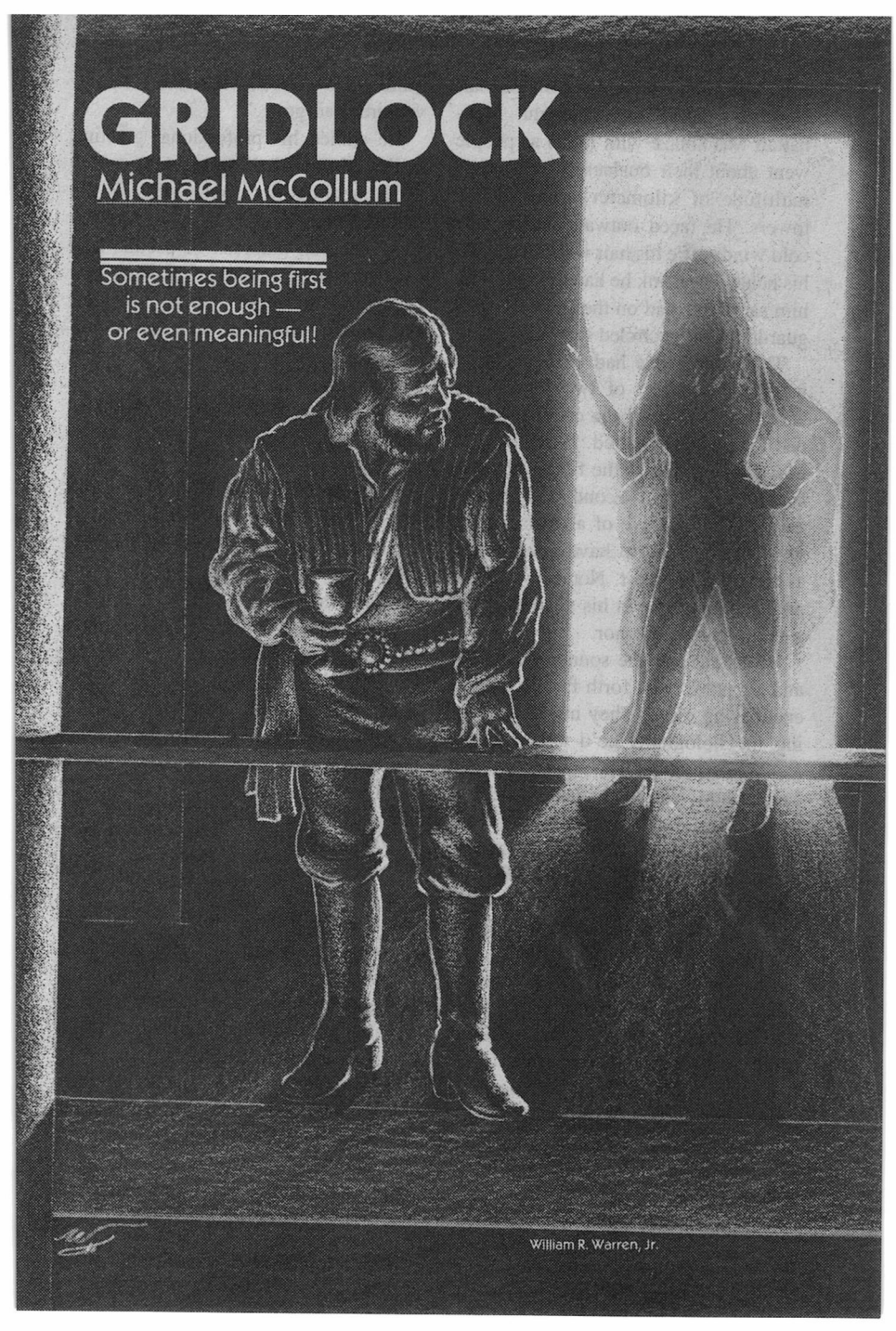
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Sometimes being first is not enough — or even meaningful!
William R. Warren, Jr.

John Thurman Smith stood on the balcony and gazed into the night. Manhattan was ablaze with lights as people went about their business in the city's multitude of kilometer-tall residence towers. He faced outward, letting the cold wind ruffle his hair while it cleared his head. The drink he had brought with him sat untouched on the stainless steel guardrail that encircled the balcony.

The party inside had been going on for the better part of two days, long enough that most of the original guests had long since departed. If anything, it had grown larger as the first group had been replaced by a second (and in some cases, a third) wave of arrivals. Smith would have liked to have gone home, as well. He couldn't. Not only was the party taking place in his apartment, he was the guest of honor.

He listened as the sound of laughter and applause burst forth from his darkened living room. They must be showing the holograms he'd taken aboard *Kon Tiki III* again. The autocamera had caught him just as a giant wave had washed him overboard during a storm. The hologram showed him frozen in time, up to his neck in froth. His sour expression epitomized all the injustice heaped on mere mortals by an uncaring universe. It was *very* funny!

The sounds from the party got louder, then quieted again. Someone had exited through the door leading from the living room to the balcony. He turned to see a woman silhouetted in the flickering light. She was blonde, beautiful, and of indeterminate age. She seemed to glide to where he supported himself with his elbows resting on the railing.

"Hello," she said in a husky contralto. "I wondered where the great adventurer had gone."

He smiled his professional greeting smile. "I don't believe we've met."

She held out her hand, betraying the fact that she was older than she looked. Ever since an outbreak of pseudo-leprosy fifteen years earlier, bowing had been much in vogue. "Irina Scorvini, Mr. Smith. I arrived an hour ago. If you came out here for solitude, I'll go away and leave you alone."

"Nonsense. It was getting stuffy inside. I stepped out for a breath of fresh air."

She gazed out across the city in the same direction he had been looking. "The lights are very beautiful tonight, aren't they?"

"That they are."

After another moment, she seemed to come to some internal decision. She said, "Do you mind if I ask you a personal question, Mr. Smith?"

"I'm John to my friends. What's the question?"

"I was watching the pictures inside. Why do you do it?"

"Do what?"

"Risk your life the way you do? This *Kon Tiki* expedition was hardly your first escapade. You climbed Mount Everest two years ago. And if I remember correctly, you celebrated the Armstrong Tricentennial by hiking across the Sea of Tranquility in an antique spacesuit. Are you trying to commit suicide?"

He smiled. "Hardly. The fax services exaggerate the danger. True, I followed Sir Edmund Hilary's original route up Everest, but I had the latest in climbing gear, a modern oxygen breather, and full communications with the Everest

Summit Hotel. As for my vaunted stroll across *Mare Tranquillitatis*, the suit may have been a replica of an Apollo moonsuit, but my environmental control system was the best money could buy.''

''And your recent voyage aboard a log raft?''

He shrugged. ''I could have summoned up rescue within twenty minutes if I'd gotten into trouble.''

''But you were nearly lost at sea!''

''I had a safety line. I was also wearing a locator beacon.''

''But isn't it dangerous to do all of these things alone?''

He laughed. ''Believe me, if I could have found someone to go with me, I would have. I'm afraid people aren't very adventuresome.'' He peered at her in the light from the living room. She had the most beautiful green eyes. Also, the wind whipped her gauzy gown in a most fetching manner. ''Are you really interested in why I do these things?''

''I wouldn't have asked otherwise.''

''Very well. How old are you?''

She smiled in a way that told him that she had been born when no gentlemen would ever ask that question of a lady. ''I will be seventy-eight next August.''

''Funny, you don't look it.''

''Of course not. Physically, I haven't changed since I was thirty.''

He nodded. ''And barring accidents, you can expect to be young and healthy for another century at least. I, on the other hand, am only twenty-six.''

''All the more reason for you to be careful. You have so much to live for.''

''The truth, Irina, is that I find modern society boring. People never seem to *do* anything. They're vicarious spectators. They wrap themselves in so many layers of swaddling that they can never hope to experience life in the raw. When was the last time someone punched you in the nose?''

She frowned and got a far off look in her face. ''When I was twelve. I called Tommy Rankine a name and he hit me.''

''What risks have you taken since?''

''As few as I could manage,'' she replied with more honesty than he expected.

''That makes my point. Life without risk is tasteless. There is more to living than merely accumulating birthdays.'' He stopped and gauged his listener's reaction. Something was wrong.

''Don't stop,'' she urged.

''Nothing more to say,'' he demurred. ''Now then, do you mind if I ask *you* a personal question?''

''Please do.''

''My lifestyle is very attractive to certain women. When you came out here, I had you classified as someone interested in an evening's recreation. I think I've made a mistake. Who are you?''

''I told you. My name is Irina Scorvini.''

''That isn't what I meant. Why did you come here? You don't strike me as someone looking for a romp.''

She sighed. ''You are very perceptive for one so young. Yes, I have an ulterior motive. I am director of the Time Laboratory and we have need of a man of your talents.''

''Oh? To do what?''

''I'm not free to discuss the matter here. However, if you will accompany

me, I guarantee that you won't be bored."

He thought about it for a moment, then said, "Sure, why not? The party was beginning to drag anyway."

Two hours later, the aircar containing Smith and Professor Emeritus Irina Scorvini, Ph.D, began letting down toward a great pyramid of a building on the outskirts of Mexico City. The car made a sweeping turn before flaring to a landing. Smith peered at the multicolored lights in the park below. "What, no dinosaurs?"

"Very funny."

After landing, Irina led him to the pyramid's rooftop entrance, down a flight of stairs, and through a long hall to an auditorium-sized conference room. The room's sole occupant was a mustachioed man seated at one end of an enormous mahogany table.

"John Smith, may I present Doctor Pedro Arturo Vasquez, deputy director of the Time Laboratory?"

The two men exchanged greetings, after which Irina directed Smith to a seat next to Vasquez. She took the chair opposite them.

"How much do you know about the time laboratory, John?"

"Precious little. You're funded by the planetary government and do research into the nature of time travel."

"That is more than 98 percent of the public knows about us," Vasquez replied with a hearty laugh which caused ripples in his oversize paunch. "Time travel has been a great disappointment to most people ever since its discovery in the mid-twenty first century."

"You mentioned dinosaurs," Irina said. "I would give fifty years off my life to see a dinosaur. The sad truth is that our machines can never bring us back photographs of dinosaurs, saber-toothed tigers, or paleolithic man."

"Why not?"

"It's a matter of control. While we can modulate our machines' displacement in time fairly well, we have no control at all over where they emerge. Once it has been time shifted, a machine may materialize anywhere in the universe where the local mass density is less than ten atoms per cubic centimeter. In a way, that is lucky. It means our machines will never materialize inside a planet or a star."

"What you are saying," Smith said, "is that you can't steer!"

"Correct," Irina replied. "The theory of time travel offers us no hope that we will ever be able to control the spatial coordinates of our points of emergence. Where a time machine materializes is governed solely by random quantum effects."

"Surely you can see our problem," Vasquez said, giving Smith a mild whiff of garlic breath. "In one hundred years of operations, we've collected literally millions of holograms taken from deep interstellar space. *Every damned one of them portrays a starfield more or less identical to the one you can see from the roof of this building!*"

"How do you know you are going into the past then? Maybe your machines are merely flying off into space somewhere."

"Not possible. We always measure the temperature of the CBR on emergence," Vasquez responded. "That

tells us the date to within 100 million years or so.''

''CBR?''

''Cosmic background radiation. the Universe started out as a point of nearly infinite density which exploded outward in what we refer to as 'the Big Bang.' That original explosion has been expanding for 14.2 billion years now. As the Universe expands, the radiation released by the Big Bang has been cooling off—'red shifting' in scientific parlance. In our epoch, the temperature of this cosmic background radiation has reached 2.7 degrees Kelvin. The CBR is the quiet hissing noise you hear when you focus a radio telescope on a dark region of sky.

''Obviously, the farther you go back in time, the hotter the CBR. It rises a few degrees every billion years or so. By measuring its temperature wherever our machines emerge, we can calibrate how far they've traveled backward in time.''

''If you can't send your machines back to historic or prehistoric times, what good are they?'' Smith asked.

''Despite our limitations,'' Irina replied, ''we do important work. By observing the Universe in previous epochs, we measure things the astronomers cannot. For instance, it was the Time Laboratory that first derived the correct value for the Hubble Constant.''

Smith had no idea what the Hubble Constant was, but decided not to pursue the matter.

Irina continued. ''Three years ago, Pedro and I had an insight into how we might reach a particular point in space and time. On the strength of that insight, we were able to obtain a substantial increase in our funding.''

''Wait a minute,'' Smith replied. ''I thought you said that it was theoretically impossible to steer a time machine!''

''Our solution hinges on a rather special case. There is one point we can be confident of hitting.''

''Where?''

''Why, *The Beginning*, of course. If we put enough energy into the time field, we can send our machines back the full fourteen billion years to the Big Bang!''

Smith looked at the two scientists and wondered if he had fallen into an asylum for the criminally shortsighted. He blinked. ''You lost me there. I don't see the point.''

''Think of the Universe as a giant funnel, Smith,'' Vasquez said. ''The spout is the Big Bang and the mouth is the far future. As you go backwards in time, the Universe shrinks. Therefore, the volume in which a time machine can materialize also shrinks. At the very beginning, the volume is so small that it may be considered a single point.''

''It *was* a single point, wasn't it?'' Smith asked. Science had bored him in school, but at least he had learned that much. ''Besides, the density at the beginning of time was a hell of a lot higher than ten atoms per cubic centimeter!''

Vasquez looked at his superior. ''We do seem to be getting ahead of ourselves, don't we, Irina?''

''Let me tell it,'' the laboratory director said. She turned to Smith. ''Are you familiar with the concept of black holes?''

''Vaguely.''

"A black hole occurs when a massive star runs out of fuel and gravity causes it to collapse in upon itself. The force of the collapse is strong enough to squeeze the star's substance right out of existence, transforming it into a dimensionless point of infinite density.

"Such a hole is dimensionless. It does not appear so to us, however. The reason for that is that a black hole is surrounded by an 'event horizon,' which encompasses the region of space where escape velocity exceeds the speed of light. Since nothing can go faster than the speed of light, the volume defined by the event horizon appears to us to be a sphere of absolute darkness. The size of that sphere depends on the amount of mass which has fallen down the hole, and can be quite large. For instance, the hole at the center of our Galaxy is approximately the size of the Earth—or rather, the volume inside its event horizon is."

"What has this to do with the Big Bang?"

"It is directly applicable. In one sense, the Universe itself is a black hole. It possesses an overall density large enough that one must exceed the speed of light to escape it. Therefore, the Universe possesses an event horizon which defines the farthest point our telescopes can ever hope to see. The current event horizon is several billion light-years from here, of course. However, at the beginning of the Big Bang, when the Universe was a dimensionless point of energy, its event horizon measured some twelve light-minutes in diameter."

"It was, in effect, a giant black hole?" Smith asked.

"Precisely," Irina replied. "That was the insight which Pedro and I had. We realized that if we sent our machines back to The Beginning, they would arrive in an empty bubble of space some twelve light-minutes in diameter. There they would remain until the expanding shockwave from the Big Bang collapsed their time fields and kicked them back to us."

"What did you expect to get back? A cloud of superheated vapor?"

"Not at all. We calculate that it takes several nanoseconds for the explosion to build in strength until it becomes dangerous. In that time we can analyze the energy spectrum, detect elemental particles, and perform all manner of useful observations. The machine returns to us long before the explosion can damage it."

"So what went wrong?"

Vasquez stared at Smith for a second. "What makes you think something went wrong?"

"Why else am I here?"

Irina sighed. "You are quite right, John. So far we have succeeded in reaching The Beginning with two machines. The results have been . . . disappointing."

"How so?"

"How long a machine will stay in the past depends on where in the bubble of space it materializes. Still, no matter how quickly the initial shock wave reaches it, up until that time, the Universe should be totally black. There is absolutely nothing to sense. No light, no energy, and especially no cosmic background radiation!"

"And that wasn't what you found?"

Irina shook her head. "The first ma-

chine detected an average CBR temperature of 20°C and a random fluctuation 15°C around that. There shouldn't be any CBR at all, and the fluctuation is totally incomprehensible."

"How long was the machine in the past?"

"Three minutes twelve seconds."

"And the second machine?"

"Four minutes, twenty-five seconds. The CBR readings were more or less the same both times."

"Tell him the rest," Vasquez said.

Irina chewed on her lower lip for a moment. "Energizing a time field for such a long trip is terribly expensive, John. Our appropriation allowed us to budget for up to 100 trips. By materializing throughout the twelve light-minute bubble of space, we hoped to emerge within a few light-seconds of the point where the Big Bang began. Out of seventy-five attempts, however, we failed to reach The Beginning a total of seventy-three times. We have no idea why."

"What has all of this to do with me?"

"Our previous machines have been instrumented to observe the cataclysmic birth of the Universe. They were not optimized for general observations. It is our intent to use our remaining energy budget to send a different type of machine into the past. This one will be equipped with the widest possible range of sensors. It has occurred to us that there is one very general observation tool that we have not tried yet."

"What is that?" Smith asked.

"We would like to send an observer. There shouldn't be anything to see at The Beginning, but we can't afford to take chances. We'd like to send you!"

* * *

The time machine was a sphere some two meters in diameter. It was an instrument probe which had been modified to carry a man. It was smooth save for the various instrumentation ports and the hundred centimeter square window set directly in front of the pilot's cramped seat. It reminded Smith of some of the first space capsules.

"What sort of instruments are those?" he asked, pointing toward the square boxes which dotted the sphere's interior bulkhead.

"Film cameras," Irina said.

"Kind of old fashioned, aren't they?"

She shrugged. "All of our modern equipment uses the principle of photonics. Pedro believes that there is something about conditions at The Beginning which cause photonic devices to malfunction. For that reason, we have provided this machine with the widest possible range of technologies. Film photography may be archaic, but it was used for centuries with good results."

"I take it you don't believe your failure was due to a malfunction," he said.

She hesitated. "I can't help wondering if we are up against some sort of exclusion principle."

"What's that?"

"Consider the black hole that we were discussing earlier. Once inside the event horizon, nothing can get out. Not light, or mass, or information. What goes on inside the hole can never be known by those outside. The astrophysicists say that information exchange through an event horizon is excluded and that an *exclusion principle* is at work."

"And you think the same is true for visiting the moment of the Big Bang?"

"How else can our failures be explained?"

He shrugged. "It's too deep for me. I'm just the bus driver here."

She turned to him. "Then you accept our offer?"

"I'm tempted," he admitted. "Still, I need more information. As I told you at my apartment, I don't jump into these things foolishly. Why don't either you or Vasquez go?"

Irina smiled. "As you said, some of us aren't adventuresome."

"Why not? Is it dangerous to travel in time?"

"Oh no! People don't ride the machines anymore, but when the laboratory was first built, several successfully traveled backward in time. They all returned safely and showed no ill effects afterwards."

"Any chance I might collide with one of your previous probes?"

"None. Time fields cannot overlap. No machine can approach another closer than about fifty meters."

"So what is there to worry about?"

Once again she bit her lip in a way which Smith found very fetching. Her evening gown looked out of place in the cavernous laboratory from which the machines were launched. Still, he was glad that she hadn't changed into something more appropriate.

"There *is* a theoretical danger. It involves the exclusion principle."

"Oh?"

"If such a principle exists—and remember, it is only an hypothesis—it means that human beings can never know what happened during that first moment in time. We may well have suffered instrument malfunctions in the two machines which made it to The Beginning. That may have been the reason they were successful. The others didn't complete their jumps because their instruments were *not* malfunctioning. If there is an exclusion principle at work, any probe capable of returning meaningful data will automatically be prevented from reaching The Beginning."

Smith shrugged. "That's why you are sending me, isn't it? So that I can observe in the event of an instrument malfunction."

"Don't you see, John? By providing you with a window, we have turned you into one of our instruments. If you observe and report you violate the exclusion principle!"

"Are you saying that there's no chance of this machine reaching The Beginning if I'm alive and awake?"

"That is one possibility. The other is that you may make it, but that you yourself could malfunction."

"How?" he asked. "Die? Go blind?"

"We don't know."

He frowned. "What about the instruments in the two probes? Did they check out after their return?"

She nodded. "They passed every diagnostic test we could think of."

"Then what is there to worry about?"

"We don't know," she replied. "That is what has us worried."

He slowly circled the small spherical craft with Irina in tow. Vasquez was watching them from a catwalk that ran completely around the cavern. Finally, Smith stopped and gazed through the observation hatch of the machine. The window was five centimeters thick and

solid when he rapped on it with his knuckles.

"Seem's sturdy enough," he said. "I'll do it!"

"You'll pilot the machine?" she asked.

"Hell, yes! It sounds like fun."

John Thurman Smith sat in a powered lounger in Irina Scorvini's private office and sipped a tall cold drink of something he didn't recognize. It had fruit juice in it and not a little alcohol. It soothed him as he lay back and collected his thoughts. His jumpsuit showed large splotches under his arms and down his back, while his hair was plastered to his head from perspiration. No one had told him the time machine would get so hot.

He'd checked his chronometer just before they'd pried him out of his spherical coffin. The total trip into the past had taken ninety minutes. His machine hadn't reached The Beginning on the first jump, nor on the eighteen tries that had followed.

A time machine which doesn't make it to The Beginning materializes in a universe very different from the one he was used to. It halts a few million years short of the Big Bang. In that early universe, the sky is filled with a red the color of old coals where subtle shadings mark the places giant protostars are being born.

Each time he discovered himself in the protostar universe, Smith palmed the control which returned him to the Time Laboratory. There he had waited while the machines which generated the time field recharged themselves. Then he had jumped again. On the twentieth attempt he arrived in a place that was vastly different from the protostar universe. One look out the window told him that he had made it to the bubble of space which was his goal.

His first sight of The Beginning had told him something else. In one breathtaking moment, all that was mysterious became blindingly clear. He knew the reason the previous probes had brought back such confusing data. He also knew for certain, as Irina Scorvini had suspected, that human beings were forever precluded from observing the Big Bang. The reason for this had nothing to do with universal exclusion principles. The answer was far simpler and more surprising!

"Did you make it?" Irina asked, speaking for the first time since white-coated technicians had helped him out of the spacesuit he had worn. Pedro Vasquez sat across the office from her, nervously twirling the ends of his mustache.

"I made it," Smith confirmed between sips.

"Well, what did you see?"

"Have you checked the cameras yet?"

"They are being unloaded now. We'll have the film developed within the hour."

"Good. I'll need photographic evidence to back up what I'm about to tell you. It's the only way anyone will ever believe me."

"Out with it man!" Vasquez growled.

Smith set his glass down and turned to face the deputy director of the laboratory. "One thing I learned from my travels is that the universe is a very large place indeed. How many stars would

you say are in an average galaxy, Vasquez?''

''Approximately 100 billion.''

''And how many galaxies in all?''

''A trillion or more.''

''Did it ever occur to either of you that there might be other intelligent races out among the stars?''

''Of course,'' Irina said. ''It's a mathematical certainty.''

''What about time? Do you suppose there were races which developed before the Earth cooled, and others who will come into existence long after our Sun has sputtered out?''

''Highly likely. What has this to do with the problem at hand, John?''

''Have you considered that every race which reaches a certain technological level will probably invent time travel? What are the chances that any of them will be able to steer their machines any better than we can?''

''They won't be able to.''

''What if they all come up with the idea of sending their machines to the one point in the Universe where they can be sure to arrive? What if they aim for a bubble of empty space twelve light-minutes in diameter where they can observe the creation of the Universe?''

There was a long silence. Finally, Irina said, ''I susppose it could get crowded.

''You're damned right it could! You were correct, Irina. We'll never see the Big Bang. We won't see it because that whole volume of space is crammed with time machines! They are jammed time field to time field until the whole damned pygmy Universe is gridlocked!''

''What sort of machines?'' she asked.

''All kinds. I saw big things that looked like passenger liners, small balls that must have been instrument packages. There are cigar shapes, and cubes, and one helluva lot of spheres. Some are radiating light as though they are trying to compete with the Big Bang. Others don't even reflect. The only way you can see them is by their silhouette against the more distant machines. They're packed so close together that I couldn't see more than a dozen kilometers in any direction!''

''Then the time machines are the source of our anomalous CBR readings?''

He nodded. ''Your instruments were detecting the heat and light from the machines and averaging them out. The fluctuations are caused by a kind of Brownian motion.''

''*Jesucristo!*'' Vasquez swore. ''Then our failures—''

''Were due to the fact that every possible position in that entire twelve light-minute volume of space is occupied by a time machine. There have to be trillions of them! The time fields are packed edge to edge everywhere. I have no idea what factor selects which machines make it to the bubble and which don't. How can one machine get there *before* another when all machines arrive at the same instant?''

''That will bear thinking about,'' Irina agreed. ''Obviously, the majority of probes fail because they can't find an empty parking place.''

''Obviously,'' Smith agreed.

''Did you see nothing of the Big Bang?'' Vasquez asked.

''How could I? All I saw for 5.6

minutes were time machines. Then I found myself back here."

Irina looked at Vasquez. "Can you imagine what the total collection must mass?" she asked, suddenly excited. "This changes every assumption we've ever made about the creation of the Universe!"

Vasquez was no longer sitting. He'd begun to pace the floor. "If we can see these other beings, we can communicate with them. That means we can exchange knowledge across unimaginable gulfs of time and space."

"But we'd only have a maximum of six minutes in which to communicate," she told her subordinate.

He shrugged. "We broadcast everything in high speed bursts. They do the same."

Irina's face lit up. "Then the information exchange is already going on, and we have it recorded on the instruments we sent back with Smith!"

"Of course. It must be," he said. "We'd better get that data reduced as quickly as we can. I wonder what we should look for first?"

Irina wasn't listening. She sat on the edge of Smith's lounger and hugged him. The warmth and perfume of her was a tonic after the discomfort of the past hour and a half. "You'll be famous for this, John! Possibly the most famous man who ever lived."

"Do you really think so?" he asked.

"Of course. You are the man who opened up space and time for us. You guided us to the universal meeting place. There must be millions of different species out there, all anxious to exchange ideas. We're about to join in that exchange." She picked up her hand computer and began to figure. "Let's see. We made it three times in ninety-five attempts. That means, on average, we will succeed once every thirty tries.

"We're going to need a much bigger budget if we are to properly exploit this. Too bad the bubble isn't larger. It would increase the number of machines that can congregate there and lengthen the average stay time as well. It would be much more efficient."

Smith nodded. "I only wish I'd had a longer stay."

Irina looked up from her calculation in surprise. "Why is that?"

He smiled in remembrance. "The being in the next machine over was almost human. We started a conversation using gestures. She was very beautiful, even considering the pointed ears and the greenish cast to her skin. Also buxom. If I'd had another few minutes, I might have convinced her to join me in my machine. After all, there are better ways to spend time stuck in traffic than staring out the window!" ■

● Anyone who has begun to think places some portion of the world in jeopardy.

John Dewey

Submitted by John Hradsky

The Alternate View

GETTING SOMETHING FIXED

G. Harry Stine

These days, a common complaint among consumers—and we're all consumers in one way or another—is the difficulty in getting something fixed fast, well, and cheap.

As the old saying goes, pick two of these because you can't get all three.

Well, why not? It didn't useta be that way!

Of course. But everything didn't useta be that way! In case you haven't noticed, things have changed. And are changing. And will continue to change. And that fact is at the root of why we all have trouble getting something fixed when we can't do it ourselves. . . . and it's becoming more and more difficult to do it ourselves.

(This is somewhat like the old paradox where you can't win, you can't break even, and you can't get out of the game. . . .)

Electronic equipment—radios, TVs, VCRs, microwaves, CDs, computers, etc.—is an excellent example to use in an attempt to uncover the alternate view, the one other than, "Well, repairmen/mechanics/technicians are dumber these days; they don't train 'em right anymore!"

Until 1947, the only large-scale consumer electronic product was the AM radio. By today's standards, it's a very simple product. And it was considered by most families to be an investment that was expected to last forever, like the Model T Ford—which was still running then and parts were still available for it. You only replaced the parts that wore out. The early TV sets were treated the same way although TV sets were vastly more complex; if price is considered as an indicator, they were six times more complicated than AM radios.

A 1935 AM radio had about 9 vacuum tubes and rectifiers—the other components such as resistors, capacitors (called "condensers" in those days), transformers, and coils ("chokes") were considered "passive" components and usually didn't have to be replaced because they lasted a long time. Tubes didn't. The TV sets of 1949 used 25 to 35 tubes and rectifiers plus the big vacuum tube that's still in the modern "solid state" TV sets, the cathode ray tube (CRT).

All this early tube equipment was designed with analog principles where each component was exercised to its maximum capabilities in an attempt to keep costs down. Other factors were considered more important than the electronics. The mahogany cabinets of early AM radios and TV sets often accounted for more than half the cost of the sets.

AM radios would play for a long time. TV sets quit more often because with added complexity comes the higher

probability of component failure which means more repair bills.

The AM radio had a special place in the home. So did the first TV sets. Some were treated better than the family pets. This influenced the repair philosophy. You'd ask your friends and neighbors to recommend the best repair shop in town and check into the shop's reputation before you left your beloved set there for repairs. In some cases, you spent as much time investigating the integrity of the repair shop as you did checking out the doctor who was going to perform the tonsillectomy on your kid.

Furthermore, when the radio or the TV set quit, you could get along two or three weeks without it. Most families knew how to make their own evening entertainment by singing together, reading, or playing the piano. If you were rich, you could take in a couple of movies a week for a quarter a ticket. . . .

My, how things have changed!

In the repair shop, things were different, too. Because few shops existed, the repairman knew that his reputation and therefore his future business rested upon fixing the set to endure. The shop stocked commonplace tubes and other components. Special parts were few and those had to be ordered, but no rush because a couple of weeks weren't critical. And you didn't need a lot of special equipment, just a volt-ohm-millimeter, a single-trace oscilloscope, and an RF generator. Nearly all early AM and TV sets used the same technology, so you didn't need a lot of documentation, either, just a couple of schematics. Repairmen were expected to learn the few general schematics before they went to work in a shop.

When large-scale consumer TV came along in 1949-1950 and lots of the relatively complex TV sets appeared in living rooms, their increased complexity meant that they quit more often. More TVs demanded repair than the AM radios out there. The old local radio repairman was swamped. Free enterprise responded by enticing more people to open more repair shops to handle the increased business. Competition reared its head. More special parts were required. Better means to obtain these were needed. The shop that could not only repair a TV set well but do it more quickly got more business. TV thus was responsible for the creation of large-scale networks of electronic equipment repair shops and parts supply houses. These were the glory days for Allied Radio. (Who? Well, if you remember them, they were finally bought by Radio Shack about ten years ago. . . .)

Then came the transistor and the whole book of new solid-state electronic devices that followed. The wide variety of these cheap solid-state components allowed set designers to deviate from the standard schematics and to start using their patented new techniques for video circuits, which not only used more parts but required repairmen to consult the documentation (called a "repair manual") to discover how they worked so they could be fixed. Howard Sams made a small fortune publishing the various schematics and repair instructions and making them all available in one booklet. . . . then a series of booklets, and finally racks of large loose-leaf

twenty-pound manuals that could also be used for door stops.

Then manufacturers discovered that it was a lot cheaper with solid-state devices to profitably offer such options as automatic frequency tuning, AFC, UHF, and even remote control. Along came color, and the complexity and the options increased again. Every year saw new features being added. Every year saw more and more solid-state devices and more and more "printed circuit boards" (actually etched circuit boards). The trend proceeded inexorably toward replacement of boards with all their components on them rather than repair of the boards themselves.

The ultimate, of course, arrived with the integrated circuit. If you could put two or three features in one transistor case, why not a whole circuit—amplifier or special option device? With the sort of production volume achieved with TV sets, it became economical to design and grow special IC chips. This was a giant leap forward for consumer convenience but a massive step back for the good old repair shop. If you didn't have a repair franchise for a specific brand of set, you had a rough time getting the special board or chip to fix it. Test these things? Fix them? You needed special training, special documentation, and special and expensive factory-built test equipment. Then someone walked through the door with an Apple, Commodore, or TRS-80 that wasn't working right. . . . Or a microwave oven, which is really a little radar transmitter.

Because chips and microprocessors can work with frequency responses literally unheard of 30 years ago when we fought hard to get 4 megaHertz bandwidth for a vacuum tube TV tuner, things happen very fast in modern electronic equipment. Gone are the days of analog circuitry. It's digital these days, with crystal-controlled clock rates in the tens of mHz. This takes special test equipment, too. And it's expensive. These complex test units check out a whole IC or circuit board at one shot, testing each resistor and capacitor and exercising each solid-state component and chip through its entire operating range. The microprocessors in modern electronic equipment are also tested through special sequences and programs. There's no other way to do it because the chips and the boards were never tested at the manufacturer's plant in the first place; so many of them are being made that only representative samples can be affordably tested.

And, of course, no two manufacturers use the same circuits or programs. . . .

Today, you don't replace a single component like a vacuum tube or even a transistor. You replace the whole chip or board or card or module. This means a repair shop must either stock lots of these specialized parts or be able to get them fast because people simply cannot get along without their TV sets, microwaves, CDs, or computers for an instant longer than absolutely necessary . . . . and they'll take it to the repair shop that can deliver fastest. "If I wanted it tomorrow, I'd bring it in tomorrow."

Repairmen must be continually retrained to understand and be able to repair the new things that used to appear every year and now appear as "improvements" on an almost monthly basis. And this doesn't prepare them to

handle the "one-of" customized stuff that's appearing all the time in even greater numbers because of the ease of making special chips.

Back in 1959 when the first transistor radios appeared, you could get them fixed. Then we learned to live with the "transistor radio fix": when it quits, it's easier and cheaper to throw it away and buy a new one than to get it fixed, providing you can find someone to fix it. It's getting to be that way with TV, too. And computers. And CDs. And other high-tech gadgets.

So here I sit with a fine-sounding audio system I built from components 35 years ago, a classic 1965 V8 smog machine that requires knowledge of all the local junkyards as part sources but which will eat today's Z-cars at a stop light, and a 1979 48K computer that works just fine except I can't buy floppy diskettes for it any longer! I'm not against progress, mind you. And I'm not bragging or complaining. I got these things at the point where the technology matured, when good enough was still the enemy of the best. And I learned about gadgetry in a different era: I learned all too well how to fix it. . . .

As for the rest of the world: If something busts, it's so complicated that you won't be able to get if fixed economically, so throw it away and buy a new one.

Well, that's progress, isn't it? ■

FUTURES

(Continued from page 73)

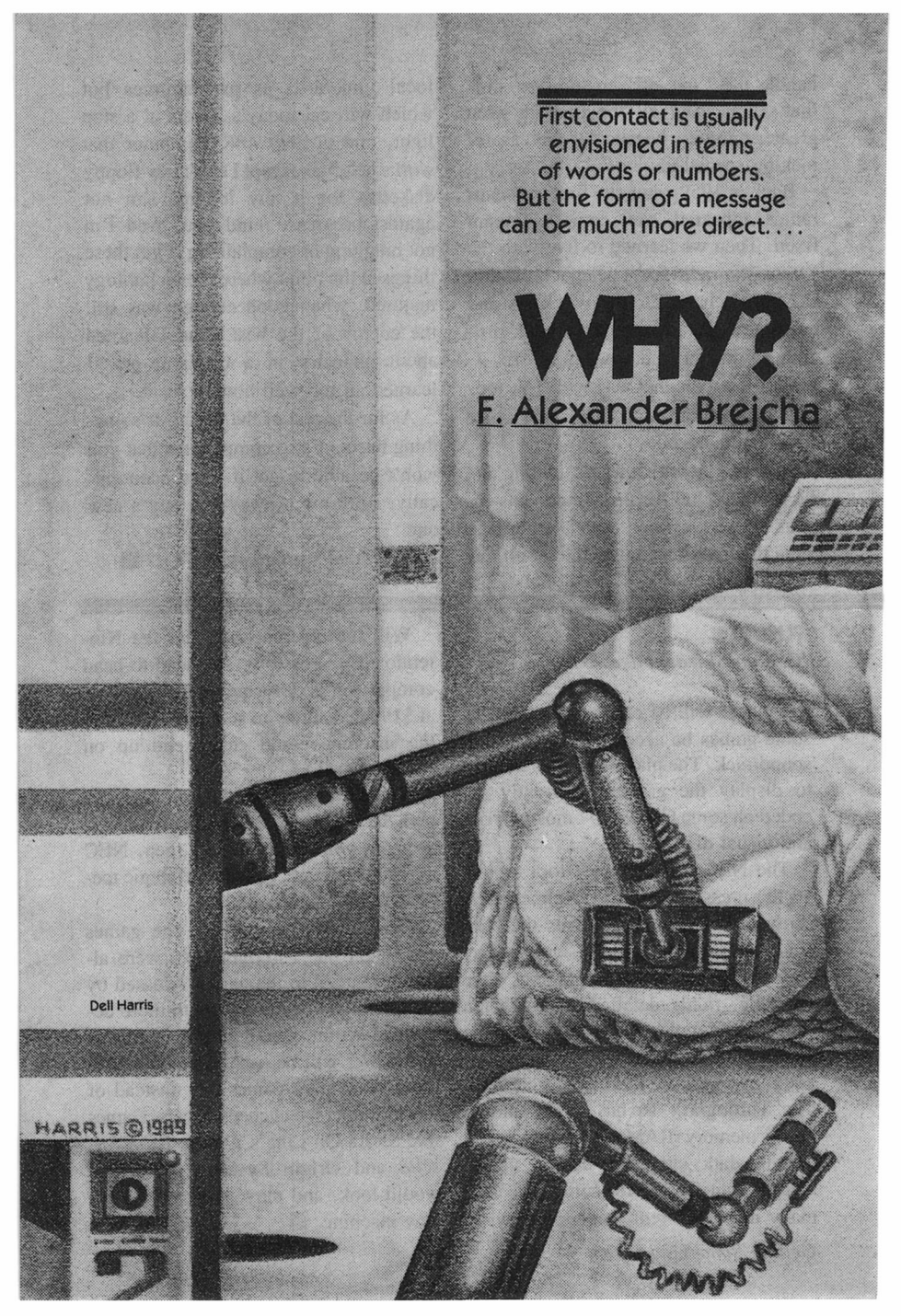
CD player will be released that will let some games be accompanied by a real soundtrack. The player can also be used to display the graphics currently encoded on some CD disks—mostly lyrics and visual displays.

The NEC people didn't fool around at the press show. They immediately showed their machine versus the Nintendo, and—to this viewer's eyes—there was no comparison. The graphics were stunning, richly detailed and with ten times more color capability then the Nintendo. Characters have expressions, and move with the fluidity of a cartoon. The Turbografx 16 has more random access memory (RAM)—the place where graphic data and game info is stored. Games can be more complex, with many more different points of view.

Will the machine supplant the Nintendo NES? Possibly. The head-to-head comparison is devastating. And, priced at $199 and surely to sell at under $150, the machine could easily end up on many wish lists.

Nintendo, meanwhile, will have its own 16 bit machine out sometime next year, as will Sega. But by then, NEC may have already gained a strategic toehold in the lucrative market.

One disappointing fact. The games shown on the Turbografx 16 were almost identical to the games released by Nintendo and Sega, only with more detail and action. One hopes that some of this power will be used to make better, more innovative games . . . instead of just recycling the cliched formats. Games like Sierra On-Line's *The Perils of Rosella* and Origin Systems' *Ultima V* would look, and play, great on NEC's new machine. ■


First contact is usually
envisioned in terms
of words or numbers.
But the form of a message
can be much more direct. . . .
WHY?
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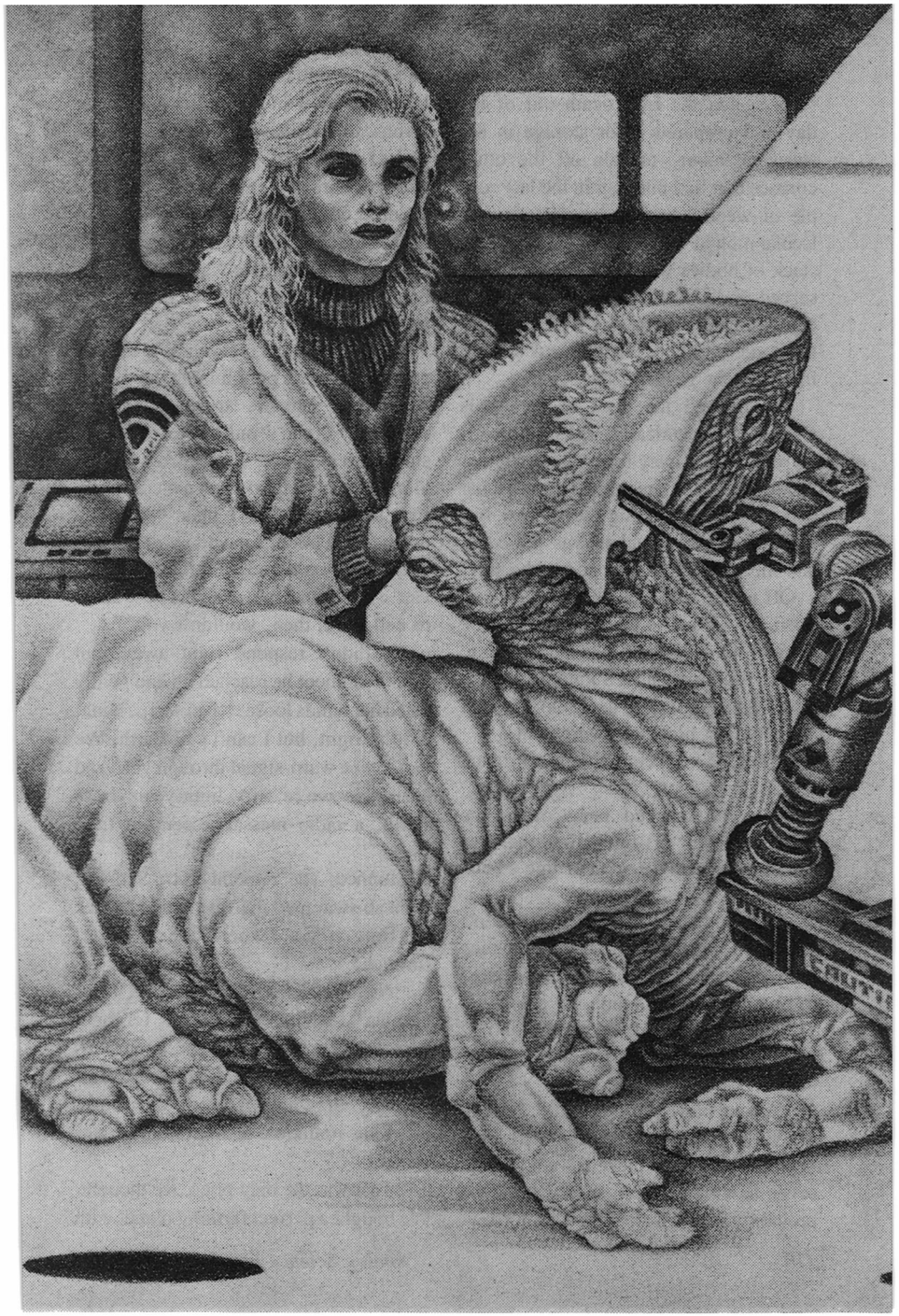


I

Nina sealed the fifth death-suit of the day and prepared it for storage in the stasis chamber—to join all the other corpses that had piled up in the last couple of weeks. In the chamber all molecular motion was stopped; the gruesome stack of bodies would be perfectly preserved and uncontaminated by chemicals until the emergency was over and the bodies could be blessed and worked into the new fields to the south.

She opened the door to the stasis chamber mechanically, eyes automatically skipping away from one particular rack of bodies as she pushed the stretcher part way in, activating the servos. Immediately, the stretcher was pulled in and she stabbed the door control harshly.

Off to one side, she heard a door hiss open and turned to see Marek Janson's gangly figure come in, his face as white as his thinning hair. Sounding angry, her uncle called out to her as he threaded his way past blocking equipment.

"Nina, I've been trying to reach you!"

When he reached her ComSet he pointed to the "off-line" light that was blinking accusingly. "Your line's been busy."

She shrugged. "So fire me. I don't feel like doing this anymore." Her voice was strained. "At this rate we'll have to give up our lease and call Earth—"

"Never! I am not breaking contract just because we can't handle a few bugs!"

"A few bugs? I've got 207 dead in the stasis chamber, including my husband!" Her voice cracked. "And I have seven new bite-victims in sick bay who probably won't make it till tomorrow! How can you talk about having a problem with a few bugs?" She tore off her scrub-cap, releasing a cascade of pale-blonde hair, and stalked towards the Colony Director, her blue eyes icy. "You'd better start thinking about calling Earth, contract or not, or there won't be any colony here on Agra. Just empty barns, buildings and weed-choked fields!"

She grabbed his collar and glared up at him. "I'm the only futzing doctor left here since Tamaris and my husband were killed, and I only have one med-student to help out. The others were all along on that field trip when the Stingers first showed up! If I hadn't been on duty, you wouldn't have any doctors at all. What would you do if I got killed?" Her eyes bored into his. "You'd have to call Earth then, wouldn't you?"

He didn't respond right away, but after a moment he reached up and gently pried her hands loose. "I'm sorry, Nina. You're right, but I can't call Earth. We can't get a warp-signal through yet. And seeing as we're fifty light-years from Earth, a radio message seems a little futile."

Stunned, she remembered. She had been so swamped that she had lost track of time. "So, when can you get through?"

"Next week."

Nina's jaw clenched. "I forgot." Suddenly she was sarcastic as she repeated her uncle's words from their last meeting, drawing herself up in a tense, mocking imitation of Marek's military stance.

"That was the only price, we thought. We bought a perfect farming planet with

almost no axial tilt and so with only mild summers and winters—''

''And in exchange we're cut off from Earth for a month or so every forty years, because of flare activity. Just one month of wearing shielded underwear.'' He tried to make it a joke as he finished, hoping to defuse her frustration some. ''You have to admit, it wasn't a bad deal. No one knew about the Stingers, then.''

For a moment she looked like she was going to slug him, and then her shoulders slumped. ''I know, I'm sorry. It's just getting to me.'' She turned away, her slim hands hanging limply as she stared at the frosted Plasteel window of the stasis chamber.

Marek straightened, reminding himself why he was in the morgue. ''I'm afraid the Stinger victims are going to have to be trusted to your nurses for the moment. Right now, I need Dr. Okanar the medical examiner, not the healer. For something a little more difficult than this.'' His brown eyes darted nervously around the morgue. ''That's why I tried calling you.''

A weary eyebrow rose. ''More problems?''

''Problem, singular. But much worse.'' He turned to the ComSet terminal. ''*Control*. Terminal on, field surveillance record for 0968 hours, 5-37-31. *Command*.'' A view of one of the grain fields appeared on the terminal screen, a full crop swaying in the breeze. ''Watch, this was a few hours ago. Luckily an on-site surveillance camera got this. Actually, not so coincidental.'' He lifted his hand. ''Just watch.''

For several minutes nothing happened, then a shadow came over the field, a shadow that grew in size and deepened as something blocked the sun. On the ground, the rippling grain stalks shivered uncertainly and bowed as if a great weight was pressing on them. A deep pulsing sound came from the speaker, growing louder as a shape began to appear at the top of the screen. It was teasingly vague at first, only a glint of metal visible in the camera's fixed field of view. But before long, the shape descended further and extended half a dozen spindly legs that crushed patches of grain as it settled to the ground. Then, the only sound that remained was the gentle breeze sweeping the camera's microphone.

The surviving grain underneath the visitor straightened uncertainly.

Nina studied it numbly. It was a stubby cylinder, dull metal alternating with gleaming projections of unknown purpose. But it was small! Smaller than a nearby field-shed. She guessed that it was about twenty meters long and about half that high. For a long while nothing happened; it just squatted there, looking almost like part of the landscape.

Nina stared at Marek, unable to speak for a moment.

''Aliens?'' when she finally found her voice.

He nodded. ''More than us! Their ship is still in orbit.'' His eyes were locked on the screen. ''I guess Essence worship will have to be revised a bit now.'' He glanced sideways at the small platinum pendant she wore.

''Why? There's no reason to think we're alone in the universe.'' She shrugged. ''Shape is irrelevant. It's the

Essence that grows and returns within all of us that matters.'' For a moment, she had a reverent look on her face as she fingered the gleaming looped cross that rested between her breasts.

''You *are* a Follower.'' He looked at her, hardly surprised.

''A lot of us are.'' She smiled weakly at him. ''Us kids. After all,'' she nodded at the stasis chamber, ''with *that* waiting for so many of us it's no wonder. It's scary to think about maybe losing over a century and a half of active life, and it's very comforting to believe in an after life. Anything wrong with that? I have to believe, or Toma's gone. Forever!'' Her stomach was churning.

Marek was quick to reply. ''No, not at all.''

She relaxed and focused on the screen again. ''But there has to be more to this. I would think you would be excited, not upset!''

''There is. Watch.''

A section of the small craft's hull swung open silently and dropped to form a ramp, onto which something stepped out. She found herself gripping the sides of the counter so hard that it hurt her fingers as she watched their pressure suit garbed visitor come down the ramp in a strangely bouncing trot. After a brief look around it entered the grain, leaving a wide swatch of wounded stalks that reluctantly straightened behind the strange shape as it carefully made its way to an access road that bordered the field.

Nina studied the alien as it came into plainer view.

''It looks like a fat-legged pony in a space suit!'' Nina exclaimed, remembering her picture books as a child and the funny little riding animals they had on Earth. ''Except that it hardly has any head, and only a short little neck.'' She looked at it more critically as Marek's lips curled in a quick smile that faded immediately.

It was short, maybe 140 centimeters tall. And it had a stocky cylindrical body that was supported by four sturdy and widely spaced legs that ended in large flat feet, or boots, rather. The horse image was further destroyed by the powerful third pair of limbs that extended forward from the underside of the body. The ''arms'' were jointed in two places, and were tipped with large three-fingered hands that looked clumsy to Nina. As for the head, which was enclosed in an opaque helmet, it seemed to be small and narrow, and was perched on a squat flexible neck that turned it around restlessly on its perch towards the front of the body.

As she watched it, it reached up and pulled a small device off a rack mounted on one side of its suit. The alien then held the device out and swung it around in a searching pattern until it fixed on the spying camera that had captured the images Nina and Marek were watching. Briskly, it put the sensor away and trotted towards the camera. As it approached, it seemed to grow larger and larger until only the upper part of its body filled the screen.

For several minutes, the featureless ovoid of the helmet faced the camera and Nina's imagination ran wild trying to picture what might lie under it. Then the being pulled out another device and deliberately and obviously took an air sample, punching buttons precisely to show the camera what it was doing, and

revealing that those clumsy fingers were surprisingly nimble.

Nina was confused. "Why is it doing that?" she asked Marek. "I can't imagine that they didn't test the air before."

Marek looked stricken and in a choked voice told her to wait and watch.

Then, almost like an adult patiently finishing a demonstration for a child, the alien put away the analysis device and tilted its head as if to imagine what lay beyond the cameras. After a moment, it reached up slowly to manipulate some hidden fastener and removed a metal band around the base of its neck, hooking it onto a clip on the front of the suit.

There was a loud hiss and the alien's legs suddenly shivered.

Then the hands reached up to remove the helmet, pulling a sleeve-like section of the suit which covered the neck along with it. The first thing visible was the neck covered by grayish-green and slightly pebbled skin. Then as the suit-sleeve came free, the bizarre head that had been hidden was revealed.

Nina's eyes skipped, looking for reference points on the surprisingly small head.

First she spotted the eyes. Two widely spaced orbs of featureless black that looked out from what she thought was the jaw, until she realized that the being had no mouth in its head. The eyes were placed at the bottom of the head with a heavy bony ridge over them. Rubbery nictitating membranes were flicking across them spastically, their motion echoed by rapidly twitching X-shaped ridges of bright orange and red feathery growths that ran diagonally front to back in each direction on top of the head.

Marek studied the picture alongside her. "I spotted the eyes pretty quickly, but I'll be damned if I can find a mouth, ears, or nose anywhere."

Nina started and then nodded, looking over the being carefully until, with a smile, she saw that the suit had a large bulge on the front with a ridge running to a container strapped to the being's back.

She pointed. "There, see that?" Her fingers traced the ridge. "How much you want to bet that the mouth is on the front of the chest and that that's a feeding tube?"

Marek stared, and then slowly nodded. "No bet. Makes things simple. Why waste time shoving food down a long throat when you can go straight to the stomach?" Then he grinned. "But how about nose and ears?" he challenged her.

She gave him a mock glare and kept looking, focusing on the head again. Then the tip of her tongue ran thoughtfully across her upper lip as she studied the cross-shaped feathery crest on the alien's head. "Those red fronds on the head, see how they're leaning into the wind? Want to bet that they're smelling the air?" Then she noticed something and commanded the computer to back up the recording slightly. "And look, see how that orange section just reacted to the sound of the 'cattle' in the next field? I'll bet that part of the fringe serves as 'ears,' " She looked over at Marek.

"Makes sense." He pointed to the base of the neck. "And that's how it breathes." He was pointing to two rapidly pulsing openings at the base of the neck, almost like gill slits on a fish, that

were right by matching nozzle openings from the suit.

Nina gave him a quick two-finger-up salute and smiled. She couldn't help feeling a small thrill of discovery and leaned forward trying to shake the feeling that the alien was somehow studying her back.

But as the recording continued she saw Marek tense out of the corner of her eye. Before she could ask what was wrong, she found out.

The alien's body suddenly dropped until only the head and neck were visible—its legs must have collapsed! She saw that the lung apertures were rapidly pulsing, and then they suddenly stopped, as did the waving fronds on the head. The neck began wobbling and the membranes flicking across the eyes locked in a protective position and did not move again.

Slowly the head drooped until it leaned over, revealing a similarly sheltered third eye at the bottom of the back of the head. The crowning sensory fringes curled in on themselves and tightened into hard balls that lay close to the skull, changing color to a uniform drab gray.

The alien appeared dead.

Numb, Nina stared as the screen blanked when Marek turned the console off.

"We put a portable stasis field around it until you can examine it." His voice had a peculiar edge to it. "After all, we don't want it getting damaged. It's in a storage shed in Sector 18."

She realized what he had just said. "Until I what?"

"Examine it. After all, you're the medical examiner now. Of course, we know *how* it died." He gave a strange barking laugh. "I mean it came here, made sure we were watching, and then committed suicide. Simple enough, right?" In a strained voice he questioned himself. "I mean, it couldn't have been a mistake."

She reached for his arm, icily clamping down on her own churning thoughts. "It's done with. Now we have to deal with it and find out why it killed itself. I'll do an autopsy to try to get some answers." She squeezed Marek's arm lightly. "You know, this has me a little shaky and I could sure use some advice on how we should best handle it."

She studied him and was pleased to see him respond. After a moment he smiled at her, a secret smile that let her know that he knew full well what she was doing and that he appreciated it.

"Like I said." He coughed. "The first thing we have to do is to figure out what happened." He pulled out a Stim-Tab and popped it in his mouth absently, sucking on it as he considered for a moment. "We know partly how it died. Obviously it couldn't breathe our atmosphere, and we know that it exposed itself deliberately. And that it meant for us to know that! What we don't know is, why?" He looked frustrated as he studied the frozen image of the bizarre visitor.

Then he turned to Nina, brightening. "Last week when Danel Wryer killed himself, making it look like an accident, you realized something was wrong and you did something you called a psychological autopsy?" She nodded. "Can you try to do the same with this . . . being?"

She looked doubtful. "I don't know.

With Wryer I could piece together reasons, what with his wife dying in a Stinger attack. But here? I don't know anything about it!''

''I know you won't have much to go on, but please try. We need some schematic of what we're up against, since we can't call Earth to ask for help.''

''Yes. Inconvenient, isn't it?'' Her investigative instincts were suddenly prodding her.

''What do you mean?''

''Just that these beings are obviously ahead of us technologically. Look at that landing craft. But don't you think that it's a little coincidental that they contact us just as we're cut off from Earth?''

Marek frowned. ''You're right, they'd have to know.'' He scratched his chin idly. ''So if this is all deliberate—''

''Why?'' She finished. ''That's how it all matures. Why, why, why?'' She clenched her fists. ''We're really in the barn without boots on in this.''

She squared her shoulders. ''Well, we'd better get started, hadn't we?'' Under her breath, she muttered to herself as she turned away from Marek. *''It's not bad enough that I have to deal with alien insects killing almost 10 percent of our colony, but now I have to be sympathetic to something else alien and try to figure out why it killed itself!''*

Behind her Marek looked at her curiously, only half-hearing her words. His mouth opened as if to say something, but then he shut it and waited quietly.

Nina stood stiffly in front of the lab console's display, eyes unfocused for a long moment, and then blinked with a sigh and turned back to Marek.

''I'm sorry. Can you have the body brought here? Make sure it's kept in a stasis field though. First I want to see about getting an atmosphere sample out of its air supply and then set up a chamber with its native atmosphere. I'll work in a pressure suit.'' She paced restlessly. ''I want to find out a bit more about it, without cutting it up. Yet.''

He looked confused.

''I want to be sure it's dead, for one thing!''

Marek blanched. ''It might be alive?''

She spread her hands. ''It's doubtful, since if it was, the stasis probably killed it. But anything is possible. There are a number of organisms on Earth that can survive unbelievable environmental extremes through various mechanisms. Look at the Stingers, here on Agra.'' An angry shudder ran through her as she swung towards the window of the stasis chamber. She planted her palms flat against it and peered in at the vague shapes behind the panel, her slender body a rigid exclamation mark of anger.

''We didn't even know they were here! After over thirty years, we find out that an occasional solar pulse that's a little inconvenient for us stimulates the hatching of insect eggs that develop into an army of killing machines, after lying dormant for forty years!''

She leaned forward to rest her forehead against the window's cool surface and closed her eyes a moment. Then she straightened reluctantly and turned back to Marek.

''The only problem is that we don't know what finally stops them. Just that they can't last forever or they would have been here when Survey explored Agra before we bought the contract.'' She shrugged. ''Probably they just die, after laying eggs for the next genera-

tion.'' Her hands curled briefly. ''Alien bugs, alien beings . . . sometimes I wish my parents had stayed on Earth instead of taking stock in Agra! If only they'd known about the Stingers—''

Marek came over and put a hand on her shoulder. ''No one knew, Nina.'' He sighed. ''But we'll find a way to deal with them. We've invested over thirty Earth-years in this planet and we'll manage!'' His face was stubbornly determined. ''We were lucky enough that Agra had native animals we can ranch like cattle, and that are edible. And now that we'll be keeping them from overbreeding, the Stingers won't be needed anymore, and we can see about wiping them out! After all, we don't need competition as natural enemies.'' He gave her an uncertain smile, trying to lighten her mood. ''But fighting nature isn't easy. We'll beat them, though. Eventually. And in another thirty years or so when the settlers and developers come, they'll find a paradise and we'll be able to retire in leisure.'' Carefully he turned her to face him. ''Are you OK?''

She nodded and let him hug her, burying her face in his shoulder briefly, forgetting herself a moment and enjoying the little-girl comfort of Uncle Marek's arms.

He glanced down at her fondly. ''I'm sorry I came down here with static, but I was scared, believe it or not.''

Seeing his concerned look, she put a smile on her face and straightened, slipping out of his embrace. ''I'll be fine.'' She took refuge in her professional persona again and briskly considered what to do.

''Before anything, I have to finish the report on . . .'' For a horrible moment she couldn't think of the latest casualty's name. ''Mikalson, so I'd appreciate it if you could arrange for the body of the alien to be brought here. Then, get in touch with Hardware and reserve some insulated servos for me and have the Medicine scanner moved over here.'' She counted off on her fingers. ''Also a complete 'scope setup, a full bio-test unit and . . .'' Her foot tapped restlessly. ''Um . . . I'll tell you what else when I think of it. But notify Construction that I'll need a pressure chamber hooked up to the main stasis generator so I can tap in and release the portable stasis gradually—''

''And you need it yesterday.'' Marek laughed, thinking Nina was her usual incandescent self again. ''But why all that from Medicine? Don't you have units here?'' He asked.

''Yes and no.'' She wrinkled her nose. ''These are all calibrated based on human tolerances and are set assuming I'm dealing with a corpse. The MedLab units are more flexible and, frankly, better.'' She shrugged. ''No criticism. I realize living patients were more of a budget priority. I'm going to have a hell of a time, though! I can't expect any help from MIDAS.''

Her mouth curled bitterly as she spelled out the acronym. ''The Medical Information and Diagnostic Assistant Service. That's fine, except that it's only programmed for humans and the Agran 'cattle.' It's not hooked into any Library modules I need.''

Marek was quick to defend it. ''We couldn't afford any esoteric modules, you know that. In order to be high bidder, we were only able to afford Infor-

mation Modules that would be useful to a start-up farming colony.'' He shrugged. ''Whatever you need, that we have, you'll get. I'll see to it myself, but I'm just as stuck as you are. I'm trying to coordinate an examination of the landing craft and I wish like space I had a hundred more Library modules myself. But I don't. I'm sorry.''

Nina nodded. ''I know. Don't mind me. I'll do what I can. But, when you're done, I want a look at your data, too. I'll need to learn as much as possible about these. . . .'' She pursed her lips thoughtfully, remembering back to school when Marek had been teaching Earth Mythology. ''Centaurs!'' she exclaimed. ''That's what they remind me of. After all, what else has a horse-like body, four legs, two arms and a head sticking up near the front?''

But before he could answer, she shoved him towards the door, smiling weakly. ''And you thought I didn't pay attention at your lectures! But now, go.'' Then she waved him out of the morgue, turning to lean against the door with a heavy sigh as it hissed shut behind him.

Alone again, she shut her eyes, fists clenching so tightly that her nails drew a faint trace of blood from her palms as she tried to stop the tears from escaping from under her eyelids.

For almost ten minutes she was motionless, body shaking slightly from time to time with silent sobs. Being alone brought back, too clearly, the memory of her husband. She saw him, felt his arms around her and remembered how they would share everything, laugh at things together, and how they would sit for hours planning how they were going to arrange things when it came time for them to meet their child-quota.

She suddenly felt the weight of the pendant on her chest and reached up to hold it, a faint trace of blood smearing the gleaming metal. ''You're with me, darling! You must be. I *believe!*'' Her voice echoed in the large room, startling her, and her eyes snapped open to confront her lab terminal where her mind painted the slumped figure of the alien on the blank screen.

Her mind stirred resentfully. She was alone and stuck with something that called for a team of scientists, not a back planet hypo-gasser. It wasn't fair, but it was her job, and blast it, she was going to do it!

She straightened and wiped her eyes, grateful no one had seen her, and went over to her desk to call up the autopsy report on Mikalson. Quickly she dictated in the by now monotonously familiar findings. The only differences from case to case were the location of the bite-marks, and which organs had been the first to be affected by the corrosive Stinger venom.

Then that was done and it was time to face a different type of alien.

II

The body of the Centaur rested on a raised platform in the temporary pressure chamber that had been erected next to the morgue building. A pressure suit designed to withstand the dense air around the alien waited for her, but before entering the chamber, she wanted to do a remote exam. Activating the Autopsy Monitor, she directed the servos to gradually turn off the stasis from

the portable unit, the main generators maintaining a field in the chamber that she had more control over.

Then, once the servos had removed all the portable equipment, she directed them to strip the alien of its suit. That was tricky, requiring several units, but, finally, the Centaur lay naked on the platform. The pebbled skin had lost some of the luster she remembered from before, and now it looked parched and fragile.

For a while she just stared, fascinated by the revealed being. Remembering her search for a mouth, she examined the body, and sure enough, it was just where she had suspected.

"Autopsy notes on subject 208, addendum, physical exam." She began her recording. "Subject's mouth is located frontally in what would correspond to mid-sternum on a human being. The jaws are heavily muscled but effectively limited to lateral motion, with minimal vertical range. The teeth are consistent with a herbivore's." She moved a camera servo closer.

"The mouth's interior," she directed utility servos to pry the jaws open carefully, noting an easing of a condition similar to human rigor mortis, "is equipped with flexible retractable lips and a long, seemingly prehensile tongue, allowing the use of a manually operated feeding tube connected to a tank carried dorsally."

Curiosity satisfied, she readied the scanners which hovered over the body, their rays penetrating the Centaur to the receiving units underneath. View by view she scanned the body as the servos turned it, allowing her to build a three-dimensional image in the computer as she tried to make sense out of what she was seeing.

"Based on scan-data," she dictated, "there remains no doubt that the subject is deceased. The sensory fringes that presumably serve as olfactory and auditory sensors have begun decomposing as have certain internal organs. Decay has been fairly extensive in these organs, despite rapid encasement in a stasis field, and tests will be initiated to determine whether Agra's atmosphere is responsible for the rapid decay. Note, elapsed exposure to atmosphere before stasis encasement was limited to," she checked Marek's notes, "approximately twenty minutes."

She continued scanning. "Subject is from a high-gravity world," she studied the computer projection, "of between 1.7 and 1.9 E-Norm gravity as hypothesized from the dense native atmosphere and the structure of the space suit. Bone structure analysis confirms this estimate, as does the degree and density of the alien's musculature."

The quadrupedal body now made sense, as did the low-profile head with only sensory organs. The brain, as she'd guessed, was located in the core of the body, with an armored nerve column leading to the head through the center of the neck.

The next major finding, further confirming the gravity estimate, was the analysis of the circulatory system. "The subject has a two-heart circulatory system, with each heart adding more pressure to the being's blood, in order that it carry enough nutrients and oxygen through the body. Of interest is the fact that the subject race's metabolism is not radically different from Human. Car-

bon-based, and with an oxygen metabolism, the Centaurs's basic biochemistry is similar. But there are elements involved and present in the body whose purpose is unclear at this time, needing further analysis from Earth laboratories."

The computer had worked out models and projections for her, but even after studying them until her head was swimming, she was still lost. All she was sure of was that they played a role in maintaining chemical reactions under the pressure and type of atmosphere that the Centaurs lived in.

She continued to note her findings one by one as she progressed down the length of the body until she made an interesting discovery that suddenly made the alien seem less frightening. "The subject is definitely male and of a bisexual species as there are no provisions for child bearing."

That one simple finding came crashing down on her, and suddenly she couldn't fear or hate the Centaur's people anymore. Now she *wanted* to find out why it had killed itself.

Then she was done with her remote examination.

Fighting down a surge of childish excitement, she started to slip on her pressure suit so she could go in for a close-up look at the body, but she was interrupted by loud voices from outside.

Impatient, but curious, she slipped back out of the suit and went to open the door, only to find herself facing a mob of off-duty colonists angrily trying to push past Marek's guards. She noticed that they were almost exclusively original settlers; only a few of the second generation were around, and no Followers.

She slipped out past the guards and got up on a fertilizer pod that lay on the ground, calling out to them until they finally quieted down.

"What is going on?" she asked, queasily sure that she knew.

She directed her question to a tall, black-haired man she recognized as Wil Richson, a Founder-Rancher who seemed to be the instigator. The powerfully built ninety-year-old had apparently been made spokesman since the others quieted down when he answered.

"We want to know why you're wasting our resources investigating an *alien*." He spat with distaste. "We've had enough problems with things alien already. We don't need to get stuck trying to explain to more of them how come we're playing around with one of their dead bodies. How do we know that they're not as unbalanced as the one you have in there?" There was a rumbling of agreement from the others. "What if they get the idea that it's our fault?" An ugly expression came over his face. "In fact, what if they're doing it! It's a rashin' coincidence, isn't it? Them showing up right after we start getting attacked by Stingers!"

The crowd fell silent considering the suggestion, and Nina had to force down a nagging twinge of doubt about just that. She had been trying to deny just that possibility and still didn't want to believe it, but it was a seductively plausible idea and she had to stop Richson from spreading it!

An expectant hush fell over the crowd as they faced her, waiting for an answer. But for a ridiculous moment, all she

could think of was of how strong the pungent scent of the "cattle" was, that drifted towards her from the stockyard at the end of the building complex. It was the same smell that she could sense from Richson and the other stock-folk facing her. Even the farmers smelled of it a little.

Helplessly, she sneezed.

For some reason, that triggered her anger and she stepped off the fertilizer pod and advanced on him, her head barely reaching his shoulder. But he stepped back without realizing it as she laid into him.

"Don't you realize what this means? This is our first encounter with an alien race! How we handle this is critical. Once we can call Earth—"

"Yes, once we call Earth," he interrupted, recovering from his involuntary retreat, "they'll be sure to ask how we are coming with fulfilling our contract." He glared at her meaningfully. "We're not interested in the 'implications of this discovery,' as the good Dr. Janson put it. We're not scientists. We're farmers, ranchers, and developers, and we're here because we mortgaged ourselves to the limit to buy the development contract for Agra, and if we don't have this planet developed and ready for the construction crews and the settlers following them, then we're in default and we'll be stuck here in isolation until the Colonial Board can find another bunch of vacuum-heads to take on the contract. And then we'll be indentured servants for the next three generations!"

A wordless wave of support swept past him and she nodded, carefully phrasing her answer. "But what if they can help us? What if they can show us how to deal with the Stingers? Poison doesn't work, they only go after living targets. Repellents, audio barriers, nothing we've tried stops them." She could feel the wave of helpless fury that greeted that statement. "We're stuck here. All of a sudden this Centaur shows up and does this, on purpose." She used her term for the aliens deliberately, trying to personalize them as something less threatening. "There has to be a reason for *him* to show up like this. That's right. *He* did this, and we have to find out why.

"And I can't believe they don't have more efficient ways of wiping us out if that's what they're after!" She laughed derisively, even as she hoped she was right. The Stingers could be an ingeniously devious way of wiping out the colony, but for some reason she didn't believe that.

She looked the other colonists in the eye, one by one, trying to get personal contact with them, to calm them. "If we can just figure out why they are here, and make contact, maybe they can help us handle the Stingers." She held her hands out imploringly. "But you have to help me by letting me work on this in peace."

It was working. The crowd was scattering. Grumbling, but she heard grudging agreement from most of them.

But Richson looked doubtful and opened his mouth to argue her point when a blaring siren rang out and everyone's BeltLinks crackled to life with the same hurried warning.

"Everyone to cover! Large Stinger swarm approaching from southwest.

Two minutes, tops. Move it! They look mad."

Richson's mouth snapped shut, but she saw he wasn't finished as he turned and grabbed Jenna Smit's little boy, standing next to him, and bolted for the building next-door, urging several other colonists along with curses.

She ducked into the control room of the pressure chamber on the heels of several others who had been closer to it than to the other buildings, and slapped the seal on the door before moving over to a window to look anxiously out over the street.

It was clear, everyone was under cover.

Craning her neck, she looked to the side and felt a chill come over her as she saw a dark stain on the sky getting closer. The spotter had been right, it was a large swarm.

She knew they weren't intelligent, but they seemed to have an active dislike for the human invaders to their planet because even though they still attacked and killed a lot of the "cattle," they seemed to take a perverse delight in seeking out and stinging humans whenever possible. Sometimes individual Stingers even ventured away from a swarm to find and attack an unprotected colonist.

She kept staring in morbid fascination, unaware that her hands were curling into fists, knuckles white with anger. Behind her she heard a soft sobbing and turned to see Sara Jenner holding a little girl Nina didn't recognize, trying to comfort her.

"Your mother is fine, she got away. She's in the other building. There's no one out there." Over and over, Sara reassured the little girl who was clinging to her tunic.

Suddenly there was a bang and she felt the Plasteel under her hand shiver and jerked away to see the smeared remains of a Stinger on the window. Another five hovered just outside. She knew it was nonsense, but she imagined that she could feel their malevolent stares just daring her to go outside or to open the door a crack.

They were large, about the size of a man's closed fist, double sets of wings a blur of motion and eight hairy legs curled up under them. The vivid yellow fur of their bodies, striped with orange and red, glowed menacingly as wide pincer jaws with venom-tipped stingers restlessly snapped open and shut, jaws which could rip open a person's skin and dig deep into flesh to release a nourishing flow of blood.

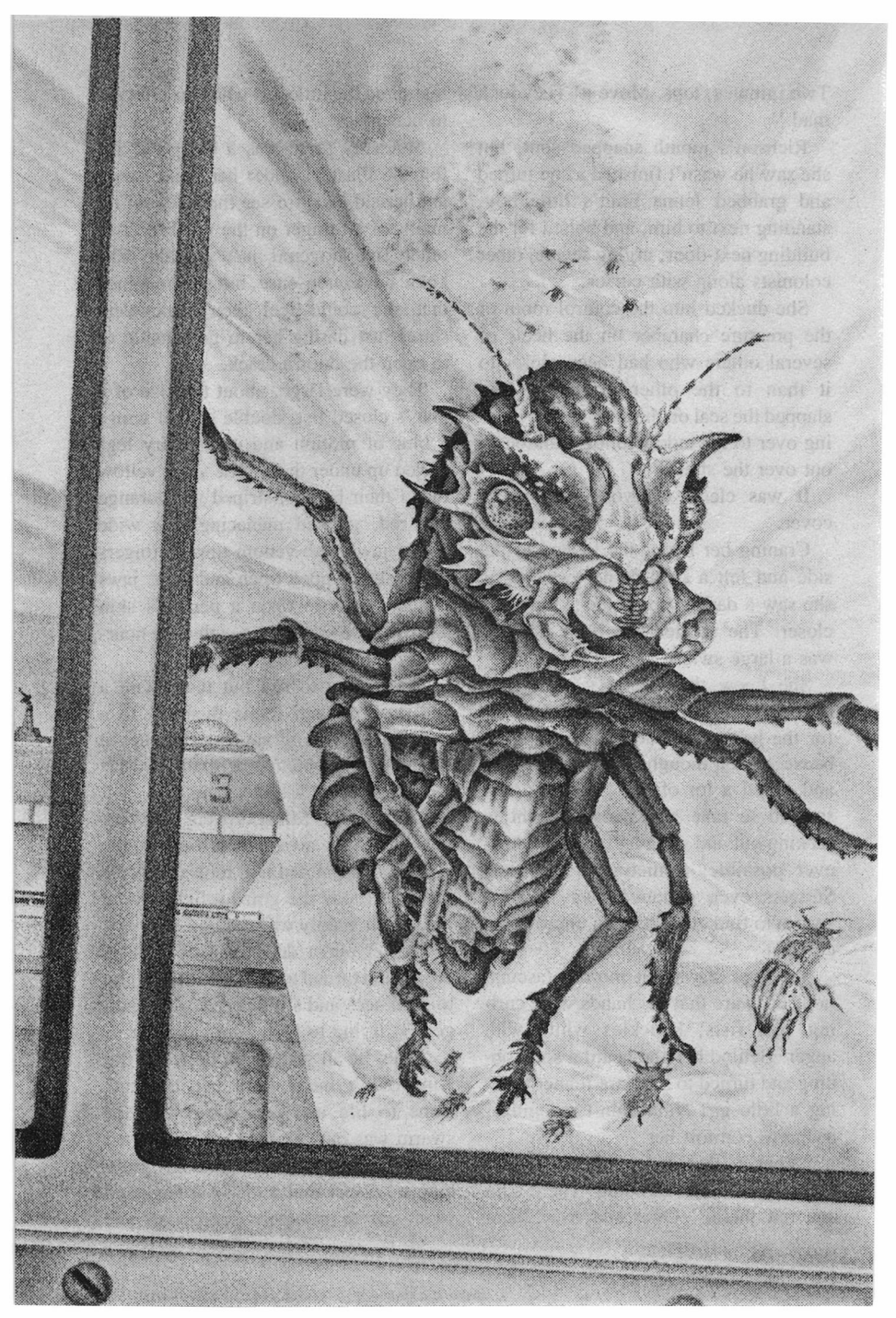
She longed to run out there with a soil-sterilizer and flame them all to a crisp—that worked very nicely, they'd found. The problem was that it wasn't too practical on a large scale.

Luckily, the Stingers were not very patient. Seeing no available victims, the swarm reassembled and took off to the north, towards the grazing fields and a nice fresh supply of food.

She let out a deep rush of pent-up breath and turned to the little girl, falling to her knees and stroking the girl's hair gently, trying to help Sara calm her.

"They're all gone now, honey." But Nina didn't move until her BeltLink came to life and announced that the swarm was out of range.

She rose and went to the door, grabbing a scraper and a disposal bag, and went out to savagely scrape off the



squashed remains of the Stinger that had tried to smash through the Plasteel. The smell was a nauseating mix of rotten meat and sulphuric acid, and she concentrated on shoving the pieces into the bag as quickly as possible before she tied it shut so tightly that she nearly ripped it. Then she grabbed a sonic cleanser and ran it over the window, over and over, removing any possible trace of the insect.

A hand came down on her shoulder and she jerked away and spun to confront a concerned Marek.

"I'm OK!" she insisted. "I just wanted to get it clean, that's all."

He didn't say anything, but just nodded and left her.

For a moment she stood there, hands at her sides with the sonic cleanser still humming, shoulders slumped. Her eyes grew briefly moist as she glanced over at the morgue. Then she straightened, fingering her pendant, and clicked off the cleanser as she dumped the bag in the nearest DizpozAll and made her way back inside.

As she stood holding her pressure suit, she thought about what she had told the others before the attack and realized that it didn't sound so stupid after all. With a new determination she climbed into the suit, grabbed the equipment she needed, and cycled herself through into the chamber with the waiting alien body.

For a long moment she stood over the Centaur, almost afraid to touch it, even though she would still be shielded by her suit. Lying there on the table, the Centaur looked so . . . lifeless wasn't the word, after all, it was dead. But limp and drained.

Mankind's first contact with an alien race was something she had often thought about, but it had always been a vision full of drama and ceremony. Something thrilling and momentous.

To have it be like this was not just disappointing, but . . . tragic.

"I'm sorry." She couldn't help saying as she picked up a laser probe. "I wish I knew why you did what you did." Shaking her head sadly, she started to make the initial incisions to open the waiting body, referring to the scan-charts to guide her exploration. There wasn't that much that an actual surgical autopsy would show that the scanners hadn't already picked up, and in better detail. But there were still subtle signs that were best examined firsthand. And the one area of internal decay she had found was inconsistent, and she wanted to check it further.

Besides, she needed specimens, fluid samples and such. Then the body would be locked in stasis until Earth could be contacted to send a Warp-ship to pick it up. She would probably be reprimanded for disturbing the body, but she had to learn as much as possible.

Moving with careful precision she laid open the skin and began her examination.

A gentle tap on the chamber-window gradually penetrated as she studied the scanner-plates, comparing them to what she was actually uncovering as she opened up the Centaur. She ignored it. She was on to something, she could feel it. But off to the side the tapping grew more insistent and she looked up im-

patiently to see Marek standing there waving a pocket-terminal. Sighing, she snapped the exam-table to full stasis and then cycled herself through the airlock and Scrubwash before stripping off her suit and joining him.

"*What is it?*" She regretted her tone instantly. "I'm sorry, it's just that I'm really in the middle of things here. I may have found something. . . . " Her mouth snapped shut. "Well, I want to check some things out first. I'll let you know."

She grabbed a tube of Shayberry juice out of the specimen cooler, smiling at Marek's momentary look of panic as she downed half of it, relishing the slightly bitter strawberry-lemon sparkle of the green liquid.

"I'm sorry, I'm just getting airy. I've been up for," She glanced at her wrist. "Over twenty hours? No wonder I'm sore! I guess I should thank you for interrupting. What is it?" She dropped into a lounger by one wall and sprawled gratefully.

Marek handed over the terminal.

"Our findings from the landing craft and the personal items you found in that pouch on its suit. Preliminary, of course. But I thought you might want to see them."

"Sure." She sat up, no longer tired and grabbed the terminal. "What channel?"

"Ninety-seven, but before you activate your terminal," he stopped her, "we did find one thing that might interest you."

"Well?" She smiled at his expression.

"The terminal you found gave us one piece." He looked briefly frustrated. "At least. They see by infrared to a large extent. The terminal display was almost invisible, until we tried viewing it with I.R. sensors."

"The eyes!" She exclaimed. "That explains why they looked so funny. Anything else?"

"Not yet, but let me show you the landing craft."

"Right." She turned and activated the terminal. On the large wall screen she saw the landing craft appear in close-up as the recorder approached and entered. Inside, the ship was totally empty, but in a significant way. Where some sort of furniture or machinery had apparently been located, nothing remained except a low bed-like platform, about two meters square. It looked jarringly out of place, having been hastily installed from the looks of the scarred flooring under it. And against one wall, a large bulge of shiny metal swelled, in marked contrast to the softly padded remainder of the interior.

Nina smiled. "Frustrating, wasn't it?" From Marek's glower, she knew she was right. "I'll bet you didn't find a thing."

"Nothing. We didn't want to damage anything." He shrugged. "Oh, we have samples of the padding and the metal, no surprises there, except for the lattice pattern of the metal—"

"Indicating that it was cast under high-gravity?" she interrupted smugly.

Marek's eyes widened. "How did you know?"

She explained her findings about the probable type of planet the Centaurs came from. She also told him of their bisexuality and the gender of their visitor, but refrained from telling him the

rest. She wanted to recheck it when she wasn't so groggy. Then, after yawning to his face half a dozen times, she held up a hand and stopped. Marek wasn't happy, but she ignored his look.

"Give me a few hours to sleep," she was adamant, "a few hours to finish my examination, and then I'll fill you in on what else I know. And what I guess."

She woke in a cold sweat five hours later, still in the grips of a chilling nightmare, but ignoring it for the unsettling reality of what Marek's report implied. She had been too tired to realize it when she had seen it, but she had to be right. It was the only thing that made sense. And it might explain the inconsistency she had been on the track of.

She jumped in the Fresher and after being scrubbed almost raw, and thoroughly awake, she threw on a fresh suit and headed back to the pressure chamber.

Once she knew what to look for, it didn't take long and she confirmed her suspicions readily by running some simulations.

As she studied the results, she stared at the eviscerated remains of the Centaur. "I don't know your name or anything about you," her voice trembled, "but what you did . . . are doing, has to be the bravest thing I've ever known."

Gently, she cleaned the body up and tried to close everything up as much as possible so the Centaur could at least have some dignity in death.

"Maybe your people are merely supremely logical and take the obvious sensible course of action, but somehow I don't believe that." She shook her head and covered the body before backing up and turning the stasis up full force again.

Then she picked up a small item she had removed from a packet of personal effects she had taken off the suit and sent to Marek.

It was a small water-worn rock, a common granite or some such. And on it was scratched a stylized design resembling a pair of Centaurs, one slightly smaller than the other. Remembering what Marek had told her, she put on I.R. goggles and looked at it again.

Suddenly she was looking at a marvelously intricate and detailed portrait of the pair, surrounded by a suggested background of plants. She held it carefully, a look of wonder on her face. "Is this your wife, or girlfriend? Or just a friend?" The little rock spoke volumes about these beings. Beings who were sentimental, artistic . . . human, for all that they were cloaked in alien flesh and from a different world.

She realized that just that was no guarantee that they were nice people, but when it was combined with the rest of what she had learned, she wasn't worried.

And it would make it easier to do what she had to, so she put the rock down and called Marek. She needed to fill him in on the rest of her findings, and to ask him to call a General Assembly to bring the rest of the colony up to date, as well.

When Marek's face appeared on the monitor, his voice was instantly concerned as he saw her.

"Nina, what's wrong?"

She told him about the rock she had found, apologizing for not telling him

as she started mentioning the implications. But he realized them as soon as he saw the etched stone, admiring it under the infrared light as she had. For a while he sat deep in thought. Then he leaned forward. "There's more, isn't there?"

She nodded and told him the rest.

When she finished he sat back, chewing on his lower lip. "You're right. It's the only thing that makes sense. Can you do it?"

For a moment she sat silently, appreciating his respect for her beliefs, but then she nodded without meeting his eyes.

"I have to! Like you said, it makes sense, and it might give us the answer we need."

"What about the other Followers?"

"They might be a problem, which is why I'm doing it the way I am." Inside, she was trying to convince herself that she had no choice.

III

A few hours later she sat in front of her terminal, having self-consciously changed and put up her hair, and she was ready.

Marek was Agra's "Director" only in executing the contract. For all other decisions Agra remained an electronic democracy like Earth had finally become, and while she technically had the authority to do what she had planned, it was borderline and she wanted the support of the colony. That meant calling for a Vote.

The Witness Technician greeted her. "You're popular tonight, Doctor. Ninety-three percent of the voters are logged on. A couple of hundred of them even got together in the Assembly Hall." He gave her a reassuring grin. "It'll be easier to get the sixty-six percent majority with this many voting, whatever you've got planned." He didn't know either, of course, and his face showed that he was dying to ask.

The screen in front of her showed the large group of expectant colonists in the Hall, and as her time-slot got closer, her fingers drummed restlessly on the arm of her chair. As she sat there, she heard the door hiss open and looked over to see Marek come sidling in quietly, out of the camera's angle of view. He gave her a quick two-finger salute and winked as she read his lips, *I'm with you all the way!*

The tech raised his hand to signal it was almost time and she cleared her throat.

Then his hand dropped and a red light came on over the camera that faced her.

As she was introduced, she got up and moved aside to give the camera a clear view of the display screen behind her. When the tech was done and the camera focused on her, she muttered a subvocal command and a picture of the Centaur, naked and lying on the table in the pressure chamber, appeared.

She saw those in the Hall recoil and she became mad, forgetting her self-consciousness.

"What is so rashing terrible about him?" She repeated her strategy from that morning when she had confronted the mob. "That's right. He's a him. The Centaurs are bisexual, just like us. They're a little different in design, but he's definitely a male." It wasn't very hard to put on a scornful look.

"And you're looking at a being who

volunteered to die a horrible death poisoned by our atmosphere rather than die quietly at home. You see, he was dying anyway.'' She paused for effect. ''That's right. He was dying. I'm not sure exactly how long he would have had, but there was extensive damage to one of his hearts, something like a cancer.''

She went on to explain about their physiology, having seen confusion when she mentioned ''hearts.'' Then she went on to dramatically describe the Centaurs's world, as it might appear —improvising liberally. She asked them to imagine a world where a stumble could kill you and where the very air isolated you and made it difficult to evolve and develop civilization. And where it was perpetually murky and dark so that you had to evolve different senses, just to see. She tried to weave a portrait so vivid that they would be forced to feel that the Centaurs were familiar and a race to be respected.

''And he came here, terminally ill, and gave his life to help contact us! An alien race, to him. But we're not that different, really.'' To strengthen her point she pulled out the rock-etching, hoping her guess was right, or at least in the right direction. She held it up, directing the camera to focus on it and to scan to reveal the full design.

''This is something I found in a pouch he carried. A family portrait probably. Maybe a picture of his mate, or 'girlfriend,' or maybe just a friend. Whoever. How can you be afraid of someone who keeps something like this with him when he knows he's about to die?'' She backed the camera off and looked straight into it.

''And now I need your help. I need you to keep an open mind and to try to understand what I am saying without letting your emotions get in the way.

''He,'' she nodded in the direction of the Centaur, ''came here, offering his body that we might understand his people better. And it's working. I've learned a lot, and once Earth gets in on it, they'll be able to analyze and hopefully understand the computer terminal that he carried. Then we'll know an incredible amount about them.'' She stopped a moment.

''But, they won't know anything much about us. They're putting themselves at a disadvantage to contact us.

''Can we do less?''

Now some of them caught on and a murmur of protests began swelling from the Hall on her screen. A number of the elected Representatives' call lights began flashing for attention. She ignored them. A risk, but she couldn't let them start protesting yet.

''I intend to show my trust and surrender my husband's body to them. I ask you to consider, why is the landing craft still here? And why does it have a low platform waiting that was obviously installed for us? And, why are the controls safely sealed away?'' She cocked an eyebrow at them, and then answered herself. ''It's simple, they want a sample in return so that they can study us. When we're ready, the ship is obviously intended to return to the mothership in orbit.'' *Never show doubt,* she told herself.

In the Hall she saw Followers jump to their feet in protest at the sacrilege she was proposing. Followers, mainly, but also a few older colonists, undoubtedly worried about her proposal giving

the Centaurs a tactical advantage. She sighed and tried to keep calm. Ironically, a lot of the Founders, like Richson, were probably on her side now. It was logical: A body was just a body. But her feelings were aligned with the Followers.

She simply sat back and waited for the noise to die down, ignoring the insistent flashing of the Representatives' lights. When the Assembly Hall began to quiet down she sat up. "If you're quite finished?"

She shook her head. "I don't understand why you're so upset. I'm sending my husband's body!"

Then, as soon as she saw she had their attention, she uttered a command and a picture of the landing craft's interior appeared on the screen behind her. "I'm afraid there's more, and I ask you *please,* to restrain yourself until I'm finished."

Her jaw was firmly set as she faced the camera. "Notice the width of the platform where they expect us to leave a body of our own?" *Or a volunteer, if we have one,* she added mentally. But no reason to mention that if they hadn't thought of it. "It's much wider than necessary to hold one body." She paused. "I suggest that it hold one body, dead by Stinger attack, and one body dead from other causes."

Again, the younger voters in the Hall went wild, but this time she couldn't take it. She boosted her microphone volume and blasted them.

"SILENCE!" There was immediate silence, and shocked expressions. Off to the side Marek was smiling, shaking his head.

But there had been less of a protest this time. "There is one such body." She told them. "I'm not asking for volunteers. But I would like Colony approval because there are no surviving relatives. I'm talking about Danel Wryer, who killed himself after his wife was killed by the Stingers. His body is still in stasis.

"I want to send both bodies so that the Centaurs have one killed by a Stinger, and one who was not. We also have to include an actual Stinger so that the Centaurs have enough to work with. And to be sure they understand our problem." She added. "Just in case I'm wrong and they don't already know.

"Hopefully they'll be able to distinguish Wryer's suicide from the Stinger-death, and it will give them an uncontaminated body to investigate. That they might need."

On the screen she studied those faces she could see clearly, planning her next words.

"I believe," she held up her own pendant, "as the rest of you, that when one of our own is returned to the soil, it's not just a matter of their bodies nourishing the ground, but the Essence of their being that remains and returns to be born again as a continuing force in the life of our Colony. That's the tragedy of all the dead stored in the stasis-chamber until we can properly bury them." She paused as dozens of hands sketched a brief and instinctive gesture of blessing, and then went on.

"But I ask you: Why do you fight me? Try to look on this from a wider perspective." She leaned forward, focusing intently on the unwinking eye of the camera.

"Let's face it, their removal isn't

going to make much of a difference in terms of actual recycled matter. And why does it have to mean a spiritual loss? Think of it as their Essences returning, not just to this planet, this little isolated colony, but imagine all Essences returning to a universal pool of energy. Maybe shared by other races? Imagine it!'' Her eyes glowed as she felt herself connecting to all the other colonists. ''Imagine it binding us all into a unity of life throughout the universe. No matter where one of us dies or where we may be ourselves, they would always be with us. A part of us. And by the way, is it really unthinkable that their Essences haven't already returned to us? Without being blessed? I can't really believe that a body has to be blessed to release its Essence. They may already be among us, at peace and with us through this.''

She looked out through the camera, trying to touch them with her words, hoping they would embrace the wider philosophy, and the possibility she had held out.

And deep down, still trying to convince herself.

She relaxed. ''You know, I would think you'd see the significance of all this. I have a feeling that the timing of their visit isn't entirely a coincidence. They waited until we were out of touch with Earth before sending down their volunteer, which may mean that they're unsure of how best to contact us.'' She shifted in her seat. ''They're also probably unsure of our psychology. For instance, how we would react to being given help?'' She didn't add her own thought that if that were true, then that revealed a lot about the Centaurs's own psychology.

Out of the corner of her eye, she saw Marek nodding. She had filled him in on her guesses and he had agreed with her.

''For instance,'' she suggested, ''they may be afraid that if they help us with the Stingers that we'll be insulted and resent them. So, by using this way they've given us an opportunity to ask for help, without begging for it.''

Straightening, she looked directly at the camera. ''That's all I have to say. It's very simple, really. I call for a Colony Vote. May I use Wryer's body and go ahead with my plan to return the Centaurs's message? Yes or no.'' She set the response pattern on the console.

As she finished, she felt suddenly drained and slumped in her seat. Marek changed the camera's angle of view with a quick command and came over to her, laying a hand on her shoulder, squeezing it in silent comfort. She leaned her chin over to touch his hand briefly, gratefully.

A large number of votes were immediate, in both directions but mainly affirmative, but then there was a lull when only an occasional response came in.

A number of Representatives's lights came on, almost tentatively, and she answered them on private channels, clarifying points for them as asked. There weren't many questions, though, and her answers were undoubtedly quickly passed on to whatever groups had sponsored the questions.

Then after about a half hour, responses started coming quickly and she was happy to see that the percentage of

"Yes" votes was still greater. At the two hour limit it was over: sixty-nine percent "Yes," twenty percent "No," and eleven percent "No response." Since the abstainers were unable to shift the vote, it was logged and final.

IV

The Ministers of the Essence finished their nervous blessings and filed hastily away from the opening of the alien landing-craft. Marek stayed outside while Nina closed her insulating suit and entered the ship, kneeling by her husband's death-suit. She tried not to think of the live Stinger over in the corner of the ship that was locked in a separate chamber, transparent and carefully sealed so the Centaurs would see what they were getting once they opened the ship and the portable stasis generators cut off automatically.

Over her loomed the portable unit that was preserving her husband and Wryer as she reached down to touch Toma's shrouded face gently with a gloved hand.

"Toma, forgive me, darling, for tearing you away from our new world and life. I can only pray that the two of you can serve to let the Centaurs find a way to help and understand us."

She glanced around the craft's bare interior, wondering if glittering ebony eyes elsewhere were watching her, and if they could understand how she felt. "Please, treat them with respect and honor, as I have tried to do with your own noble crewman."

For a long moment she stared at the front of the cabin with its mysteriously hidden controls.

Then she heard Marek coughing gently and sighed, getting wearily to her feet. She stumbled in the doorway as her eyes remained fixed on the reclining bodies, and she let Marek guide her down the ramp in the brilliant sunlight.

As she stepped onto the field, she tore off the suit's mask and turned to face the ship, feeling a strange sense of peace come over her. It was done.

A soft hum grew in the air and they backed away nervously, startled as the ramp suddenly lifted from the ground revealing crushed grain-stalks and compressed earth. Silently it swung up and shut as the hum from the craft itself intensified. Behind them a wide arc of people backed away uncertainly, both fascinated and fearful. A gentle breeze blew out at them from the ship and the grain beneath it rippled and bowed.

Marek pulled her back gently as the craft seemed to shiver briefly and the hum deepened until it seemed to reach within them. Then the ship rose off the ground, the landing struts retracting and disappearing seamlessly into the dull skin as the craft rose into the sky with increasing speed. It shrank quickly in the distance until all that remained were six wide crushed circles and a flattened line where the ramp had been.

Tentatively, at first, the others came forward, kneeling to touch the marks in the field as if to reassure themselves that it had been real. Then, one by one, they came to Nina as she stood there to offer their support and their sympathy.

And their hope.

Almost all of them were suddenly changed. The sacrifice she had made and the arguments she had poured forth so fervently were sinking in at last, and they were starting to believe she might

be right. The Centaurs would see and understand, and they would find a way of fighting the Stingers.

And as she was alternately touched, embraced or even just given a quiet word, she realized for sure that the pain was gone. She suddenly felt the most incredible surge of love for all of them and for the world around her, regardless of the problems they were facing. She belonged. The Followers were right. The Essence of all who were, and had been here surrounded her. Even her husband and Danel, and the tragic waiting bodies in the morgue. They weren't gone. And they never would be, wherever their bodies wound up.

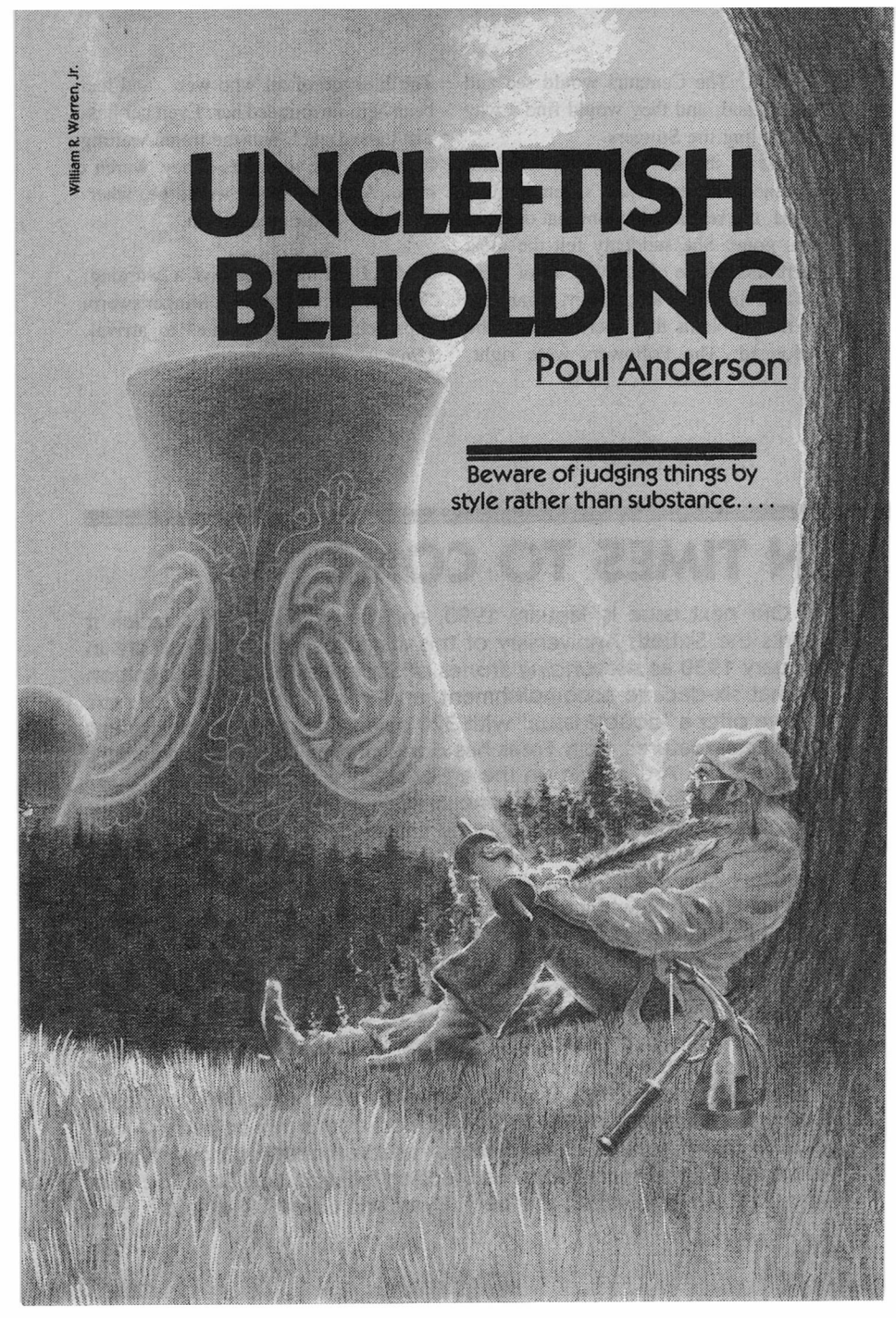
Her BeltLink screamed a warning. "To those in Field Forty, Stinger swarm approaching. Five minutes to arrival. *Move it!*" ■

IN TIMES TO COME

● Our next issue is January 1990, and that's decidedly special: it marks the Sixtieth Anniversary of this magazine, which began life in January 1930 as *Astounding Stories of Super-Science.* In recognition of that six-decade accomplishment, and in anticipation of the next six, we offer a "double issue" with 320 pages and quite an assortment of special features. Kelly Freas has done both a special cover and a "State of the Art" article on the art of science fiction illustration. Jay Kay Klein's "Biolog" is a big one and its subject is, in a way, the magazine itself, as seen through the careers of its many contributors over the years. Michael F. Flynn's fact article surveys some of the wonders our writers have foreseen in both fact articles and fiction, and the extent to which they have or have not come to pass.

Some of those extra pages will do something we normally avoid, but which seemed uniquely appropriate for this special occasion. Usually we publish only new material, not reprints—but for the Sixtieth Anniversary we thought you might like to see some samples of what we were doing in those earlier decades. So we included some memorable stories and editorials by previous editors.

Most of the issue, though, will, as usual be devoted to new material, looking forward rather than back. And most of that will be fiction—our usual wide range, and more than our usual amount, of thought-provoking stories by such writers as Stephen L. Burns, Lee Goodloe and Jerry Oltion, Nancy Kress, Michael F. Flynn, and Charles Sheffield.



UNCLEFTISH BEHOLDING

Poul Anderson

Beware of judging things by style rather than substance. . . .

For most of its being, mankind did not know what things are made of, but could only guess. With the growth of worldken, we began to learn, and today we have a beholding of stuff and work that watching bears out, both in the workstead and in daily life.

The underlying kinds of stuff are the *firststuffs*, which link together in sundry ways to give rise to the rest. Formerly we knew of ninety-two firststuffs, from waterstuff, the lightest and barest, to ymirstuff, the heaviest. Now we have made more, such as aegirstuff and helstuff.

The firestuffs have their being as motes called *unclefts*. These are mighty small; one seedweight of waterstuff holds a tale of them like unto two followed by twenty-two naughts. Most unclefts link together to make what are called *bulkbits*. Thus, the waterstuff bulkbit bestands of two waterstuff unclefts, the sourstuff bulkbit of two sourstuff unclefts, and so on. (Some kinds, such as sunstuff, keep alone; others, such as iron, cling together in chills when in the fast standing; and there are yet more yokeways.) When unlike clefts link in a bulkbit, they make *bindings*. Thus, water is a binding of two waterstuff unclefts with one sourstuff uncleft, while a bulkbit of one of the forestuffs making up flesh may have a thousand or more unclefts of these two firestuffs together with coalstuff and chokestuff.

At first it was thought that the uncleft was a hard thing that could be split no further; hence the name. Now we know it is made up of lesser motes. There is a heavy *kernel* with a forward bernstonish lading, and around it one or more light motes with backward ladings. The least uncleft is that of everyday waterstuff. Its kernel is a lone forwardladen mote called a *firstbit*. Outside it is a backwardladen mote called a *bernstonebit*. The firstbit has a heaviness about 1840-fold that of the bernstonebit. Early worldken folk thought bernstonebits swing around the kernel like the Earth around the Sun, but now we understand they are more like waves or clouds.

In all other unclefts are found other motes as well, about as heavy as the firstbit but with no lading, known as *neitherbits*. We know a kind of waterstuff with one neitherbit in the kernel along with the firstbit; another kind has two neitherbits. Both kinds are seldom.

The next greatest firststuff is sunstuff, which has two firstbits and two bernstonebits. The everyday sort also has two neitherbits in the kernel. If there are more or less, the uncleft will soon break asunder. More about this later.

The third firststuff is stonestuff, with three firstbits, three bernstonebits, and its own share of neitherbits. And so it goes, on through such everyday stuffs as coalstuff (six firstbits) or iron (26) to ones more lately found. Ymirstuff (92) was the last until men began to make some higher still.

It is the bernstonebits that link, and so their tale fastsets how a firststuff behaves and what kinds of bulkbits it can help make. The worldken of this behaving, in all its manifold ways, is called *minglingken*. Minglingers have found that as the uncleftish tale of the firststuffs (that is, the tale of firststuffs in their kernels) waxes, after a while they begin to show ownships not unlike those of others that went before them.

So, for a showdeal, stonestuff (3), headachestuff (11), potashstuff (19), redstuff (37), and bluegraystuff (55) can each link with only one uncleft of waterstuff, while coalstuff (6), sandstuff (14), germanstuff (22), tin (50), and lead (82) can each link with four. This is readily seen when all are set forth in what is called the *roundaround board of the firststuffs*.

When an uncleft or bulkbit wins one or more bernstonebits above its own, it takes on a backward lading. When it loses one or more, it takes on a forward lading. Such a mote is called a *farer*, for that the drag between unlike ladings flits it. When bernstonebits flit by themselves, it may be as a bolt of lightning, a spark off some faststanding chunk, or the everyday flow of bernstoneness through wires.

Coming back to the uncleft itself, the heavier it is, the more neitherbits as well as firstbits in its kernel. Indeed, soon the tale of neitherbits is the greater. Unclefts with the same tale of firstbits but unlike tales of neitherbits are called *samesteads*. Thus, everyday sourstuff has eight neitherbits with its eight firstbits, but there are also kinds with five, six, seven, nine, ten, and eleven neitherbits. A samestead is known by the tale of both kernel motes, so that we have sourstuff-13, sourstuff-14, and so on, with sourstuff-16 being by far the mostfound. Having the same number of bernstonebits, the samesteads of a firststuff behave almost alike minglingly. They do show some unlikeness, outstandingly among the heavier ones, and these can be worked to sunder samesteads from each other.

Most samesteads of every firststuff are unabiding. Their kernels break up, each at its own speed. This speed is written as the *half-life*, which is how long it takes half of any deal of the samestead thus to shift itself. The doing is known as *lightrotting*. It may happen fast or slowly, and in any of sundry ways, offhanging on the makeup of the kernel. A kernel may spit out two firstbits with two neitherbits, that is, a sunstuff kernel, thus leaping two steads back in the roundaround board and four weights back in heaviness. It may give off a bernstonebit from a neitherbit, which thereby becomes a firstbit and thrusts the uncleft one stead up in the board while keeping the same weight. It may give off a *forwardbit*, which is a mote with the same weight as a bernstonebit but a forward lading, and thereby spring one stead down in the board while keeping the same weight. Often, too, a mote is given off with neither lading nor heaviness, called the *wee-neitherbit*. In much lightrotting, a mote of light with most short wavelength comes out as well.

For although light oftenest behaves as a wave, it can be looked on as a mote, the lightbit. We have already said by the way that a mote of stuff can behave not only as a chunk, but as a wave. Down among the unclefts, things do not happen in steady flowings, but in leaps between bestandings that are forbidden. The knowledge-hunt of this is called *lump beholding*.

Nor are stuff and work unakin. Rather, they are groundwise the same, and one can be shifted into the other. The kinship between them is that work is like unto weight manifolded by the fourside of the haste of light.

By shooting motes into kernels, worldken folk have shifted samesteads

of one firststuff into samesteads of another. Thus did they make ymirstuff into aegirstuff and helstuff, and they have afterward gone beyond these. The heavier firststuffs are all highly lightrottish and therefore are not found in the greenworld.

Some of the higher samesteads are *splitly*. That is, when a neitherbit strikes the kernel of one, as for a showdeal ymirstuff-235, it bursts into lesser kernels and free neitherbits; the latter can then split more ymirstuff-235. When this happens, weight shifts into work. It is not much of the whole, but nevertheless it is awesome.

With enough strength, lightweight unclefts can be made to togethermelt. In the Sun, through a row of strikings and lightrottings, four unclefts of waterstuff in this wise become one of sunstuff. Again some weight is lost as work, and again this is greatly big when set beside the work gotten from a minglingish doing such as fire.

Today we wield both kind of uncleftish doings in weapons, and kernelish splitting gives us heat and bernstoneness. We hope to do likewise with togethermelting, which would yield an unhemmed wellspring of work for mankindish goodgain.

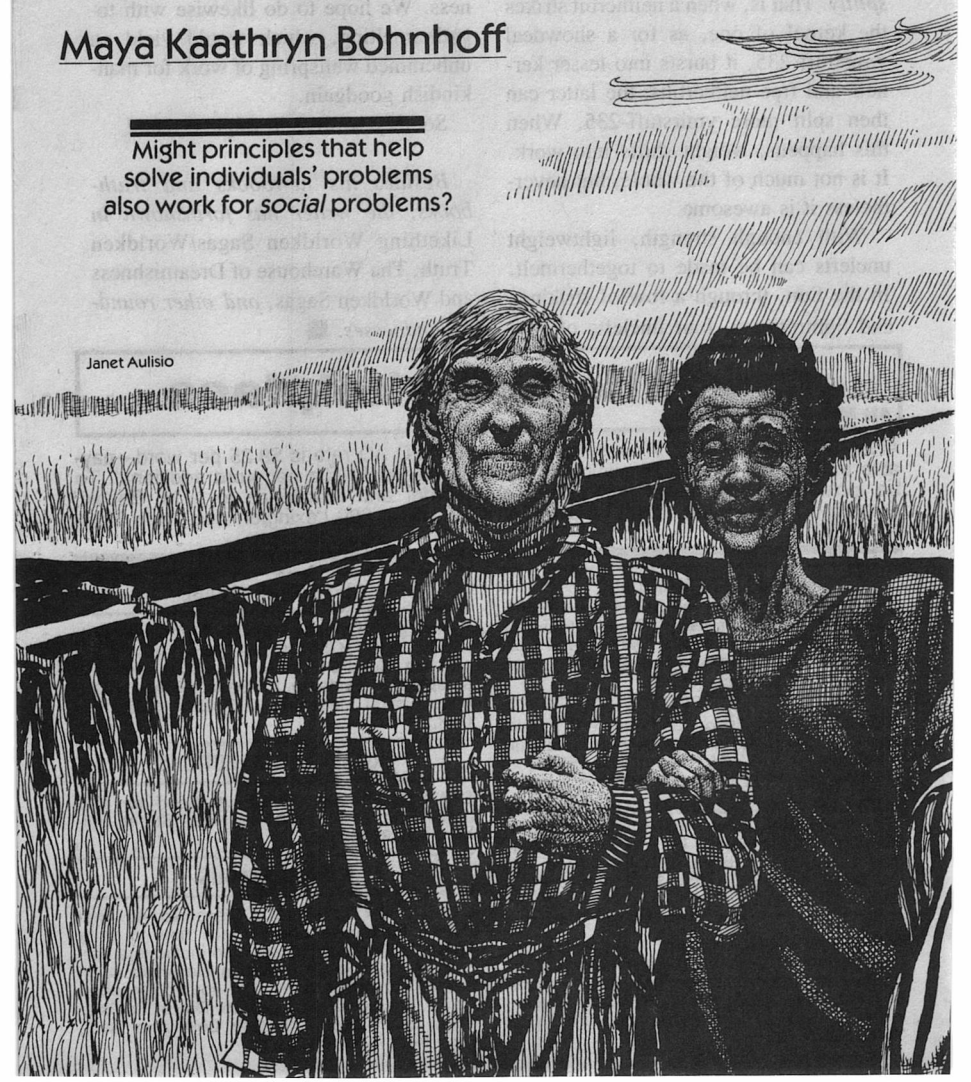
Soothly we live in mighty years!

Besides his newbooks and truthbooks, the writer has forthshown in Likething Worldken Sagas/Worldken Truth, The Warehouse of Dreamishness and Worldken Sagas, *and other roundaroundnesses.* ■

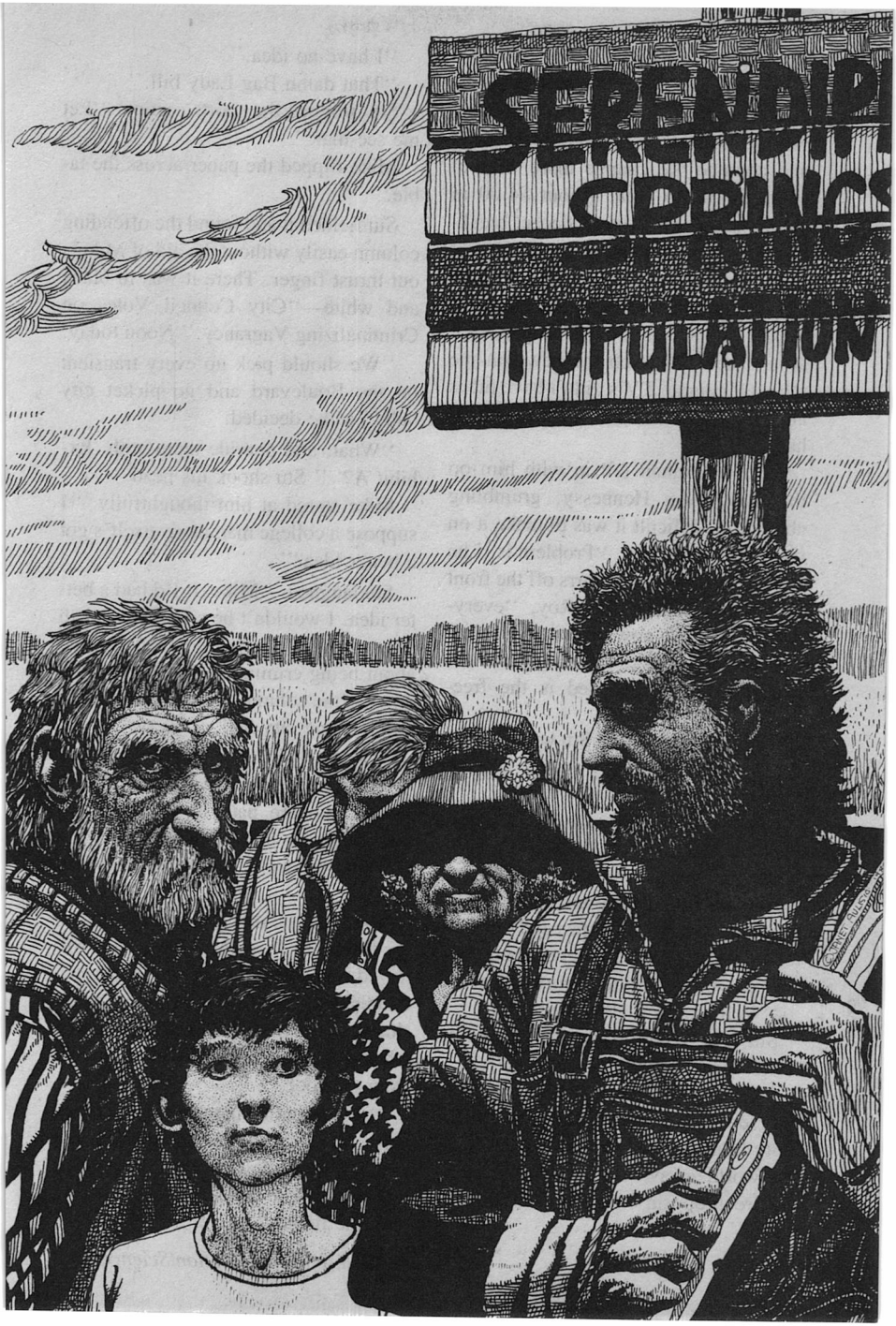
HAND-ME-DOWN TOWN

Maya Kaathryn Bohnhoff

Might principles that help solve individuals' problems also work for *social* problems?



Janet Aulisio


SERENDIP
SPRINGS
POPULATION

Stu Williams pulled his jacket across his chest and zipped it all the way up to his chin. It was damned cold for February. He dug his hand into his left coat pocket and counted the change there without taking it out to look. About $4.00 in quarters; enough to buy a decent breakfast at Caroline's or a not-so-decent breakfast and a newspaper. He decided in favor of a decent breakfast and a trip to the Sears electronics department around noon to catch the news on the tube. Of course, TV's didn't have tubes anymore, he reflected. Old habits die hard.

Mike Hanrahan fell in with him on the way down Hennessy, grumbling about how difficult it was to make it on recycling these days. "Problem is," he complained, plucking burrs off the front of his disreputable Rob-Roy, "everybody's doin' it now. *Everybody!* And his aunt on top o't. Th' only place the market's not jam-packed is the freeways."

"Freeways, Mike?" Stu wrinkled his nose. "Naw, you don't want to get into freeways."

"Damn right! But a man's gotta eat, don't he?"

Caroline's was warm and smelling of coffee and baked stuff and bacon cooking. They ordered breakfast and sat back to enjoy a discarded newspaper. Stu disappeared behind the sports page.

"Well, damn it all to hell!"

Stu lowered the paper and peered at Mike over its edge. "Excuse me?"

"Those blue-suited bureaucrats an' their damned idiot measures an' bills! Holy Jesus, they think they can legislate the world away. Do you know what they're proposin' to vote on today at noon?"

"I have no idea."

"That damn Bag Lady bill."

Stu dropped the sports section. "Let me see that."

Mike flipped the paper across the table.

Stu fielded it and found the offending column easily without the aid of Mike's out-thrust finger. There it was in black and white—"City Council Votes on Criminalizing Vagrancy." Noon today.

"We should pick up every transient on the Boulevard and go picket city hall," Mike decided.

"What, and provide them with 'Exhibit A?' " Stu shook his head.

Mike stared at him thoughtfully. "I suppose a college man like yerself's got a better idea?"

Stu laughed. "Mike, if I'd had a better idea, I wouldn't be sitting here with seventeen cents in my pocket worrying about being criminalized." He glanced down at the column again. "But I might be picketing city hall, anyway."

Annie Lee Paice stepped off the curb almost into the path of an oncoming truck. The air horn shoved her back a step and the truck rumbled harmlessly by.

Too bad, she thought. Could've been for the best. A wash of cold guilt followed immediately. Her eyes found the dilapidated old Chevy wagon in the shaded lot across the street and misted when she saw Sammie waving at her from the roof.

The guilt curled in the pit of her stomach and moved upward toward her throat. She swallowed it again—pacified it by walking to the corner and crossing with the light.

"Did you get it, Mom?" Sammie bounced off the hood of the car and met her nearly eye to eye. So tall for his age—going to be just like his Dad.

She shook her head, glancing over her shoulder at the HEW building. "She didn't even have new forms for me to fill out. She said I oughta see a lawyer."

"What the hell's a lawyer gonna do for us?" Her oldest son, David, had hauled his lanky frame out of the passenger seat and hung on the roof of the car, chin propped on his crossed arms.

"Pry some money out of your Dad, I s'pose."

"Huh! They'd have to find him, first. Did you tell her that?"

She grimaced. "I mentioned it. She said that wasn't their line of work. So we were back to the lawyer again."

David's expression didn't change. "OK, so what's next?"

He was trying so hard, she thought. Trying to act like everything was going to be just fine. It was just a matter of "What's next?"

She fought through a wave of cold panic before drawing some sanity out of his dark, resolute eyes. He was right. That's what it was—"what's next?" Small steps. She silently thanked God for him and prayed that by the time he turned fifteen he could go back to being a normal teenager.

She smiled brightly and ruffled Sammie's hair. "Next, I look for a job."

"Me too," David said.

"Who's gonna take care of Sammie and Trudy?"

"*I* can!" Sammie protested loudly enough to wake Trudy up. In the back of the wagon, she stretched and blinked.

David ignored him, his eyes kindling. "Make you a deal, Mom. We both look for work and the one who gets the best money works while the other one stays home with the kids."

"I said, *I* can!" Sammie repeated. "I can take care of us. I'm not a kid."

"Yeah, you are."

"If I'm a kid then you're a kid!"

"You're a kid, Sammie," David repeated.

"I'm twelve years old, dammit!"

"You're eleven," David corrected, "and watch your mouth."

"You watch my mouth!" Sammie's tongue made a rude appearance.

"In the car." Annie gave the younger boy a gentle shove. "Let's go find a newspaper."

Loucette Doucette rocked gently back and forth on the park bench, eyes on nothing in particular. The Sun felt warm on her face despite the near freezing temperature, but then her face was the only part of her body not swaddled in layers of warm flannel and wool.

She was indulging in her favorite pastime just now—'membering. She was very good at it—excelled at pulling faded bits of sepia-tone out of dark hiding and colorizing them. No high-tech movie magic could do what Loucette Doucette's memory could do.

God, it was all there today, too. New Orleans greens and blues, hot whitewashed walls, cool shadows, bright smiles in chocolate faces. And over all the Sun whispering a warm, loving benediction.

Her full lips curved as the smells began to emerge. New Orleans smells—hot, spicy, sizzling smells; dark red smells in her Daddy's restaurant. And she sat

on the stairs that led up to their flat, rocking back and forth to New Orleans sounds, eyes on nothing in particular, with that knowing smile her Daddy said'd get her in trouble some day.

It'd done that.

She stopped 'membering and got up, hungry, longing for Creole food. They didn't know Creole cookin' at the Mission. Not like she did. Maybe Nancy'd let her putter in the kitchen today. She liked that.

Behind her shopping cart, headed across the park, she started 'membering again. Old, flat, crepe-soled sturdies grew sleek and high-heeled. Her steps tapped with the rhythmic authority of youth, hips swayed.

This time the memories carried her for three blocks—all the way to the front door of the Mission. She swept in like she owned the place, feeling that powerful flush of warmth that only came when many pairs of eyes were on you. Then many pairs of lips would whisper your name—"Loucette Doucette."

"Lucy-Ducy! How you doin', hon?"

Memories fled before the grizzled smile. Loucette parked her shopping cart by the door and returned the smile with one of her own. She still had good teeth that were still dazzling against her ageless café noire skin.

"Allo, Guillaume," she said and sat next to him at the long table, pulling off elbow-length fingerless gloves.

His smile deepened. He loved the way she always called him "Guillaume." Everybody else called him "Billy," thought of him as a gin-soaked old rodeo bum. Not Lucy—not Loucette. She was a class act and she thought of him as a class act—made him feel like one. Guillaume.

"Breakfast, Lucy?"

She nodded, shrugging off a few layers of unnecessary warmth, and smiled when Billy came around and took her elbow. "Why, merci, Guillaume," she exclaimed, as if he didn't perform the same ritual almost daily. But she always acted out her surprised pleasure, always let him escort her to the chow line, take her down a tray and help her select her breakfast—putee dayjunay, she called it.

But today there was a surprise after all—the usually sunny group of faces behind the steaming trays seemed pinched and grim. Behind them, beyond the racks of fresh-baked rolls and kitchen utensils, angry voices carried over the hiss of running water.

"Inhuman, fratricidal, cold-blooded bastards!"

Billy paused in the act of handing his tray to the uncomfortable-looking black girl just that side of the scrambled eggs and peered past her, eyes seeking the source of the argument. He'd never heard Nancy Yee being angry before. Wouldn't have thought she had it in her.

The guy behind him in line poked a finger at the kitchen. "What the hell's that noise about?"

The black girl (Delores, that was her name—he could never remember it—she didn't look like a Delores) shifted from one foot to the other and cast a chocolaty glance over her shoulder.

"*Don't* tell me to calm down!" yelled Nancy Yee's voice. "I don't want to calm down!"

A male voice mumbled something unintelligible in return.

Delores leaned over the scrambled eggs. "Nancy's pretty steamed about that new bill."

On cue, Nancy's voice shot from the back of the kitchen. "Dammit, Leon, stop patronizing me!" She was obviously steamed about something.

"What bill's that?" asked Billy.

"The city council is voting on a bill that would make transients criminals."

"Transients?" Billy frowned. "You mean—"

"She means you guys." Nancy Yee appeared between a couple of bread racks, her dark eyes backlit with anger. "They want to make bad luck illegal." Her assistant, Leon Squires, lurked behind her, hang-dog.

Loucette set the dish of peach halves on her tray and turned to look at the young woman. "Theah must be somethin' we can do," she said. There was always something one could do.

"You can pray," said Nancy Yee, and left the kitchen.

"Oui." Loucette nodded thoughtfully. "One can always pray, because God will always listen."

"Funny," said the guy behind Billy, "I never noticed her havin' a Chi-nee accent."

"Vietnamese," Loucette corrected him. "Nancy is Vietnamese. From a very old, very fine family. She speaks French very good, too," she told Billy, and went to eat her petite déjeuner.

There'd been little on the noon news from the official contingent about the Vagrancy Issue as it was politely referred to. On the street, it was the "Bag Lady Bill" and no one referred to it politely.

What the news did show were man-on-the-street interviews (ironic, Stu thought) and a healthy uproar from religious groups and community service organizations.

The men and women in the street were divided over the issue. Comments ranged from: "It sucks!" to what was shaping up to be a long-winded diatribe against the evils of laziness before the tele-journalist put a cork in it.

"I think it's about time," said a thirty-ish looking woman with an armful of toddler. "I mean, my kids gotta walk down the streets an' see them people lyin' there—pushin' their little carts around an' all that. I mean, I don't know who those people are or where they been or what's goin' on in their heads."

I wish I knew what was going on in yours, Stu thought.

Mike snorted. "Lovely woman," he said.

The reporter next tried to flag down a young collegiate type who was in an obvious hurry. He afforded the discamera a second of anger. "It's fucked," he commented, before the censor could react.

Mike laughed. "Ain't it," he said.

The next woman interviewee agreed, if more politely. "I think it's an obscenity. I don't believe we have the right to legislate people out of our cities just because they're homeless. They need help, not a drop kick out of town. I don't understand this bill at all. It's not solving a problem, it's just hiding it . . . or hiding from it. It's morally reprehensible."

"It's absurd," said a middle-aged businessman. "I wouldn't be surprised if Santa Theresa was consumed by a ball

of fire. Maybe we ought to rename the place—Santa Adolpho after Adolph Hitler."

"Human litter," said the next Santa Adolphan, shrugging. "You find litter lying around, you pick it up and throw it away. Same difference."

An interview with members of the Inter-faith Council followed which went a long way toward reviving Stu's faith in his fellow men and women. A greying Catholic priest and a young female Bahā'ī, with matching expressions of deep concern, represented the organization against the backdrop of city hall and picket signs.

"This bill will do nothing to address the problem of homeless people," said the girl, earnestly. "We're dealing with an age-old disease here, and this bill is only aimed at masking the symptoms."

"So, you're saying this is just a Band-Aid measure?" asked the TJ.

"It's worse than a Band-Aid measure. It's like putting a dirty dressing on an already infected wound. And it's as much a tragedy for the people responsible for this cruelty as it is for the homeless. They can't possibly understand the reality of what they're doing."

"There have been rumors that the churches and organizations of the Inter-faith Council will offer sanctuary to the homeless if the bill passes. Could you comment on that, Father?" The TJ poked her bright blue microphone at the priest.

"The member organizations of the Inter-faith Council are planning to offer shelter and sanctuary to as many homeless people as they can legally contain. If this bill passes, and we're praying it won't, we'll publish a list of centers that will be open for that purpose."

"But, Father, won't you be aiding and abetting criminals?"

"No. We're simply taking them off the street. If they're not on the street, they're not vagrant. If they're not vagrant, they're not criminals."

The newswoman swung to face the discamera, adopting that serious 'on-the-beat-reporter' look. "So, surrounded by a show of solidarity from the religious community, the Santa Theresa city council deliberates over this highly controversial issue. We'll be on hand to report on their decision as soon as it's made. This is Karen Culver for Channel Seven News."

Stu shivered and shrugged his shoulders deeper into his jacket.

Mike made a rude noise and turned to go. "Better gi' back to work."

"Yeah." Stu followed him out of the over-heated department store and out onto the sidewalk. They went their separate ways there—Mike returned to scavenging for aluminum cans, and Stu headed for the Murphy Street Mission for an afternoon's gainful employment. Nancy Yee must be climbing the walls, he thought.

A chipped kitchen counter and three broken chairs later, he ate dinner, listening to Lucy-Ducy talk in her smoky N'awleans patois about singing in her Daddy's restaurant. He hadn't seen Nancy all day. A frustrated Leon told him she'd disappeared right after breakfast, probably to join the picketers at city hall.

At six o'clock, Leon disappeared into the Salvation Army store next to the Mission and reappeared with a portable

TV. He set it up in a corner of the dining hall and turned on the evening news. Everyone stopped talking, chewing or washing dishes to watch and listen.

The decision had come in at 5:30 and was written in the angry faces of the crowd in front of city hall. There was a futile confrontation on the steps of the building between exiting councilmen and picketers, then the list of religious centers open for sanctuary rolled slowly up the flat screen.

"There's Nancy!" someone yelled, and they all watched her shout soundlessly into the face of an equally furious councilman while names and addresses slid over her tear-stained face.

Stu helped the Mission staff and evening regulars set up cots in case they had a lot of sleepers. Nancy showed up as they were finishing, eyes red from crying, voice hoarse from shouting. She paid Stu for his work and offered him a place to stay. He declined, pocketed his money, and headed for the "Y."

He had to pass in front of city hall, skirted it quickly, the way a man hustles past an open grave, and hurried across the adjoining park. He slowed a little to enjoy the moonlit-lamplit beauty, watch milky tendrils of steam rise like wraiths from the damp sidewalk. He short-cutted across the frosty grass and came out on the parking pad, near its lone occupant—a battered station wagon with frosted-over windows.

He was about three feet from it when a flashlight beam lit up the inside of the car, throwing the shadows of two people into relief against the semi-opaque glass. He was in the act of slipping quietly away when a third, smaller shadow popped into sight and a plaintive voice wailed, "Mom, Sammie's kicking me!"

His appreciation of the situation did an Immelmann loop. The next thing he knew, he was tapping on the driver's side back window.

There was a moment of total silence inside the wagon, then the window rolled slowly down.

"Oh," said a woman's voice, in obvious relief. "I thought you were a cop."

"You're lucky I'm not. A cop would have to arrest you. I'm just going to warn you that you'd better move your car."

"Can't. We're outta gas. Or just about, anyway. That station down the block is about as far as this old junker's gonna get."

"Well, ma'am, I don't know if you've heard any news today, but there is a new law on the books that says if you're caught loitering in this parking lot after midnight tonight, you'll be committing a punishable offense."

There was another silence.

"We're not hurting anybody here," she said.

"No, you're not."

"And we can't move the car. We don't have money for gas."

"I do," Stu offered.

"We can't take your money, mister." The adolescent voice was defensive.

"Yes, you can. Look, ma'am, I know you don't want these kids to spend the night in juvenile hall, but I'm afraid that's just what might hapen if you don't move this car someplace less conspicuous."

Stu waited out the whispered confer-

ence, his eyes fixed on the halo of gold around a traffic signal at the corner of San Pablo and Main. A long, low car glided to a stop as the halo flared to crimson.

Stu leaned down to the window. "Ma'am, I'd suggest you come to a quick decision. There's a police car at the corner."

"Go around to the passenger side," said the woman. The car rocked with the flurried rearrangement of its occupants.

Stu rounded the Chevy's nose, keeping his eyes on the police car, which still sat at the intersection.

They had to exit the parking lot practically in front of it and sidle past on their way to the filling station. It executed a wide U-turn and followed them, pulling up beside the mini-mart when they stopped at the pumps.

"Geez!" whispered Sammie. He watched the cops watch Stu pump gasohol while they bought and sipped hot coffee from biofoam cups. The steam looked wonderfully hot and delicious. A rap at the back window made him all but jump out of his skin. He rolled the window down viciously.

Stu peered in at him. "Let's go get some hot chocolate for everybody, OK?"

Sammie forgot his anger at being scared and grinned. "OK!"

His mother started to put a damper on his enthusiasm. "Mister, we can't—"

"Yes, you can. It's my money. I'll spend it any way I want. And the name's Stuart—Stuart Williams. Now, you want coffee, tea or cocoa?"

Annie relented. "Coffee . . . Thank you, Stuart."

"I'll have coffee, thanks." David asserted his adulthood matter-of-factly.

"Chocolate!" cried Trudy, unconcerned with asserting anything.

"OK. Two coffees, one chocolate. Coming?" He looked at Sammie.

"Sure!" Sammie catapulted out of the car. "You can call me 'Sam,' " he stage whispered, eyeing the police officer near the door of the mini-mart.

"Thanks, Sam. You can call me 'Stu.' "

"Thanks, Stu."

They smiled at the cop on their way in, collected their coffees and cocoas, paid with most of Stu's meager earnings and smiled at the cop again on their way out. He managed a half-hearted response, then returned to his partner and his squad car.

Stu took over the driver's seat and did some quick thinking about where they were headed. He decided the Mission was the best place, but realized halfway there that the police car was still tailing them. He felt a deep reluctance to let the cops know they were shopping for a place to crash. It would mark that old gold Chevy for future suspicion.

He silently cursed the situation. Part of him understood their curiosity—he could've kidnapped these people for all they knew. But most of him was angry. Angry that a quirk of fate—the loss of a job or, in this family's case, he suspected, a husband and father—could transform a person from citizen-in-good-standing to suspicious character.

He was the same man he'd been two years ago, before all this—sure, a lot poorer and a little more cynical, but that didn't mean he'd come unhinged.

Maybe the members of the city coun-

cil, or whoever was in that squad car, simply judged other people by what they thought they'd do under the circumstances. Sort of an upside-down, inside-out Golden Rule: Do unto others as you suspect you'd have done to you.

In the end, he took them to the Bahā'īs Center, intending to see them settled in, then leave. But the place was over-run and under-staffed and he found himself useful as an allocater of blankets and pillows. When that was over, it was easier just to find a free corner to curl up in before he fell asleep on his feet.

At 7:00 the next morning, Stu quietly consumed a breakfast provided by the local Bahā'īs and Quakers before wishing the Paices good luck and heading for Murphy Street. He felt guilty about accepting charity. He might be out of a job and a home, but he wasn't drunk, disabled or destitute. Not like Billy or Annie Paice or—

He stopped, staring at the gleaming squad car parked boldly in front of the Mission. Two cops sat in it, watching the comings and goings of its "patrons."

"Son-of-a-bitch!" he muttered.

He watched as Loucette Doucette made her way out onto the sidewalk on Billy McGuire's gnarled arm. She was without her shopping cart today—for obvious reasons. Billy shot the officers a sassy grin and touched the brim of his stained Stetson.

One of the officers flipped open a voice-activated compad and began mumbling notes to it. He was still mumbling when Stu passed by and entered the Mission. Nancy Yee was just inside, glaring out the big front window.

"Friends of yours?" Stu asked drily.

"Not funny, Stuart." She turned from the window, glossy, black page-boy fanning with the movement.

They walked side by side toward the kitchen.

"Got a lot of customers today."

Nancy glanced at the crowded dining hall and nodded. Cots and mattresses and sleeping bags were propped or stacked or rolled against the walls. "Yeah. I don't know how long we can handle this many people, though. We're meeting with the Goodwill and Interfaith people tonight about forming an organized cooperative. . . . You eaten?"

Stu nodded. "Nancy, you wouldn't happen to need some extra kitchen help, would you?"

"Oh, I *need* it, all right. I just can't afford it. I can barely keep what I've got. Why?"

He shrugged. "I ran across a family living in their station wagon. The mother and oldest boy could use some employment."

"Sorry, Stuart. But I will keep my ears open." She punched his arm and smiled. "I've got plenty for you to do, though."

He smiled back. "I was hoping you'd say that."

The news became the focus of the day's activities. At noon the little portable flat-screen in the dining hall provided the Mission lunch crowd with some rousing entertainment.

The Mayor of Santa Theresa wasn't the most popular celebrity in town, but he was easily the most controversial. He had everyone's full attention the minute

his face appeared on the screen. He got more than their attention when they heard what he had to say.

The anchorwoman did the warm-up in neutral tones: "It's been less than twenty-four hours since the vagrancy ordinance came into effect, but there are already problems with enforcement. According to Mayor John Eastwick, a lack of cooperation from certain civic and religious organizations has impeded the ordinance's effectiveness. Mayor Eastwick, what, exactly, are these organizations doing?"

The mayor's very angry face appeared on the screen.

"They're subverting the law. The entire point of the ordinance was to safeguard the tourist trade that Santa Theresa depends on. Because of this gross interference on the part of a group of well-intentioned but misguided organizations, we are seeing only the minutest drop in the number of vagrants wandering our streets. I seriously doubt these people realize the impact this can have on our tourist trade."

"But isn't the incidence of actual vagrancy—by that I mean people sleeping and pan-handling on street corners—significantly down even this early on?"

"Yes, it is. And those vagrants who were in violation of the ordinance were dealt with. Last night, the streets of Santa Theresa were conspicuously clean. The problem is that our sanctuary groups turned their charges back out onto the street at first daylight. That means the people we don't catch will just wander the streets all day, then hole in their missions and churches and halfway houses at night."

"But if they're off the streets, hasn't the ordinance accomplished its purpose?"

"No, it has not. The intent of the ordinance was to drive indigents out of Santa Theresa, not force them underground."

A loud hiss rippled around the dining hall and a wad of paper napkin sailed at the screen.

"What does the City Council propose to do about the situation?"

"We do have some legal recourse, but I'm not free to reveal what action we'll take first."

"Then you do intend to take action?"

"Only if these groups continue in this flagrant attempt to circumvent the law. I don't imagine they can afford to offer this level of support for very long, but if they persist, we certainly will take legal action."

"Mayor, it sounds as if you're prepared to challenge the entire concept of sanctuary."

The mayor looked momentarily uncomfortable. "Let's say I'm prepared to question it."

Whatever recap the anchor made was lost in the general outrage from the Mission audience. A flurry of napkins fell around the TV, prompting Leon to rush protectively to its rescue.

Stu Williams spent the day suspended in unease. And with good reason. The first legal action the City Council took when the "well-intentioned but misguided" civic groups revealed no sign of capitulation, was to become unbendingly strict in its enforcement of the building capacity ordinances.

The sanctuaries reacted by shuffling their occupants from one room to an-

other whenever the suddenly ubiquitous police force put in an appearance. The police counterreacted by making surprise inspections at twelve midnight on a Sunday. By 4:00 A.M. the first group of indigents was taken to the Juvenile Authority to await final transport out of town. Mike Hanrahan was among them.

Stuart Williams didn't know that until nearly 2:00 P.M. the next day. By that time, he'd found Annie Lee Paice's oldest boy part-time work and helped several more single parent families settle into the annex of the local Bahā'ī Center. Like the Paices, they had to share single rooms, but it beat the hell out of air mattresses at the Mission or the underside of a staircase.

"What were you, Stu? Before, I mean." Annie Lee pulled him out of a half-anxious/half-aimless stare across a park that was, for once, empty of everything but early tourists taking advantage of a warming in Santa Theresa's ambivalent weather.

He shifted slightly on the silicrete adobe bench, squinting at a pair of tourists who squinted back as if at a museum display—"Theresan Couple at Lunch in Natural Habitat."

"An urban planner," he said. "You know, one of those guys who're paid to look at your orange groves and see shopping malls."

Annie gave him a surprised glance. "I'd think you'd make a good living at that."

"If you're good at it. I wasn't good at it. I looked at shopping malls and saw orange groves."

"That why you're doin' odd jobs at the Mission an' sleepin' at the Y?"

He tilted his head, considering his own particular set of whys and wherefores. "My wife died," he said. "We had all these plans that . . . Well, they were the kind of plans that only work for two people. So I found myself suddenly—"

"No place to go?" guessed Annie. "In here, I mean." She tapped her chest.

"Yeah," he agreed. "I got sad and drank too much. Then I got sober and mad and picked fights with everybody I knew—my boss included. And somewhere in there I realized I didn't want to be good at turning orange groves into shopping malls."

"You quit?"

"I got fired." He shrugged. "I *deserved* to be fired, I have to admit. So, I sold my house and drifted around. 'Going on sabbatical,' I called it. I wanted to look at architecture, get some direction, some inspiration. Those were all my good reasons for not getting into counseling instead. I dropped out. Then, I ran out of money in Santa Theresa."

"No kids then, huh?"

He shook his head. "We were going to wait another year, 'til Beth finished her Master's degree. She was younger than I am." He was depressed, suddenly, remembering that. He hadn't thought about it much since he'd washed up under Mike Hanrahan's staircase in a chilling rain almost a year ago.

Annie looked at her five-year-old Adidas and empathized. "My old man went on sabbatical, too," she said. "Took his secretary with him. . . . She was a *temp*."

"Shouldn't last too long, then," said Stu.

Annie gave him a sideways look. He

was looking back, face ultra-serious . . . . all but his eyes. She laughed.

"How does a man do that?" Stu asked, as they made their way back to the Mission, later. "How does a man leave his family—his *children,* for God's sake!"

"I dunno. I guess he couldn't take *me* anymore. Showin' a cute li'l Geohjah peach off t'your National Guard buddies is a lot different than bringin' your boss home to a high school dropout who doesn't even know what it is you do for a livin'."

"What did he do for a living?"

"Something to do with micro-circuits. Hell, I thought it was something 'lectrical. You know, like house wiring. I called him an electrician. Made an ass of myself. Never knew what was goin' to pop out of my mouth. His friends at work thought I was cute. *He* didn't think I was cute. He thought I was dumb."

Stu glanced at Annie Lee, assessing her. She still looked like a cute li'l Georgia peach to him—a harried, hassled and worried peach, but a peach none the less.

"You're not dumb, Annie," he said. "Don't ever let anyone tell you you're dumb."

The Mission was a madhouse this afternoon. People jostled each other for a place at the rear of the main hall—a place where a policeman entering the room might not see them and single them out. Children milled and squealed under foot. Somehow through it all, Stu saw Nancy Yee gesturing at them from the kitchen door and steered Annie in that direction.

Nancy pounced on Annie first. "Delores is sick and this place is a zoo. Could you *possibly* help out in the kitchen? I can pay you three dollars an hour."

Annie glanced at Stu and shrugged. "Where do I start?"

Nancy flashed a relieved grin. "Thanks. Just go on in. Leon will put you to work."

When she turned back to Stu, the grin was gone. He had the impression that it still hung in the air on the other side of her head, waiting for her to step back into it.

"Stuart," she said, and he knew something serious had to follow. "Stuart, the police picked up Mike. They caught him scavenging for returnables along the Main Street off-ramp."

Stu stared at her, suddenly chilled to the marrow. "Where do they . . . Do you know where he is? Jail?"

Nancy shook her head with a swish of gleaming black silk. "Not jail. They don't want to be responsible for these people, Stu. They were to be detained in an annex to Juvenile Hall until there are enough for a busload. Then they get bussed out to the interstate."

"To do what?" Stu asked, heat rising into his face. "To starve or get run over or hitchhike into oblivion?"

Nancy shrugged. "Who cares, right? They're no longer Santa Theresa's problem. . . . Where are you going? You can't bail him out, Stu."

He stared at the small brown hand gripping his sleeve.

"I've already tried," she said. "They're only releasing them into the custody of relatives—and then only if they can produce proof of residence somewhere. I don't think that's consti-

tutional, but you know what 'they' say—'' Her mouth twisted wryly. ''You can't fight City Hall.''

''Proof,'' Stu repeated. ''Everywhere you go these days—everything you do—you've got to prove something to somebody. Prove you have credit, prove you've got a degree, prove who you are, prove you really exist . . . prove you even have a *right* to exist. And then, some place like goddamned Santa Theresa questions that right—'' Tears of exasperation made him pinch his eyes shut. ''Damn,'' he finished.

''There's nothing we can do,'' Nancy murmured.

Even before she'd finished the cliché, Stu could see her challenging it. Her eyes kindled. ''Yes, dammit! *Yes!*'' She tugged at his sleeve. ''My office,'' she told him, and struggled toward it, sidestepping floor-sitters, side-jumping kids.

He followed.

Forty-five minutes and half as many phone calls later, Nancy was fading, but triumphant.

''So, let's say you can really mobilize these people,'' said Stu carefully. ''Then, what? You get all this stuff together and take it where?''

''We'll have to find a place.''

''*Find* a place?''

Nancy was already on her feet, already sifting through a file drawer. ''I've got a map here somewhere. . . . ''

She came up with it instantly. Stu didn't doubt that her files were as well-organized as the rest of the Mission . . . under normal circumstances.

She plopped the map down in front of him—''SANTA THERESA CHAMBER OF COMMERCE,'' it said, and ''SANTA THERESA AND OUTLYING AREAS.'' She tossed her credit card on top of it.

''Do you think Annie would let us use her car? I get followed everywhere in mine. I'll pay for gas.'' She pointed at the card.

''Newspaper?''

She nodded. ''*And* police. Would you ask Annie about the car?''

''Turn left here.'' Nancy pointed at the faded sign. It proclaimed, to anyone who cared, the junction of Santa Theresa's modest I-80 Business Loop and State Highway 19.

Stu turned onto the tree-lined washboard, grimacing at the tattered patriotism of a once-upon-a-time red, white and blue gas station. Fifty yards later, he had brought the car nearly to a crawl, staring out the window.

''What *is* this?''

Nancy folded the map neatly across her knees. ''This is—or should I say—this *was* Serendipity Springs. A little the worse for wear, but still worthy of the name.''

Stu turned his stare to Nancy. ''Meaning, it still has springs?''

She slapped his leg with the map. ''Yes! And it's still lucky, lucky, *lucky!* Pull over.''

It was a mess—a disaster. The buildings were aging recluses; smothered with vines, overshadowed by monster oaks, hemmed in by tree-sized shrubbery and choked with dust. Three out of four roofs had improvised sky-lights and several front porches featured a direct path to the root cellar. There was a drug store cum grocery (a ''Mercantile,'' according to the drooping sign), a boarded-up café replete with warped

lunch counter, a post office, a drive-in of indeterminate age and another building of indeterminate use. There was also a church, a peeling, weed-choked motel with tiny, square cabins, and a quintet of houses which the most entrenched realist would declare haunted.

Stu stood tentatively on the porch of one of the almost-certainly-haunted houses and surveyed the street. The opposing house surveyed him in turn, its empty windows passive and benign. He felt a tickle of something like excitement struggle up from the pit of his stomach.

Nancy was watching his face. "Well?"

He shrugged, attempting to appear uncommitted.

Nancy stamped her feet. "This-is-it, this-is-it, this-is-it!" she said. "It's perfect!"

He shook his head. "Nancy . . . I don't know . . . "

She sobered suddenly, dousing the smile. She could do that. It was like having a deep hole appear in the sidewalk right where you were about to step. It scared the stuffing out of Leon. "Would you rather starve? Do you think *they'd* rather starve? Right this minute, there could be a bus loading up at Juvenile Hall. Your friend Mike could be on it. It's going to take him to a place without roofs or walls or food or drink. This looks pretty good next to that."

It did look pretty good next to that. "It'll take a lot of work," he said.

"Anything that's worth anything takes a lot of work," Nancy countered. Then she punched his arm. "Come *on*, Stu. What do you *really* think?"

He grimaced. "If I told you, you'd think I was out to lunch." He slapped his thigh. "Let's get this show on the road."

On the way back into town, Nancy made copious lists of tools, supplies, sundries and urgent phone calls to make. Meanwhile, Stu paged through imaginary architectural renderings of red, white and blue gas stations and drive-ins of indeterminate age. As a result, he nearly missed the scene that was unfolding in the parking lot north of the town square—nearly, but not quite. Nobody could fail to notice the trio of black-and-whites converged in one corner. Stu swore and pulled the car into the curb.

Nancy looked up from her lists. "What—? Lucy!" She was out the door before Stu could even think of dissuasion, clipboard forgotten on the empty seat. He sat there in uncertainty for a moment, then got out of the car and followed, cautiously.

Nancy was already involved in the stand-off, putting herself directly between the cops and their quarry. She was gesturing wildly, her voice creating hot punctuation marks in the cool, crisp air. Behind her, the old woman sat cross-legged on the grass, her little piles of goods—pilfered from the dumpsters of the rich and famous—spread about her on colorful scarves. Her head was tilted stubbornly, arrogant chin thrust upward. Dark eyes spat a tirade of steamy Creole invectives at the four young city soldiers, who were clearly not sure what to do. They eyed the small crowd of tourists and natives that had gathered to watch.

A fifth officer manned the radio in his squad car, no doubt seeking guidance from higher up. Apparently, he

received it—he left the car and issued a report to his teammates that took all of two seconds.

Stu stood helplessly by and watched as both Lucy and Nancy were escorted to a squad car and ducked inside. Lucy's goods ended up in the trunk of the same car. Her shopping cart—a late model Raleys—was left in the care of two blue-suited boys who peered uncomfortably at the crowd. They peered back —interested, angry, uncertain.

That was when Stu saw the discams topped with station call letters; saw the TJs in their ersatz-wool blazers with matching microphone wind filters. One camerawoman zeroed in on the shopping cart. He followed the movement with his eyes and stared at the cart for a full minute before he could tear them away. When he did, it was to see Billy McGuire standing not five feet away, his colorless eyes squinting into desperate, miserable slits.

Stu moved quickly, pulling the old cowboy away from the scene, listening silently to husky whimpers of desolation.

"My Lucy . . . Why'd they hafta find Lucy? Oh, damn that girl! Why'd she hafta go out peddlin' her crap? Didn't she know this'd happen? . . . My Lucy . . . " And it started all over again.

Stu drove Billy back to the Mission, where someone would have to stand between him and that suddenly irresistable bottle of booze. A peculiar feeling that was neither shock nor anxiety nor good red anger roiled behind his solar plexus. He was calm telling Leon what had happened. Calm, because Leon could be counted on to panic and make his voice squeak incoherently. He was calm driving Leon to the police station, where it took over two hours to get Nancy released.

He didn't know what he was saving his anger for until the three of them were back in Annie's borrowed station wagon.

Nancy slammed the passenger side door and looked at Stu with eyes that had "mutiny" etched across each iris. "Now, we mobilize," she said.

Stu nodded, gritting his teeth so hard his jaw ached. He gunned the engine viciously and jerked the car into reverse, checking to make sure that no one had wandered into the path of their backward plunge. In the rearview mirror, Leon's face had gone suspiciously white.

David Paice wriggled in his seat and adjusted his baseball cap. The street looked the same as it had half an hour ago—dark, misty and quiet, except for the comings and goings of dart-like prowl cars. He watched the garage doors disgorge them at regular intervals.

He glanced at Stu. "Maybe they won't do it tonight," he said.

"Unless they want to have to feed these people another meal and put them up for the night, they have to move them pretty soon."

"How about now?" David pointed across the street.

The sharp nose of a police van had appeared in the exit of the station parking lot. It rolled down the ramp that sloped to street level and turned left onto Darlington Avenue. Stu and David watched it glide past their side street observation post, street lights flickering on the faces of its passengers.

"That's it," said Stu. After a discreet pause, he started the car, flicked on the lights and pulled out onto Darlington. The van's tail lights glowed ahead of them at a traffic signal. They caught up before the light changed and rode the van's trail out of town.

It was the proverbial piece of cake. The only problem was that the drop site was on the opposite side of town from Serendipity Springs. It was a grove of trees near an overpass. Chosen, Stu imagined, for its proximity to the freeway and a major county road. It was a broad hint to the indigents to take a hike—literally.

He bypassed the grove and pulled the station wagon onto a rutted dirt track.

David flipped off his seat belt. "I'll bet I can see from the roof," he said, fumbling for the door handle.

"Whoa!" Stu's hand clamped on his shoulder.

"What's the matter?"

Stu pointed at the roof of the car, then twisted the dome light to an off position. "*Now* go."

David grinned. "Sorry, I forgot." He was out the door and clambering onto the roof.

The car rocked briefly, then settled as David found a comfortable position. There was a bare five minutes of calm before the car began rocking again. The door popped open and David deposited himself inside.

"All done," he said. "The van's on its way home."

The pitiful group of transients was still standing in a confused huddle when Stu caught them in the cold glare of his head lights. They all turned and blinked warily, then one stocky, glaring, red plaid figure separated itself from the group, assuming a defiant posture.

Stu grinned and brought the car to a halt. "Mike!"

Within fifteen minutes of their hurried conference, Stu was transporting a car full of indigents to Serendipity Springs. Nancy had set up her command post in one of the creaking houses and was ready for an army of homeless. The nine that arrived were overwhelmed by the warmth and hospitality of their greeting.

Stu was overwhelmed, too—with the complete transformation Nancy's team had worked on the dilapidated building in a mere six hours. The interior had been scrubbed within an inch of its life and smelled, not of disinfectant, but cedar and spice. Oil lamps were scattered about everywhere, illuminanting piles of blankets and goods. It was like Christmas at Aunt Mary's or a scene from *It's a Wonderful Life*.

Stu told Nancy where she could find the remainder of her lost sheep and accepted an invitation to a hot dinner. He slept in Serendipity that night and dreamed of drive-ins and malts and carhops on roller skates.

There were twenty-five homeless in Serendipity by morning. They were clothed, fed and the mostly-sober put to work on Nancy's scrub team. Stu spent the morning running errands for "The Committee"—the unofficial title of the ad hoc steering group of which Nancy Yee was the nominal head.

By the time Stu and his companions stopped erranding, another group had an unofficial title. The homeless had begun calling themselves the "Down-

&Outer Club," and Billy McGuire solemnized the appellation with some boards and paint. Stu held the ladder while the old cowboy mounted the "Club" shingle from the porch of the shabby Victorian that served as relief center. The "Down&Outers" broke into spontaneous applause—the probably-haunted house was theirs.

"Who owns this property?" Stu asked Nancy after the impromptu "ceremony."

"I don't know. State of California, probably."

"Aren't they likely to want it returned to them at some point?"

"Why? So it can continue to rot in peace?" Nancy's dark eyes flashed. "I've seen you snooping around the foundations and poking your nose into the attics. These buildings are salvageable, and you know it."

"*Marginally* salvageable."

"*Salvageable,*" repeated Nancy. "Why are you trying so hard to be a wet blanket, Stu? This sort of thing should be right up your alley."

"Stealing towns?"

"No, urban renewal. And we're not stealing. Borrowing, maybe . . . Scavenging. These people are professional scavengers, aren't they?"

When he didn't reply, she gave him a sly glance. "You didn't answer me. How come you're being such a drip?"

Stu barely managed to keep from laughing outright. "I didn't know I was being a drip. I thought I was being a realist."

"Realist-shmealist. You're being a drip." Nancy suddenly became disconcertingly earnest, scooting sideways on the porch step to face him. The step groaned in protest. "Stuart, Serendipity is no place for realists. It's a place for dreamers."

"You evicting me?"

"I'm exposing you. You're no realist. A realist would still be in Chicago planning lucrative suburbs, not nursemaiding the refuse of Santa Theresa."

The word "refuse" raised his hackles. He started to rise to the bait, then accidentally let his eyes get tangled with hers.

"*Dream,* dammit," she said.

He sighed deeply and gazed around him. "It's salvageable, Nancy. Every building but that old barn next to this place. That should come down."

"OK. What about this place?" She nodded back over her shoulder.

Stu grinned. "I was thinking it'd make a great Bed & Breakfast for the Down&Outer Club."

Nancy's answering smile was dazzling. "Then Bed & Breakfast it shall be. How many able-bodied souls do you need for your construction crew?"

Stu shook his head. God, but her mind moved like a cat. "Six or seven."

"You got 'em."

Nancy was up and away, leaving Stu feeling as if he'd just visited Oz. . . . Or the Twilight Zone, he thought, surveying the tree-shrouded street. Just beginning to bud, the half-naked trees looked benignly sinister. Their skeletal branches dangled like the arms of lonely wraiths, wearing nothing but bracelets and rings of peridot and emerald.

He shook his head. Definitely Oz.

By 3:00 that afternoon, he found himself at the head of a team of outsized Munchkins. Billy McGuire and David Paice were among them, as well

as an out-of-work carpenter and an aging bricklayer. The remainder of the eight-person crew were young and inexperienced, but eager.

Stu put a group of four to work cataloguing areas that were merely unsightly, while he checked more thoroughly for structural problems. Annie Lee set about tearing down crumbling wallpaper, while her sons tagged obediently behind Billy, scavenging for usable wood. There wasn't much, although a search of the ramshackle barn revealed a stack of warped but recyclable two-by-fours under a rotting tarp. Nancy Yee added wood to one of her ubiquitous lists.

The donations of food, clothing and supplies were astounding. Members of the Committee's various civic groups would visit Serendipity with eyes wide open. "You could use 'this' or 'that,' " they'd say, and disappear, to reappear later with the aforementioned 'this' or 'that.'

By the end of their first week in Serendipity, the Down&Outer Club's growing membership had lawn mowers, hand tools, power tools, wood, some odd lots of brick and cinder blocks, and one small semi-quiet generator. They also received old furniture, rugs, and even a couple of wood stoves.

Nor were their less tangible needs ignored. There was no alcohol in Serendipity Springs, but there were a number of alcoholics. There were no drugs, but there were those who considered them essential to their existence. Nancy's contacts with AA were immediately on the scene setting up meetings, recruiting people to attend them.

"Only seven?" Nancy asked, looking over the list of volunteers. "Only seven people signed up?"

Shelley Forbes shook her head. "Don't let it worry you, Nan. These are just the ones who are ready to admit they have a problem. There'll be more coming as soon as it sinks in that they're cut off. The only way for them to get booze or drugs is to go back into Santa Theresa, and if they do that, they'll just get kicked right back out again. A word of warning, though. They could cause problems for you in the meantime."

Nancy nodded in resignation. Problems. There always would be problems. Somehow she'd hoped Serendipity would make them all go away.

Stu's work crew expanded, so he expanded his renovations to the old mercantile. As it happened, that was a stroke of good timing—thanks to a few carefully placed suggestions, there was a sudden influx of day-old baked goods and other perishables from the supermarkets and bakeries of Santa Theresa.

"We need a refrigerator for all this," someone said, and several old butcher cases and freezer chests appeared. Some of them were broken, but between the four members of the "D&O Electrical Group," two meat cases and three freezers were soon restored to a semblance of functionality.

"I could can this stuff, if I had mason jars," Annie said, eyeing the perishables, and jars appeared. Annie Lee and Loucette became the hub of the food preparation team—"The Cookery." They turned the salvageables into stews and goulashes and broths.

If it was old, or new but not working just right; if it was perishable, unsalable or unwanted, it showed up in Serendip-

ity. Which was not to say that many nice, new, shiny things didn't also show up in Serendipity, but used things appeared in much greater abundance.

"Hand-me-down things for hand-me-down people," muttered Mike Hanrahan acerbically, appraising a truckload of gnawed-looking furniture. "This whole damn town is a hand-me-down."

"Now, y'old mule-head," returned Billy McGuire. "This stuff'd be great if it was refinished proper."

"Hmmm. And I s'pose yer just the fella t'restore't?"

"It'd be a job," Billy admitted, "but if I had some varnish remover and sandpaper. . . . "

"Beautiful job, Billy!" Nancy admired his handiwork from the open front door of the D&O Club. The little Queen Anne table glowed with the warm sheen of wood oil from beside the half-refinished staircase. "Who did the doily?"

"That's tattin', deah," Loucette informed her, entering the hallway from the front parlor. "That dahlin' old girl, Mrs. Etterly done it. Lahd, when she come heah, she'd a whole *bag* o' tattin'." She chuckled. "Totin' that big ole bag, an' not one stitch a' clothin' in it, jus' lace an' thread an' them little crochet hooks." She said something in French and laughed.

Nancy stared at her. "Lucy, *where* did you get that *wonderful* outfit?"

Lucy smiled her glorious smile and made a piquantly tottering pivot. "Isn't it *grand,* though?"

"It certainly is *you,*" Nancy said, and meant it.

The old red dress with its padded shoulders and tiny waist almost made her see the elderly Creole as she no doubt saw herself—a Creole Queen, eternally youthful. To add to the quality of agelessness, Loucette's hair was sprayed and netted into a style that fit the dress perfectly. The whole effect was underpinned with a pair of worn black velvet pumps, complete with round toes and tiny, crooked red bows.

"A very kind lady from the Salvation Army gave me these," said Lucy. "Can't see why anybody'd throw out such a fine dress. Annie did my hair," she added, patting the sleek, black coil.

"You look like a model-doll, Lucy," Billy enthused.

Lucy's black face glowed with delight. "An' your table is très belle, Guillaume."

Nancy looked at the little table speculatively. "Billy, didn't I see about three more of these little guys in the cellar?"

"Yeah, I got one for th'other house in the works."

"Will they all look as good as this one, do you think?"

Billy scratched the snowy carpet of stubble on his jaw. "Don't see why not. One's got a cracked leg, but I think I can wood putty that just fine."

Nancy crossed the hallway and brushed her fingertips across the warm grain. "Hmmm," she said, and smiled. "What's cooking? Smells Creole."

It *was* Creole. Everything, from the potatoes to the plentiful zucchini to the fish, tasted of Louisiana kitchens. Two rooms had been set up for dining, making use of the various shapes and sizes of second-hand tables and junkyard chairs that had found their way into Serendipity.

Nancy stayed for dinner, sitting at a table with the Paices and Stu. She was tending toward moody silence until David's "Pass the zucchini" became "Pass-the-zucchini-you-should-see-what-Phil-Kroeger-and-I-found-out-behind-that-old-filling-station!"

"David, where're your manners?" asked Annie Lee reflexively. "Didn't I teach you to say 'please?' "

"Sorry, Mom. Please. It was the neatest thing—this whole barn full of old junkers."

"Junkers?" asked Nancy.

"You know, old cars. *Really* old cars. Antiques."

Nancy's eyes took on a speculative gleam. "Hmmm. I wonder if we could sell them to a junkyard or car mechanic."

"*Sell* 'em?" David laughed. "Over Phil's dead body! He wants to—um, re—um, refur—um, fix 'em up. You should've seen the way he drooled over that old Buick. *Gag* me! It was really pukey."

"Yeah, pukey," echoed Sammie, rolling his eyes.

Annie Lee bristled. "David Andrew Paice, you watch your tongue! You're not too old to have your mouth washed out with soap."

"Just too big, huh, Mom?" David quirked a grin at Stu, who failed to return it. The grin faltered. "Uh, sorry, Mom."

"Me too," said Sammie, not to be outdone, even in contrition.

Nancy picked up her half-empty plate and headed for the kitchen. "See ya," she said.

Stu watched her go, suspecting that a new list had just sprung into being.

* * *

The truck arrived bearing a jumble of auto parts. It left carrying several pieces of Billy McGuire's refinished furniture, a crate of The Cookery's canned goods, and a bag of Pearl Etterly's tatting.

Phil Kroeger was ecstatic, and closeted himself with David Paice in the rundown garage with a decrepit Buick and the parts. They were seen only at meal time, looking like they'd been bathing in thirty-weight. Annie Lee quickly despaired of getting her oldest son washed up for dinner.

A bare week after the arrival of the auto parts, Phil stood sheepishly outside Nancy's office at the Mission, looking as if he'd committed some heinous offense.

Nancy glanced up and saw him there—lumberjack cap in hands stained even darker than their normal mahogany. "Good grief, Phil! What's wrong?"

Phil shuffled. "Well, Miss Yee, it's like this . . . It's my cars."

She didn't even help him along with so much as an 'Oh?', so he was forced to clear his throat and look even more sheepish and shuffle again.

"I finished one of 'em."

Nancy's face lit up like Mrs. O'Leary's barn. "That's *wonderful!* You'll have to take me out for a spin."

"Well, Miss Yee, that's just it." Phil's voice, soft as his over-sized black eyes, grew even more muted. He saw that Nancy was about to ask him to speak up (everybody did), and cleared his throat again. "I can't take anybody for a spin. I don't got gas."

"Gas," echoed Nancy weakly.

"Um . . . yes, ma'am. *Real* gas

. . . gas*oline*. I managed to get a gallon here'n there to test the engine, but not enough to *drive* anyplace. Stuff's hard to come by these days.''

Nancy flipped open a notebook and scribbled something. ''Gas-o-line,'' she said, then reached for the phone and her Rolodex simultaneously.

Phil boggled, watching her move —flipping through the Rolodex with one hand, picking up the receiver and punching out the prefix with the other. The Rolodex hand stopped and the phone hand completed the number.

''Hi! Is Mr. Garvey in? . . . Nancy Yee . . . Thanks!'' She winked at Phil and picked up a pencil. ''Hi, Mr. Garvey, Nancy here . . . What? . . . Oh, yes, the car parts were a *God* send. We really appreciate—Oh, no, thank *you*, Mr. Garvey . . . Jim . . . Actually, that's what I'm calling about. Phil's got one of the cars in running condition, but it doesn't have a converter and we don't have any gasoline for it and . . . Well, that'd be nice . . . Well, I'm sure Phil would be happy to show it to you. . . . Sure!'' She glanced at her watch. ''How about one o'clock? You could have lunch out there with us. . . . Nonsense, Jim. There's plenty. All our friends have been just as generous as you have. . . . Great. You like Creole? . . . Fantastic! See you at one, then? . . . Oh, it's that old red-white-and-blue filling station on A19 at 80 . . . Uh-huh. Just turn in there . . . Wonderful. We'll meet you there, then.''

She hung up with a smile of satisfaction. ''You shall have fifteen gallons of gas at one o'clock this afternoon. That ought to be enough for a good spin.''

Phil's slow smile was crooked and full of holes. Nancy thought it was one of the best smiles she'd ever seen.

Jim Garvey was as good as his word, showing up at 12:50 in front of the old filling station with three five-gallon cans of gasoline.

''What a gasser!'' he chortled, ogling the faded red-white-and-blue pumps. ''Little pun, there,'' he informed Nancy.

She smiled and nodded. Phil shuffled.

It took ten minutes to pull Garvey away from the battered garage, but he finally followed them to where Phil's pride and joy awaited what was probably its first square meal in forty years.

''Fifty-two Buick!'' Jim Garvey breathed awfully. ''Not bad shape. Little dinged up, though.''

''Haven't got the stuff t'do much body work,'' said Phil defensively.

Garvey waved that aside. ''Pretty is as pretty does,'' he said. ''Let's see how she runs.''

''She'' ran like an Olympic marathoner—steady and smooth. Phil took Nancy, David and Jim Garvey on the inaugural spin and was toothily beaming from ear to ear when they pulled up again twenty minutues later in front of the gas station.

Stu was there, examining the underground gas tanks, when they drove up. He rose and waved, unable to resist answering Phil Kroeger's infectious, lopsided grin.

''Sounds great, Phil! Good work.''

''Thank you, Mr. Williams.''

''Stu,'' Stu corrected him (for about the fiftieth time).

Phil smiled and nodded.

Jim Garvey had gotten out of the

Buick and was peering into the gas tanks. "Y'know these tanks look like they're still good."

Stu joined him. "I was wondering about that. Is there anyway to tell for sure?"

Garvey chuckled. "You thinking of setting up business?"

"No, just idle wondering."

Nancy squatted down opposite them, staring at the stygian hole. "Of course, we could use some gasohol for all the relief vehicles, and gasoline for Phil's projects." She wrinkled her nose. "Pretty silly idea, huh? It'd take a fortune to fill these."

Jim Garvey's eyes fell on the Buick, returning only reluctantly to Nancy's face. "I imagine it'd be real handy for you folks to have working pumps out here. . . . Especially if Phil here is planning any more renovations. Wouldn't hurt to check it out."

Nancy smiled.

Jim Garvey was mightily impressed with the Cookery's Creole cuisine. He was also impressed with the amount of work the Down&Outers had done on their new quarters.

"This is great, Nancy," he congratulated her after a lunch of filé gumbo and hot, sweet French bread. "You folks have done a bang-up job on this place. That little motel is looking real cute. Y'know, it kind of reminds me of the little town I grew up in . . . Truelove. Truelove, Idaho."

He smiled reminiscently, stomach and heart both feeling comfortably full. "I remember we had one of those drive-ins, too. You know, the ones that looked like a giant mug of root beer? Sat out by the hiway . . . such as it was."

He chuckled, then stretched and stood up. "Well, I got work to do this afternoon." He rolled comfortably to the dining room door, then glanced back at Phil Kroeger. "You do body work, Phil?"

"Yessir."

"Hmmm." Jim waved a hand in farewell and left.

The double tanker truck showed up five days later with a big, red ribbon around its curved flanks. A huge banner across the nose of the truck announced it as a gift "From the Petroco owners of Santa Theresa." It rolled into Serendipity at noon on a Saturday, escorted by Jim Garvey and a TJ from the local PBS station.

Nancy was immediately wary. "Jim, you *know* we don't want any publicity."

Garvey had the good graces to look embarrassed. "It wasn't me, Nancy. One of the other owners happened to mention to his wife that we were doing this charity bit and she works for KETV. Next thing I know . . . " He shrugged and glanced at the journalist—an earnest-looking young Hispanic woman with glossy black curls that were bobbing vigorously as she tapped her first notes into a pocket compad.

Nancy scowled and opened her mouth to say something thwarting, when the young woman looked up and gave her a smile no less dazzling than her own.

"Hi. I'm Pepper Delgado." She held out her hand. "You must be Nancy Yee."

Nancy smiled weakly and took the hand. It had a very firm grip. "Pepper, I . . . We're really not in the market for

publicity. Could I convince you to . . . to leave?''

''*Why?* I'd think publicity would be exactly what you *did* want. You could be drawing support from statewide—even nationwide.''

''We could also be drawing unwelcome attention from statewide, Pepper. This little town may have owners somewhere who might suddenly decide their worthless property is worth something after all. Or at least that they don't want it in the hands of a bunch of reprobates. I don't want this to end up in the courts—we'd lose.''

Pepper was shaking her head. ''Do you have any idea how much weight popular opinion carries in situations like this?''

''Actually, I do. But popular opinion didn't save these people from being drop-kicked out of Santa Theresa. I doubt it'd save them from a charge of 'grand theft, town,' either.''

''I'd be willing to bet you're wrong. If the media took an advocacy role—''

Nancy's eyebrows twitched. ''*Can* the media take an advocacy role?''

Pepper had the honesty to blush slightly. ''Not strictly speaking. But a journalist can. Please, Nancy. This is the most important story Santa Theresa has ever produced. This isn't just tourist pap, it's—it's an epic. It's—''

''It's the lives of about fifty homeless people at the moment.''

Pepper nodded, soberly. ''I *know* that. But if these fifty people are successful, if they can survive, if I can get *other* people interested in their survival—get them to *care* about it . . . Nancy, that's worth something, isn't it?''

Nancy Yee sighed. ''It's worth a lot, if it would really work that way. But what if the wrong people get interested in Serendipity, Pepper? What then? You look at these folks and see heroes—so do I. But a lot of other people look at them and see drunks and junkies and derelicts and juvenile delinquents. If we show off Serendipity to the wrong people—''

''Then it becomes a media battle. It already *is* a media battle. I don't think you realize what a stir this has caused. We still get calls asking what's happened to these people. That's why I'm here—because people still care. Out of sight isn't always out of mind.''

Nancy considered that. ''And who are these people? The callers, I mean.''

''Some are just concerned and curious. A few expressed a great deal of interest in helping.''

''Did you get their names and addresses?''

''They're on file.''

''Can I have them?''

''Can I have a story?''

Nancy looked at Pepper speculatively. ''How'd you like to do a documentary?''

''A documentary?''

''Yeah. Instead of just popping a human interest story, why not a feature: The Resurrection of Serendipity Springs?''

Pepper answered the other woman's slow smile. ''Something to air around the Fourth of July, huh?''

''I like the way your mind works, Ms. Delgado.''

''I have a cameraman whose mind works the same way. I'll need him.''

''Can you trust him?''

"With my life. He's my fiancé."

Nancy tapped the top of her clipboard thoughtfully. "How soon can you have him here?"

Pepper's fiancé, Georg "Sunny" Durande, was an amiable young man with glossy black dreadlocks and skin the color of bittersweet chocolate. He spoke with a tease of Jamaica and moved with a thin whisper of music.

"Don't those give you audio problems?" asked Nancy, fascinated by the sheer number of tiny silver bells entwined in his hair.

He smiled blindingly and drew a soft, black hat out of his jacket pocket. "Part of my recording equipment." He pulled the hat over his head, effectively silencing the bells, and hefted his Lasex PortAVee to one shoulder.

Nancy was quickly impressed with the way Pepper and Sunny worked. They were ubiquitous but unobtrusive —filming everything and everyone, but staying out of the way. The ceremonial filling of the gas tanks, attended by the entire population of Serendipity, was covered in full. Afterward, Pepper interviewed a few of the residents and took a tour of the inhabited buildings.

"You've done an amazing piece of work here," she told Nancy over a cup of hot coffee. "This is a legitimate miracle."

Nancy shot Stu a conspiratorial glance. "We're just getting started. As soon as the motel renovation bears some fruit, we'll be able to house more residents."

"How are you housing what you've got now?" asked Sunny. "Fifty-seven, I make it."

"It's not easy," Stu admitted. "We've got three houses livable. This one, moderately so, the others just barely. We've got running well water. We manage to get it hot once a day to allow bathing. There's electricity for the kitchen and work sites only. No flush toilets yet, but we're working on it. We had to dig outhouses," he replied to Sunny's raised brows. "Two of these old Victorians have five bedrooms. The other one has four. Plus, we've converted a couple of downstairs sitting rooms into bedrooms. Everybody has at least one roommate. Actually, we've got room for more. As far as feeding everybody . . . well, right now we do it in shifts, the cantina here only holds about thirty people."

Pepper nodded, following his gaze around the cozy suite of the two converted parlors, which even now held about fifteen occupants. "This is a real cute place," she complimented them. "Sort of faded Americana. I'll bet it's good for morale to have a place like this to hang out."

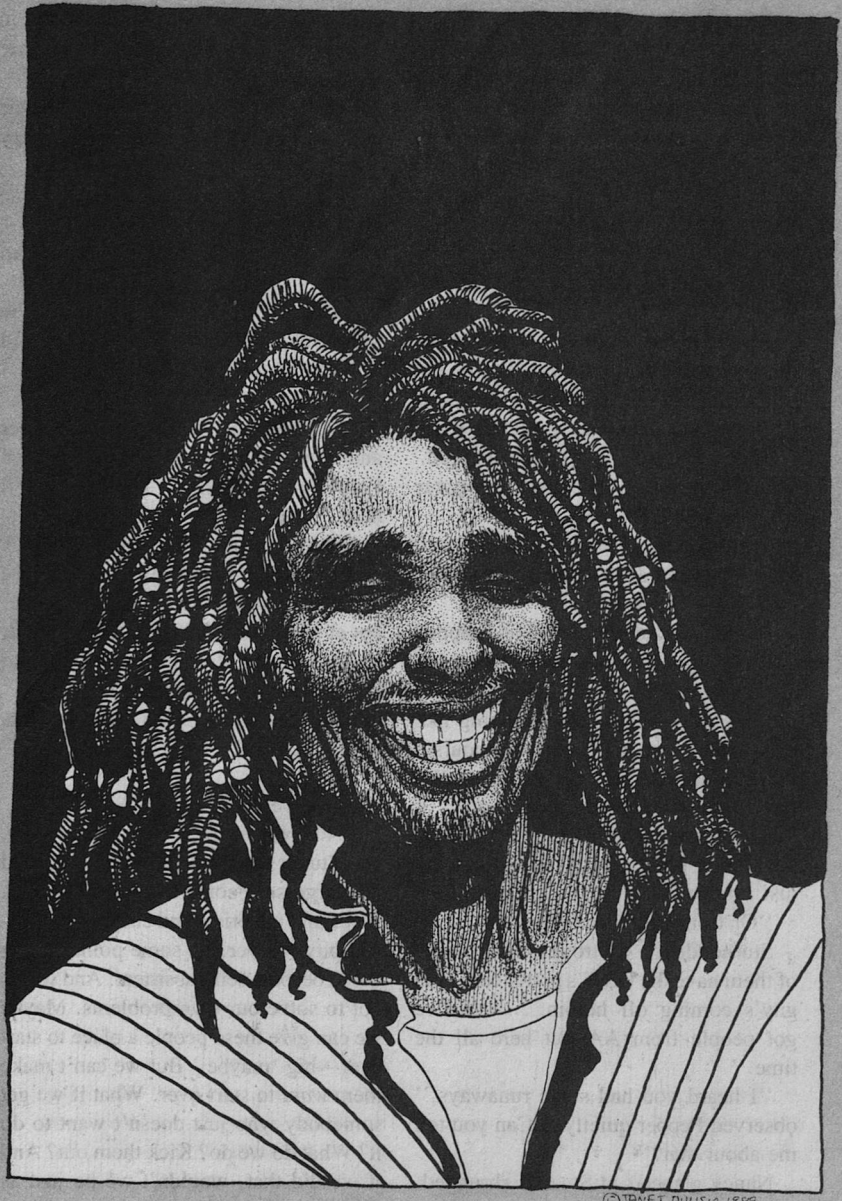
"My patrons seem to be happy." Nancy surveyed the Down&Outers in the "café" and felt a moment of intense satisfaction.

"So what's next?" asked Sunny. "I'm sure your population is growing."

"You bet! Especially since we're literally soliciting citizens. These are just the folks that haven't been able to get off the street in time, or who volunteered to come out here and put their supposedly useless talents to work."

Stu smiled at his coffee cup. "When we hit one hundred, Billy wants to erect a population sign out on the Loop."

"Billy McGuire is our master carpenter," explained Nancy. "We've sold some of his work in Santa Theresa."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Pepper's ears perked almost visibly. "They're self-sufficient?"

Stu and Nancy both laughed.

"Not by half!" said Nancy. "But we're trying. It's like digging for buried treasure—discovering half-remembered or never-developed skills, putting them to work. Sometimes the hardest part is getting these folks past the idea that they're useless or worthless. They're far from it. . . . If we could just convince people of that, get them to invest in Serendipity. . . . "

"One of our biggest material problems," said Stu, "is power. We've got three little Honda generators and four full propane tanks. But to get this place fully modernized . . . " He shrugged.

"What about alternative power sources?" asked Sunny.

Stu nodded. "We're looking into both wind and solar. But we need materials and expertise."

Pepper looked thoughtful and tapped on her compad, while Stu wondered if she generated as many lists as Nancy did. He felt a niggle of something like guilt and cleared his throat. "Of course, those are just the material problems. We have human problems too. Some of these folks are alcoholics, some of them have other problems, some of them are just trouble."

"Or troubled," said Nancy.

Stu nodded. "Or troubled. A couple of them have the D&T's pretty bad. One guy's coming off heroin. . . . We've got people from AA out here all the time."

"I heard you had some runaways," observed Pepper quietly. "Can you tell me about that?"

Nancy glanced at Stu and shrugged. "They wanted coke. They wanted it bad enough to hike all the way back into Santa Theresa for it. One of them is in jail on a possession charge. The other one is still missing."

"They were kids," said Stu, and was angry but didn't know who to be angry at.

"Sounds like you need a full-time counseling staff," Sunny said.

Nancy smiled faintly. "We can dream."

Pepper's compad squealed at the speed of her note taking. She wanted to do more than dream.

"I like them," said Stu, after Pepper and Sunny had packed up notes and PortAVee and left. "I think they'll help."

Nancy sighed. "Me too. But they made me realize just how much help we need. I mean, this place is reclaimable, but at what cost?" She shook her head, looking, for the first time since Stu had known her, almost defeated.

"Is it the place or the people you're thinking about?"

"Both."

"Are we doing badly?"

"No. No, we're not. Not right now. But Stu, it can't go on indefinitely. All this largesse. People can't keep pouring funds and materials and energy into Serendipity forever. At some point, we've got to become self-subsistent. And we've got to solve our own problems. Maybe we can give these people a place to start over—big 'maybe.' But we can't make them *want* to start over. What if we get somebody who just doesn't want to do it? What do we do? Kick them out? And if we did that, wouldn't we be just as

guilty as the society that rejected them in the first place?''

''Some people don't want to be helped, Nancy. That's just the way it is.''

''But what do we do with them? What do we do with Stark Benson if he won't go to the AA meetings, and he won't work, and he won't even talk to the counselor?''

''I don't know. I don't have an answer to that. But I do have an answer to the other problem. I think we can be self-subsistent. Hell, I *know* we can.'' He got suddenly to his feet. ''Come on. I want to show you something.''

He took her hand and led her out through the kitchen, past the coy looks of its staff, across the half-groomed back yard and through a recently rehung gate in the unkempt hedge.

Nancy side-stepped the pair of shears lying near the gate and stopped, her eyes wide. In front of her, within the huge rectangle formed by the hedge, neat rows of tilled and furrowed soil stretched in a crazy-quilt pattern. On stakes marking each section, seed packets proclaimed what was planted in the furrows. In one corner, a monstrous growth of squash sprawled, a pile of clippings lying next to it on the earth. Other, less primordial-looking plants dotted the large plot.

''When did all this happen?''

Stu laughed at the expression on her face. ''Not overnight, I assure you. Some of our Club members found the plot and decided to try their hands at gardening. Seeds are cheap, so we approached a local nursery. . . .'' He shrugged. ''We'll know if any of us have green thumbs in a week or two.''

''But those great big . . . whatevers . . . '' Nancy waggled a hand at the squash.

''Remnants of the previous residents. It was pretty wild, but I think we've trimmed it back enough to see some produce in season. And this isn't the only plot. There's another one in about the same condition behind the pink stucco. Plus, there's the orchard on the other side of the motel. Peaches, cherries, apples. It's pretty overgrown, but the trees all seem healthy enough. Some of them are starting to blossom already.''

Nancy smiled. ''Just like the Down&Outers, huh?''

''Feel better?''

She laughed outright. ''Can this be Stuart Williams, the realist?''

''Realist-shmealist,'' Stu grinned. ''Serendipity is no place for realists. We ran 'em all out of town.'' There was a definite dream-gleam in his eye.

Nancy saw it and nodded. ''Yes, I feel much better.''

The rains came in early April and, with them, enough indigents to more than double the population of Serendipity Springs. Billy McGuire chose a piece of wood for his population sign.

Three units of the motel were finished and pressed into service, and work started on the interior of the little church.

Glorying in the equipment lent by Jim Garvey's Petroco, Phil Kroeger finished the body work on the '52 Buick and unveiled her during a break in the weather. Jim Garvey immediately handed him a check for $36,000.

Phil, who had never seen so much as a fifty dollar bill, could only stare at it.

"She's a classic car, Phil," said Garvey. "And you did a classic job on her."

"But, Mr. Garvey," stammered Phil, still staring at the check, "you can't drive her out on the road. She's illegal—she burns gasoline. You need to get 'er converted."

"No, sir." Jim patted the Buick's gargantuan nose. "What I need is a classic car permit and I have one of those. She's worth more than thirty-six thou', of course, but if I leave you the equipment you've been borrowing, we should be even up."

Phil's big, dark eyes filled with tears. "Thank you, Mr. Garvey. Thank you."

"My pleasure," said Jim. "Literally." He studied Phil's face for a moment, then said, "D'you mind if I ask sort of a personal question?"

"No, sir."

"How'd you come to be a—a—"

"Hobo, sir. Tha's what I call myself. Jus' a hobo."

"What I mean is, how come you're not doing this kind of work for a living? You're damn good at it, you know."

Phil glanced at the check again. "Wellsir. I used to do this sorta work. Then I got real sick. Didn't have no bennie-fits. Y'know, hospital—that sorta thing. When I was well enough to work again, I was sorta broke up lookin'. An' *broke*, too. Hadta go on welfare. Nobody seemed to want an old, broke up dude with no schoolin'. Nobody believed I could do what I said I could do."

Garvey nodded. "Well, I believe you, Phil. You've got a touch with old cars."

Phil smiled his slow, holey smile. "Tha's 'cause I love 'em, I s'pose."

"Yeah, and I bet they love you, too." He patted Phil's shoulder and headed off to take possession of his old new prize. "Don't spend that all in one place."

The check was spent in many places, but the Committee made certain some of it went toward turning Phil's ramshackle auto shop inside out and putting it back together in much better condition. He even got an old Coke machine to stand invitingly against the front of the building.

Billy McGuire painted his population sign red-white-and-blue and used the same colors on a sign for Phil's garage. Both signs were reared the same day with all Serendipitans in attendance. One sign said: "Serendipity Springs —Population 137." The other said: "Phil's Klassic Korner." Delgado and Durande recorded the event for posterity.

They also recorded the return to Serendipity of several runaways. There was an angry and tearful welcome. There was a fight. Two stayed and entered the rehab program, one left and never returned.

When a couple of residents were found smuggling booze into Serendipity, Delgado and Durande recorded that as well. And when Billy McGuire, suffering from the lingering effects of their smuggling, went into D&T's, he insisted they be there to disc his agony.

"I want to remember," he said. "An' I want them kids to remember. This is

what hell's like. It ain't no burnin' place. It's a damn drunk tank."

His Lucy cried and that went down on disc, too.

They also recorded the ongoing restoration work. There were four crews, now. Two handled destruction and construction, two handled interior finishing. While one crew tackled further clearing and cleaning of the motel with inexpert gusto, the more experienced took over work on the two half-finished Victorians. The finishing crews followed them around cleaning, painting and wallpapering.

"Granny wallpaper," Annie Lee dubbed it. It was leftover stuff, mostly; dignified patterns in muted granny colors. It fit the aging houses to a "T."

So did the truckload of antique furniture and carpets driven into town by two smiling representatives of the local Catholic Relief Association. Nancy and Pepper, chopping weeds in the front yard of the Down&Outer Bed & Breakfast (or the D&O/B&B as it was affectionately called), ogled the rich assortment with unabashed lust.

"What's this?" Nancy asked the beaming driver.

The woman looked as if she was fighting a raging case of giggles. "This," she said, "is from the estate of Dorothy Calderon. She died two days ago and bequeathed all of her furniture and some of her cash assets to Serendipity Springs."

After five seconds of silent amazement, Pepper giggled. So did the Catholic Relief ladies.

"This is just great!" sighed Pepper finally. "I'll get Sunny and the discam—"

"Right behind you, and recording," said Sunny's voice. "Nancy, are you going to open your present?"

Nancy laughed, eyes dancing. "Wow, you betcha!"

It was Christmas in April. There was a literal houseful of antiques, everyone of them breathtakingly beautiful. The Down&Outers unloaded each piece with great care, ooh-ing and ah-ing.

"I ain't never, *never* had anything like this!" exclaimed one middle-aged woman cradling a Tiffany lamp in her arms as if it was alive.

The riches were distributed between the restored Victorians, finding places of honor in parlors, front halls and bedrooms. All of the late Mrs. Calderon's fine dining room tables went to The Cookery dining parlors. Those, with a few additional appointments and some of Pearl Etterly's tatting, gave the establishment a breath of fading class—like a dried orchid pressed between the pages of a first edition of "Jane Eyre."

Annie Lee laughed delightedly at the stunning effect of polished wood reflecting the dancing flames of a dozen oil lamps and candles. "This is fantastic! Lord, I wish we could open up for business. Can you imagine, Lucy?" She draped an arm around the older woman's thin shoulders. "Now all we need is a piano so you can sing for our supper."

"We do have a piano," said Nancy. "A baby grand. That is, it's ours if we want it. Or we can sell it for what it'll bring at auction. They left it in town because it needs to be moved by pros. Do we want it?" She looked to Lucy for an answer.

"It'd prob'ly bring a lot at auction . . . ."

Nancy shook her head. "Not important. The question is, do you want it?"

Lucy's eyes glowed. "Oh, Miss Nancy, I would jus' love to have a piano."

They installed the baby grand in one corner of the larger dining parlor. Pearl Etterly draped it in lace and Lucy sat down to test the keyboard. It was well tuned and Lucy's experienced but rusty playing filled both rooms with sweet, blue sounds. She played and sang for the diners that night, accepting their requests (when she knew them) with smiles and their praise with flushed modesty. Her voice, deep and smoky, was laced with the hairline cracks of age, but still had the power to enchant.

After dinner, Nancy called a town assembly. All adult Down&Outers and several of the older kids crowded into the twin dining rooms to hear what was up. The Delgado/Durande news team put the gathering on video disc.

Nancy stood at the head of the front dining parlor on the raised flooring of the big bay window embrasure and addressed the assemblage. "By now, you've all seen the beautiful furniture that's been moved into the houses. It's ours because a very sweet lady changed her will three weeks ago and made us—Serendipity—heir to her house furnishings and about eighty thousand dollars of her cash estate."

A murmur of stunned appreciation circled the room, followed by enthusiastic cheers.

"I believe she knows how grateful we all are for her wonderful generosity," Nancy continued, when the good-humored roar abated. "But I still wish she could be here tonight so we could throw a party for her. However, we've got lots of friends who are still very much alive, and I think it would be a nice gesture to throw a party for *them*."

The idea went over like fireworks on the Fourth of July. Plans for the May Gala began immediately. Nancy compiled the invitation list and Jules Trevor, secretary of the Committee, printed the invitations and recruited a detachment of couriers to hand carry them to the recipients. Annie and her kitchen staff planned a sumptuous but thrifty buffet and Lucy practiced her repertoire of silky, sultry tunes.

The Construct and Interiors crews put in extra hours, exhausting themselves in an orgy of cleaning and finishing. They converted the remaining parlor of the D&O Club into yet another intimate and homey dining room, and turned the old house into a Victorian showplace.

Pepper Delgado surveyed the finished product thoughtfully, then hiked down to Phil's Klassic Korner to use the pay phone. She returned to town, looking like a cat backstroking through heavy cream, just about the time Sunny was introducing Stu and Nancy to a gentleman with white hair, wire-rim glasses and a Ph.D. in solar engineering.

The gentleman, Paul Walker by name, spent the afternoon in conference with Stu, either closeted in Stu's office or wandering about Serendipity. Pepper, meanwhile, spent the afternoon softening Nancy up to receive one of her brainstorms. After chatting at length about the wonderful progress the D&O Club had made and how many new friends they had enlisted among the more influential citizens of neighboring

Santa Theresa, she finally made an approach.

"That," she declared, nodding at the D&O/B&B, "is a major accomplishment. I mean, it looks like it was done up by some hotshot architect/designer."

Nancy beamed at the old house. "It does look great, doesn't it? These are pretty exceptional people."

"I kid you not, Nance. This place would look right at home on the cover of *Home & Garden* or *California Life*. . . . It's a shame it has to be hidden from the world."

"What do you have in mind, Pepper?" Nancy glanced at the other woman's face. "Or maybe I should have said, 'Pepper, what have you done?' "

"Nothing reprehensible. It's just that I have connections with a couple of magazine publishers. I called them in."

"Called them in?"

"Favors. I share research with people, do some interviews, special interest stuff."

"And what did you tell these connections?"

"That I had a special interest scoop—a unique restoration project."

"Pepper . . . "

"I didn't reveal anything important. Laid it out like kind of a 'Mystery Spot.' They *love* that kind of stuff. Whets their appetites. More to the point, it whets the readers' appetites." She watched the expressions chasing each other across Nancy's face for a moment, then said, "By the way, I've found us another benefactor. . . . Can Sunny disc the Gala?"

Nancy choked on a laugh, then scowled with mock severity. "Sunny had better disc the Gala, or he'll be the last course of the evening. And who's this mystery benefactor?"

Pepper pulled a business card out of her pocket and handed it to Nancy, suspecting for a moment that she had wasted her trump card.

"Hey! This guy owns a lot of real estate. And isn't he involved with civil liberties stuff?"

"He's an attorney. A very wealthy, very nice, very generous attorney. He's represented homeless people in court a number of times."

"No kidding?" Nancy tucked the card into her shirt pocket and headed for the house, wielding her trowel. She stopped halfway up the porch steps. "By the way, wish the readership of *Home & Garden* 'bon appetit.' I hope they like Serendipity Surprise."

Pepper whooped and ran all the way to Phil's.

The May Gala promised to be bigger and better than anyone imagined. The guests begged to bring guests of their own, and started a new flood of giving. The "thank you" banquet turned into a fund-raiser with no prompting whatsoever from Nancy or her cohorts.

Offers of assistance poured in. Area high schools formed support groups and volunteered after school and weekend help to speed the renovation process along. They dug and planted, scraped and painted, polished and waxed. And they took their orders in all of this from people who bare months or weeks before had been considered worthless by nearly everyone, including themselves.

Wherever they went, they left a gleaming trail. Everything gleamed.

Everything from the finish on Loucette's piano to the finish on Phil's two newly refurbished cars. Even the four more barely finished units of the "Lucky Lullabye Motel" gleamed—with fresh baby blue and white paint. And if the row of fresh cypress trees along its sweeping gravel circle didn't gleam, at least they looked "damn fine," in the opinion of Mike Hanrahan, who engineered their planting. The motel units were immediately inhabited by three families and four young women late of Santa Theresa's blossoming red-light district.

The night of the Gala, Phil's two new antiques took places of honor flanking the Down&Outer Club's white picket gate. Jim Garvey added a third vintage vehicle to the line up; his two invited guests brought the tally up to five. By 7:30 the main street of Serendipity was lined with limos, compacts, beat-up station wagons—even a school bus.

It was a barely clouded night with a slight, balmy breeze. Japanese lanterns bobbed down the walkway on silver cord, swayed under the eaves of the B&B's wide veranda and dotted the yard with little pools of golden light.

Nancy decided she couldn't have begged for a better night. In the light of Serendipity's four honest-to-God propane fueled street lamps, the place really looked like a living, breathing town.

"Pretty, isn't it?" asked Annie Lee Paice from beside her on the veranda.

Nancy nodded and glanced at her. "Wow! So're you! Has Stuart seen this get-up?"

Annie blushed. "It's just an old square dance rig I altered, that's all." She stroked the lacy shoulders.

"Ah! Do I detect the fine hand of Pearl Etterly in this so-called 'old square dance rig'?"

Annie nodded. "You really think it's pretty? I mean, it doesn't seem . . . silly or old fashioned?"

Nancy studied Annie again. The veranda, with its lanterns and old whitewashed porch swing, was a suitable frame for a pretty Southern belle at a garden party; her guests coming and going behind her, their conversations mingling with the breeze, music floating from her open parlor windows.

"It fits the night, Annie," said Stu William's voice from behind Nancy. "It fits the town. Old fashioned . . . that's just right here."

Nancy grinned. "Took the words right out of my mouth," she said. " 'Scuse me. I've got to check up on the seating arrangements."

Annie watched her duck into the house, glanced at Stu, then smiled shyly at the porch railing.

"I hope you're not planning on hiding that pretty dress in the kitchen all evening," Stu said.

She quirked an eyebrow at him. "Why, you got something in mind?"

"Dinner and dancing. That is a dancing dress, isn't it?"

"I guess it's got a few dances left in it."

"Then we'll make sure they get put to good use."

"Look at them kids!" snorted Mike Hanrahan. "They look like somethin' out an old high school year book! White socks 'n' duck-tail do's."

"You complainin' again, Irish?" asked Billy, handing him a large tray of vegetables and dip. "I like the way they look—takes me back, y'know?"

"Somebody oughta take you back, Cowboy, an' see if they can't fix yeh."

"Guillaume est parfaitement . . . parfait," Loucette informed him. She pointed at the kitchen door. "Now, you jus' take that tray out to dining room one. Dining room one, you heah?"

"Yes, madam. I ain't deaf, just—"

"Stubborn," Lucy finished for him. "That's what's wrong with you, old man. You're stubborn. You jus' can't *stand* to have any fun."

"Fun? Pffft! You call this *fun?* House full o' noisome strangers . . . laughin', carryin' on . . . Hmph! Fun won't start, Miss Lucy, until you start singin'!" And he wheeled out of the kitchen with his laden tray.

"Old crocodile . . . " muttered Lucy, shaking her head. "Scowl at you, an' then pay you a compliment."

Billy shrugged affably. "Guess that's the way he has fun, sugar."

"Um, Mr. Garvey?" David Paice's fourteen-year-old face looked as if it belonged to somebody caught tee-peeing the mayor's house.

"Yessir, what's the trouble?"

"Well, it's this, sir." David fumbled forty dollars and some change out of his jeans pocket and held it out. "Um, I think it belongs to you. It's from gas-ohol. Well, some of it, anyway. Some's for gasoline."

Garvey put down his fork. "You had customers?"

"Well . . . yessir. I was helping Phil in the shop and this car pulled up and they wanted gas. They were real desperate—they were nearly out. . . . Then, a couple more people came in and . . . Was I wrong to sell it?"

Jim snorted. "What else could you do, son? Give it away?"

"Coulda, I guess."

"Hmm. And the gasoline?"

"Some guy with an antique car. He had a license for it—he showed me." David grinned. "You shoulda seen the way he looked at that '72 T-Bird Phil's doing for you. Nearly popped his eyeballs out."

Jim Garvey looked thoughtfully at the handful of money. "How'd you and Phil like to manage a franchise for me?"

"Sir?"

The media were not blind, deaf or dumb. Nancy knew that. And she knew that whatever else it was, the Gala was a media event. It was a calculated risk and she hoped they were ready for the onslaught of attention today. They had to be ready. They had something to fight for—and there were more of them to fight for it every day.

Billy's new population sign featured a replaceable placard which tracked the rise of that statistic in increments of twenty-five. Just that morning, it had been amended to read: "Serendipity Springs, Population: 225."

And that morning, Sunny's plaid Ph.D. friend had begun spec'ing alternative energy sources for Serendipity. And that morning, Stu had conscripted a crew of twenty to start work on his drive-in, while Annie Lee, Billy, and Lucy fielded a similar team to give the old café a thorough scrubbing down. And that

morning, another group of Down&Outers had begun finishing work on the church.

And that morning, Stark Benson had stolen his roommate's pitiful savings and some of his clothes, snatched a loaf of bread and some fruit from the kitchen of the B&B, and taken off for parts unknown. A failure. *Another* failure. And as many times as Nancy Yee told herself the failure was not hers, she still racked her brains for something she could have done—something she could do for the next Stark Benson.

And she would still be pondering that this evening while she was being interviewed on national TV. And she would probably still be pondering it the following week when, a bit short of the Fourth of July, Sunny and Pepper aired their documentary.

When maybe all hell would break loose.

What broke loose was more like purgatory. . . . No, Stu decided, that wasn't quite right. It was just life to the power of ten. There were flashes of hell, bursts of heaven and a very earthly sense of waiting in between.

The media were a pain and a pleasure. They were suddenly and constantly under foot, in the way, and generally obnoxious, but the influx of media resulted in the influx of something else that Stu was sure Serendipity Springs had never expected to see—tourists. And with the tourists came money.

MacDonald's Mercantile, set up for the limited needs of the Down&Outers, found its supplies decimated in a weekend. But—wonder of wonders—there was *money* to buy more goods. Bea MacDonald's staff started canvassing local farms for assistance and came up with enough responses to open a produce section. Two farm owners even lent their skills to help the Down&Outers growing group of would-be farmers with their garden plots.

Phil's Petroco station, with its fortuitous location, was doing land-office business and so was his auto shop. Antique car buffs wandered in from far and wide, bringing their special-license machinery with them. The beat-up red barn behind Phil's Klassic Korner became a club house for Jim Garvey's Antique Auto Club—the 'Great Gatsbys.'

"This place is a damn zoo!" muttered Mike Hanrahan murderously, glaring out the window of the Mercantile. "And we're the damn specimens!"

"Nonsense, Michael," Bea MacDonald had retorted. "We are *not* a zoo. In a zoo, the specimens don't get to keep the proceeds."

It was that, along with the genuine caring exhibited by most of their visitors that kept the residents of Serendipity from feeling like they were living in a literal zoo.

It was the hell side of the equation that kept them from feeling like they were living in a literal heaven. Some of the TJ's were from the Tabloids. They weren't so much interested in the progress made by a group of rehabbed street people. They wanted dirt. They wanted to hear about the runaways, asked if the "shady ladies" at the Lullabye were still practicing their trade, imagined secret murders and drug caches.

Several of them disrupted an AA meeting and had to be removed. Nancy simply called the state police. It was an irony, and the police were reluctant to

respond at first, but they did come and they did get the Tabloid TJs off the premises.

No hell is complete without its arch-demon, and in this somewhat homespun version of Dante's Inferno, it was Santa Theresa's mayor, John Eastwick, who assumed the role of Old Nick.

When he had contemplated the possible results of the "Bag Lady Bill," the appearance of a thrift-store township next door was not one of them. Outraged and embarrassed, he called on the police and had Nancy Yee and several other members of Serendipity's guiding Committee arrested. Since he had no grounds to hold them, he was forced to order their release almost immediately. All he got for his pains was bad press and a headache to match.

He appealed to the county supervisor and sheriff, but they were both unsure of their jurisdiction. Serendipity Springs had been an incorporated township and that status had never been changed.

Frustrated, Eastwick telephoned the governor and was informed that Serendipity was on his long "to do" list. The mayor swallowed his impatience, and ordered his staff to find any landowners who might have soil underlying the upstart town.

They found two—both irritatingly sympathetic to Serendipity's populace. One said that for a dollar a month, he'd rent the place. The other made the fee a family dinner once a week at the D&O/B&B.

More frustrated, Eastwick contemplated ways in which he could use the press against Serendipity. His one and only attempt ended in a sharp focus on his own role in the town's rebirth. He quickly realized that any meddling on that front would spread his own name across every tabloid teaser on every rack in every supermarket and convenience store in the country.

John Eastwick could do nothing but dodge reporters and wait for the governor's office to act.

"So, we're still an incorporated township," Stu repeated thoughtfully.

"I hate to sound dumb," said Annie Lee, "but what does that mean, exactly?"

"It means that we can elect a city government. *Should* elect one."

"Stuart's right," agreed Nancy decisively, pencil bouncing on her steno pad. "A city government could solidify Serendipity's legal status, which right now is just a paper fact. According to expert opinion, it would give us a clear legal identity."

"What would we need?" asked someone from the packed audience in the half-finished church. "What kind of government?"

"Do we get to have elections?" asked someone else.

"Sure. We'd elect a mayor, a town council . . . " Nancy looked to Stu.

He shrugged. "A police chief might be a good idea." He chuckled at the "boos" that illicited. "Come on, folks! Not all policemen are bad guys, you know."

"I think Mr. Williams is right," said Phil Kroeger tentatively. "We need a police chief. I mean, after all, we got crime jus' like anyplace else. Seems like it's gettin' better, but I still gets my tools took sometimes."

"We need a school board," said a

forty-ish woman with a shock of red hair. "We've got enough kids here to warrant starting a school. Right now, our kids are truant. Or at least they have been. The last thing we want is for the state to take our kids away from us."

There was a ripple of "amens" and sundry mumbles to that.

Annie was nodding vigorously. "I agree with Sharon a hun'ert percent. And we *could* start a school, too. Right here in the church building."

"You used to teach, didn't you, Sharon?" Nancy asked, her pencil suddenly active.

"Yes, I did. Junior high school level. I had a drinking problem," she added. "That's what got me fired. I've handled that. But, if it bothers anybody . . . "

"It don't bother me," was the general response.

"Just means you understand the rest of us," said one of the ex-prostitutes. "Maybe you can pass that along to the kids."

"So, we want a mayor, a town council, police chief or sheriff or something, school board, principal . . . " Nancy stopped scribbling and bounced her pencil a few times. "Most of these are elected positions . . . heck, we ought to just make them all elected."

"So let's have elections," said Annie. "We all know each other pretty well. Let's go for it."

That night, Serendipity Springs elected itself a mayor, a town council, a police chief, and a school principal. The school board was gotten on a volunteer basis and made up almost exclusively of parents. There were no nominations, no time for campaigns, just names written anonymously on little pieces of paper and counted dutifully by Sharon Vandeman (Principal of Serendipity School) and Annie Lee Paice (a member of the school board).

The first action of Mayor Stuart Williams and his council was to set aside the still vacant building of indeterminate usage as the town library. The four young out-of-work ladies from the Lucky Lullabye immediately volunteered to stock the proposed shelves with the used books that had been flooding Serendipity since its revival.

The first action of Police Chief Michael F. Hanrahan was to consult with the town council about the fines and disciplines for various offenses. There was no holding tank, no jail house, just an office, an old hat, and a pair of handcuffs for the incumbent. Most of the discipline revolved around work crews. It was unanimously decided that repeat offenders of the worst offenses be punished by deportation from Serendipity's safe haven. You could get deported for drug abuse or violence, but little else.

The Down&Outers became their own police force—pushing and pulling at each other's problems. Pleading, threatening and hollering a lot. Struggling for order and self-esteem. A number of people got to see the inside of Mike's office, whether they wanted to or not. Young most of them, angry most of them. And Mike would give them the kind of talking to only Mike could give and find them something to do with their anger.

The library opened on the Fourth of July amid great celebration. Also being celebrated: the debut of the Main Street Malt Shoppe—a gleaming bit of chrome and vinyl nostalgia replete with a juke box and an endless counter. The tour-

ists, many of whom attended the fête in the styles of the '50s and '60s, loved it. And they loved the barbeque held all along Main Street and the fireworks display that capped the evening.

Santa Theresa's mayor, John Eastwick, did not love it. He loved even less that the governor was the guest of honor, was given the key to the "city" by Mayor Stuart Williams, and had more or less officially commended the re-founders of Serendipity Springs for their "courage, vision, and outstanding effort."

He loved less than that the opinion of the governor's office that there was nothing illegal about Serendipity's inhabitants. They had settled with the landowners who had interest in the town and they had incorporated status and a city government. Their inhabited buildings were up to code, and they had been most cooperative with the county regarding health and safety regulations. Their business licenses were in order —their attorney had seen to that. They had a licensed nurse living in the pink stucco "Municipal Building," and a licensed counselor in their Rehab Center.

So, Mayor Eastwick was forced to smile plastically into discam lenses and say, "I'm pleased at their success," through clenched teeth.

That July was a hot month for Serendipity, measured by more than just the giant thermometer outside Police Chief Michael Hanrahan's office. After the Fourth of July fête, the tourists came rolling in like the ground support forces in a benign war.

The multi-faith church was opened for worship; its one large stained-glass window, designed by a local artist, dedicated to Nancy Yee, "whose impulsive vision made Serendipity a possibility."

"What should we call this place?" Annie Lee asked, staring at the window. Her eyes reflected the pantheon of color in the stained-glass replica of Earth displayed against Sun and Moon and star field. "I mean, it's going to be a synagogue and a church and a mosque and—" She shrugged. "Church just seems like too small a word for all that."

"And My house shall be called a House of Prayer," quoted Loucette, softly. "Book of Isaiah."

And so it was. And it witnessed the prayers of Hindus, Jews, Buddhists, Christians, Moslems, Bahā'īs and Native Americans. It also witnessed two weddings: Sunny Durande married Pepper Delgado beneath the multi-hued glow of Nancy's window; and Billy McGuire took his Lucy to the altar, and from there to a cottage across from "Fortune's Fruit Farm."

In August, Stu and Annie Lee gave the House of Prayer its third wedding and opened the little drive-in catercorner to Phil's Klassics, which provided Serendipity with enough converted antiques to clutter Main Street quite cheerfully. Each residence had its own vehicle parked out front, the keys assigned to a peg by each front door. Main Street was a portrait of "faded Americana."

The August issue of *California Life* carried that portrait in a full color spread. So did one of the August issues of *Time*. The D&O/B&B displayed both in a big marquée in the front hall ("foyer," insisted Lucy).

"Hometown USA," read the *Time* article. "If you didn't grow up there, you'll wish you had."

The tourists seemed to agree. They kept all three of Serendipity's eateries bustling and crowded the new units of the Lucky Lullabye. The Down&Outers opened a gift shop and a clothing store which carried only fashions of the '50's, '60's and '70's. It was established that when one went to Serendipity, one dressed for it. It was a weekend's fun: Put on your hand-me-downs (or your Hometown designer fashions), get into your classic car and drive to Hometown USA for a pleasant, carefree stay in the Lucky Lullabye Motel. Dine on Classic Malt Shoppe fare, drive-in delicacies delivered by real car-hops with ponytails and roller skates, or Creole cuisine. Go to sock hops and hay rides and barbeques.

More homeless found their way to Serendipity. They became instant citizens, built homes and learned how to till the soil, pick fruit, raise windmills, adjust solar panels and greet visitors. They, too, wore second, and third-hand clothes and didn't seem to mind living in a place that looked as if time had abandoned it somewhere in the middle of a past decade.

Most new residents learned quickly how to stay out of Mike Hanrahan's office. Those that didn't saw a lot of Mike. A few saw their way out of town. One or two saw the inside of the county jail. They weren't the rule, but the exception. People now came to Serendipity because they wanted to be there. It was a fresh start place on its way to becoming a legend.

Billy McGuire built a new population sign in the woodshop behind his furniture store and emblazoned the title "Hometown USA" across the top in bold red-white-and-blue letters. "Serendipity Springs," read the royal blue letters beneath. "Population: 450."

"Hometown, my aunt's bunions," groused Mike Hanrahan.

"It's nostalgia, you old coot," said Bea MacDonald, and dumped a bagful of fresh-picked pippins into an apple barrel.

"It's nostalgia's worst nightmare," corrected Mike. "Claptrap, rundown, hand-me-down town. Don't they remember what we've been. Derelicts!"

"It is *not* run down!" objected Sammie Paice-Williams, around a mouthful of green apple. "It's neat! All the tourist kids wish *they* could live here."

"Hmph!" Mike eyed the boy skeptically. "An' I suppose yer gonna tell me you'd rather be here than some nice neighborhood with a baseball diamond an' a shoppin' mall an' a McDonald's an' all, eh?"

"Sure! Anyway, we're gonna have a baseball diamond next spring and, well . . . we already *got* a MacDonald's." Sammie cast a squinty glance at Bea, who chortled.

"And who promised you a baseball diamond, may I ask?" asked Mike.

"Dad did. And Mr. Walker even said we could have *lights*."

"Hmph! Typical politician. Promise you the Moon!"

Sammie bristled. "Dad's not a politician. He's the *mayor*."

"Speaking of your Dad," said Bea, "isn't that him outside shouting for you?"

Sammie's head swiveled so he could

see out the front window of the Mercantile. "Wow!" he yelled. "He's got a *bicycle!*" He was gone like a shot.

"Noisome brat," groused Mike, blinking.

"Stodgy coot," said Bea. "You love it here. You can't tell me you'd rather be someplace else."

Mike's exaggerated grey eyebrows scooted up his forehead. "I could tell you that, old woman, but it'd do no good at all. Listenin' to drunks howlin' an goin' through hell in the night. Watchin' poor old shits like Gunnar dyin' of AIDS, or poor young shits like Alice dyin' of crack."

Bea glared at him, exasperated. "At least there's someone here that *cares* about those 'poor shits,' Michael Hanrahan. *You* care, too, but you won't admit it. Won't admit you care and won't admit how happy you are here."

"Happy? Pfft! What I *will* admit is that on a scale from scroungin' in dumpsters to livin' at the Ritz, Serendip falls somewhere in the middle."

"Coot," Bea repeated, and left him sitting among the vegetables.

It was a good year for Hometown USA. Thanksgiving was celebrated with a Harvest Festival that included a special service in the House of Prayer, followed by a banquet in the new school building, and a Pumpkin Patch Hop in the open field behind the Fortune orchard.

December brought a week-long Winter Fair in celebration of Christmas and the Solstice. There was no snow, but both of Serendipity's streets were lit up with a riot of twinkling color. Even the windmills that powered the decorations were festooned with them. Four hot pretzel and apple cider stands kept natives, guests, and visitors warm outside, carolers and wandering street performers kept them warm inside.

On the Loop, Serendipity's flood-lit signboard, flanked by a shimmering, thirty-foot Douglas fir, charted the growth of the native population: 500 on Christmas day.

"We're in the black," Nancy Yee announced at the January Town Meeting. "The Harvest and Solstice Festivals actually gave us a jump on our budget for the first quarter. Folks, I can't believe I'm saying this, but we have extra money."

The meeting hall erupted in cheers.

"And since we have extra money," Nancy continued when the cheer mellowed, "the Town Council unanimously decided that everyone should have a vote in what we do with it. But, before we start collecting ideas, Stu has an announcement to make."

Nancy yielded the stage to Mayor Williams, who smiled at the hall full of citizens before speaking. He smoothed the much-folded piece of paper and cleared his throat. "This came this morning, and I've got to say, it's been hell waiting for the chance to tell you about it. Ladies and gentlemen, a group of about thirty homeless people have taken up residence in an abandoned mining town east of Barstow."

A wave of electricity swept the room, bringing in its wake a slew of questions. There were no further suggestions as to where Serendipity's extra money might be spent.

Serendipity sent 75 percent of its "extra" money and a team of volunteers

to Sage, California. Hometown II was born.

By April, Sage had amassed a population of over 200 and strong support from its neighboring communities. By May, Sage was not alone. A ghost-town in Kansas, an abandoned riverfront community in Ohio, an old resort town in Missouri, a played-out gold camp in South Dakota—all across the United States, the sleeping awoke and the dead resurrected.

The homeless began to flee the cities, flocking instead to the Serendipitys and Sages and Middleforks and Ahanus. And the media followed; and where the media went, so too went the tourists.

"It says here this new Hometown in Arkansas's doing kind of a hillbilly thing," said Bea MacDonald, perusing the Sunday *Herald*. "That'd be something to see."

"Hmph! Oughta send the ol' Cowboy down there," groused Mike Hanrahan, fanning himself with his police chief hat. He groused as often as ever, but with much less acid these days. Sometimes, as now, the grousing was even accompanied by a smile.

Bea ignored him. "Well, I like our Hometown just fine. It reminds me a little of where *I* grew up. I remember, my family had a red and white Mercury wagon—just like that one." She nodded at the automobile in question, parked at the curb just below their shared seat on one of the benches that lined the Mercantile's wide, shaded porch.

"Just like home, eh?"

"No, Michael. Not 'just like it.' This *is* home. It's got all the things home's supposed to have. Old folks, kids, dogs, cats, cat fights . . . a playground, a graveyard." She nodded, acknowledging the rightness of that and thought of old Gunnar. "A graveyard with fresh graves," she said. "And a place to pray for the dead—and the living. Old drunks and old houses, old cars . . . and old *coots*." She glanced sideways at Mike.

"Gullible old biddy," he snorted enthusiastically. "Gettin' all misty-eyed over some ol' hunk o'tin. Serendipity always was an' always will be a hand-me-down town."

"Coot," said Bea disparagingly.

They were both silent for a moment, eyes going back to the street. On the curbing below, a couple of antique car buffs argued the relative merits of Mercuries and Fords while a gaggle of teenagers in worn denim and sneakers drank cola and watched and giggled. Across the street, three little girls roller-skated up and down the sidewalk, scooting and weaving through roving groups of people who laughingly accepted them as part of the scenery.

Up the block, against a backdrop of greenery, a dozen or so gyrating splashes of color dotted the playground between the House of Prayer and the new Rehab Center. An upbeat selection from the Malt Shoppe juke box accompanied the wild ballet, punctuated by the squeals and shouts of the dancers, and underscored by the buzzing of summer lawn mowers.

Mike took a deep breath of the too-warm July air and stretched and slouched, making the old bench creak in protest. "Biddy," he said, with no acid at all. ■

the reference library

By Tom Easton

Black Milk, Robert Reed, Donald I. Fine, $18.95, 327 pp.
Phylum Monsters, Hayford Peirce, TOR, $?, ? pp.
Hyperion, Dan Simmons, Foundation Doubleday, $18.95 hb, $6.95 pb, 482 pp.
Illegal Aliens, Nick Pollotta and Phil Foglio, TSR Books, $3.95, 336 pp.
Quozl, Alan Dean Foster, Ace, $4.50, 344 pp.
Angel Fire, Andrew M. Greeley, TOR, $4.95, 354 pp.
The Best Japanese Science Fiction Stories, John L. Apostolou and Martin H. Greenberg, eds., Dembner Books (distributed by W. W. Norton), $16.95, 176 pp.
Last Orders, Brian Aldiss, Carroll & Graf, $17.95, 223 pp.
Endangered Species, Gene Wolfe, TOR, $19.95, 506 + vi pp.
Callahan's Lady, Spider Robinson, Ace, $16.95, 208 pp.

For most of its history, the science in science fiction has been dominated by physics and astronomy. That is, SF has been a thing of rockets and blasters and time machines, of distant planets and galactic adventure. Yes, there have been biology, sociology, anthropology, psychology. In fact, these sciences have played crucial parts in the development of modern SF. Yet they are absent from the image of SF held by the general public. Most people—including SF writers and editors—still think of "hard" SF as centered not just in science, but in the "hard" sciences.[1]

Is this about to change? Maybe. Genetic engineering has been inching its way toward a practical technology since the early 1970s. So far, the gengineers are limited in their manipulations to microorganisms. Redesigning humans and animals remains for the future (the

[1] I know a book editor who has said, quite explicitly, that she wants "'hard-science' oriented (in the sense of physics-based) sf." Biology won't do.

distant future, if luddites such as Jeremy Rifkin have their way). But SF writers are busily dreaming of the possibilities inherent in the technology and of what those possibilities might mean for people.

Actually, they've been doing it for quite a while, and this month, we have two examples that can bear discussion: Robert Reed's **Black Milk** and Hayford Peirce's **Phylum Monsters.** Interestingly, both novels are rooted in the same sorts of paranoid fears that motivate people like Rifkin. Neither takes the technology of gengineering as a given, the way we handle those rockets and blasters. Like Heinlein's "Blowups Happen," Del Rey's *Nerves,* and many more from the days when the marvels of modern everyday technology were themselves glimmers in the physicists' eyes, they say (among other things), "Look at this new technology. Ain't it scary?" It will be a decade or so before gengineering is, like rockets now, routine background, cliché, furniture.

So what are Reed and Peirce saying in their stories? Reed offers us a time when, thanks to Dr. Aaron Florida, gene tailoring is commonplace. It handles sewage treatment. It provides safe, miniature wild animals for neighborhood parks. It optimizes children for the futures of which their parents dream. Here is Cody, daughter of two lesbian moms, ultimate tomboy. Meet Marshall, predestined genius whose mother would have given Portnoy hemorrhoids. Ryder, whose parents were hard-sold a super memory that turned out to be as much handicap as blessing. Beth, simply the best that could be drawn from her tortured parents. Jack, tailored offspring of a family of drunks, druggies, and thieves, perhaps their one desperate shot at decency, yet also one they must deny. Meet the parents, who one and all, deliberately or accidentally, exploit their kids.

So what else is new? Our kids *are* our mortgages on the future? We're *supposed* to vest all our hopes and fears in the next generation? We're *supposed* to blackmail our children with our sacrifices? Meet Reed's point. Through Ryder's all-recalling viewpoint, he shows us a Florida who wishes to be remembered, well or ill, even though one of his projects has backfired most dreadfully. He was, it seems, designing organisms that might thrive in the lifeless gas giants—a gift to the future, a sop to his own ego—and they are loose. People are dying, now only on the Florida complex in orbit around the Moon, soon on the Moon itself, and then on Earth. All humankind is threatened.

Reed has a nice hand with the kids—though they may seem at times rather older than their years or contexts properly justify—and he spends most of his time and effort on them. The disaster is peripheral, off-stage, though it comes to drive events, to make explicit the idea that our children are the future, and to bring about a sudden relief of parental pressures, a phase-change of just the sort that often marks the shift from childhood to maturity.

That done, the disaster disappears far too easily. Reed's true story is the kids, growing up. The disaster is in the end a red herring; its revelation as such is an anticlimax that ends the book with a thud and converts a hitherto satisfying read into a disappointment.

Hayford Peirce's **Phylum Monsters** is somewhat less ambitious and less subtle, given to heavy-handed pokes at lawyers and other follies. Yet it, too, concerns the relationship of parents and their kids in an age when the former can choose the latter's traits. The hero is

Robert Clayborn. He is a "life-stylist," one of the gengineers who design the human "models" that will be mass-produced by the corporate creches (such as Apple-Boeing) for purchase by the general public. The models have a government-mandated long life-span, good health, uniform good looks, and assorted personal talents and tendencies. Unfortunately, on occasion, something can go wrong with a model. When this happens with Clayborn's daughter, his airhead wife wants to exchange her for another, without defects. The daughter Clayborn loves will go back to the factory, presumably to be dismembered.

Here, then, is a nice personal conflict that might have been quite sufficient to drive the plot of a short story or novelette. To it, Peirce adds disaster: Suddenly, beginning with Clayborn's grown son by another marriage, in fact with a model he himself designed, "life-styled" humans start to turn into apes, lizards, fishes—devolving, becoming the "phylum monsters" of the title. Naturally, Clayburn becomes the favorite target of the legal profession. Equally naturally, the Arkansas reactionaries, who reproduce the old-fashioned way and are quite skeptical of modernity in general, begin to look like the salvation of the species.

And let's not forget the pet rocks from Mars, each one containing the "anima" of an ancient Martian, serving Peirce's characters as communicators, calculators, calendars, remote control devices, and more. They want real bodies, and they want Clayborn to help. And they, too, are part of the solution.

The book's not bad. I enjoyed it. It's written, plotted, peopled, and paced pretty well. My main objection is that Peirce played it too much for yucks, when he could, like Reed, have played it straight and thereby, perhaps, have made his serious point—like Reed's, about parents' tendency to exploit their kids—more effectively.

Is that objection unfair? Am I pissing on him not for writing the story he wrote badly, but for not writing the story I think he should have written? So be it.

Dan Simmons is, within distinct limits, a marvelous writer. He can spin yarns, knit intricate plots, paint human characters in full color and depth, and do it all with the best of them. The case at hand is his latest novel, **Hyperion.** Modeled explicitly on Chaucer's *Canterbury Tales,* it poses as the separate tales of several pilgrims to the world of Hyperion, where exist mysterious artifacts, the Time Tombs, that seem to be traveling backward in time, and an equally mysterious being, the Shrike, apparent protector of the Tombs, planetary wanderer, murderous and arbitrary killing machine, worshipped by a strange cult that believes the Shrike is a harbinger of the Last Days. The time is long after the destruction of Earth, long after the separation of humanity into two factions, the planet-bound Hegemony and the habitat-dwelling Ousters, who wander Oort clouds, raid the Hegemony's facilities, and are viewed by the Hegemony rather as the ancient Romans had to view the Visigoths: barbarian plunderers, destroyers, threats to true civilization.

The government calls the man who was once Consul of Hyperion and tells him: The Time Tombs have begun to show signs of opening, the Ousters are gathering for an attack on Hyperion, and the Church of the Shrike has announced that one last group of pilgrims will be permitted to travel to the Tombs. Your name, Consul, is on the list, and we want you to go. Your mission, should you choose to accept it, will be to un-

cover the secrets of the Time Tombs and the Shrike and deliver them to the Hegemony. At the same time, beware: One of the pilgrims may be an Ouster spy.

And we're off. The Pilgrims gather and begin their journey. To pass the time and share everything they might possibly know, they tell the tales of their past involvements with Hyperion. There are the priest's tale, the poet's, the soldier's, the detective's. There is the tale of the old man who carries an infant, who was once his grown daughter. There is the Consul's tale. Together, they paint a full and fascinating portrait of Hyperion and its mysteries. They also illustrate the breadth of Simmons's talent, from macho to bathos, from cyberpunk to mystery to military, from hard SF to soft, and fantasy.

Sadly, Simmons pisses it all away. In science fiction, it is essential that the author be consistent in the technical underpinnings of his civilization. He cannot, as Simmons does on one page, say that his people use both the English (acres) and the metric (kilometers) systems of measurement.[2] The author must also take some pains to get those technical details that he chooses to state explicitly *right*. For instance, he cannot hope to get away with saying that sulfur dioxide smells like rotten eggs[3] or that fiberoptic cables generate a smell of ozone or that heads suddenly overloaded by sheer data can literally explode.

Do you say that authors slip? Of course they do, and I am no exception. Do you say that many readers neither recognize nor care about the difference? You are, of course, quite right. Even so, the author has a responsibility to the truth. He or she must lie to tell the story, yes, and readers (and reviewers) readily accept those lies that are essential to the story. But he must also try his damnedest to remain true to reality. If he fails, he gives the impression that he does not know what reality is. He forfeits that plausibility which is essential to the integrity and momentum of the story, and to that respect for the author which lets the reader believe in the story for as long as it lasts.

For all the excellence of Simmons's plotting and characters and sheer imagination, by the time the reader reaches the end, there remains barely a shred of suspension of disbelief. I suspect Simmons knew it, too, for the ending as much as says, "Hey, suckers! I've hooked you and made you expect some sort of crashing finale. Here it is: All join hands, now, and let's do this neat little song and dance number from that old and beloved Judy Garland flick."

Bah, humbug. I'm not looking forward to the sequel.

Nick Pollotta has been a stand-up comedian, a cartoonist, and a writer of humorous SF radio plays. Phil Foglio is a cartoonist and illustrator whose work has a certain distinctive, leering wackiness. Together, they have produced **Illegal Aliens,** in which supernally evil aliens land in New York's Central Park and seize a sample of humanity to put through a bogus test for galactic citizenship. Unfortunately for the aliens, the sample is the Bloody Deckers, a street gang. Meanwhile, Earth's First Contact Team has sealed itself off in a UN sub-sub-basement and preempted the planet's military and scientific resources. And when the inter-

[2]Not unless he gives the reader some hint that he knows the combination of incompatible units is at least a little strange.

[3]Oh, that's a common gaffe! And it's unforgiveable in anyone who graduated successfully from college—or even high school—with even minimum science exposure. The rotten egg smell belongs to hydrogen sulfide. Sulfur dioxide is "sulfur and brimstone"; my wife says it smells like tuna fish.

stellar cops show up, too late as usual, the situation is well in hand—except that now the humans are looking like a Class A threat themselves.

Experienced SF readers have heard it all before in hundreds of classic yarns in which humans display superior intelligence, strength, and pure meanness, show an astonishing ability to reinvent alien technology, with improvements, and make the aliens look like chumps. Played straight, such stories are very soothing to adolescent male egos (of all ages); they may strike others as insultingly dumb. Fortunately, Pollota and Foglio do play their story for laughs (though the laughs may strike you as sounding a lot like snickers).

There once existed small blocks of paper squares, glued together (like a notepad) along one edge. The squares bore pictures, each one slightly different, and when you fanned the edges of the block, you saw an animated sequence.

I haven't seen the things since I was a kid.[4] I mention them because Ace Books has apparently revived the concept, as "Flip-a-mation (TM)." Or so says the cover proof for Alan Dean Foster's latest, **Quozl.** The bound galleys have, in the upper right corner of each odd-numbered page from page 73 to page 269, a small blank square. The published book will presumably put in those squares suitable drawings, so that when you fan the pages, you see an animated cartoon.

"A cartoon of what?" you ask. Well, how about a Quozl? It's a lovable, warm, fuzzy alien best described as a giant marsupial bunny rabbit. The species' past is murderous, but modern Quozls have thoroughly sublimated all that. They also restrain their bunnyish breeding quite admirably, although not so thoroughly that the homeworld can avoid sending off generation ships to find new turf. One such ship reaches Earth during World War II and lands in the American Rockies. The Quozls, suitably paranoid about their reception, burrow underground and hide. But the day comes when a young human and a young Quozl meet, and then the die is cast. What one human knows, soon all must know, especially when the human first contact has a sister who grows up to write a Saturday morning cartoon show called Quozltime.

Foster has done a nice job of imagining his Quozls, and he makes some nice points about the need to sublimate the human tendency to violence. But the events of the story itself are so familiar as to be traditional, and Foster moves far too slowly, methodically, and predictably through them.

You can count on Andrew M. Greeley for thoughtful, provocative fiction, generally with some religious connection (after all, he's a priest). Thus, when his latest, **Angel Fire,** finally landed on my doorstep (a year after its first publication by Warner), I grabbed it happily. And, overall, I wasn't disappointed.

Professor Sean Desmond is a puckish biologist whose novel ideas about evolution have just earned him a Nobel Prize. For some reason, however, those same ideas have prompted someone to order his death. Fortunately, a "guardian angel," in the guise of lovely Gabriella Light, has appeared in his hotel room with the word that she will protect him. And we are off, through numerous attempted murders and successful saves,

[4] I haven't been a kid since then, either, so it won't surprise me a bit to hear I've missed something. Maybe the things are still around, perhaps as one of those prizes you can get for a quarter from an over-sized gumball machine.

to Stockholm and an education in the nature of angels. If sometimes the angelic lectures threaten to bore, Greeley promptly demonstrates he's a master of pacing by bringing in some action. And in the end, he reminds us that the mission of a guardian angel is much less to be a shield against mayhem than to help us be the best that we can be.

Attentive readers may feel some confusion at the top of page 160, when, after a press conference, Desmond asks Gabriella, "Are you somehow dependent on us, like that guy suggested?" The problem is that no "guy" suggested any such thing, except perhaps before a copyeditor or typesetter laid rude hands upon the manuscript. And I mention it because the putative dependence gets mentioned again, once or twice. Its lack of basis irritated me so much that, if the problem had arisen at the beginning of the book, I might well have refused to read further.

The Japanese go bananazai for SF.[5] For American SF, they provide a major translation market, despite their country's smaller size. They also generate a great deal of their own SF, most of which we never see on our side of the Really Big Ditch. The reason for the disparity may be—pick one:

—Americans are extremely parochial (they—we!—are).

—American SF is the best stuff around and who needs a lot of second-rate foreign crap anyway?

—We generate so much crap of our own that we don't leave room on the market for foreign material, crap or not.

—The Japanese viewpoint just doesn't translate.

We could argue for hours—or at least for an entire column—but we won't. Instead, I will point you at **The Best Japanese Science Fiction Stories,** edited by John L. Apostolou and Martin H. Greenberg. It proves at the very least that not all Japanese SF is crap and that good translators can put the viewpoint within our reach. If that viewpoint still seems strange—as in Sakyo Komatsu's "The Savage Mouth," in which the narrator eats himself; Tetsu Yano's "The Legend of the Paper Spaceship," whose subject is a madwoman who may be a shipwrecked alien; Ryo Hanmura's "Cardboard Box," whose viewpoint character is precisely that; or Kobo Abe's "The Flood," in which people deliquesce—well, that is what SF, *au fond,* is supposed to do. Yet the viewpoint can also seem quite familiar, as in Takashi Ishikawa's Bradburian "The Road to the Sea" and Shinichi Hoshi's "He—y, Come on Ou—t!"

Overall, the difference in viewpoint is suggested by editor Apostolou when he says, "The future holds no great fascination for most of Japan's SF writers; instead, they use the genre to examine the past and the present, attempting to understand their rapidly changing society. . . . many Japanese SF writers . . . choose to explore the social implications of change, producing what could be called parables or cautionary tales." Add to this the strangeness of an imagery rooted in a very different tradition of myth, legend, and history, and you have some idea of what you will find in this one.

Strange, yes, but tasty. Buy it. Buy it in such quantities that the editors and publisher will bring us more and thus expand the appallingly short "Reading List of Japanese Science Fiction in English" at the end of the book—most of which has been published in Japan by

[5]Ouch! Sorry!

Kodansha English Library (mainly "for young Japanese students of English").

Would you expect a sample of British SF to seem less foreign than the Japanese? After all, to a large extent, we share one history, one culture, one SF tradition. Yet even within that commonality, there are writers with the gift of making readers, such as me, scratch their heads in puzzlement. I have in mind Brian Aldiss and his **Last Orders** collection of stories from the 1970s. They are surreal, self-consciously artistic, so full of appositional absurdities that their flavor is strange indeed. The one line that struck me, when I read it, as communicating that flavor best comes from "The Monster of Ingratitude IV": " 'Look, here we sit, Lurido, our limbs disposed as we will. We talk, we communicate, our senses flow like silent water, and our nails grow.' "

The self-consciousness shows in the comment that human experience is cyclic, repetitive, repeated both within and across stories and reinforced by that very repetition, as well as by the echoing of characters, lines, events on Earth, on the artificial "Zodiacal Planets," in stories more or less in the standard vein, in "enigmas" that divide a single tale as a kaleidoscope divides an image and that are sometimes more about themselves than they are in fact themselves.

Aldiss' intent, I suspect, was literature with a capital L, immortal, one with the gods. It therefore fails, for the only writing that in truth approaches immortality is that intended—by a Shakespeare, a Dickens, a Molière—for people, ordinary readers, not for the gods. Holy offerings tend to become burnt offerings as soon as the libraries clear out those storage rooms to which they relegate all those books the readers never read.

* * *

Here's another collection, much more to my taste—and, I think, yours—than Aldiss' and showing surprising affinities with the Japanese anthology. It's Gene Wolfe's **Endangered Species.**

What's endangered? The short story? Maybe, for the market ain't what it used to be. Yet there is a market, and in what that market gives us we can find stories so marvelous that each one tells us anew why the short story was invented in the first place. Some will say the marvels come from writers like Aldiss, who treats the short story as a vehicle for "art" and experimentation. (To my mind. the experiments should only see print if they are successful, not just to say, "Look! I'm experimenting!")

If Wolfe experiments, he is so successful that we never suspect him of it. He achieves his effects with the highest of all artistries, meaning "artlessly," smoothly, convincingly; never does the curtain bulge as the stagehand walks behind it; never do we see the wires that support Ariel; never do we cease our grin of childlike delight at the prestidigitations of the master.

Thirty-four times he does it. A few times—as in "Peritonitis," in which humans are fleas—he would not be out of place in a kimono. In others, he gives us what Aldiss would call an "Aperture Moment"; in "War Beneath the Tree," he sets up a situation that demands we peek through a keyhole into the future and comment for ourselves upon the frightening viciousness of sibling rivalry. In still others . . . but I lack the space to enumerate the remaining 32 delights. Buy the book. It is, quite simply, the best single-author collection you will see this year.

Bars, taverns, saloons, and men's clubs are celebrated in myth, legend,

and song. They are even saluted in science fiction. The reasons are necessarily uncertain, though we may mutter something to the effect that, because bars are one traditional home of the tall tale (perhaps especially those of the *Canis hirsutus* variety), they give the writer an easy voice ("Did I ever—hic!—tell you . . . ?"). What's more, bars may even resemble the SF genre in that SF was for much of its history dominated by males and marked by a sense of clubbishness or camaraderie of precisely the sort one can find in some bars, sometimes.

Do you suspect that I am about to say something about one of *Analog*'s premier saloon-keepers? You are, of course, absolutely right. Spider Robinson rode the stools of Callahan's Bar to a fair measure of his fame. Eventually, he brought the series to a definite end. But the venue remains appealing, and there are settings that can be exploited in similar ways. One such is the brothel.

Meet **Callahan's Lady.** She is the Madam. Her House, like her husband's bar, is an ideal of its kind, a place that brings out the best in most people, staff and clients, and where strange things happen. The viewpoint character is a young streetwalker whom the Lady rescues from a murderous pimp, straightens out, and employs. There's a werebeagle, a talking German Shepherd (remember Ralph von Wau Wau?), a customer who can make you do anything she wishes, as long as she says "Please," a con man with a fading conscience, and more. Great—if not squeaky clean—fun, plenty of puns, patent Spider.

Unfortunately, it doesn't work as well as it did in the bar. Perhaps the reason is that Spider's brothel is not supported by as much external myth and tradition. Perhaps the setting's utopianization just fails to convince, presumably because fewer readers have experienced the setting in its "natural" form and wished to capture more of the few magical moments that can happen there.

Or maybe—could it possibly be?—Spider has been riding this horse too long. ■

●Take care to get what you like or you will be forced to like what you get.

George Bernard Shaw

●Adversity is the trial of principle. Without it a man hardly knows whether he is honest or not.

Henry Fielding
Submitted by John Hradsky

brass tacks

Dear Mr. Schmidt:

What an interesting editorial in the May issue! The weak point in your experimental society is the testing that would be needed to say who would be admitted or rejected. It is difficult enough to think of tests that would bring out the facets of a completely honest character, but can you imagine trying to pin down one of those pathological con men who seem to exist everywhere? I suppose you could argue that a con man would leave a trail that the tests could reveal. Well, what about a fifteen year old? Who would have picked out the Richard Nixon of 1929 as a crooked president? (or even president?)

This brings me to another point. Why have the tests only once? Just as there are people who begin life well and later fizzle, there are folks who look awful at first but turn out to be marathoners. Why not have the tests every five years, say? This also lets people who have fallen from grace have a shot at redeeming themselves. I concede this would put a tremendous strain on the system—how do you persuade a society or rugged individualists that they should be tested (and face the possibility of being tossed out) every X amount of years?

Finally, I can't help worrying about snobbery, even among RIs. It is such a stunting deforming force, and so prevalent that it seems nothing can stop it. How easy it is for any society to evolve into a citadel of privilege with time.

GREG KOSTER

Bremerton, WA

Dear Mr. Schmidt:

I read your editorial "Utopia Test," (May 1989) and found it very interesting. I would like to make a suggestion on your comment "Making reliable selections of strangers would require both

a better developed science of sociology than we now have . . . and better techniques of psychological testing."

I think we already have the best selection tool that has ever existed in history and that is this very society we live in today. The Laissez Faire society we live in is already the tool for selecting reliable people. The people that are successful today in our society are the most qualified people. They meet all the requirements in your editorial.

Your requirements, as I understand them, are that a person would need a strong, well thought out sense of personal ethics with clear ideas of what they are willing to do under what conditions, and a clear conception that others have rights comparable with your own. If a person does not have these qualities he will not be a success in this society. Without these qualities no one would trust you, rely on you, or give you any responsibility. This means no one would hire you, or if they did, you would not keep the job for long. So without these qualities you could not be a success. Also, you say another quality would be enough intelligence and understanding of how things work, humans and societies as well as the physical. I think any successful person must have this quality. Now the question is how do we tell a successful person from an unsuccessful person?

I would say the person should have several things, such as what is his net worth and how he went about getting it. If he or she had gotten most of his or her money from prior generations it would not count. Also this person would have to be respected by his peers and the people in the society.

GAVIN W. SPORE

Santa Ana, CA

I wish I could agree with you, but I've read too many newspapers and seen too many counterexamples to believe that character and competence are either necessary or sufficient for financial success in our society.

Dear Dr. Schmidt,

Lois McMaster Bujold's "The Mountains of Mourning," (May 1989) is the kind of story I like to see: it reminds you to think about important issues, and the technological fix, used in context, is appropriate technology.

It looks like G. Harry Stine got bit by future shock: "I was used to my old word processing software and could use it to do everything I wanted. Why can't I go out now and get either a duplicate, or something very similar that does just what I want, no more and no less?" He mentions marketing as a reason. I have the technology on my shelf to whip up something personalized for him; I'll only charge him about $2,000 for my time. I doubt I can compete with his $9 distressed merchandise. Today we use software like people: we buy a general purpose package and teach it to do what we want through customization. It's much cheaper that way.

Another important point is that Stine is intimately familiar with his old word processor. He will have to read the manuals carefully several times to get equally familiar with his new ones, particularly to get the customization just as he wants. I'm writing this on the $89 shareware he mentioned. I just checked the on-line help: it can count words, and can do 10-point letter quality print with one-inch margins and a top centered page number as he requires.

I hope people don't get the wrong idea about modern software; I hope they take Harry Stine's complaint in the same spirit as those who said, when cars first appeared, that cars would not obey the reins.

JAMES F. CARTER
3318 Beethoven Street
Los Angeles, CA 90066

Dear Mr. Schmidt:

I have been reading *Astounding/Analog* for about thirty years. In that time I have tried other science fiction magazines, but *Analog* is the only one that has been a permanent part of my reading.

Over the years a pattern has developed. When *Analog* arrives I first read the Editorial, then Science Fact, followed by The Alternate View, Brass Tacks, and The Reference Library. Along the way I search out all the end-of-article fillers or quotes. G. Harry Stine's "The Mystique Beat Goes On," (May 1989) prompts this letter.

First, a disclaimer. I don't work for Commodore or for a computer dealer. This is being composed on a Commodore 64, using an inexpensive word processor program. The C64 is an old device by computer standards. Commodore doesn't advertise it much anymore, but it is still readily available and is supported by the most programs and games of any computer in the field.

The C64 has excellent sound and graphic capabilities, supported by inexpensive voice synthesizers, musical keyboards, light pens, graphic libraries, graphing programs, etc. Best of all, my setup can be duplicated today for under $600. That covers a console, power supply, color monitor, 5¼" disk drive, and near letter quality printer. Compare that with "state of the art" systems like IBM PC and its clones.

There is one fly in the ointment —resident memory is sort of skimpy; a long mailing list or large magazine index must be broken up into sections to fit the computer's memory.

I'm with Stine. Why throw out this little jewel for something more expensive, more complicated, and with less software support? Until there are a lot of the new computers sold, the software companies are not going to tie up their time and money developing software for a computer of unknown sales potential.

As a nation we are addicted to change for change's sake. We "upgrade," spending plenty of money for glitzy, but dubious, "improvements." As Stine points out, computers are only one symptom of this addiction.

Keep up the good work!

J. M. KINABREW, JR.
New Orleans, LA

On the other hand, some changes really are *beneficial, but not everybody sees the same ones that way. Personally, I wouldn't want a word processor as basic as the one Stine described; I have one that can be used that way quite easily, but I've found plenty of uses for the other things it can do as well, and I found it very easy to learn and well-supported. But tastes differ. I got letters from many people extolling the virtues of one system or another, and I suspect that in a great many cases the "best" system is simply the first one a particular user got to feeling comfortable with!*

Analog:

Always a pleasure to see something by Lois McMaster Bujold, especially with our old friend Miles. I must confess, however, that I wouldn't have bought the rag (what a godawful cover!) had it not been for Warren Salomon's article. One can always count on Salomon for a non-partisan work of reason.

Warren missed one key point, I think, in relying on current commodities to justify the cost of a future form of travel. Current commodities don't even pay for present-day spaceflight, despite the maybes of microgravity medicine and

manufacturing and the very real benefits of spinoffs. There is no reason, however, to assume that future economies will be thus limited. Predicting that far in the future is trying to take too big a step at one time. Let's establish a permanent presence in near-Earth space before we worry about how to pay for starships.

After my initial enjoyment of "The Mountains of Mourning," I became aware of a disturbing bias. Lois seems to be campaigning strongly that all babies should be born, and kept alive, regardless of defects. She stacks the deck for Miles—making him brilliant, likeable, successful—and for the baby girl—her "defect" was a non-threatening one, common "even back on old Earth"—and thereby cheats the difficulty of the question.

Mutation *is* a danger to a group with a limited gene pool, and a planet which has experienced nuclear war is more susceptible to the birth and propagation of nonviable individuals. The Vorkosigans, being well-off, could afford to provide medical care for Miles, and support him even if he never became able to support himself. What if Miles had been born to a poor community with no resources to spare? What if he'd been defective mentally as well as, or even instead of, physically? (Obviously there would then be no story, but the question stands.) Abortion, or infanticide, in such cases would be in the best interests of the survival of the whole, and therefore both moral and ethical.

The reflex reaction to that is usually "all life is sacred." An ego-satisfying thought, but not true. We routinely deny life to other living beings, even those in perfect condition, for no more reason than our own enjoyment. This only leads to long-term destruction of the very ecosystems which support our entire race. Protecting those with no survival ability of their own is a luxury. While our society may or may not be able to afford it (I tend to think we're already overextended), a frontier or colony cannot.

As for the rest of the issue, well, the "Lemming-ade" story was funny, but anyone who's read "Zodiac: the Eco-Thriller" lately would see a dark side to it. "In the Fluff" was really more or less a piece of fluff. (I thought only junior-high writers still used "a better man than you'll ever be.") The fawning editor-praise in "Bank Robbery" ruined whatever writing merits it may have had.

I agree with G. Harry Stine; there hasn't yet been a decent software program written for writers. (The best one I've ever used was a Jacquard mainframe, which became obsolete back in—hmm—1981.) And I'm afraid I don't have much use for reviews; haven't agreed with one yet.

Gee, that's the first Dean McLaughlin I've seen since *The Fury From Earth!* I enjoyed both the idea and the byplay, and found the Lady-or-the-Tiger ending very thoughtful. Professionally, though, I hate loose ends.

More of the Bujold/Salomon/McLaughlin quality, and I might even buy another issue. But not until I recover from launch.

DIAN L. HARDISON
ENGINEER, NASA
Kennedy Space Ctr., FL

Dear Mr. Schmidt:

I was interested to see Richard Kennaway's letter on Loglan in the May 1989 issue. Mr. Kennaway fails to mention, or glosses over, two points about Loglan:

(1) The planned "going public" of Loglan is more on the order of a "going

public again''—Loglan originally went public in 1960 with a long descriptive article in *Scientific American*. In fact, during the late 1960s and 1970s there appears to have been a small movement promoting Loglan, but it seems to have withered away by 1980.

(2) Dr. James Cooke Brown's Loglan Institute is not the only source of information about this particular language project; a competitive variant (renamed Lojban to avoid trademark or copyright infringement) is being developed by a group in Virginia. Loglan thus has the linguistic distinction of being the only language in history to have split into dialects before generating a body of speakers.

Why development of Loglan has been delayed because ''the Institute never managed to get significant funding from sources such as the NSF'' is a mystery to me. This sounds more like an excuse than a reason. There have been at least a thousand constructed language projects developed during the past century, of which perhaps a dozen have made an impression on the world's consciousness. The only one that had significant outside (private) funding was Alexander Gode's Interlingua. The ''going public'' of Esperanto, spoken by several million people around the world today, was originally paid for by the inventor's bride's small dowry; and the language's early development occurred in what can only be described as a financial vacuum. Numerous explanations have been given, by supporters and detractors alike, for the failure of all of these projects (or, in the case of Esperanto, for its lack of success); but no one, so far as I know, has ever blamed failure on lack of funding by a government agency.

DONALD J. HARLOW

Pinole, CA

Dear Dr. Schmidt:

I agree that I may have been somewhat hasty in saying that hypertext would not be a suitable form for a language textbook (Brass Tacks, April 1989). But I was responding to the exaggerated claims that too many of its advocates have made for it. My own experience of learning languages, both in school and out of school, leads me to believe that hypertext will be useful for learning a language only if it is combined with a tutoring system for that language. I am trying to write such a system for Latin, in TI's PC Scheme. I don't have any hypertext software, but if there is a package that will work with PC Scheme, I'd gladly take a look.

My main criticism is directed against what some of hypertext's exponents foresee as its effect on how the written word will be published, rather than against the concept itself. I have done some thinking about the idea of electronic publishing, and I have come up with a difficulty that could be insuperable. How will authors and publishers be paid for what they do if books are published on line? It seems that no one has really tried to answer this question. I am not asking what arrangements could be made for establishing fees or prices, but how these arrangements could be enforced. Suppose that some future network publisher uses a yearly or monthly subscription fee for earning money, and anyone who pays that fee could read anything that publisher offered. What would keep a subscriber from downloading a book, and giving free copies of it to all his friends? This is actually a problem with any direct electronic access to published works. If something appears on a reader's screen he can write it into a file. And you can be sure that if stealing a book becomes this easy, it will become a common way

of getting books.

I have other objections to online publishing. One is that the need for a single network will eventually give control of publishing to a single large organization. Moreover, it would be impossible for a new publisher to go on line without permission from that organization. To allow anyone at all to upload works to the net would result in chaos, and since this organization would most likely be a private corporation, it would have to be paid somehow by the publisher. My guess is that the cost of going on line would be so high that small publishers would have no chance.

I must say that I am glad to see a serial in your June issue even if it's only a very short novel. I'm one of those readers who miss the serials that used to be so common in *Analog*. One reason is that the sort of novel that *Analog* publishes is not being published elsewhere. They're not even being reviewed in *Analog;* Tom Easton invariably devotes most of his space to authors I have no interest in. It is true that it's better for authors if *Analog* mostly publishes short fiction, and as an aspiring author, I'm glad that it does. I just hope that you will have one or two meaty serials each year to satisfy my appetite for long stories. Incidentally, *The Washer at the Ford* is one of the best stories you've published lately. Along with "Ally," it made the issue worth every penny of its price. The only flaw I found in Flynn's story is his character Murchadha who confuses the Queen of Hearts in *Alice in Wonderland* with the White Queen in *Through the Looking Glass*. It was the latter who made the statement about being able to believe six impossible things before breakfast. Also, having been in both Scotland and Ireland, I am pretty certain Murchadha's language would not be heard from anyone except possibly an Ulster Scot.

In "Survival Course," dinosaurs being hunted to extinction by ancient aliens is a very old idea in SF, and it wasn't much of an idea to begin with. Nor did Mr. Delaney's handling add anything to it.

I agree wholeheartedly with your editorial as it concerns the utility or inutility of "he" and "him" and "his" as genderless personal pronouns. I don't agree with you that it would be a good thing if English did away with gender entirely. That would be contrary to the native genius of our language, and would make it poorer, not richer.

But what really disturbs me is that you gave a mere slap on the wrist to publishers who try to act as feminist thought police. This is actually a form of censorship, and it is a lot more insidious and dangerous than banning books from school libraries. The people who try to get books banned are at least honest about what they are doing; they admit that they are trying to keep their children from reading certain books. But the publishers who insist on changing an author's words to agree with feminist prejudices are not honest at all; they are trying to keep certain kinds of writing from even being published, without admitting that this is what they are doing. What if an author did not happen to agree with the feminists? Would the publishers still have the gall to change his pronouns to the approved feminist substitutes? And would feminists still maintain that they are only trying to gain more freedom for everyone?

FREDERICK FOWLER

Columbia, SC

Look again—I didn't *say it would be good for English to do away with gender altogether, but rather to* add *a genderless (as distinct from neuter) one as an additional option.* ■

IT'S ANLAB TIME AGAIN!

Mid-December is our last issue for 1989, and once again we'd very much like you to let us know how we're doing, via The Analytical Laboratory. The authors are interested, I'm interested, and you should be interested. Not only will your votes provide tangible rewards for your favorite authors and artist, but what we know about your likes and dislikes will influence our selections of what to offer you in the future. So *please vote!* Here's how:

Look over all your copies of *Analog* dated 1989, or refer to the annual index which will appear in our January 1990 issue. Pick your *three* favorites in each of the following categories: novella or novelette (a single category, for AnLab purposes), short story, science fact article, and cover. (Since there were only two serials this year, you won't be voting in that category.) List your choices in order of preference (your very favorite in each category is #1) on the ballot below, and mail it in. The ballot is intended to make it easier for you to vote, but if you don't want to cut it out, feel free to copy it. We'll tabulate the votes and let you know how they came out a few issues hence.

Please send your votes to: AnLab, *Analog,* 380 Lexington Avenue, New York, NY 10017—and to be sure your vote counts, please mail it in time to reach us by February 1, 1990.

And thank you very much!

—The Editor

ANLAB BALLOT 1989

NOVELLAS & NOVELETTES

1. _____

2. _____

3. _____

SCIENCE FACT

1. _____

2. _____

3. _____

SHORT STORIES

1. _____

2. _____

3. _____

COVER

1. _____

2. _____

3. _____

a calendar of analog upcoming events

1-3 December
TROPICON 8 (South Florida SF conference) Fort Lauderdale area, Florida. Guest of Honor—Lynn Abbey, Fan Guest of Honor—Leslie Turek, TM—C.J.Cherryh. Registration—$20 until 1 November 1989. Info: SFSFS Secretary, Box 70143, Fort Lauderdale FL 33307.

8-10 December
SMOFCON 6 (The convention runners' conference) at Howard Johnson Airport Hotel, Toronto, Ont. Registration—C$40/US$32 until 30 October, C$50/US$40 at the door. Info: SMOFCON 6, Box 186, Station M, Toronto ON Canada M6S 4T3. (416)232-0294 (1900-2200 EST).

12-14 January 1990
CHATTACON XV (Tennessee SF conference) on board the Chattanooga Choo-Choo. Guests—Michael P. Kube-McDowell, Robert E. Vardeman, David Cherry, Danny Gill, etc. Registration—$18 until 1 December 1989, $25 thereafter and at the door. Train—$60 flat; $85 for sleeper car suites. Info: Chattacon XV, Box 23908, Chattanooga TN 37422 (include SASE). (404)591-9322.

12-15 January 1990
MOSTLY EASTLY CON (media SF convention) at Holiday Inn North, Newark, N.J. Registration—$35 until 25 December 1989 (no memberships thereafter); $7 supporting at all times. No guest stars. Info: Joyce Yasner, 140 Cadman West, #21H, Brooklyn NY 11201. Include SASE and make checks payable to Poison Pen Press.

12-15 January 1990
SERCON 4 (literary SF conference) at Westin Airport Hotel, San Francisco, Calif. Registration—$35 until 31 December 1989, $50 at the door. Info: Sercon 4, c/o Michael Wallis, 1647 Willow Pass Rd #161, Concord CA 94520. (415)458-9304. CIS: 74570, 1264.

23-27 August 1990
CONFICTION (48th World Science Fiction Convention) at Netherlands Congress Centre, The Hague, Netherlands. Guests of Honor—Joe Haldeman, Wolfgang Jeschke, Harry Harrison; Fan Guest of Honor—Andy Porter. Registration—$65 until 31 December 1989. Supporting—$28 until 31 December 1989. This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition—the works. Join now and get to nominate and vote for the Hugo Awards and the John W. Campbell Award for Best New Writer. Info: Worldcon 1990, Box 95370, 2509 CJ The Hague, Netherlands. Enclose sufficient International Reply Coupons for airmail response.

30 August-3 September 1990
CONDIEGO/NASFiC (North American SF Convention) at the San Diego Omni Hotel International, San Diego, Calif. Guest of Honor—Samuel R. Delany, Fan Guest of Honor—Ben Yalow. Registration—$65 until 1 January 1990, $75 thereafter, $85 at the door. Info: ConDiego, Box 15771, San Diego CA 92115.

—Anthony Lewis

Items for the Calendar should be sent to the Editorial Offices six months in advance of the event.

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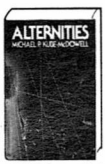

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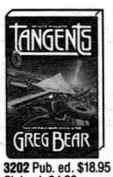

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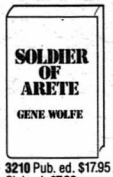

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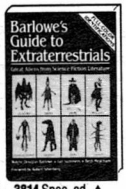

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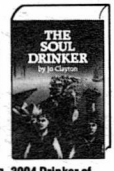

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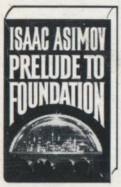

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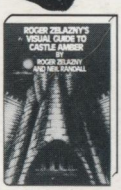

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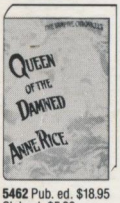

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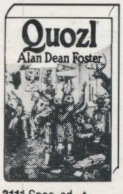

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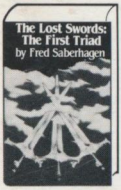

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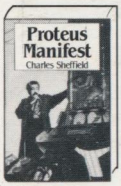

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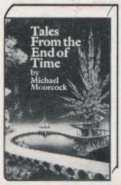

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