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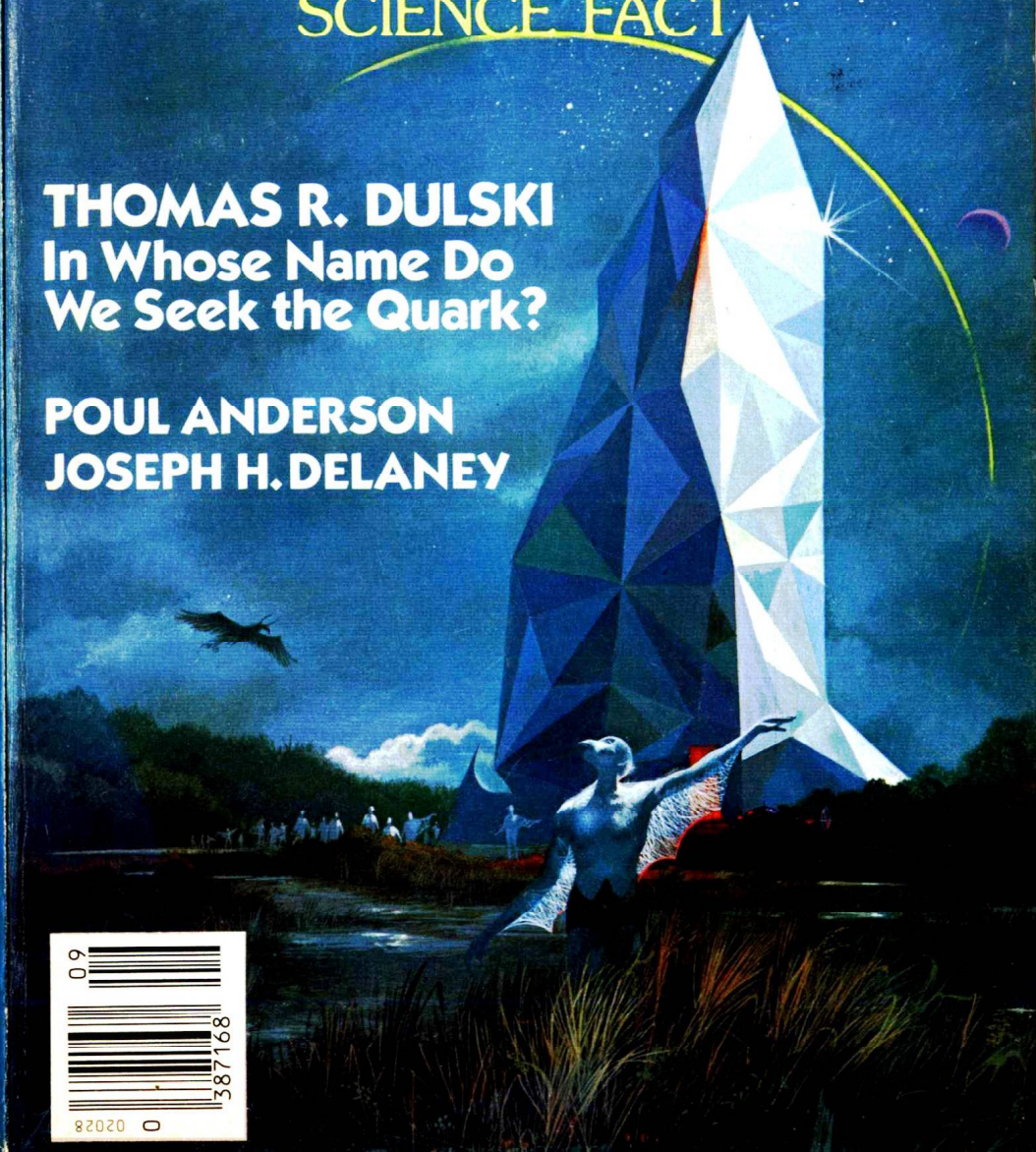

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In Whose Name Do We Seek the Quark?

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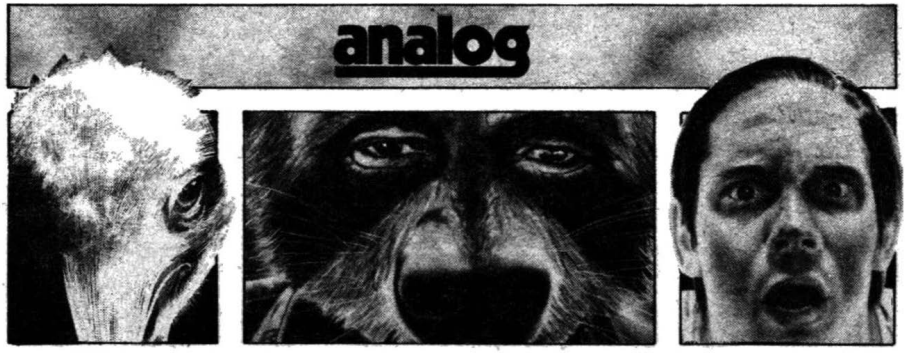

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Editorial

THOUGHT BY PROXY

Stanley Schmidt

Once upon a time, when the world was young and not fully explored, there was a king named Impervius who sincerely desired that his kingdom be the best and most prosperous ever. He knew that this required knowledge and careful consideration of when to plant and harvest crops, how to build roads and bridges, how to heal the sick and defend the frontiers, and any number of things like that. But Impervius had little aptitude for these things, and trying to learn them seemed like a frightful bother. So he found a wise man named Homer Calculatorius, appointed him Royal Thinker About Hard Subjects, and depended on him to study these esoteric matters and advise His Highness on decisions involving them. In his spare time the Royal Thinker was encouraged to look for new tidbits of knowledge which might be applied to furthering the kingdom's welfare, for Impervius knew that knowledge which his neighbors had not yet discovered would give his kingdom an advantage over theirs.

For many years this arrangement

worked very well. Homer was diligent and clever, and with his guidance the kingdom of Impervius prospered and developed a standard of living that was the envy of all its neighbors. But one day the Royal Thinker About Hard Subjects came to King Impervius with a new idea which gave him pause. There was reason to believe, said Homer, that when bluebirds flew south for the winter they went to a distant sea where they turned into great blue *whales*. If Impervius sent a fleet of ships to the southern sea in winter, they could easily bring home vast quantities of meat and bone and oil which would assure the kingdom of prosperity far beyond even that which it now enjoyed.

For the first time since he had appointed the Royal Thinker About Hard Subjects, Impervius was unsure what he should do. Homer's proposal was tempting, and yet to Impervius's admittedly untutored mind the whole idea seemed—well, a little screwy. That fleet of ships would cost a great deal; if the Thinker was right, the expense would be a good investment, but if he was wrong it would be a disastrous waste which might cost Impervius his throne.

But how could he *know?* Homer offered to show Impervius the data and calculations supporting his theory, but Impervius could not make head or tail of them. And so he remained sorely vexed by this dilemma: did this startling proposal from a trusted advisor with an impressive track record prove

(a) that bluebirds did in fact fly south and become blue whales for the winter, or

(b) that the Royal Thinker About Hard Subjects had flipped his lid?

The answer, of course, is that it *proved* neither, though it raised questions about both. On the one hand, the Royal Thinker's distinguished history of past accomplishments suggested strongly that he tended to know whereof he spoke—and bluebirds *did* disappear for the winter, and reliable observers had long reported the existence of whales which *must* contain a lot of meat and oil. On the other hand, the idea of a little bitty bird changing into a great big whale seemed to clash violently with Impervius's experience of how anything real behaved.

Unfortunately, the king had neither the time nor the inclination to follow even one bluebird through a year's migrations to watch for The Change. It irked him even to have to think about such a thing, because that was what the Royal Thinker was paid to do for him. And now, for the first time, he faced a question which by its very nature could not be trusted to the Thinker: when could he trust the Thinker's thoughts?

The example is fictitious, whimsical, and oversimplified, but the problem is real, contemporary, and growing. In our own, nonmythical country (and others like it) we have a voting populace and a more or less representative government making decisions about scientific and technical matters without personally knowing much about science or technology. And many of those decisions

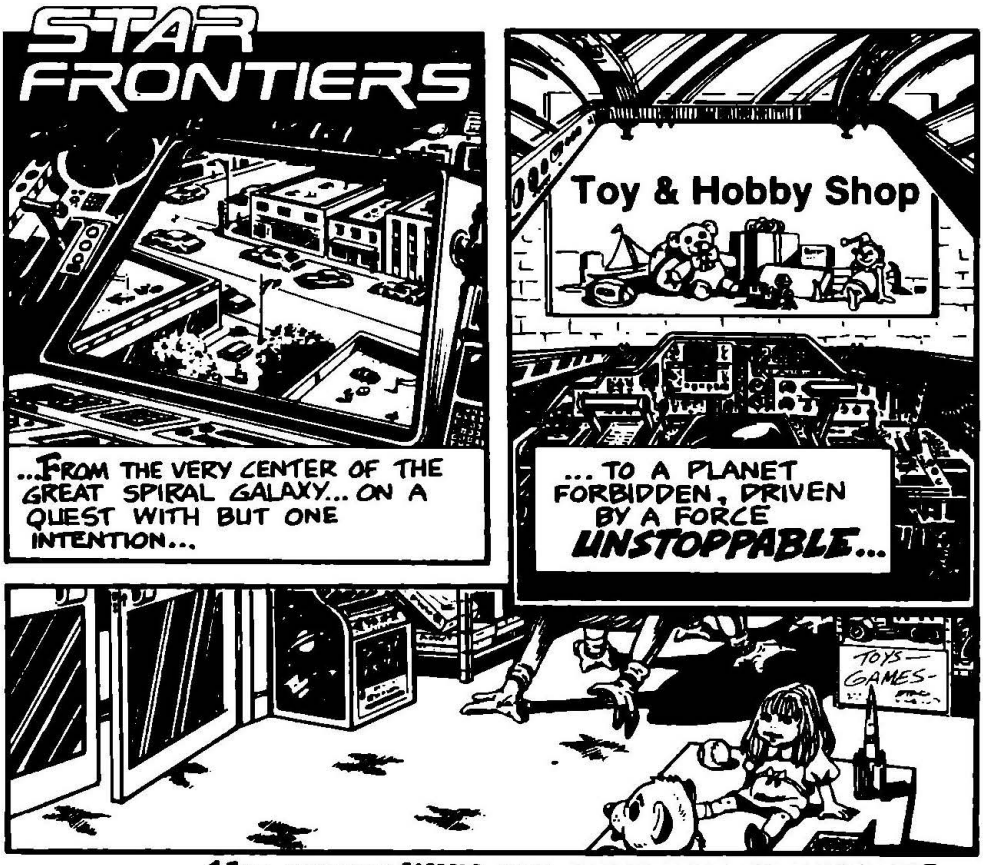
will have far-reaching and profoundly important consequences.

To name just a few topical examples: Government agencies, influenced somewhat by popular opinion and lobbyists, must decide how much, if any, should be spent on space programs, and whether that money is better allotted to manned or unmanned missions. They must decide under what conditions, if any, nuclear power plants should be allowed to operate, how radioactive wastes may be disposed of, and how much support should be given to what kinds of alternative energy research. They must consider what restrictions, if any, should be placed on genetic engineering research and application of its findings. They must make decisions about the extent, if any, to which the teaching of evolution and/or "creation science" shall be allowed or required in public schools.

In these and many similar areas, decisions are made by the general electorate and their elected and appointed representatives. Yet few legislators, judges, or persons-in-the-street have more than the most superficial, fuzzy understanding of rocketry, nuclear physics or engineering, radiation medicine, or genetics—much less any in-depth competence or practical experience in even one of these fields. So they depend on "experts" to do their hard thinking for them, and base their decisions on the "bottom lines" provided by their experts. And they get annoyed and uncomfortable when two experts in the same field give different answers —which happens often. Cases in point that spring immediately to mind are the nuclear power and creation-evolution controversies. In widely publicized cases, physicists have testified on both sides of the nuclear debate and biologists on both sides of creation-evolution. This disturbs nonphysicists and nonbiologists because they are depending on the experts to tell them The Answer, and there obviously ought to be *one*. After all, isn't science the very epitome of an area in which facts are facts and everything is cut and dried?

No, it is not, and the misconception that it is merely underscores how woefully undereducated our populace—and leaders—are in these areas of vital concern. When someone says science is "cut and dried," that merely tells me that he has never done any. It is an area in which certain kinds of terms and questions and answers are much more precisely defined than in others, but that by no means means that it involves no subtle questions of judgment or interpretation, or that everything always works neatly the way a beginning textbook describes it.

This, of course, does not answer the layman's question of which experts he should trust. There is some truth in the facetious definition of an expert as a man fifty miles from home with a briefcase; I have often seen workers at one institution hang on every word of a visiting lecturer from another while remaining blissfully unaware of the accomplishments of others among themselves (who get *their* recognition when they visit elsewhere). But that observation provides no more than a warning that all credentials should be taken with salt. How much faith should



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be placed in whom remains a serious question, with no answer as simple as King Impervius or Johnny Q. Public would like.

College degrees, bibliographies, and other measures of past performance give at least some evidence of at least some demonstration of past competence. (Their lack, on the other hand, does not necessarily evidence lack of competence. An exceptionally capable person may educate himself without going through the formal channels which issue pieces of paper, or a highly talented scholar may be more interested in teaching than research.) While it is true that some academic programs are better than others, and that some students barely squeak through while others shine, any degree is at least a fair indication that the possessor, at least once in the past, showed enough competence to convince several people that he deserved it. Similarly, some publications are landmarks in the development of a science while others—*many* others—are trivial and unimaginative responses to the pressure to "Publish or Perish." Moreover, neither editors nor referees are omniscient or infallible and occasional mistakes—and sometimes even hoaxes—slip by. Still, a long list of publications at least proves that, on a number of past occasions, the author was able to convince at least three others that he had done a piece of work of enough value to warrant publication.

But none of these credentials, by itself, proves any more than the minimum I have claimed for it—and the key word in those minimum specifications is *past*. What voters and officials seldom fully grasp is that scientists, like any other group, vary considerably in both professional ability and personal integrity—and not only from one individual to another, but from one period to another in an individual career. History is full of scientists, from the most famous to the relatively unknown, who did good solid

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work early in their careers and then wandered off into unproductive areas, some of which appear blatantly "unscientific" to many now looking at them. Frank E. Manuel, a historian at Brandeis University, and Ray Hyman, a psychologist at Stanford, have been researching such cases, some of which formed the basis of a recent *New York Times* feature captioned "What Happens When Heroes of Science Go Astray?" Isaac Newton, for example, literally built the foundations of modern physics, an accomplishment of such importance that it has overshadowed his later quarter-century of preoccupation with the occult. Alfred Russel Wallace is now belatedly recognized for having independently hit on many of Darwin's ideas, but he later spent a lot of time with spiritualism. Nikola Tesla made many important contributions to the understanding and application of electromagnetism, and posterity has tended to overlook his later excursions into a wide range of wild ideas which never panned out. Some others were not so fortunate —Franz Joseph Gall's dabblings in phrenology apparently led history to forget his breakthroughs in real understanding of the brain.

I will accept, as a working hypothesis for the moment, that these later activities of Newton and Wallace and Gall and Tesla were indeed unscientific aberrations—though there is another side of the question to which I'll return a little later. Meanwhile, perhaps I should mention, though not by name, some examples with which I have a more direct acquaintance. As editor of *Analog*, I hear from a lot of people with unor-

thodox ideas about science for which they hope to find an outlet. Some of these we do air; others we might if we had room. But there are also a surprising number in which I can find nothing of substance, even from people with well-supported claims to having been competent and even outstanding scientists or engineers in years gone by. Not uncommonly, such writers are strongly critical of much generally accepted science, and in support of their views remind me, for example, that Albert Einstein never really accepted the statistical ideas of quantum mechanics.

I have good reasons to believe that that is true—but what is its significance? Does it prove that quantum mechanics is wrong—or that Einstein was wrong? The answer, as with Impervius's advisor's bird/whale idea, is that it proves neither, though it raises both questions. Einstein's previous accomplishments in physics were so formidable that it's hard not to listen to him, and it's quite possible that he really did have a valid hunch, which he never succeeded in refining to a scientifically provable assertion, that something was fundamentally wrong. Whatever the reason, he *didn't* so refine it, and it remained a hunch. It may only prove that even Einstein's mind had limits on how far it could stretch, and grew less flexible (as most do) with age.

Here I come to the caution, the "other side of the question," that I mentioned a little earlier. Hardly anybody dismisses Einstein's refusal to embrace quantum mechanics as an "aberration," but that is exactly the attitude usually taken toward Newton's search for occult powers or Wallace's attempts to contact the dead. In fairness to them, it should be pointed out that in their historical context these things were not so "obviously" nonsense as many consider them now. It just may be that they were asking questions that looked legitimate at the time, and either the answer was *no*, or they had not learned how to ask the question properly. Since we haven't either, and in view of their past accomplishments, it just *might* be worthwhile for someone to take a closer look at their "aberrations" before becoming too smugly patronizing about them.

Dr. Hyman's initial suspicion was that such aberrations (if such they were) were psychopathological in origin—that the scientists "went mad" in their later years. His later studies convinced him that this was *not* the case. Instead, he concluded, their minds remained sound but fell into subtler traps such as venturing outside their areas of solid expertise, relaxing their own methodological discipline, and working secretly rather than offering their work to public scrutiny.

My personal suspicion is that both happen to varying degrees. A very few of my correspondents couch their writings in such terms, and accompany it with such extraneous matter, that I really suspect (though I do not claim to be a psychiatrist) that they are genuinely and certifiably psychotic, and therefore more to be pitied than censured. Others are sincere, coherent, and rational, but misguided or inadequately grounded in the field they're pursuing—often because they have not kept up on recent developments. In a few cases, I'll grant,

it *may* even be that the rest of us are wrong and I am encountering genuine pioneers who unfortunately have not learned to express their ideas well enough to sell them. The world is *still* not fully explored.

But the only true test of whether a scientific is *right* lies in a direct experimental comparison of prediction and reality—something which no one has the time or expertise to do personally in every case of interest or importance. So the answer to the question plaguing King Impervius and our own public and politicians is a painful paradox:

(1) You *can't* trust *anybody* (absolutely).

(2) You *have* to trust some people (at least tentatively) because the sheer volume of information is such that no individual can directly verify more than a small fraction of it.

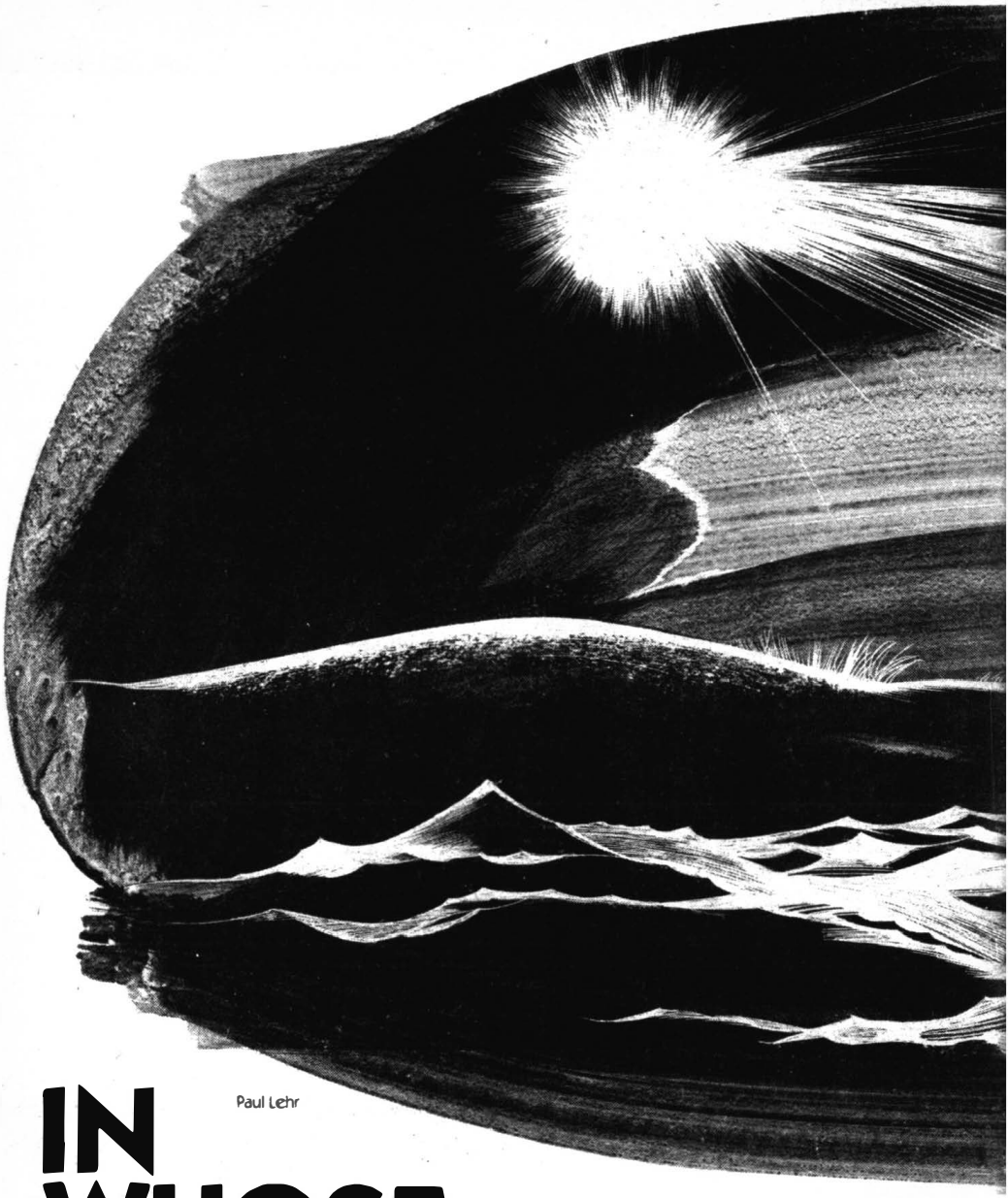
It's not quite as hopeless as it sounds; there is a partial way out. But it will have an uphill battle to become very popular, because there's a catch.

As long as King Impervius cannot make head or tail of Homer's calculations, he is at the mercy of any con man who can pass himself off as a Thinker About Hard Subjects. But if he learns enough to be able to follow, with his own critical eye, at least some of the Royal Thinker's reasoning, he will have some basis for making a personal judgment of his advisor's abilities. If nothing else, he will be able to spot the cruder grades of charlatan by recognizing really blatant nonsense.

The catch, of course, is that this will take personal involvement and work. The King will be reduced to learning something about the Royal Thinker's business, and that will not happen without effort. The saying that there is no royal road to mathematics is very old, very true, and equally applicable to just about any field. Since each field has its own obstacles and there are many fields, King Impervius and all the rest of us are going to remain somewhat dependent on experts. But we can no longer afford to be absolutely so and to leave *all* the thinking to them. King, voter, legislator, judge—anyone who is really determined to see that decisions on science and technology are rationally based is going to *have* to learn enough about those fields, at the very least, to exercise personal judgment of who the experts are and whether they're doing their jobs. ■

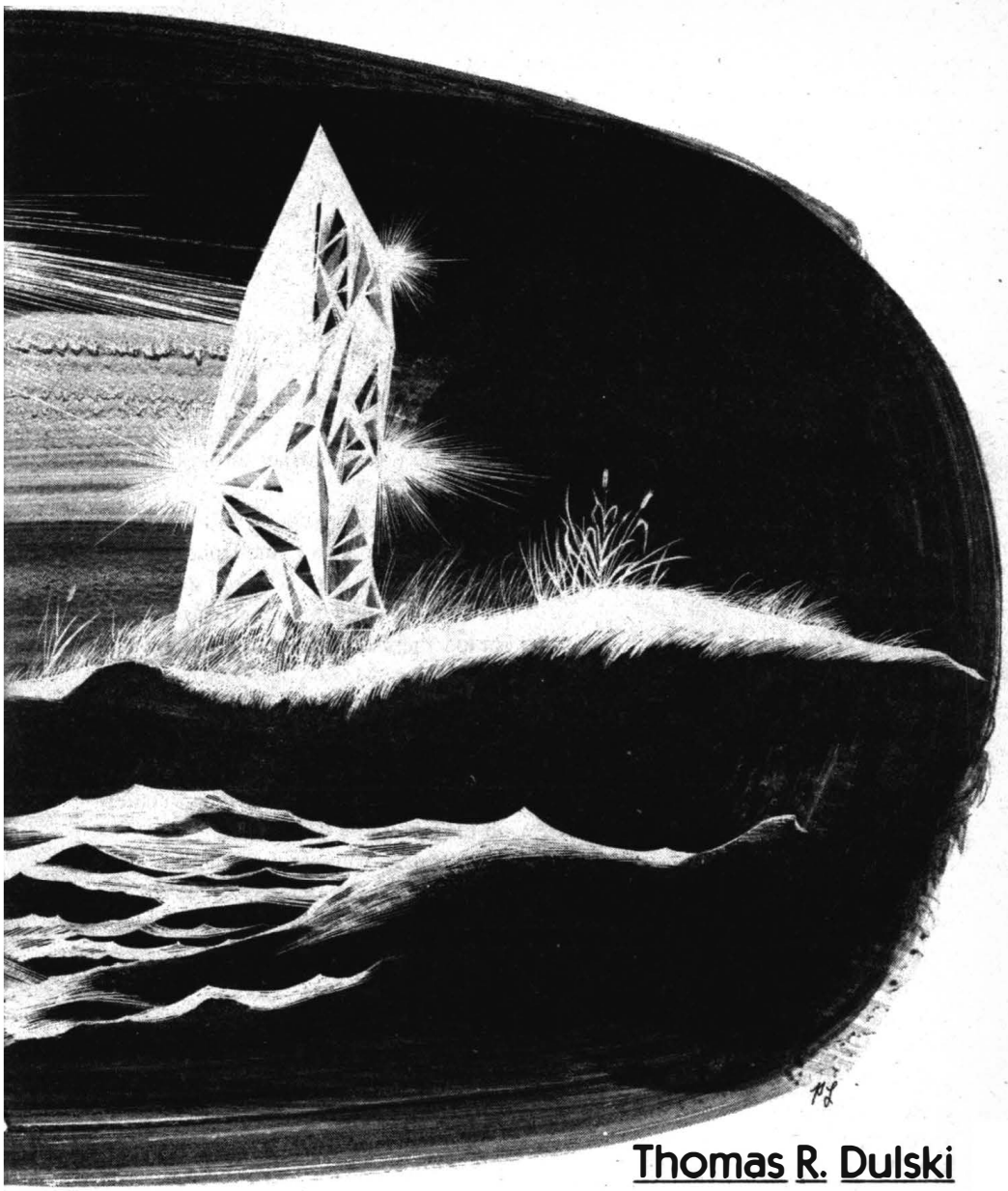
● A finely tempered nature longs to escape from his noisy cramped surroundings into the silence of the high mountains where the eye ranges freely through the still pure air and fondly traces out the restful contours apparently built for eternity.

Albert Einstein



Paul Lehr

IN WHOSE NAME DO WE SEEK THE QUARK?



Thomas R. Dulski

The universe
may hold beings
who could give
us gifts beyond
our wildest dreams.
But when is a gift
really a gift?

As I looked out the limo window across the grey salt marsh, watching that incongruous structure grow in the distance, it seemed impossible that only two days had passed.

Too many people. Too many questions.

It was going awry. The whole thing. Our chance to grow as a race. And it was my fault. I was too caught up in life to represent us.

They don't understand us. Not a bit. I didn't do my job.

And what can I say this time that will explain what it is to be human?

Judy could show them, if they could see her with my eyes.

"Fish-ees!"

Judy dropped down to her knees on the transparent floor of the hotel barber shop and pressed her small hands against the glass. An ancient golden carp regarded her sedately through the floor.

I watched the Houdan barber's face, looking for tolerance or understanding under the reserved lupine features. "She won't cause any problems," I said, slipping into the chair beneath his poised cloth.

Word had apparently gotten around the hotel that the new Terran envoy had a retarded ten-year-old with him. He gave us both a toothy grin that seemed a bit too broad. "Of course not, Mr. Rhyss," he said. "I'll have the manicurist keep an eye on her."

There's a certain look you see in people's eyes sometimes.

Maybe I'd become oversensitive. Maybe I'd come to look for it. Maybe I even imagined it sometimes. But it seemed to be there, beneath the alien features of a barber on St. John's Haven. I'd come to hate it. It made Judy a thing, not a person. And I hated this barber for it.

"Just a trim," I said. "Tapered in back."

"The bangs?"

"Leave them."

The Houdan barber hand-motioned to a Terran girl who was doing her own nails at the back of the shop. She came and sat in a chair near Judy, who was talking in a low whisper to the fish beneath the floor.

"You're here to speak with the Teydurax, I understand," the Houdan said, clipping ringlets that fell onto my chest. "Odd thing, how they popped up here, settled themselves in out there on the marsh. Made you Earthers travel half the galaxy to speak with them."

I remained silent at that, listening to the steady whirr of the sonicutters and wishing that there had been a barbershop on the *Amehoshi Maru*.

"Let the mountain come to Mohammed, eh, Mr. Rhyss?" The barber paused, holding his tools aloft—a tableau in the floor-length mirror in front of me.

I focused on my own tired eyes. "Something like that," I said, thinking that this Houdan knew Earth culture better than his own.

"Everyone's wondering what you're going to ask them," the Houdan said, resuming his clipping. "I mean, no one seems to have been able to get a sensible answer out of them so far. A race like that. All their knowledge. Advanced technology They don't seem to need spacecraft to get about, I understand. Congruence knows how they got

here. And they'll only speak to the Terran envoy. At least, that's what the newsdisks have been saying ..."

"Fish go bite!" Judy said, wriggling her fingers in front of her eyes to be sure they were intact. The manicurist arched an eyebrow, then continued filing her nails.

"Play nice, Judy." I caught her eyes in the mirror. "Daddy will be through here in a few minutes."

Judy wriggled her fingers at me and giggled.

"Cute child," the barber said. "Your, ah, wife isn't traveling with you, Mr. Rhyss?"

I've never known quite what there is about Sino-American culture that it so rapidly and thoroughly infects everything it touches. This Houdan would have been something immeasurably different, his *concerns* unthinkably alien, if some Terran frigate hadn't happened upon his world a few centuries in the past. But now here he is—fifty light-years from home, trained in a trade that has not the remotest connection with his race, and *thinking* like a Terran busybody.

"I said, your wife isn't ..."

"She's dead."

"Oh, ah ... I'm sorry ..." The whirr of the sonicutters changed pitch as he withdrew from something that might have been embarrassment.

That poor woman, I thought. In her fear and loneliness she could tell them worlds about us.

I leaned back in the limo seat and closed my eyes.

"The hotel management said that you've had experience with ... children like Judy?" I motioned the woman to one of the suite's lounge-slings as I collected a scattered array of embassy briefs, popping the last out of the disk-reader.

The woman sat with her knees together, her purse in her lap. "Ja, I haf zee degree *und* five year *mit zurückgebliebenen Kindern* at zee Institute."

"Judy is not disturbed or autistic," I said, sealing the diskholder. "She's ... slow." Why did I dance away from the word "mongoloid" as if it would burn my mouth?

Frau Groenstein looked up at me with sad cow eyes. "I *versteh* ... you excuse, I understand the difference, Herr Rhyss. I haf worked primarily with children such as your daughter."

I opened the wet bar. "Can I offer you something?" Besides the standard fare, I noticed several things you could be arrested for having on Terra.

"I do not take intoxicants," Frau Groenstein said.

"A commendable attitude which I wish I shared." I poured arrap for myself—more than I needed—and took a seat on one of the slings. "Judy's napping now, or I'd have you meet her." I took a sip of the bitter liquid, studying the woman's nervous face. She had to be from the colony on Siegfried, or else, God knew, from Germany. She looked to be fifty, subjective—maybe on the downside of her last rejuv. She might be really quite old.

"I'll be at meetings and functions most of the week," I said. "What I'm looking for is someone responsible to

take care of Judy while I'm away from the hotel."

"I am good with children, Herr Rhyss." Something about her tone of voice told me that she needed the job.

I rubbed the cold glass against my chin, suddenly feeling the woman's sadness penetrate my bones. I didn't want to hear her story. At that moment there was no room left inside of me for that. "Usually, ah, the people I've used have had references of some sort "

Frau Groenstein fumbled hurriedly with the static seal of her purse. "I haf references from zee Institute. " She thrust a disk out at arm's length, her fingers trembling.

I took the disk and held it a moment, thinking what a colossal ass I was. I handed it back to her. "I'm sure you'll be fine," I said. "Would a centipex a day be acceptable?"

She still held the disk, offering it back to me. "You can read zee letters from zee Institute " Her eyes were hurting me. I looked away.

"You have the job," I told her. "Tomorrow. Be here tomorrow morning at seven."

Some bird-like thing took off from among the salt reeds with a great flapping of wings, frightened by the whine of the limo's field.

A universe that teems with life.

What defines human in the midst of such diversity?

The red sun, Dancer, hung in a cloudless late-afternoon sky. Beneath its watchful gaze, the port city of Boduad baked like a pile of delicate orange pottery.

Falconbridge put down the menu. "Well, Armand, what have you decided?"

I was watching the Merikresh webspinners at the bay inlet, my mind wandering. "Decided?"

"Brit-comage and weem is excellent this time of year. The hydrofoils bring it in fresh from the islands."

I turned back toward the table and nudged Judy back into her seat. "Fine," I said, pulling her dress down over her knees. "Some sort of shellfish, isn't it?"

"Like scallops, if you've heard of them. It's in a cream sauce. I think your daughter will like it."

"Sca-aps!"

Falconbridge fingered his mustache and smiled. "That's right, little miss, scallops." He motioned toward a waiter.

A light sea breeze rippled the restaurant awning with the snapping sound of plastic.

My gaze wandered back to the bay inlet where the bore riders were bobbing with their boards, poised in a rhythm of anticipation.

"When is the tidal bore due?" I asked, my eyes beginning to well from the watery glare.

Falconbridge dropped back into Terralingua, ignoring the waiter with his scriber and pad. "Five twenty-seven local, according to today's newsdisk." He checked his wrist. "Another five minutes. It's quite a sight."

"That's what they tell me. Somehow, I expected to see that big moon in the sky."

"Bad angle here. You'd have to get up on the restaurant roof to see it, I imagine. But Old Donner will be di-

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rectly overhead for the laser show later tonight."

The waiter cleared his throat and Falconbridge rattled off our order in a rapid string of fluent Bandalese.

"Those Pangoin web-people down there—the Merikresh, I guess they're called " I pointed over the railing. "I've never seen anything quite like that. What are they doing?" Some of the webs were really elaborate now—big white doilies lining the banks of the estuary. Each with a small black figure racing back and forth over its surface.

"They have a saying," Falconbridge said. " 'When the joy fills us, we spin.' Interesting."

"Interesting," I agreed, thinking of the little white nets in the privet hedge in Arlington.

"Oh, I ordered iced andrax and milk for Judy."

"Sure."

"Mik fo Judy," Judy said, studying her inverted reflection in the bowl of a soup spoon.

Falconbridge put a cylinder of paper in his mouth and lit the end with a sulfur match. "Like the Greeks say about dancing, eh? 'When the joy fills us, we dance.' "

I must have been staring. "Oh, a dirty habit I picked up somewhere." He held up the glowing end of the tube and blew out a stream of smoke. "Care to try one? They're really quite addictive."

"I have enough bad habits already," I said, my nose wrinkling from the toasty smell.

"Just as well," Falconbridge said, taking another breath through the glowing tube. "The Teydurax would disapprove, no doubt."

It had taken until now to broach the subject. Falconbridge might have been looking for an opening. He stared at me pointedly, his lips trailing white smoke.

"You mean, as the gods who chide us in our folly "

Falconbridge crushed the cylinder onto a small plate, leaving a smoldering worm of paper and an ugly stain on the porcelain. "What's that, one of the Dakota poets?"

"Senalak of Aurin. 'As the gods who chide us in our folly/Forgetting 'twas our folly made them/So spurn we dreams of starflung peoples/Calling only *our* world home.' "

Falconbridge rubbed his mustache with a brown finger, his dark eyes pensive under bushy eyebrows. "I think you're right for this, Armand," he said, at last. "I know you, and I recommended you, but that aside The Contact Office has made some colossal mistakes in the past. Some of those were my mistakes. But I feel good about having you as the Designate here."

I noticed that some of the bore riders were testing their style on a few of the small waves that had begun to funnel up the inlet. Something about their brief ride and hurried swim back to the inlet mouth suggested the winding tension of a clockspring. "I wish I shared a little of your confidence," I told him. "I can't remember being this nervous about an assignment."

"Understandable. We've been dealing with sub-Terran first contacts for the last two hundred years. The Ritteau Worlds—that was before you and I were born. All the diplomacy in our lifetimes has been in the 'trinkets and beads' category."

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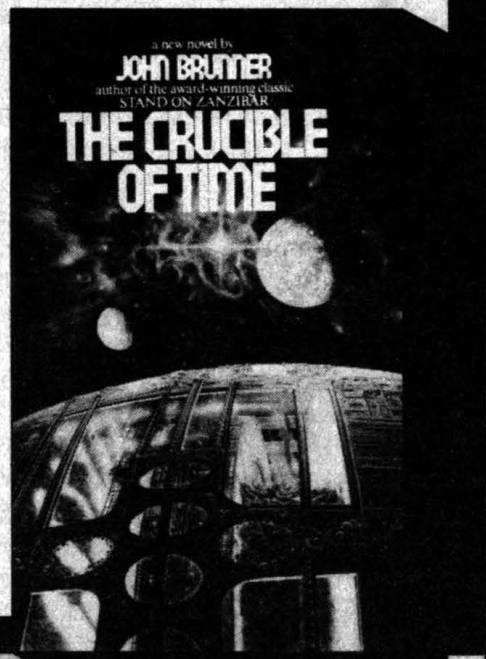

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I looked at him, wondering if George realized that he'd just demeaned both our careers, not to mention nine-tenths of the known sapient races. It was top-of-the-head shop-talk, I knew, but I still didn't like it. Not now, anyway. My expression must have showed my distaste.

Falconbridge took a sip from a crystal goblet of iced water to mute his exaggerated pose. "That's what it's amounted to, you know, Armand. Oh, I know we're supposed to consider the whole culture, not just the science and technology. But don't you get a bit weary of barefoot poets in mud huts? Here we have something that can advance our civilization by millennia!"

I squinted out at the dazzling interface of sea and sky. "I think the wave is coming," I said.

And indeed, a mountain of water had swallowed a half-dozen of the yachts anchored about the bay. Seconds later they reappeared, bobbing like corks behind the approaching foam-topped wall. Somewhere along the shoreline a Euterpe ensemble struck up a fanfare of buzzes and strident squeaks.

I noticed after a moment that Falconbridge was still staring across the table at me. "Did you ever imagine," I said, as the piston of water drove its burden of diverse brave life up the channel, "did you ever suspect, that the day would come when someone would offer *us* trinkets and beads?"

Maybe the point is moot, I thought. The distinction between the galactic cultures. We seem to be in one boat now. With our frailties and our uncertainties.

"Conventional diplomacy just doesn't apply," the marshal's aide was saying, his mouthparts struggling with the inflections of Terralingua.

Marshal Insh had allowed his subordinate to run on for the last several minutes, resting on his tail and sipping at a vile-looking concoction through a bent straw. Now he rumbled, something like a human clearing his throat, and all eyes turned toward him.

"The peoples of Amix Jocha are not evil monsters," he said, watching the heads bob around in agreement. "They bleed and they cry—and, yes, in their own way, at some deep level, they desire to live in peace as much as we do. As much as our friends from Terra. *But!*" And the conjunction hung in the air like the prayerful cry from a minaret. "But," he said, finally, "their leaders have cast a powerful net upon their minds and hearts. They will once again stifle their natural instincts and march in step to the drumbeat of lies. War — Congruence forbid it!—war will be the inevitable result!"

The marshal touched his grey-furrowed brow with a fingerpad. "They will fight us with every milligram of their strength and will. Witness the conquest of the Ritteau Worlds—outmatched in technology, in industrial base, the Jocha horde died by the millions. And yet they came. ."

I edged my way out of the small crowd around the marshal, looking for a place to set my empty wineglass.

"The marshal can be quite a windbag, once he gets wound up." It was Ray Kinney, Falconbridge's special assistant and one of the brightest young men in the Terran Contact Office. Kin-

ney had made six round trips between Earth and St. John's Haven in preparation for the formal talks with the Teydurax. We'd had adjoining cabins on the *Amehoshi*. Judy had finally come to know and like him. She is a good judge of character.

I eased us further out of earshot. "What's Insh doing here, anyway?" I asked. "The last time I saw him and his retinue was during that harangue at the U.N. in New York."

Kinney shrugged, sipping at a glass of champagne. "I'm sure he's got some formal excuse for being on St. John's Haven—the Bofus League is always holding trade negotiations with some world or other. Ninety percent of the galaxy's business is conducted here these days." Kinney brushed at his sandy forelock, looking past me toward the marshal. "The real reason is the Teydurax, of course," he said. "The Bofus League wants us to ask for military technology to use in a war against Amix Jocha."

"Oh, Christ!"

"Sure, that's a song without end from those characters. The Bofus worlds see the Jocha horde as the only thing standing between them and all that potential trade with those primitive worlds toward the Core. So they evoke this image from the past—you know, the Green Peril. Never mind the treaties and the hundred years of peace. And Insh imagines that the Teydurax will give us some ultimate weapon to use against them." Kinney smiled and drained his glass. "Squash them, like—you'll pardon the expression—bugs."

I looked over my shoulder at the crowd, where Insh was still holding court. The amphitheater lobby was getting warm from the press of people. Or perhaps it was the wine. "I sometimes wonder why we even pretend to listen to them," I said.

Kinney put a hand on the shoulder of my tunic. "Don't kid yourself, Armand," he said. "There are lots of people who would fall into step behind the marshal. . People high up in the Terran Protectorate of the Veil, for instance. And if Rita's Veil calls for war Well, there's enough others whose finely balanced weathervanes will turn quickly in the direction of *that* wind."

"Ah, there you are! Armand Rhyss!" It was a short pudgy man I didn't immediately recognize. His hair— what remained of it—was white, and braided in a circle around a pink bald spot, like a laurel wreath. He put out a hand in greeting, grinning and red-faced. "You don't remember me," he said, no question in his voice.

Kinney backed off and looked at him as I shook his hand.

"Uno Pasky," the man said. "The Centauri Memorial Lecture Series about five years ago. Arlington University."

I blinked and remembered. He was a scientist. Weinberg Laureate. Physicist. That was it. He'd been on a program I'd chaired . it seemed more like a decade ago. I struggled to remember the theme of those lectures, but for the moment it eluded me.

"I imagine you're wondering what I'm doing at a theater party seven hundred lightyears from Arlington, Virginia, eh?"

"Dr. Pasky, this is Raymond Kinney of the Terran Contact Office." As they

shook hands, my image of those seminars cleared. Epistemology and Human Science. A heady subject which generated little interest among the student body. Although, as I remembered, the Philosophy Department had turned out in force. "In fact, I remember you well, Dr. Pasky," I said. "You spoke about the psychology of science. And you're right; I am curious to find you here."

Pasky blinked little blue eyes. "It seems we're all on the same team, eh? Mr. Falconbridge—the cabinet minister—invited me to come. I've been up in the Spectrometer Probe in geosynchronous orbit for the past week with most of the scientific support people."

"I didn't even know we had any kind of special facility in orbit here," I said.

Kinney smiled. "George believes in the old 'need to know' principle. It harks back to his days with the State Department."

Pasky feigned surprise—a habit of exaggerated facial expression that I seemed to remember. It made him seem more of an eccentric than he really was. "But aren't you the principal focus for all this . . . preparation, Armand? That's what I was led to believe, eh?"

"Armand is First Contact Designate, to use the bureaucratic jargon," Kinney said. "It means he opens the formal talks with the Teydurax on a one-to-one basis with a representative from their side. It also means that it's his wrist that gets slapped if we make some classic *faux pas* right at the start."

"A heavy burden," Pasky said, solemnly. "Personally, I couldn't imagine myself in that kind of situation . . . with that kind of responsibility."

Kinney nodded. "It stinks, in a way. It places all the burden for error on one individual, at the very beginning when misunderstandings are most likely to occur. But it's been a tradition right from the beginning. Bureaucrats love to have somebody identifiable to point their fingers at in case something goes wrong. And it *does* give us a chance to save a bad start by getting another envoy into the talks who is briefed on the mistakes of the first." Kinney shrugged. "As I said, it's been a tradition in first contact situations. And the Teydurax have agreed to it."

Pasky rubbed his glistening bald spot. "But these Teydurax . . . they're eons ahead of us from what we've been able to learn. A little different situation than your standard sort of diplomatic gamesmanship, eh?"

I watched Kinney's face, but if he took any offense at Pasky's choice of words, he betrayed no sign. "*They* asked to talk with *us*," Kinney said, snatching an *hors d'oeuvre* from a floating tray. "That tells us something about them." He popped the thing in his mouth and chewed methodically. "They turned up here on a cross-cultural world hundreds of lightyears from Earth, settled themselves in out there on the marsh, and insisted that *we* come to *them*. That tells us something more. They're not Gods, Dr. Pasky. They have some answers, that's all. *Some* answers."

"But *what* answers, eh?" Pasky said, smiling broadly with an impish gleam in his eyes. "That's the big question. Imagine yourself in the place of one of the races that we Terrans have contacted in the last five hundred years or so, eh? The Houdan. The Pangoin. Those Bofus

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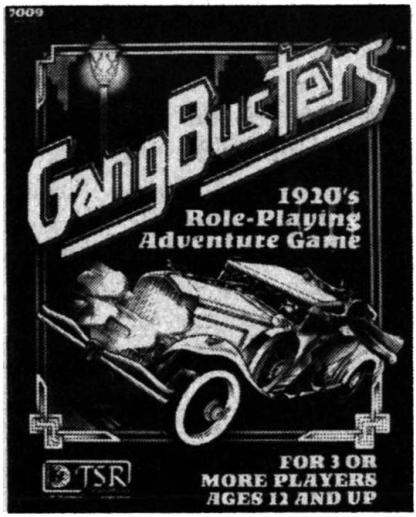

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kangaroos. The Green Meanies of Amix Jocha, eh? Imagine yourself in their place. All of a sudden your world-view turns upside-down. All of a sudden your little tribal squabbles fade in the shadow of something too big to ignore. British warship and African village. Terran frigate and Houdan commune. What do you do, eh?"

"Not quite," Kinney said. "You're a scientist, Dr. Pasky. You should know better than most—we have something that none of those examples you used had."

"Ah, scientific method," Pasky said with a broad smile. "Logic. Inductive and deductive reasoning. Nothing can frighten us as long as we cling to these."

Kinney looked away and sniffed. "That's right," he said.

Pasky touched Ray Kinney's elbow, so that their eyes met. "But, my friend, what if someone were to tell you that our very thought processes—those comforting syllogisms—were biologically limited brain chemistry. Having little or nothing to do with the universe as it really is?"

Kinney was shocked, I could see, but was trying not to show it. "That's Skeptic nonsense, Doctor."

Pasky wouldn't let it go. "But just suppose, Mr. Kinney, that the Teydurax would tell us something like that?"

Kinney's gaze flicked toward me, then back to the little man's earnest face. "Then I'd know," he said, "that they're trying to frighten us, probably to hurt us. They'd be my enemy."

Pasky, what would you have me say to them? What question, really, would you have me ask?

* * *

I'd decided to walk back to the hotel, having missed all the levicabs at the amphitheater exit.

A festival performance of *A Midsummer Night's Dream* with music by Mendelssohn. It had been quite a production. Running translation in nine languages, and complete with an impish Puck whose feet were really cloven.

God, those actors have never seen the Earth, I thought, feeling a little giddy from the night air and the lime-colored glow from the empty sidewalks. "Lord, what fools these mortals be," I whispered to myself with a suppressed chuckle. *All sorts of mortals*, I addended the thought, *but all definitely mortal. Not one of them can weave an enchantment worth a damn. Oberon is a clerk in the Veil Protectorate Office. And Puck is a bastard Bofan kangaroo!*

The night breeze that had been scheduled out of the west came up fast, hitting me with a cool slap. *The real enchanters were notable by their absence*, I thought, remembering the dark loge box reserved for the Teydurax. That empty tier in the amphitheater had cast a spell on the audience with more effect than the play.

Passing a side street, I caught a brief glimpse of a floodlighted helium-filled Buddha floating above the bay. *What fools we must seem to them*, I thought. *Perhaps we amuse them with our primitive diversity, our quaint concerns. Toying with us might be fine sport.*

And those things do best please me/That befall preposterously

"Cabs all disappear when you want one." It was Pasky, puffing and out of breath. He must have been hurrying to

catch up to me. "Just like Boswash, eh?"

I slowed down and he fell into step alongside. Despite the cool breeze his pink forehead was beaded with sweat.

"Terra exports its problems along with everything else," I said. "Are you staying at the Farraday?"

"Where else would a physicist stay in Boduad?" he said with a grin. "Though actually the place is named for someone else entirely, I understand. Falconbridge's office made the reservations." His teeth fluoresced in the light from the pavement. "I guess we're all staying there, eh? Sort of a Contact Office command center."

"It's near the Terran Embassy and the Veil Protectorate Office," I told him. "And that object the Teydurax built for themselves out in the estuary delta is only a few kilometers away."

"You've seen it, then?"

"Pictures."

"They had me speculating on that thing for weeks before they shipped me out here," Pasky said. "For one thing, I'm supposed to figure out why they erected that polygon on marsh land."

When I didn't ask, he continued: "I think it's electrically coupled through groundwater to the ocean here. Some tests that were run seem to suggest that the Teydurax are measuring every neutrino event that occurs in this planet's seas."

"That's not many, is it?" I asked, not really sure, and not very interested.

"A few thousand, maybe, in the short time they've been here. We're not even completely sure that that's what they're measuring, but there are indications. God knows what it means." Pasky produced a large handkerchief, shook it out like a flag, and proceeded to mop his dripping brow. "Not really mind-reeling technology, eh? That's the surprising thing. We do that sort of thing ourselves, monitoring the flux from the galactic core. Of course, we're merely counting neutrinos—with some pretty poor counting statistics, I might add. They may be doing something quite a bit more sophisticated."

We were passing some mammoth sculpted fountain that fronted a closed art museum—dark stone torsos, twisted together in a towering silhouette. From the darkness I could hear the gurgle and splash of running water.

"And then, of course, there are those studies that we did from orbit," Pasky said. "That's quite another matter."

"You mentioned a Spectrometer Probe earlier."

"I can't believe your Mr. Falconbridge hasn't filled you in on all the details."

I shrugged—a slight gesture that turned into a shiver as a waft of cool wind hit us. "George is playing impresario, as usual. I suppose he regards me as his temperamental *heldentenor* in this production he's staging."

"The star is not to be bothered with props and scenery?"

"Something like that."

Pasky was silent for several paces. I listened to our footsteps and the dark splash from the fountain. Then he asked, "Are you interested?"

"Yes," I said, inwardly admitting to a touch of resentment toward George. I thought of Falconbridge as a friend,

and I didn't like the image I'd just now conjured for Pasky.

"We were supposed to check that Teydurax structure for emitted radiations," Pasky said. "The geosynchronous probe was converted from something that had been designed for stellar studies. When I arrived here I thought it was a bit of overkill for a job like this—it's really quite well equipped. I had originally suggested low altitude fly-bys with aircraft, but Falconbridge, or somebody, thought that might be regarded as a bit tacky by our new friends.

"What we found was interesting, to say the least." Pasky seemed to notice the white handkerchief still in his hand. He stretched it out in a taut line, holding one end aloft. "A shadow cone at all neutrino energies, coming off one of the faces of the Teydurax polygon "

I got the picture, turning to him. "You mean it's *absorbing* neutrinos?"

Pasky smiled and shrugged. "I'm afraid so. None of us up on the probe wanted to believe it."

"You'll have to put that in perspective for me."

Pasky cleared his throat. "Say a billion neutrinos from all the momentous stellar events out there bombard this little world, eh? There's many more than that every second—but say a billion, okay? They come from all directions in space, but the bulk of them here locally are from nuclear processes in their sun." Pasky patted his upper lip with the handkerchief. "Chances are all but one of those little buggers will pass through this planet without interacting with matter without being deflected or absorbed. One out of a billion.

"That's the thing about neutrinos —they're like ghost particles. Or rather the universe of matter is like a ghost to them. We still can only measure them by putting a big mass in their way and counting those rare interaction events. More by dumb luck than any planning, we happened to have such an instrument on the probe.

"Now the neutrino flux here from Dancer is unusually high. We'd expect about one interaction event a week with the neutrino detector on the probe. And that's exactly what we got until we lined up our detector in geosynchronous orbit so that the Teydurax polygon was between the detector and the sun. Then we got nothing. Not a single event in four standard months, they tell me. That's too long to be some statistical quirk." Pasky put away the handkerchief. "Even if we caught an event now, the chances are it would be from the interstellar flux coming from behind our probe."

I was still a little uncertain. "What can absorb neutrinos like that?" I asked.

"Not a blessed thing that we know of," Pasky said.

A lighted carriage glided by overhead, its searchlight probing for an address among the dark overhanging balconies on one of the buildings.

"Neutrinos don't feel the strong nuclear force and they're electrically neutral, so electromagnetic force doesn't affect them. The weak nuclear force works on 'em, of course—they carry off some of the kinetic energy when neutrons decay into protons, for example. And gravity would affect them if they had a small mass—we're still not completely sure if they're massless or not. Conventional wisdom has it that you could be pretty sure of stopping any

given neutrino with a lightyear or so of lead."

I had to admire Pasky's grinning enthusiasm. Over the decades I'd met many scientists of all manner of personalities. It had always seemed to me that the good ones all shared an infectious fascination with their discipline and almost a need to explain. It was the lesser lights who usually adopted a "you wouldn't understand" pose and who talked to outsiders in cocktail party banalities.

It *was*, however, getting a bit heavy for an outsider from the social sciences. "Tell me, Uno," I said with a smile, "do you really believe all that?" Something about the man told me that he wouldn't be offended.

Pasky reacted by grinning from ear to ear, then looking away. "A matter of faith," he said with a chuckle.

I noticed where he was looking. We were passing the flood-lit facade of the Cathedral of St. Arlen du Figeaux. There it was—like a holoframe out of a diskfolio on the Second Age of Faith: a lacework of stone, glass, and air, climbing toward the night sky. The most famous Christian landmark for seven hundred lightyears.

"It *is* a matter of faith, you know, Armand," Pasky said, his gaze following the spire-lines of the old church until his neck was craned back. "Science. Logic and its application, eh? In the day-to-day world of human we'll say, personal affairs, it's a clear-cut choice. You live your life either by logic or by faith. Or perhaps, more commonly, by a little of both. In the culture of today the distinction between the two modes always seems pretty easy to define, anyway." Pasky nearly tripped, and I caught his arm. "But in my business," he continued, "the lines between the two still get a little blurry at times. The deeper we look into things, the more trouble we get into, eh? A discrete event either happens or it doesn't—except in quantum mechanics. We start talking about the 'knowability' of things. Heisenberg, then Ackerman two centuries later. That sort of thing. Einstein puts up a speed limit, but Bell shows that a local cause instantaneously affects a remote event. The next thing we know we're traipsing all over the galaxy on engines that travel through God knows what when they engage that hyperdrive. "

Despite the cool wind, I felt my face begin to flush. Pasky's words started to bring forward that swirl of memory I had carefully tucked into the seams of consciousness where it nettled but couldn't sear.

Sarah.

I felt as if I had been slapped viciously with an open hand. I turned away from Pasky as it came rushing back.

The Sheherazade *out of New Sidney failed to emerge from subspace at its preprogrammed coordinates. A radar search of several billion cubic miles above and below the ecliptic in the Mars orbit region failed to reveal*

I fought to drive the sound of the reporter's voice out of my head by listening to Pasky, who was going on, oblivious.

" we have our Messianic figures, like Einstein—though that appellation probably would not have amused him and our presaging prophets like Maxwell " Pasky looked again

toward the great stone church. "And all those masons who built the cathedral of quantum physics " He looked at me and I wondered if my face showed anything. "It's a faith of sorts, Armand. And its creed is reason—the belief that we creatures of this universe can one day map this tapestry on which we, ourselves, are a small detail. Like all faiths, it's the universe trying to comprehend itself."

Part of my mind was listening to Pasky, engaged and interested, even somewhat moved. In the background, though, the darkness roiled, and the sound of the newscast droned on:

The heat-blackened liner was discovered in the Oort cloud of cometary bodies by the crew of a Titan-based mining ship. Official investigators from the Outer System Authority would only comment that the circumstances of the tragedy appeared similar to those which befell the freighter Longwood *last year*

Pasky must have noticed a distance in my eyes. "Have I been running on too much, Armand?" he asked.

"No," I said weakly. Then I snapped out of it: "No, not at all. I guess I've had a little too much of everything today." I studied his sympathetic features. "Earlier tonight, back at the reception before the play, you raised an interesting question."

Pasky nodded solemnly. "What if the Teydurax should tell us that our faith in reason is misplaced."

"I think you would agree that it's served us pretty well so far."

Pasky remained silent.

"It certainly seems to *work*," I said, staring off toward the glitter of our hotel a block ahead.

"So do magic and religion, to those who subscribe to them."

"No, I mean " There was no other word. " logically, we know it's a viable way of dealing with the universe."

Pasky grinned. "Glad to hear it, Armand," he said. "That was spoken like a true believer."

The Sheherazade's *passenger manifest also included Mrs. Sarah Rhyss, wife of Dr. Armand Rhyss, professor of Extraterrestrial Affairs at Arlington University. Dr. Rhyss has served the Terran Contact Office as a special envoy in critical early meetings with many galactic cultures*

Suddenly, I wanted to run that last block back to the hotel. To collect Judy from Falconbridge's suite and hold her in my arms.

I suppressed the urge, fighting for calm. "Damn it, Uno," I said. "Do you really think the Teydurax might tell us that?"

Pasky shrugged, as if there were a weight on his shoulders that he was trying to dislodge. There was a period of silence. It occurred to me some time later that Pasky, too, was struggling with an inner pain. "You might ask them," he said at last.

Yes, Sarah, you are the key to this, somehow. Your love for us.

If only I had the power to express it. Distill it out for them.

Mona Falconbridge was wearing a night robe of dusty pink, but her wrists still jangled with gold bracelets. I won-

dered if she slept bedecked in her jewelry.

"She's been a dear," Mona was saying, ushering me into their suite, where her husband was trying to engage Judy's attention with a plush shatterball. They were an incongruous pair—both sitting stretch-legged in the center of a large arabesque rug as the furry pieces of the toy writhed to reassemble themselves in their midst.

"Armand, I didn't see you when the play let out. We've been a little concerned."

"George has been back almost half an hour."

"Hi, Punkin," I said, picking Judy up off the rug, enjoying her high-pitched giggle. "I walked back with Uno Pasky," I told them.

Falconbridge got up with a grunt and some creaking joints. The shatterball, bereft of the body heat of its audience, relaxed on the rug.

"Sorry if we've been keeping you up," I said, shifting Judy's weight, then finally setting her down. Judy rubbed her eyes. "You sleepy, Punkin?"

"She had a nap about seven," Mrs. Falconbridge said.

"We've got to be going," I said. "Thanks very much for staying with Judy tonight."

Mona Falconbridge adjusted a grey curl near her ear. "It was no problem at all, believe me, Armand. It made me feel like a young woman again. Besides, George can tell you how I loathe those ancient plays."

"She fell asleep once during *The Toucan's Tip* at the Boston Repertory. Imagine." Falconbridge fingered his mustache with a smile.

"Don't listen to him, Armand. It's George who nods off at the opera."

I took Judy's hand and moved toward the door. "Well, we'd all better get some rest."

"A big day tomorrow," Falconbridge agreed. "The first of many, I'm afraid."

"You're getting everyone in on that morning meeting?"

"All the principals—Kinney, Green, Antberg. This fellow Pasky. The prime minister and the secretary general by hyperwave hookup. And we've had to invite Ambassador Tanaka and Evans of the Veil Protectorate; though I doubt that they'll say much."

I smiled weakly, feeling tired from more than just the day. "Then, in the afternoon, the matador steps out into the ring."

"Yes," Falconbridge said, knowing me too well for team-talk hype. "A pity they didn't come to the reception tonight."

"Did they offer an explanation?"

Falconbridge shook his head and put a hand on Judy's shoulder. She turned and beamed up at him. "Don't let it bother you, Armand. Get some rest. We'll talk alone tomorrow before you step into the ring."

I opened the door to the hallway, taking Judy in tow. "Goodnight," I said. "Thanks again."

"*Goo-night!*" Judy said to them, making me proud.

A gust of sea wind pelted at the limo. It sounded lonely and cold. The invisible force of the truth, felt but ungraspable.

I wrestled the pillows into a free-form

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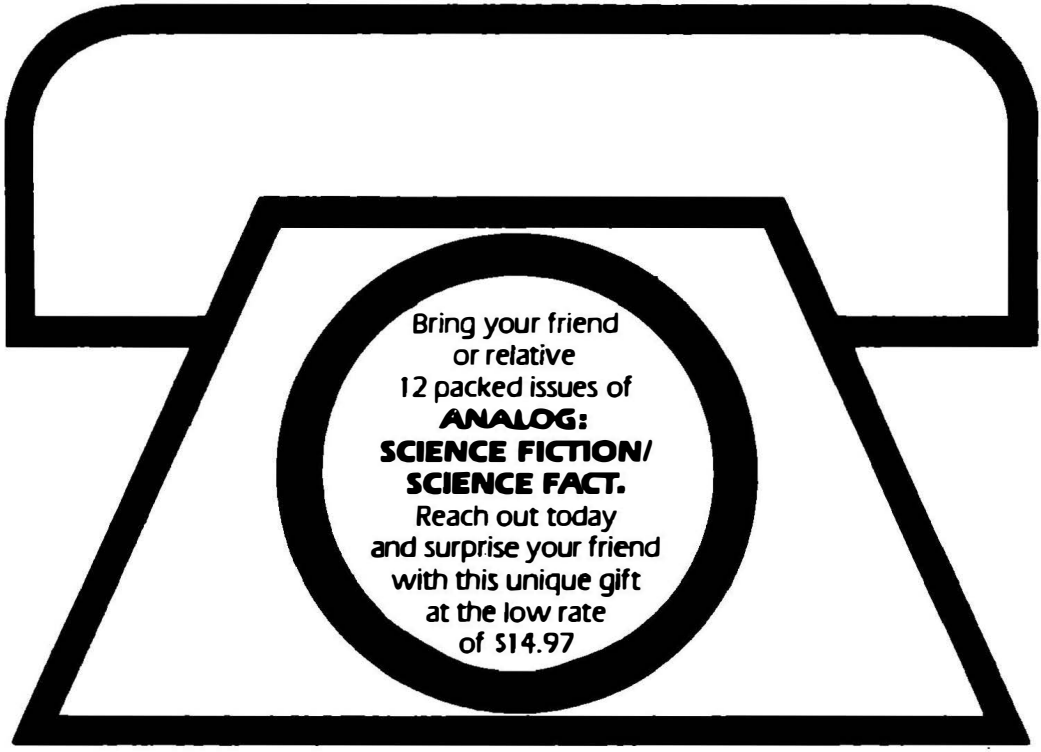

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mass under my head, staring off into the darkened room. I could just hear Judy's rhythmic breathing in the small bed next to mine, punctuated by the soft click of the pendulum clock on the mantle.

She'd been a trouper about the milk, accepting my explanation that the hotel kitchen was closed for the night. *So much goes unspoken between us.*

Inside that little head there is a joy, an acceptance . an understanding. The same amazement at life, as any other ten-year-old.

Nothing is ever going to spoil that. I'm going to make her strong. Strong enough so that one day she won't need me.

I closed my eyes, smelling the cool linen.

Perhaps I dozed. Time passed at any rate.

Armand, a voice said, *my sister would have wanted this. Sign the paper—don't make us fight you on this.*

All of me that's left. That little head. That big heart.

Things were different when Sarah was alive. The two of you could cope.

Sarah!

Just a week. I'll leave you notes, so you won't forget anything. You can cancel that Saturday morning lecture. What do you say, Armand? You know I haven't seen my family in ten years.

My wife's eyes blinked at me out of the darkness.

Mommy's going to visit grandmum.

You can take care of Daddy while she's gone, can't you, Judy?

Sarah.

Her patient blue eyes watched me as I struggled with the pillows.

A doctor's voice, echoing from hard white walls: *I know these things aren't supposed to happen any more, but they do. If you had elected an* in vitro *conception we would have been able to monitor*

I won't let them take her, Armand. It's all machines *in there. Promise me, you'll never let them take her!*

I promise, Sarah.

The glade behind the Fine Arts Building. How many times had that afternoon returned to me, vibrant with detail—as if the present were a dream and only memory was real? Judy and the grey squirrel in a sunlit Mexican stand-off across a carpet of green. Sarah kneeling on the picnic blanket, her hair tied back with a red scarf, cutting the rolls we'd just bought. A Chopin Polonaise drifting on the still air from one of the rehearsal halls.

I clung to the image, even as it began to fade. It was like trying to climb into vapor.

The mantle clock clicked its soft brassy click.

I tried to think of nothing, trying to lose myself in the soft darkness.

Slowly, sensation formed out of the void. I felt myself sliding through a cool darkness. Rippled light above me. Dark shapes floating on some kind of interface.

I was swimming. Not a man, but a fish. Swimming in a pond littered with floating leaves. Reflected on the surface (seen but unseen) were the barren branches of three trees. It was autumn. The water was cool.

Dimly, I was aware that it was an ancient flat print—an etching by Escher that I'd seen somewhere. "Three Worlds," it was called.

Like the golden carp beneath the glass floor of the hotel barbershop, I glided through the dark water of my milieu, growing tired and old. Above me, the dead leaves of the past floated by, vaguely perceived. While reflections of yet another world, a strange world of light and air, seemed too distant to be real.

It was all too fast. I need time to put it together. If I ever can

I was brushing my teeth when the hall door buzzed. "That's the lady I told you about," I said. "It's okay to let her in."

I heard Judy working the latch and then the pneumatic hiss as the door slid open. Then I heard nothing but silence —straining my hearing with the toothbrush poised and my mouth full of suds. Spitting into the sink, I poked my head out the bathroom door.

Frau Groenstein was standing in the open doorway, a mask of a smile on her face, the white purse held in front of her like a shield. Judy was a couple of paces back into the suite, staring up at her, open-mouthed.

"Come in, please," I said. "Judy, say hello. This is Mrs. Groenstein."

Judy responded by taking several backward steps as the lady entered the room. The door slid shut behind her.

This didn't portend well at all. I stepped out of the bathroom and walked over, extending my hand with a smile. "You're right on time," I said. "Please sit down and I'll order some breakfast for the three of us."

Frau Groenstein took a seat on one of the slings. "I haf eaten, thank you," she said. "But please, perhaps, some tea?"

I picked Judy up, taking her thumb gently out of her mouth, and carried her over.

"Judy," I said, "this nice lady is going to stay with you while Daddy is away today."

Judy pressed her face against my shoulder.

"Hey," I said, sitting down with her. "Say, hello, Punkin. She's a nice lady."

Frau Groenstein's awkward smile seemed to help a bit. Judy relaxed in my lap, looking at her silently.

"Is your name Judy?" the lady asked, setting her purse on the floor.

"Yeah," Judy said.

"My name is Hilga. Can we be friends?"

Judy looked at me. I winked at her and nodded.

"Yeah," Judy said after a moment of reflection.

I relaxed a bit and reached for the phone to dial room service.

George, you're not a bad sort, really. In a strange way you're part of the answer, too.

Pasky's remark about the use of the Farraday as a command center was nowhere more appropriate than in the ballroom that Falconbridge had had sectioned off into makeshift offices. An assortment of telecommunications gear and cybernetic devices lined the walls of sound-proof partitions, attended by earnest-looking shirt-sleeve types—Houdan, Pangoin, and human.

I nearly tripped over some of the cables, as my attention was caught by a

bank of holomonitors that showed the Teydurax polygon in an array of false color images.

"Mi*ss*-ter Rhy*sss*," one of the Pangoin said, noticing me. "You're looking for Mi*ss*-ter Falconbridge?" From the egg-case on the thorax I took it to be female. "Right through there," she said, pointing.

Falconbridge was on the phone behind a large glass desk. I closed the door and sat down.

"I understand, sir," Falconbridge was saying. "Armand just walked in. Yes, sir. I'll explain the situation."

I watched the thin screen slide back into the desktop. It had been the PM. I could tell from George's obsequious phone etiquette.

"Well, Armand," he said, awkwardly shifting some mental gears, "your moment in the bullring is almost at hand."

I motioned toward the slot on the desk where the holoscreen had receded. "I thought that the prime minister had said his piece at the meeting this morning."

Falconbridge cleared his throat and leaned back in the bucket chair, a light-pen between his fingertips. "I think you know, Armand, that some of what you heard this morning was public relations—for the benefit of the secretary general and the Veil Protectorate people."

"It sounded good to me," I said.

Falconbridge cleared his throat again. "Then I don't know how this is going to sit with you "

I don't normally consider myself naive, but at that moment I was genuinely puzzled. "We're not interested in medical advances?"

"Oh, certainly we are. The greatest good for the greatest number. All that The plague on Sarna Asfar. That list of incurable infectious and degenerative diseases No, the PM is behind all that as a high priority. No question."

I narrowed my eyes, wondering for a moment if I was talking to a total stranger. "*But* " I began for him.

Falconbridge rebounded by raising his brows and looking past me. "*But* there is the matter of Amix Jocha "

I didn't want to believe this. "What about them?" I said.

Falconbridge pulled out a desk drawer and fumbled in it. In the seventeen years that we'd known each other I'd never seen him this visibly nervous. He produced a paper cylinder and put it in his mouth. "Armand, you know me pretty well " The white tube bobbed ridiculously as he talked.

"I thought I did."

you know I wouldn't support a position I didn't personally believe in " A wood match struck somewhere behind the desk and he tried to light the end of that thing without singeing his mustache.

"That's bullshit, George," I told him. "You compromise yourself twenty times a day in your job. But I always believed you knew where to draw the line."

Falconbridge blew out a stream of white smoke that extinguished the match. "The PM is worried about the Jocha horde and so am I."

"Insh," I said.

"Not Insh. Everyone knows what he and his crowd are."

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I got up feeling the need to pace, but there was no room in the makeshift office. "So you want me to plead with the Teydurax to give us a cosmic fly-swatter!"

"Lower your voice, Armand!"

Feeling frustrated and betrayed, I sat down, collapsing into the chair. I looked across the desk through a thin layer of smoke that hung in the still air at the level of our eyes.

"There have been intelligence reports," Falconbridge said. "Amix Jocha is preparing again for war." An ash tumbled down the front of his tunic, leaving a dirty trail. He ignored it, or didn't notice. "It's real this time, Armand. They want the Veil maybe ultimately as a staging base to cut a path toward the Core."

"You saw these reports?"

"The PM said "

"Screw the PM, George! Did you, personally, read the goddamn intelligence reports?"

"You know nobody in our bureau is cleared for that kind of thing! What are you getting at, Armand? You think the threat is a fake?"

I glared at him. "Yeah, I think it's a fake. I think Insh and his boys made some points on that junket to New York. Maybe with the government or maybe indirectly through the Trade Guild. The Bofans aren't the only ones who would benefit if the Jochan Truce was eliminated." My eyes were starting to water and I waved angrily at the smoke. "I think our man in the swarm—if he exists at all—has a kangaroo tail tucked under his carapace."

"I believe the PM is an honorable man," Falconbridge said, but his voice was a bit shaky.

"The PM is a scared little man when he moves in certain circles," I told him. "The Union scares him, the joint chiefs scare him, and, most of all, the Trade Guild scares him."

Falconbridge seemed to be looking for some place to put the smoldering cylinder. Finally, in frustration, he held it up in the air between two fingers. "I'm not going to listen to that kind of talk, Armand. In a little over an hour from now you're going to be representing our government in what could be the most important meeting in its history "

"I'd say that's understating things a bit, George."

" *and* I've been directed to give you special instructions by the duly elected head of that government "

"*And* this *is* an election year. Let's not forget that, George. The PM's reelection support may be the hook that somebody sank in him. If the Guild threatened to withdraw its support "

"You're building castles in the air, Armand. You haven't even given me a chance to explain the instructions. Now, will you please shut up for a while and listen!"

I sank back in the chair and watched silently while Falconbridge dialed up a glass of water from the desktop and dropped that vile cylinder into it. It died with a hiss. "Okay," he said. "Here are your instructions from your government: You will explain to the Teydurax first of all that the Terran people are peace-loving, having been at peace with all the races of the galaxy for the last one hundred years. You will voice the

concern of your government about preparations for war that have been discovered on Amix Jocha, describing the superior numbers and breeding rate of the Jochans, as well as their avowed claims to certain stellar regions which are populated by free, indigenous peoples." Falconbridge met my stare and spread his hands. "That's all of it, Armand. An expressed concern. Beyond that, the remainder of the meeting will follow the outline that was discussed this morning."

"A little healing and a little war," I said.

"An expressed concern, Armand."

"No matter how it's phrased, the implication is there."

"What if the horde is getting ready to swarm, Armand?" He stopped me from speaking with a raised hand. "Forget Insh. Forget the Guild for a minute. Just entertain the possibility for a while that this thing is real. You've read the *Annals* and the popular accounts—*Out of the Hive*, that sort of thing. You've seen the pictures—everybody has."

"You're asking me to represent the human race to the Teydurax by asking them to put a weapon in our hands."

"A defensive weapon."

"George, do you know how silly that sounds?"

Falconbridge folded his hands on the desktop. "I'm not ashamed of this. We want to survive, in peace, that's all. And I don't think we can afford to worry how this position will seem to the Teydurax. We have to assume that they'll accept our words as the truth."

I looked at the water glass on its little raised platform. A brown stain was diffusing from the soaked paper tube. "How can I ask the Teydurax to accept something I don't believe myself?"

"You, personally, aren't involved. Now, I know how that sounds, too, but you aren't new to this game, Armand. You were picked for this assignment because of your extensive experience in first-contact situations. You know very well you're representing the Terran government, not yourself."

"*Everybody*," I said, "is new to *this* game."

Falconbridge brushed his mustache with thumb and forefinger, a small grin partially concealed by his hand. "Now why don't we stop philosophizing and get down to some last-minute nitty-gritty diplomatic details."

I looked at him, not sure what I was feeling. "I might walk on this, George. Let you go in there yourself. Or send Antberg."

He removed his hand and now he was grinning broadly. "You won't walk out on this, Armand. You're forgetting how long we've known one another I know you wouldn't trust anyone to go in there except yourself."

The first meeting. The first ride out across this bleak landscape. Could it have been only twenty . I glanced at the limo's chronometer. Twenty-five hours ago. ?

The salt reeds were rippled by the limo's field, like Kansas wheat in a prairie wind. I had been staring out the window at the grey undulations for several minutes, trying to assemble my thoughts.

It was not coming together. There was no suitable preparation for this

meeting. In the past—in those other first-contact situations—I had entered the meetings like a legally appointed envoy. This time I felt more like the human specimen who had drawn the short straw.

No, there was no suitable way to prepare. Or, perhaps, my life until this moment, suitable or not, was the only preparation possible.

Then I was looking at the glistening facets of the Teydurax polygon—a towering, lustrous-white crystal seemingly condensed out of the brackish marsh. The limo was a black smudge reflected in one of the milk-glass surfaces as we glided nearer. Seconds later we came to a hovering stop.

I started as the driver popped the door latch.

"You're wearing a phone, sir?" he asked. "I was told to return to the city. The ground's too soft to park."

I nodded at his eyes in the rear-view mirror. "It's hard to say how long," I told him, noticing the little ledge of a threshold that had appeared outside the limo. "I'll be calling before dark, though." My hand was on the door handle.

"Good luck, Mr. Rhyss."

I took a deep breath and stepped out into a soggy salt breeze.

I stood there a moment facing the featureless white wall, engulfed by the wind and the whine of the limo's field. Then a human-sized doorway appeared in front of me, as if the solidity there had been an illusion. A warm orange light streamed out of the portal, like something out of an antique Flemish painting. Standing there on the threshold, I couldn't shake the impression that the interior was illuminated by candle flame.

I tucked the attache under my arm, wiping my hands on my tunic. As I stepped toward the streaming light, a gust of wind pelted at me, carrying with it the gull-like cry of some creature of the marsh.

I had been frightened that first time —wondering whether I would face angels or demons. Or something so utterly new that it defied metaphor.

There used to be something called, I think, Cope's Law. A largely disproven generalization about genetic evolution on Earth. It stated that as animals evolve, they increase in size. Dinosaurs from little reptiles. Clydesdales and Belgians from *Eohippus*. That sort of thing. It was one of those nuggets of orthodoxy that sound so right that nobody really bothers to question them. Until somebody noticed that the dating of the fossil record just didn't support it. Environmental pressures work just as often in the opposite direction—to decrease body weight and surface area. Xenopaleontologists tried several times to revive the old theory from studies of strata on a hundred worlds, but it never could be made to hold water. Not when accurate dating was available over long fossil epochs.

The Teydurax were big for bipeds with no balancing tail. Too big, I thought, to have evolved from something even bigger. Perhaps there would be another revival of Cope's Law after this contact. Some misguided accounts might even point to our own six-foot

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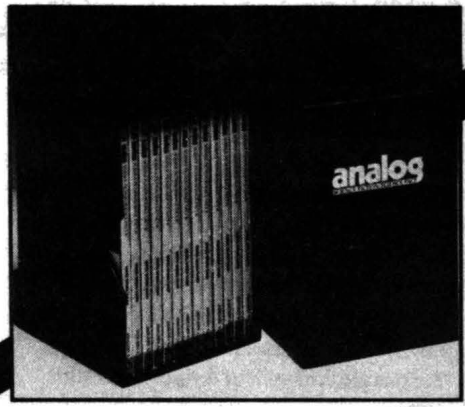

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ancestors of a few centuries back as a step down the evolutionary ladder.

Such thoughts were going on at some level in my head as I studied the creature before me.

It was all of three meters. Perhaps more, but what I took to be its natural posture was not quite erect. The upper torso leaned forward a bit, so that its finch-like head seemed to be looking down on the top of mine. Mentally filtering out the golden radiance of the room, I gathered that the fluffy down that covered its body was white, as in the holographs I'd seen. The legs were short and might have belonged to a big cat. And when it stretched its arms, a downy curtain extended from its body, like the gliding skin of a flying squirrel.

The effect made me fight down a shudder.

"You are the human, Armand Rhyss?" The interrogative inflection was flawless, the Terralingua accent, pure Boswash—a masculine tenor from the holos.

"Yes," I said, suddenly somehow aware without looking around that the portal behind me had reassembled into a seamless wall. The golden room was very large and very cold, and nearly empty.

"For our purposes," the Teydurax said, "my name is Merack. Welcome. We will speak." He gestured toward two strange but comfortable-looking chairs. One was for me, the other obviously designed for the Teydurax.

The alien moved with a slow, loping grace. We sat, and Merack crossed his legs as a man might have. "You've traveled far to meet with us, Armand. It was an act of friendship, we feel certain. And we are grateful."

"I'm personally honored to meet with you as a representative of my government and of the people of Terra." The chair, I noted, was designed so that when I leaned back our eyes met. A nictitating membrane flicked over the dark irises.

"We are an old people," Merack began. "We have learned some things that we believe may have meaning to your race—either as things for the joy of knowing them, or as aids to ease the burden of life." A puff of breath sighed out of nostrils in the white bill—almost visible in the room's cold air. "Like you, once we were a deep-space-faring race that roamed the stars seeking fulfillment. Seeing you now reminds us of our youth, and we would offer in friendship the benefit of our experience."

I flicked open the static seal on the attache and pulled out a sheaf of papers. "There are, of course, many questions," I said.

The lines from Francois Villon ran through my head, as I recalled that first meeting with Merack. But did they apply only to us? Or to them, as well?

"Prince, I know all things: fat and spare,
Ruddy and pale, to me are known:
And Death that endeth all our care:
I know all save myself alone."

"Selfishness and selflessness are two sides of the same poisoned pool," Merack was saying. "We have found an island in that pond, but it floats. At times it moves nearer one shore or the

other. But never too near, lest it run aground."

"There are those who say that all acts are fundamentally selfish."

The nictitating film slid across one eye, then the other. "No," the alien said, "that is not true. Even of those who believe it."

I looked down at the packet of notes I'd prepared for this meeting. It was a hodge-podge of formal outlines and scribbled comments in the margins—the extract of a little more than a day on St. John's Haven. Little of it seemed to have been touched upon with Merack, and yet several hours had already passed. I flipped through the pages, wondering if any of it fit the tone I sensed from this meeting. "When you called us here, to this meeting," I said, "what shore was your island near?"

"Selfishness. Your race is a sleeping child. It pleases us to rouse you from your dreams. To watch your face as you awaken."

"Perhaps our dreams are pleasant. Some human infants cry when they awaken."

The white bill parted just a bit. A black tongue flicked, then disappeared. "Your tears will dry," he said. "Our pleasure is in that."

I dropped the sheaf of papers into my lap. "Of all the races in the galaxy, why did you choose us, now?"

"You Terrans are a gregarious people—a puzzle piece that now fits in many different places."

"If you change us, you change many other races in the galaxy, as well?"

"Yes, as one ripe fruit exudes a vapor to ripen a whole basket."

The golden room seemed to grow even colder. The warm radiance seemed incongruous—almost, a deception.

"So there's nothing special about us. No unique capacity—no hidden potential?"

"You are gregarious."

"Is it possible," I said, "that we will come to regret the change?"

"Yes."

"That answer surprises me."

Merack brought a delicate white hand up, the thin fingers spread. "Despite our recent appearance in your lives, we know the human race quite well, Armand. A meeting such as this is not the product of a whim, as I'm sure you surmise. We know, for example, that that which you call nostalgia is too important to you to lose. It and a host of related characteristics both limit and complete you."

"We will change so very much then, that we will pine over our lost youth?"

The pale hand dropped with the grace of a butterfly, settling on one down-covered knee. "Many among you will," Merack said. "Over the ages it will fade. Quite likely, it will leave a residue in your culture of sad and beautiful art."

We were both silent for a space that stretched into minutes, our eyes locked across a nameless gulf that I could just dimly perceive.

"Where do you come from?" I said at last, shrinking from the question I had almost asked. For in my mind the words still burned: *Will we hate you?*

"A place you know by a traveler's name—the smaller of the two companions to this great disk." Some indefinable emotion flickered across those black eyes, catching me by surprise. "Your home is quite beautiful in our

night sky, Armand. And though we've traveled it widely, it still holds mystery and special meaning to us."

"You are from the Lesser Magellanic Cloud," I said, awed by that fleeting glance into a Teydurax soul. "That is still quite beyond our fastest ships."

"For a time. Even without our help you would soon learn to reach that far."

"And yet now we lack real understanding of how even our present ships carry us among the stars."

The Sheherazade's *passenger manifest also included Mrs. Sarah Rhyss, wife of*

"You have a personal interest." It was not a question—Merack had mastered the interrogative and there wasn't a trace of it in that remark. But how could he know about Sarah? Empathy? Telepathy? Or had Falconbridge told them? I felt my face flushing with resentment.

The alien looked away, almost as if what he saw on my face troubled him. "Travel among the stars takes many forms," he said. "The generation-ships and the frozen sleep ships are nearly always early efforts of the more ephemeral races. These eventually are replaced by one of the five principles upon which hyperluminary travel can be based. We have observed that the speed of development of the first stardrives is usually inversely related to a species' average life span. I understand you have an old expression: 'Necessity is the mother of invention.' Some peoples who live quite long never do develop the capability —they live and die within a sphere of space bounded by not much more than the distance light travels in one lifetime. The tortoise stays within his shell, so to speak, while the May fly inherits the stars."

"And us?"

The dark irises returned my stare. "Quite short. You will use all five stardrives. The simplest you've already discovered. You travel through time."

"Through time?"

"A metaphor. But an apt one. Your hyperdrive engines carry you backward to a time when the universe was at an early stage of expansion. The distance between any two points was shorter then, of course. Lightspeed is not such a prodigious limit in the early universe. When you arrive at your destination locus you return to the present. Given the mysteries and metaphor associated with time, it is really quite a simple loophole."

"But dangerous ." I said, speaking out of a confused haze.

"Yes. The early universe was hot. Travel too far into the past and you do not survive the journey."

The four hundred thousand-ton liner will be towed to the Titan yards for study by investigators from the Outer System Authority.

"There is always the danger of a runaway engine dropping too far into the past with this approach," Merack said. "Though with understanding, the potential is there to explore the universe through space and time."

I saw it now in a nightmare vision behind my eyes. The *Sheherazade's* engines running wild into a deep hot explosive past.

Sarah!

"You will learn the other modes of travel. They are more subtle. And safer. But you will return to this first ap-

proach—the allure of exploring your own history will be too great to resist."

I could hear my pulse pounding in my ears. "We will learn to control this, then? Travel short distances into the past

The finch-like head didn't move, but the eyes seemed to bore into me. "To resurrect the dead? No, Armand, you will learn a certain wisdom before your people begin to plumb the depths of their past."

Damn this thing! I was convinced for an instant again that it was reading my thoughts. I jammed the papers into the attache and sealed it with a crackle at my fingertips.

"You know the past, then, as we do not " I was irritated and confused, dizzy and cold—and through it all I saw Sarah smiling at me across a picnic blanket.

"Yes," Merack said. "In a sense. We have learned to read the cosmolith. Your race still believes that information is lost in those dark traces you call black holes. But it is not."

"The cosmolith?"

"A word we coined in your language. Studied in a certain manner singularities are like stone strata on which the character of the universe can be read. Our universe writes its own history and defines itself in the cosmolith. If you were a scientist, Armand, I would speak of holograms formed by the wave functions of virtual gravitons—but it would be just another imperfect analogy."

I remembered the rhythmic bobbing of the grey squirrel's tail as he stopped to sniff the air and Judy held her ground. *That's Chopin, isn't it?* Sarah said.

"Why does this structure absorb neutrinos?" I blurted. I had meant to say "how," but at the moment the distinction was lost in a mental blur.

Merack leaned forward, looming over me. "In the early universe those particles you call neutrinos condensed out of the hot continuum at a moment very early in the expansion. Your scientists know that the neutrino background of the universe is only one degree above absolute zero on the temperature scale you call Kelvin. This compares to 2.8 degrees Kelvin for photons, which condensed out much later in time. The neutrinos have been cooling longer than the photons. If one compares the properties of the new neutrinos—those produced by all the subatomic events that have occurred since the original condensation of the primordial neutrinos—with certain properties of the neutrino and photon background, a second sort of cosmolith can be generated." Merack blinked at me, seemingly confident that I had followed him. "For corroboration and additional detail," he explained.

"These two cosmoliths, then, contain all history?"

"We have reason to believe so, Armand—everything that has ever happened anywhere. Though we still read them imperfectly. We have made the study of the cosmoliths the focus of our culture for millennia now."

"And what do you read there about the future?"

"A power-curve of diverging probabilities. The future appears to be truly fresh clay."

Fresh clay.

I remember thinking that Merack with those words had just wiped out every

fatalistic and deterministic philosophy mankind had ever formulated.

My wristphone buzzed, breaking the silence. I pressed the stud, thinking it would be Falconbridge with concern about the length of these proceedings.

It was. But his voice was tense. "Armand, Mona just called. She stopped in your suite after shopping. Judy seems to have disappeared."

I shrank from that remembered fear — that terrible ride back to Boduad across this marsh.

A bleak undulating greyness and the crackle of police reports from the limo's radio. Falconbridge's face talking too much out of the holoscreen. It was a timeless emptiness that engulfed me—a grey haze, penetrated only by the hammering of blood in my ears.

Pasky was in the hallway as I stepped out of the elevator. He said something as I rushed past him.

have been here already."

I slid my hand into the crack of the unlocked door and pushed it open savagely. The mechanism yielded with a cushiony hiss.

He followed me into the suite, still talking. " fingerprints identified her as a patient at the Institute. I guess George has told you "

I looked at the empty room; the open doorways: bathroom—dark; bedroom — sunlit from the windows there; study—a blue clock face on the holoset swimming in darkness. I walked numbly toward the sunlight across the footprint-mottled rug. The beds had been made. Judy's dolls lined the bedroom mantle. One blew a kiss at me as I stood in the doorway.

The mantle clock clicked; the yellow brass pendulum catching brilliant light in its swing.

Promise me, you'll never let them take her, Sarah said.

"Armand!" Pasky grabbed me by the elbow and I realized my hand was at my mouth, my fingers cold and trembling against my lips.

I lowered my hand, wrestling myself out of the grey haze and swallowing down nausea. "I heard," I said. "In the limo. She tied up the real one the real Frau Groenstein."

"They'd been looking for her for almost a day when we reported in about Judy." Pasky rubbed the back of my tunic. "They'll find them soon, Armand. And not to worry, eh—they assured us that her profile shows no dangerous traits "

"Hilga," I said, remembering the self-conscious smile she had for Judy.

"You heard, eh? Hilga Müller is her real name." Pasky guided me back out into the living room and down into a sling. He opened the wet bar and began probing among the bottles. "The police are very good here, Armand. ."

I could feel Judy's face burrowing into my shoulder, as I had sat in this very spot this morning. *Say, hello, Punkin. She's a nice lady*.

Pasky sat a bottle down with a wet clunk and turned with two glasses in his hands.

"For the nerves, eh?" He handed me one and plopped into the sling where the woman impersonating Frau Groenstein had sat. His pink face forced a smile as he pulled on the drink. There

was a long moment where I just stared at the glass in my hand. "She's harmless, Armand," he said, finally.

"We haven't come very far at all, you know," I said, not looking at him. "We've learned to rattle around in a little part of this galaxy in dangerous machines that we've built but don't really understand. And we don't die of the old diseases anymore—we die of a whole set of new ones now. It still takes a balance of terror and the threat of Armageddon to keep us from war. There's still that howling lemur inside of us, Uno the brain " I held the glass up and pressed it against my forehead. "The brain is as much a mystery as it ever was." I rolled the glass on my brow. "It's *us*, Uno. How can something understand itself?" I took the glass down. "I should have asked the Teydurax. They know it all, the lousy bastards " I shifted my foot out from under the sling and something rolled out across the rug.

I picked it up. It was a small blue ovaloid—a bit larger than a robin's egg. The warmth of my palm released some hidden latch, revealing a hinged seam. I sat my drink down and pried it open with one finger.

"What is it, Armand?" Pasky asked, leaning forward.

I didn't answer, staring down into my palm where, in the holographic depths of the tiny shell, a man was crucified.

The law, morality and ethics, religion—they are the rungs we've built for our climb down out of the trees. A collective human self-reference, like a cultural psychoanalysis. They are our greatest treasure and hope.

Could that be the key?

Are the Teydurax too old to remember their own primitive heritage?

Or are they descended from seed-eaters? Some primeval twittering finch with no blood on its mind?

"You should, perhaps, wait, Armand."

I had my hand on the brass handle of the carved wooden door. "Wait for the police, Uno. Out here." The stone lacework of the cathedral loomed over us, climbing toward a sky already red with dusk. I looked for an instant into Pasky's eyes—a man I hardly knew—and knew him for a friend. "Please," I said.

I swung open the door and entered a cool, scented stillness. There was a muffled click and echo as the heavy door glided closed.

The vestibule was large and empty. I faced a fading fresco of Saint Arlen du Figeaux, patron of spacefarers, in his moment of martyrdom. How many believers had carried this image with them on the outbound trek to the early colonies? I was in the presence of the Second Age of Faith and I didn't care. A hundred thoughts were rushing through my mind—all of them focused on Judy. I walked past the nimbus-ringed faceplate, the somber eyes following me, and pushed silently through a pair of cut-glass doors.

The great aisle stretched before me. And above, an immense space of still air, where Dancer's fading light still streamed down in rays through clerestory windows. Dust motes danced and winked at me.

Someone coughed in the dim distance toward the altar. The sound echoed with

solemn precision, lasting longer than seemed reasonable—finally fading.

I began walking toward the source.

The empty pews streamed past like a ribbed sea, and I felt the weight of angels' eyes from the painted ceiling.

The altar was a galley table from an ancient reaction drive planetary tub — rendered in gold and twice life-size by the hand of some long-dead artist. Cups and drinking tubes hung on its sides in a baroque rhythm of bas-relief. Two enormous unlit wax candles stood at either end of the altar cloth.

As I passed under the transept I began to resolve three figures sitting in a front pew—a priest, a woman, and a child.

Seconds later, I began to hear the woman's voice. "*Segnen Sie mich, Pater Ich habe gesündigt* " The sound was muffled, as if spoken from behind a closed hand. The words were repeated, spaced by sighs of in-drawn breath.

"Hilga not cry," I heard Judy say and my heart leaped with joy.

"God forgives you, madame," the priest said. He looked up and back, noticing my approach, then looked back at Hilga Müller. "He sees and forgives."

I slipped into the row behind them and took a seat in silence. Judy got up and kneeled on the pew. She smiled back at me, her little hands clutching the seat back.

Everyone has a question for them.

But don't all those questions, collectively, say something about us?

George's rationalized sell-out to expediency.

Uno Pasky's Skeptic stance—perversely undermining the meaning of his own life's work.

My concern to know the cause of Sarah's death—a knowledge which will not bring her back and which brought me no comfort.

And just what, really, did that priest want me to ask them?

Pasky, my friend, somehow we must all keep the faith.

In the Critique of Pure Reason, *Immanuel Kant limited science to the world of experience and faith, ever unprovable by reason.*

But if that is so, then in whose name do we seek the quark?

Hilga Müller had gone with the police quietly, patting Judy affectionately on the head, but quite unable to meet my eyes. I had wanted to say something encouraging to her, but the moment slipped by and she was gone. I asked Pasky to check with the Institute and verify that the record showed that no harm had come to Judy. Now we were alone in the great cathedral—Judy, the priest, and I.

He was a remarkably young man, this priest. He could have been twenty-five, but no older. Blue eyes and a boyish curl of black hair over the forehead. His black cassock was wrinkled from sitting in the pew.

"I was talking pretty fast there, at first," he said, "until I got the whole picture."

I had Judy in my lap, hugging her back every time she squeezed. I nodded. "She's just a very confused and lonely woman," I said. "She would never hurt anyone."

The young priest rubbed the sides of

his nose with both hands, almost in an attitude of prayer. "It took a while to verify that. The German had me confused a bit, until I remembered enough from the seminary." He took his hands down and looked up toward the ceiling of the apse. "It's been a long afternoon. I didn't want to leave them."

"Thanks," I said, finally meeting his eyes.

"You're the Terran envoy," he said. "The newsdisks have been carrying your picture for weeks now."

I nodded.

"Have you met with them yet?"

"Today."

He stood up and stepped out into the aisle, looking toward the golden altar. "They know a great deal, I guess that's what the news has been saying. They want to teach us."

"Yes, they know a great deal."

He kept his back toward us and his voice echoed off the far wall behind the altar. "I don't suppose you spoke about religion?"

"No."

"No, I suppose not," he said, still turned away. "I imagine, though I imagine you'll get around to it."

The limo glided to a hovering stop before the milk glass wall.

I sank back into the back seat cushion, picturing the golden coldness inside the polygon. The towering aspect of that alien Horus, radiating such certainty about us.

Could it be, in their vast knowledge, that they understand, too, what it means to lose Sarah? To almost lose Judy?

Falconbridge. Pasky. That young priest. Are we all transparent to them? No, I decided. It's not true. They don't understand us.

I haven't made them understand.

"My name is Eras," the Teydurax said. "I will speak with you today."

I sat down with the attache on my lap, watching the huge creature fold itself into the enormous chair.

"You may assume that I know all that went between you and the one known as Merack, as if I were he. For that is, in fact, partially true."

"Where is Merack?" I asked.

"Merack is home."

"In the Lesser Magellanic?"

"Yes."

I swallowed, tasting the chill air of the room.

"Your daughter is well?"

"Yes. No harm came to her." Inexplicably, I felt again those little fingers slip past my cheek, as I passed her to Mona Falconbridge before boarding the limo.

"Still," the alien said, "yesterday's incident was most unfortunate."

"No harm was done," I said, wanting to get off the subject.

"Those such as the woman who abducted your daughter—we have the skill to heal them."

To avoid those penetrating irises, I fumbled with the attache seal. "And my daughter," I said, pulling out some papers.

"Your daughter is mongoloid."

Damn them! I thought. *How can he say that to me now!* Knowing, though, that there could be no mockery or malice behind the impassive stare. No, not even condescension. Hating him anyway.

How dare he—this thing—say the words I couldn't think!

Sign the paper—don't make us fight you on this.

"Yes, she's mongoloid."

"The skill to heal your daughter still eludes us, Armand."

I turned some pages not knowing what they said. "I knew that, of course," I said, almost choking on the lie.

Seconds beat by. Then the alien said: "Give her to us, Armand."

It didn't completely register at first.

"We know you can't teach us to cure every human ill "

"Give her to us and she will be happy. There is a concept in your culture "

"No!" A word without thought, divorced from the explosions going on behind my eyes. I still couldn't look up into that face.

"Your love for your daughter is perverted by your own needs, Armand. You fear now that I speak the truth. You fear the loss of her company."

I jerked my head up and met the alien gaze. My eyes must have been wild. "She could never be happy with you!"

The pale beak parted, the black tongue flicked, then it spoke: "Then come with us, too, Armand. You and your daughter can be together. There is a sense in which—from our perspective—you suffer from the same affliction. With us you can have what clarity it is in our power to give you. You will know us better than any of your race. As the rest of humanity will be changed in generations, you and your daughter will be changed in a day. And with us you will have something which we perceive is

very important to you self-respect."

I suddenly found it hard to swallow in the dry cold. The nictitating membranes blinked solemnly at me in sequence: one, two—drawing out the silence.

"No," I said at last, "you're wrong about us. About Judy and me. About all of us." I knocked the attache and papers to the floor and leaned forward. "We're dumb compared to you. We can't read the cosmolith. We don't know what's coming and we hardly remember where we've been, but you can't give us what we already have.

"We *have* self-respect, Eras. I have it. And Judy has it. And I will see that she grows up keeping it always."

I looked into those dark irises and felt human history behind my gaze. "We Terrans have had a penchant for getting ourselves into big trouble. In ages past nuclear fusion weapons were all the rage. And then there was a period of culture wars with antimatter bombs, where we threatened solar systems with corona death from their own suns. We've almost blown ourselves to dust a thousand times—surely you know that, Eras?" I breathed deeply, watching the impassive face of the Teydurax. "It's still there—the bloodlust. It rises from time to time to push us to the brink. Now we're worried about the Jocha horde—those poor, faceless trillions. But I believe we'll make it again without Armageddon. Because we've got a spark, Eras—dumb and violent though we are. As individuals. And as a culture. We *have* self-respect. That's something you don't understand about us. We hardly understand it about ourselves yet."

I stood up, and the alien drew back. Something on that face suggested surprise. "Your price is too high, Eras. We won't swoon into your arms. The human race has never had anything handed to it and we'd lose too much of ourselves if we started taking your kind of handouts now.

"Come around again in a thousand years and we'll talk as equals. But until then, leave us alone. We've got work to do."

It was hours later.

Stepping out into the cold marsh wind, it occurred to me that I had just turned down something like godhood for the human race.

Judy was in the back seat of the limo, waiting for me. And when she hugged me, I knew it was finally over. We were going home. ■

● A leader is best when people barely know that he exists. Less good when they obey and acclaim him. Worse when they fear and despise him. Fail to honor people, and they fail to honor you. But of a good leader, when his work is done, his aim fulfilled, they will all say, "We did this ourselves."

Lao-Tzu

SCIENCE & CREATION

Poul Anderson

Much of the recent controversy over evolution and creation shows a widespread lack of understanding of either the nature of science or the nature of man. Perhaps a bit of historical reflection is in order. . . .

One of the less endearing—and more dangerous—features of the 20th century has been a worldwide tendency to substitute rhetoric for discourse. By now, reasoned debate is a rarity. There is seldom even any effort to understand an opposing point of view. Instead, a person attributes opinions or attitudes to the other fellow and proceeds to heap billingsgate upon him because of them, although they may not actually be what he means at all. Living near Berkeley, California, I have over the years watched this sort of thing develop in the academic community and its hangers-on, until I am inclined to agree with a fictional character of mine who remarked, "Sure, I'm anti-intellectual. I prefer people who think."

Well, that may be just a little exaggerated, a hint of the same behavior I was condemning. It got your attention, though, didn't it? Let me try to make the rest of this essay an exercise in rationality.

I propose to discuss the "scientific creationism" which is so much in the current news. My conclusion will

scarcely surprise you: that "scientific creationism" is a contradiction in terms. If that were all, there would be no point in stating it yet again. Why preach to the choir? However, it does seem to me that spokesmen for the scientific establishment have generally made their points poorly, because often they themselves don't quite realize what the concept of evolution signifies. Thus the argument we'll advance against creationism here will take a turn that may prove surprising, therefore enlightening to some readers. Indeed, it will be only the first step in a brief exploration of the philosophy of science.

We begin by forswearing invective. The creationists are *not* a bunch of yahoos. They are generally well-educated and well-mannered individuals, a number of them with excellent scientific credentials. (While I don't know just what James Irwin's views on evolution are, we all know he believes the Biblical story of Noah is substantially true, and led an expedition in search of the remains of the Ark—after having been on the moon!) Nor do most of them want to suppress any other doctrine. Socially and politically, they have several quite valid, important points to make. Secular humanism has in fact become the teaching of the public schools, to the exclusion of crucial parts of our heritage. The effects on culture are already sad, the implications for the future of liberty and even for national survival ominous. Would it really infringe anybody's constitutional rights if children were to learn something about the roots of their civilization?

But this does not mean they should learn things, at taxpayer expense, which simply are not true. By now, the scientific attitude and the body of discoveries to which it has led are themselves basic to society, and not merely Western society. "Scientific" creationism is not content to maintain that the universe is the work of God. It claims that this Earth is, at most, a few thousand years old, and that the species of living beings we know today came into being in their present forms. Of course, the First Amendment guarantees any American the right to believe and argue for that, and teach it privately. But the notion has no more claim on "equal time" in public education than do, say, astrology, psionics, or Marxism.

It is scarcely necessary here to repeat what has often been pointed out: that if the creationist assertion were true, then our astronomy, physics, chemistry, biology, and archaeology must be false. For example, evidence for geological ages includes matters as diverse as the well-established laws of radioactive decay and a cosmic red shift observed by familiar techniques of spectroscopy. Much has been made of certain unexplained anomalies in certain mineral formations—far too much. Science is always coming upon such phenomena, and needing time and effort to learn what brings them about. We don't yet understand ball lightning very well, either; but nobody says that, on this account, we should throw out our meteorology. Instead, what understanding we do have provides a context within which to seek explanations of countless details.

Thus the claim that our planet is less than a million years old, and has under-

gone no significant changes during its existence, is incompatible with science. At best, a person might declare that God created the universe recently, full of misleading clues to something quite different. Emotionally, I am inclined to think this is an insult to the Creator. In the famous words of Einstein, "The Lord is subtle, but He is not malicious." Logically, we need only note that the declaration is, by its nature, untestable, incapable of being disproven; therefore it is devoid of empirical meaning.

We might, though, find it worthwhile at this point to refute one statement frequently made by creationists, that the development of matter and life from primitive to complex forms would violate the second law of thermodynamics. Even some who have accepted evolution as a fact, such as the late Lecomte de Noüy, have maintained that it would have been statistically impossible without supernatural guidance. They should have known better.

Part of the problem arises because the second law is deceptively simple-looking but has profound and far-reaching implications. It can be expressed in confusingly many ways, and has been. In one of my college textbooks (*Physical Chemistry*, by Frank MacDougall, Macmillan, 1944) the phrasing of the law goes: "It is impossible to devise any mechanism or machine by means of which a quantity of heat can be converted into the equivalent amount of work without producing other changes in the state of some body or bodies concerned in the process." Another book (*Introduction to Theoretical Physics*, by Leigh Page, Van Nostrand, 1928) puts it as: "No self-acting engine can transfer heat from a body of lower temperature to one of higher temperature." Here a "self-acting engine" means, essentially, one which is isolated from outside influences and which takes its working substance through one or more complete cycles.

There are numerous other, equally valid versions of the same truth, but these two should be enough to show that we are dealing with something which is quite basic and not at all self-evident.

Not so incidentally, the first law of thermodynamics amounts to the law of the conservation of energy—that is, that the total amount of energy in an isolated system can be neither increased nor decreased. While the only completely isolated system is the universe as a whole, in practice we can make arrangements which come very close to that condition.

Were it not for the first law, we could build perpetual motion machines of the first kind, as they are called, whose driving power comes from nowhere. Were it not for the second law, we could build perpetual motion machines of the second kind, which would draw their energy from anywhere. For instance, a motor at room temperature could be driven by the air molecules that happen to collide with its piston. The impossibility of this is not immediately obvious, which is why it was not established until the 19th century and is still overlooked in many science fiction stories.

Numerous people who understand the second law as a principle governing heat engines can get bewildered about the wider applications. These involve entropy, about which science fiction has

also perpetrated a great deal of nonsense. Actually entropy is a measurable quantity, though you need calculus to describe it mathematically. In any thermodynamic process where an amount of heat Q is exchanged at a temperature T (which may vary throughout the volume and during the time in which things happen), the increase of entropy is equal to the integral of dQ/T.

Now "increase" can be negative, that is, represent a decrease. When something occurs thermodynamically in a system, entropy can and often does decrease somewhere. However, it increases elsewhere, and the second law states that the *total* gain in entropy is always positive. That is, whenever a change involving an energy transfer takes place in a system, entropy always is greater at the end of the process than it was in the beginning.

A "system" can be anything: an atom, a molecule, a machine, a living organism, a galaxy, the cosmos as a whole, anything. But we must consider the entire system, not just a selected part of it.

An increase in entropy corresponds to, or measures, an increase in disorder, or a decrease in the orderliness of the system. Therefore, whenever something changes, we find there is less order afterward than there was before.

Here is a very rough example or analogy. Think of a house whose lady has brought it to absolutely perfect arrangement and cleanliness—not a single item of furniture out of place, not a speck of dirt or dust anywhere. Then her children come home from school and her husband home from the office, and the family starts using the place. Things *happen* in it. The immaculate condition doesn't last long, does it?

True, next morning the lady can restore her dwelling to its former orderliness. However, to do so she must expend energy, both her own and the energy of whatever appliances she uses, such as a vacuum cleaner. That energy comes from the conversion of food in her body—or fuel in an electric generator somewhere—into disorganized gases and masses. The house may become neat again, but the environment as a whole is more chaotic than it was.

This is not an argument against good housekeeping! It is simply a reminder that everything has its price.

The growth of life itself, and the maintenance of its exquisite complexity, is a wonderful example of order brought out of seeming chaos. Far too readily can we overlook the price paid, the net disorder. The solar energy which drives life was once tidily located in the sun. Its diffusion through the universe involves an enormous increase of disorder, of entropy. The profit that life makes along the way is minuscule by comparison.

In fact, even considered by themselves, biological processes require entropy increase. (The mean free energy does decrease, but that is an entirely different quantity.) We too are heat engines, subject to the same laws as all others.

The whole starry cosmos exemplifies the principle. There was no primordial chaos before the Big Bang—not really. Instead, everything was neatly concentrated in one location. Then it scattered,

and is still scattering, a disorderliness far exceeding the structural order of galaxies, stars, planets, and life forms which have appeared in the course of the process.

Unfortunately, too few spokesmen for science grasp this themselves. Hence they are brought to incoherence by the specious claim that evolution is thermodynamically impossible. True, the refutation of that claim, even on the rudimentary level of this essay, might well drive away the popular audience whom the scientist wants to enlighten. Yet if the universe were any easier to describe than it is, would it not be that much the less miraculous?

In a still more subtle way, it seems to me that advocates of evolution put themselves at an unnecessary disadvantage by underrating the concept for which they are arguing. Here we begin to touch on the nature of science itself.

Creationists generally talk of the "theory of evolution." Many who disagree with creationism reply that evolution is no such thing, but a fact. Thereby they fall into the same dogmatism as certain of their opponents, and become subject to the same refutation. After all, what is a "fact"? Nobody alive has ever met an Australopithecus or watched prokaryotic cells develop in the pre-Cambrian seas. It is a rather feeble retort that nobody has met Adam and Eve either, or watched the world coming into being by fiat.

In the last analysis, those of us who accept the idea of evolution do so because it is an inference, based on many different accumulated observations, which enables us to account for those data, fit them into a scheme that makes sense. The creationist can quite legitimately reply that this is what his beliefs do for him.

However, at this point in the history of science, it is a mistake to agree that evolution is a mere "theory." That concedes more to the creationist than he deserves.

What is a theory, anyway? To answer that qustion, we must take a look at the scientific method itself.

Now, a number of distinguished scientists have denied that there is any such thing, and I rather agree with them. That, though, would take us too far afield now. Let us just glance at the traditional paradigm, oversimplified though it is. The purpose will only be to make clear what we mean by certain words.

In this paradigm, scientists begin by making observations of nature, as exact as possible. Then somebody formulates a scheme which summarizes those observations, preferably in mathematical terms. That is because mathematics is the language *par excellence* of precision. Somebody else takes such a *description* and tries to explain it by a *hypothesis*. That is, this person proposes the existence of a mechanism or a relationship which would logically produce the observations themselves. A good hypothesis also yields *predictions*; it tells us what further observations we should try to make. If we make them, and the results fit the scheme well enough, then in due course the hypothesis gains the status of a *theory*. That

is, we accept it as depicting, more or less correctly, some aspect of reality.

Later discoveries may prove irreconcilable with the theory. In that case, we have to discard it—or, at least, drastically modify it—and look for another.

The standard example comes from planetary astronomy. For untold millennia, observers had been gathering data about the motions of the heavenly bodies across the sky. This effort culminated, for the time being, in the magnificent work of Tycho Brahe in the sixteenth century. Meanwhile, of course, there had been many attempts to account for the data. The idea that everything revolves around Earth grew increasingly unlikely as information accumulated; the picture had to be made too complicated, with epicycles. As early as the thirteenth century, Alfonso X, king of Leon and Castile, remarked that if he had been present at the Creation, he could have given the Creator some good advice!

Eventually Nicholas Copernicus offered a much more satisfactory description, in which the sun was at the center. Galileo Galilei and others refined this system and added to it. Finally Johannes Kepler put it into elegant mathematical form, in his three laws of planetary motion.

Isaac Newton then accounted for those laws by his hypothesis of universal gravitation (even though he himself denied making hypotheses) together with his own three laws of the motion of all bodies, not just planets. Soon observation confirmed this so well that it became a basic theory in physics. By means of it, later generations discovered new planets and explained the behavior of distant stars.

There remained a few loose ends, such as a slow change in the orbit of Mercury. Early in the 20th century, Albert Einstein proposed a whole new theory, general relativity, which included Newtonian mechanics as a special case and which accounted for those anomalous phenomena.

Thus far the usual description of science in action. As said, it is much oversimplified, and in many instances is scarcely true at all. Still, if nothing else, it does help us give clear meaning to our words.

The important point here, though, is that even taken at face value it is incomplete. It omits a further stage of thought which is of primary importance.

Before going on to that, let us very sketchily review the history of the evolutionary concept. That way we can compare it to the development of astronomy. If nothing else, we will be reminding ourselves that the idea of evolution was not invented by a few subversives in the 19th century, but has a long and honorable past of its own.

By 1800 the concept was already in the air. There had been some speculation along those lines as far back as Classical times, if not before. During the Renaissance and after, men gradually realized that they were coming upon the petrified bones of beasts which no longer existed. Early in the 19th century, the great French naturalist Georges Cuvier advanced the hypothesis that more than one creation had occurred in the past: that life had appeared several times, to be wiped out by worldwide

catastrophes, and that the account in the Bible refers only to the latest of these eras. Regardless of this deferral to religion, Cuvier was considered blasphemous by many. Once some of his students decided to throw a healthy scare into him. One of them costumed himself like the traditional Satan, entered the professor's home at night, woke him, and roared, "I am the Devil, and for your impiety I have come to eat you!" Cuvier looked him up and down and replied scornfully, "Hmf! Horns and hoofs. You can't. You're graminivorous."

His catastrophism was denied by a contemporary compatriot, Jean Baptiste Lamarck. A war hero at age sixteen, Lamarck later boldly maintained that living species had developed from less specialized ancestors. However, he thought that the causes lay in environment and the actions of individual organisms. This was so unconvincing that few accepted it until the 20th century, when for a time a version of it became official dogma in the Soviet Union.

In 1830 the Englishman Charles Lyell published the first volume of his epochmaking *Principles of Geology*, in which he showed that the forces that had shaped Earth in the past were the same as those at work today. By then it was becoming clear that man had coexisted with many animals long vanished, and in 1836 the Dane Christian Thomsen laid the foundations of modern archaeology by his scheme of successive Stone, Bronze, and Iron Ages, with the Stone Age reaching extremely far back in time.

Public as well as scientific interest in prehistory grew apace. More and more fossils were collected, in the Old and New Worlds alike, and reconstructions were made. When the Crystal Palace exposition opened in London in 1856, it included several life-sized statues of dinosaurs. Since they were not labeled, many visitors were puzzled by them. One man guessed that they were intended as an object lesson in temperance, to show what drunkards might expect to see.

In the same year, remains of Neanderthal man first came to light, in Germany. Initially, most biologists denied that this could be an extinct form of human, and various fanciful stories were devised to account for it. Yet evidence continued to accumulate, while the growth of geological knowledge made it less and less easy to believe that such creatures as the dinosaurs had perished in the Biblical flood—that they were, in the phrase of that day, antediluvian.

In 1859 Charles Darwin published *The Origin of Species*. This stunning demonstration of evolution as an understandable, natural set of processes—a hypothesis which had occurred independently, in less detail, to Alfred Russel Wallace—was followed four years later by another intellectual bombshell, Lyell's book *The Antiquity of Man Proved by Geology*. At the same time, field workers such as the Frenchmen Boucher de Perthes and Èdouard Lartet were turning up ever more traces of archaic humanity. When Darwin issued *The Descent of Man* in 1871, he did not "prove we are descended from apes." What he did was describe *how* humans

and simians could have stemmed from a common ancestor; the idea that this *had* happened was, by then, current.

Of course, it had met with much opposition, both popular and scholarly. Southerners during the American Civil War were fond of saying that maybe Yankees came from monkeys all right, but Mar'se Robert E. Lee couldn't be related to anything with a tail. Most clergymen combatted every suggestion that the Book of Genesis was not a straightforward piece of reporting.

In fairness we must add that not all did; indeed, some made important contributions to knowledge in this field, especially in France. For that matter, Thomas Henry Huxley's debating opponent, Bishop Samuel Wilberforce, was by no means a bigoted ignoramus, but a cultivated and philanthropic gentleman.

Nonetheless, the data were accumulating remorselessly. In a paper read in 1865 the Austrian monk Gregor Mendel established the basis of genetics. His work went almost unnoticed for a generation, but came back to light after the Dutchman Hugo de Vries had identified the phenomenon of mutation, about 1895. Here was the decisive last factor that Darwin had not known of, the material on which his principles of natural selection and sexual selection operated. Meanwhile, in 1891 another Dutchman, Eugène Dubois, had found in Java the relics of a being that was unequivocally related to man and yet far too primitive, too apelike, to be *Homo sapiens*.

Meanwhile, too, knowledge was rapidly growing of the world as it had been long before anything like us existed. A clear-cut example is the evolutionary lineage of the horse, established through fossil finds by the American O.C. Marsh.

Out of all this, an understanding developed of much more than fossils. Evolution could be seen in action: that is, the principle of evolution made sense out of observations in science and even everyday life. An obvious case is that of industrial melanism. The peppered moth of England darkened, for better disguise against predators, as trees grew coal-sooty during the Industrial Revolution. In our own lifetimes, with decreasing air pollution, the same species is growing lighter again.

Creationists object that this is not a valid example, but represents mere variability. Nobody, they say, has ever seen a whole new species come into existence. That is true enough, as far as it goes—with some possible exceptions among microscopic organisms. However, evolution takes thousands and millions of years to bring about most of the unmistakable changes that evolutionists describe. The evidence is necessarily indirect. But so, just as necessarily, is the evidence for the reality of events chronicled in the Bible.

Many anomalies have cropped up, but most have turned out to be explainable. Thus, Piltdown man was always an embarrassment, because he did not fit onto any reasonable human evolutionary tree. At last chemical analysis showed that Piltdown man was a hoax. Without the great guiding principle of evolution in general, who would have paid attention to him at all?

Likewise, we have seen the evolu-

tionary principle in sometimes tragically practical application today, as pathogenic microbes gain immunity to antibiotics through the selfsame process of natural selection that Darwin found. On a still deeper level, we find that we can best understand the details of protein chemistry as between different species (for instance, cytochrome-c) in terms of their differentiation through geological time; but it was the concept of evolution that caused researchers to look for such divergences in the first place.

So we have very briefly reviewed the development of evolutionary thought —the evolution of evolution, so to speak—and seen how fundamental it has become to biology. Now we must return to the comparison with physics, and to the philosophy of science in general.

As we have seen, theories are subject to disproof. Else they would have no meaning. (Thus, if I told you that space is pervaded by a fluid so subtle that no instrument or experiment can possibly detect it, you could not prove me wrong, but you would not be obliged to take me seriously, either. As a matter of fact, this is precisely what happened to the "luminiferous ether" about which 19th-century physicists had speculated. It turned out to make no difference whether the ether existed or not; therefore nobody had any further reason to imagine that it did exist.)

Thus many theories have fallen by the wayside. But some reveal themselves, in the course of time, to be more fundamental than that. They become basic principles, by which theories themselves are tested. They become touchstones by which observations are evaluated. They become a context within which everything else, in a given field of science, is understandable.

Examples within physics are the two laws of thermodynamics, already mentioned. Without them, we simply could not make sense of our observations of any process involving energy exchange. With them, not only do we comprehend what we see, we are led to new discoveries.

For instance, back in the 1930s, physicists noticed certain curious features of recoil during radioactive decay. The energies and momenta did not balance out as they were supposed to. Either the principles of energy (and momentum) conservation were wrong, or else some ultra-tiny particle was involved, carrying off the excess. Rather than give up their basic principles, which were far too helpful to discard, scientists hypothesized that such a particle did exist: the neutrino. This idea proved fruitful in gaining more knowledge of the nucleus—although not until a generation later was the neutrino actually detected, and then only indirectly.

Granted, basic principles originate in empirical observations. Indeed, the laws of thermodynamics came out of grubby engineering work, and rather late in the history of science at that. Nor are the basic principles Holy Writ. They are subject to modification as our knowledge grows. Thus the separate principles of conservation of mass and energy were unified—modified—into the single principle of the conservation of mass-energy, by Einstein.

However, such principles have be-

come so fundamental that the complete overthrow of any of them would mean the complete overthrow of the sciences with which they are concerned. We would be practically back to Square One. It is therefore both understandable and sensible that scientists will not — cannot—set them aside without an absolutely overwhelming, and hence unlikely, body of evidence.

I submit that evolution is no longer a mere theory. It has become just such a basic principle. It is as much a fundamental of the universe, as we conceive the universe to be, as are the laws of thermodynamics or relativity. There is no scientific argument against it, only an antiscientific one.

The question remains: How shall we persuade a lot of perfectly nice people that they are undermining a cornerstone of their entire civilization? ■

● Our next issue—the one called "Mid-September" —leads off with "Ghost Town," a strangely haunting tale of a future archaeologist on a "dig" aboard an abandoned space colony. At least, he thought it was abandoned when he arrived.... The author, Chad Oliver, is himself an anthropologist, which probably has a good deal to do with the "real" feel of the story (though some key elements, I suspect, are *not* based directly on personal experience!). Val Lakey-Lindahn is doing the cover.

Also in Mid-September is Ray Brown's "Identity Crisis," which is the conclusion, at least for now, of his popular "Reformed Sufi" series. To say that he turns the universe inside out in this one might be a bit of an exaggeration—but not much.

We'll also have the conclusion of Joseph H. Delaney's *The New Untouchables,* Dr. John Gribbin's reexamination of the Earth's greenhouse effect from a new perspective that gives new and surprising answers, and an assortment of short stories, including some by Jack C. Haldeman II and Ian Stewart.

IN TIMES TO COME

On Gaming

Dana Lombardy

Star Trek: The Role Playing Game, introduced this year by FASA Corp. (Box 6930, Chicago, IL 60680), is an impressive work.

Not only the research and design deserve such praise; the sheer amount of material included and the high quality of graphic presentation make this game and its supplements of interest even to science fiction readers who don't play role-playing games.

The "Star Trek" television series ran from 1966 to 1968 in 78 episodes (plus 22 animated episodes from 1973 to 1974). It made an impact unequalled until *Star Wars* appeared in 1977.

Despite criticism of its qualitative unevenness, and annoyance over the antics of "Trekkies"—its most vociferous fans—"Star Trek" is still regarded as one of the best SF TV series. An early two-part episode, "The Menagerie," won a 1967 Hugo award for best dramatic presentation.

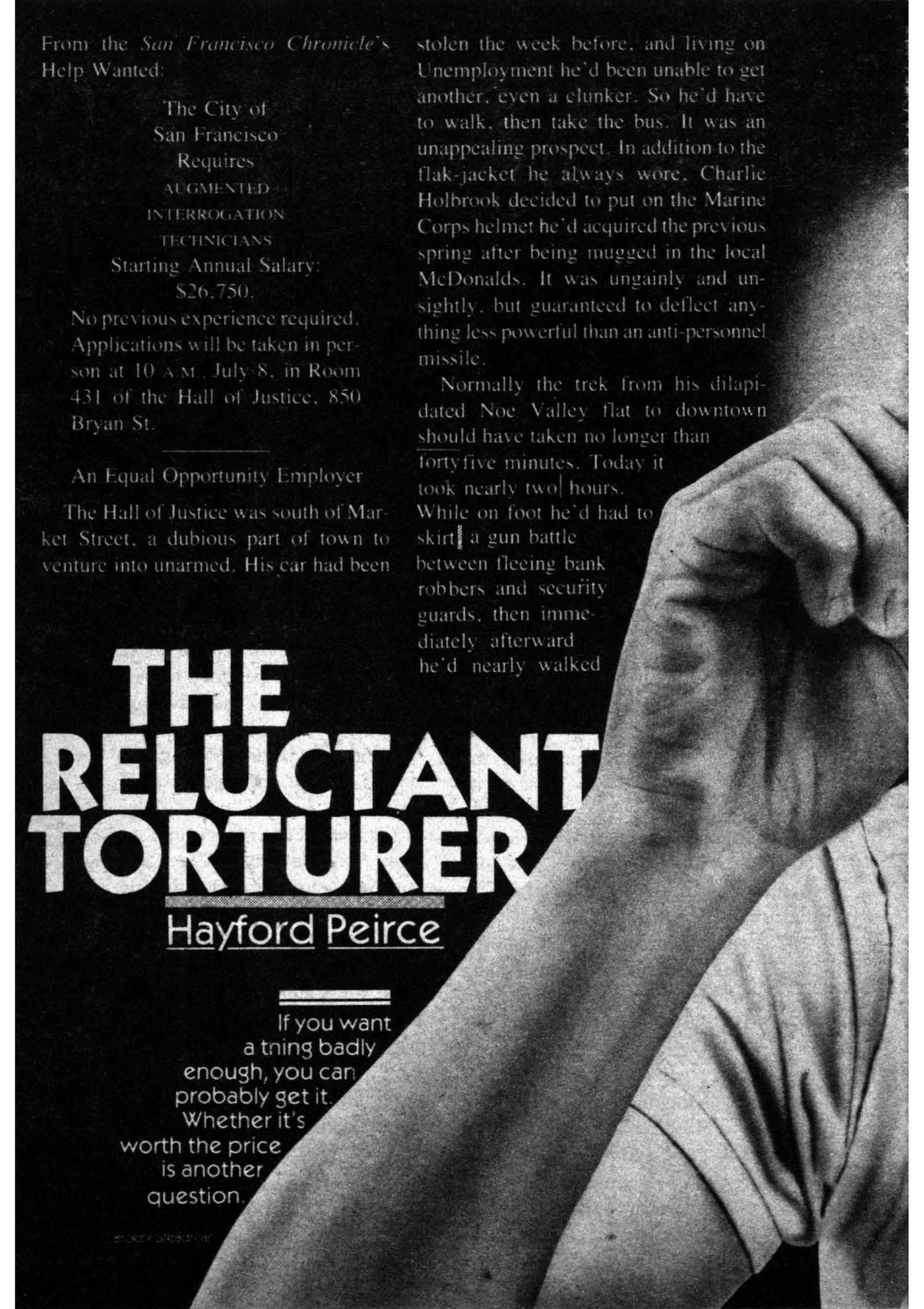
The game's introductory set includes a 128-page basic rules book containing all the instructions needed to create and play a Star Fleet human or Vulcan character; an 80-page pull-apart book of scale deck plans of the *U.S.S. Enterprise* and Klingon D-7 class Battlecruiser; a 48-page book with three introductory adventures and descriptions of the deck plans; a 22½ × 33-inch starship combat hex grid; 112 illustrated die-cut counters with ship symbols on one side and individual character figures on the opposite side; and two 20-sided dice.

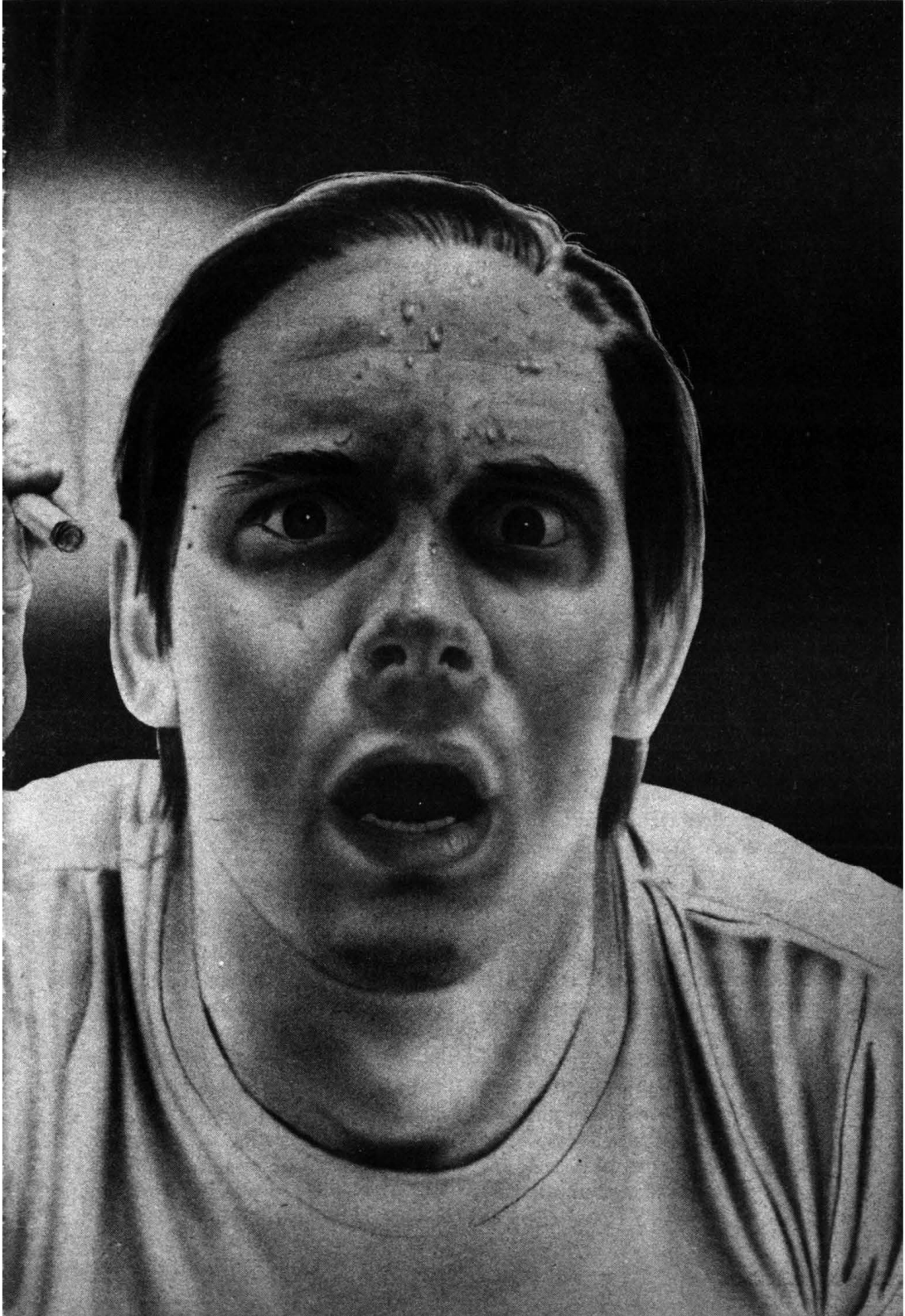
The rules cover man-to-man combat, starship combat, how to generate (create) planets, and how to generate cultures and aliens. To play Captain Kirk, Mr. Spock, or a new Star Fleet character, you roll dice to acquire point values for seven attributes: strength, endurance, intellect, dexterity, charisma, luck, and (mostly of benefit to Vulcan characters) psionic potential. The rules are lavishly illustrated with black-and-white photos from the TV series. (The "charisma" section includes pictures of Captain Kirk kissing four different women!)

You also need a Gamemaster (referee) to guide your group of players through scenarios he designs, or through those adventures provided in the game or as supplements. These adventures are quite interesting, and while they use information and settings from the TV episodes, they're not repeats of the TV series.

The team of designers who made *Star Trek: The Role Playing Game* are longtime fans who struggled with a big job. Unlike creating a completely fictional universe, which is standard procedure in designing most SF games, they had to be consistent with three seasons of TV scripts and with published information that fills in the gaps in "Star Trek" history that the series didn't show. Since the series contradicted itself on some important points, the design team went to great lengths to determine which was the most correct

(continued on page 95)


From the *San Francisco Chronicle*'s Help Wanted:
The City of San Francisco Requires
AUGMENTED INTERROGATION TECHNICIANS
Starting Annual Salary: $26,750.
No previous experience required. Applications will be taken in person at 10 A.M., July 8, in Room 431 of the Hall of Justice, 850 Bryan St.
An Equal Opportunity Employer
The Hall of Justice was south of Market Street, a dubious part of town to venture into unarmed. His car had been stolen the week before, and living on Unemployment he'd been unable to get another, even a clunker. So he'd have to walk, then take the bus. It was an unappealing prospect. In addition to the flak-jacket he always wore, Charlie Holbrook decided to put on the Marine Corps helmet he'd acquired the previous spring after being mugged in the local McDonalds. It was ungainly and unsightly, but guaranteed to deflect anything less powerful than an anti-personnel missile.
Normally the trek from his dilapidated Noe Valley flat to downtown should have taken no longer than forty-five minutes. Today it took nearly two hours. While on foot he'd had to skirt a gun battle between fleeing bank robbers and security guards, then immediately afterward he'd nearly walked
THE RELUCTANT TORTURER
Hayford Peirce
If you want a thing badly enough, you can probably get it. Whether it's worth the price is another question.



into the barricades a SWAT team had set up around a savings-and-loan where would-be robbers had taken sixteen people hostage. A young woman—presumably an escaping hostage—lay dead in a pool of blood in front of the glass doors. Charlie Holbrook averted his eyes hastily and walked on.

On the bus he tried to read the paper. City Hall, it appeared, had received a threat to poison the city's water supply with nerve gas stolen from an Army biological-warfare base unless $20 million ransom was paid and seven members of the imprisoned Sisters of Celestial Discontent released from their cells on San Quentin's Death Row. Charlie shrugged and turned to the sports section.

The bus was diverted twice. An elementary school had been bombed in the Lower Mission district, and the streets were jammed with ambulances and fire-fighting equipment. Bile rose in his throat before he could tear his horrified gaze away from the scattered bits of flesh and small mangled bodies being carried away.

"The Marin County Army of Liberation," said his seatmate.

"Nah, they always use phosphorous bombs," said the woman behind him knowingly. "It's probably them Balinese Unity Leaguers—they're real old-fashioned: they still use dynamite and plastique."

A few blocks from the Hall of Justice, at Howard and 8th, a Muni bus had been overturned and set on fire by members of the United Brethren of Masochists, Sadists, and Disciplinarians. A few charred bodies could be seen still burning inside the gutted bus. Uniformed members of the Brethren carrying placards marched around the intersection, blocking traffic. RESTORE BONDAGE TO OUR SCHOOLROOMS, Charlie read, A CHILD IN CHAINS IS A CHILD UNLEASHED.

A long line of applicants snaked down the sidewalk in front of the Hall of Justice, kept in order by truncheon-wielding policemen. Charlie tapped the shoulder of the leather-and-chain freak in front of him. "What's this mean, anyhow, 'Augmented Interrogation Technician'?"

She stared scornfully at him from a tatooed face. "Like torturers, man, they looking for torturers."

"Oh." Charlie sighed plaintively. "I thought they meant like guys asking questions on the quiz shows."

Eventually he reached Room 431, was handed an application form to complete, and was dismissed after filling it out. Two weeks later he received a notice telling him to report to Room 673 of the Hall of Justice. This was a small auditorium seating perhaps a hundred people. It was nearly filled. A man approached the lectern.

"Good day," he said, "I am Mr. Rumsey. You are the final candidates from the several thousand persons who applied to participate in our Augmented-Interrogation program. There are three positions open. In the next few days, through a grueling set of tests, most of you will be eliminated, but I wish you all success. And now I am certain you will appreciate hearing a few words from the man most responsible for the implementation of this program. Writer, nationally known columnist, television

personality, professor of sociology here in the Bay Area: Dr. Leonard Hansell."

There was a smattering of uncertain applause as a gaunt, hollow-cheeked man strode briskly to the lectern. He stared out at them grimly with pale-blue manic's eyes. Charlie Holbrook felt himself quail as the basilisk gaze seemed to halt for a moment on him. Dr. Hansell coughed drily.

"All of you are aware of the world-wide upsurge in terrorism and related activities such as indiscriminate hostage-taking over the past thirty years," he began without preliminaries. "Starting with airplane hijackings in the early '70s, terrorist activities here in the United States have now reached a level at which none of us can feel any reasonable security against the threat of sudden random violence and/or death at the hands of terrorists. Your daily newspaper gives you ample confirmation of that.

"I, and thousands of officials at all levels of government, are concerned not only by the present levels of terrorism, but also by certain potential acts of terrorism which we feel are inevitable. How long, for instance, will it be before some so-called liberation movement, either here or abroad, possesses itself of an atomic or hydrogen warhead and holds to ransom a major city or an entire country? Most of you have heard of the threat to poison our city's water supply unless a ransom is paid and seven convicted murderers and terrorists released. Are they bluffing? Who knows? How are we to find out unless we ignore their demands and dare them to do their worst?

"One solution to a large number of terrorist situations would be the judicious use of advanced augmented interrogation techniques applied to members of the terrorists who come within our grasp."

"You mean torture them?" asked a voice hesitantly.

"If you like," said Dr. Hansell reprovingly. "It is a word charged with emotional overtones, and I deprecate its use. Nevertheless, as pragmatic realists, we must not hesitate to call a spade a spade, however unsavory it may be. For several centuries now in our Anglo-Saxon culture, the use of torture has been held in low repute. Perhaps rightly so. But the moral questions involved are no longer entirely germane.

"Let us consider a hypothetical situation: a group of terrorists has concealed an atomic warhead in downtown San Franciso, set to detonate in ten hours, unless a set of their demands is met. The spokesman for the terrorist group holds a press conference to present their demands. He is seized by the authorities. Then what? He almost certainly has information which would lead to the discovery of the warhead and the arrest of his fellow terrorists."

Dr. Hansell sighed dramatically. "But upon being detained, he would almost certainly be cautioned by a lawyer to remain mute, and his release would be added to the list of non-negotiable demands made by the terrorists. In the meantime, the clock is ticking, and the deadline approaching. In a few hours the warhead will detonate and perhaps half a million people will die horrifically.

"I ask you: is there no solution to this situation? Until now the authorities have

said *No. I* say *Yes.* Of *course* there is a solution." Dr. Hansell's eyes gleamed. "It is to inflict unbearable pain upon this self-confessed terrorist until he is made to disclose all information necessary to enable the authorities to locate and dismantle the warhead and, ideally, incarcerate the remaining terrorists.

"The equation is a grotesquely simple one: one man's pain, that of a self-confessed terrorist who holds in contempt the lives of millions of other human beings, against the well-being of every man, woman, and child in the city of San Francisco. Tell me: Is there any possible alternative solution?" He thumped the lectern. "No!" he shouted. "There is only one possible choice under such circumstances: the greatest good for the greatest number!"

There was a hushed silence. Dr. Hansell smiled thinly. "We are looking for a few good torturers. If any of you feel you would be unable to purposefully inflict pain on a fellow human being, whatever the justification, even to save your own life and those of your loved ones, you are urged to leave now. For those who remain, practical training is about to begin in the basement, where a number of kittens and baby lambs are being held in readiness."

Gagging, Charlie rose to his feet and stumbled awkwardly out of the auditorium with a dozen others under the disdainful eye of Dr. Hansell. Outside, in the corridor, he stood gulping great draughts of fresh air. My God, he thought, kittens! Why not babies? He shrugged in disgust. Back to Noe Valley and Unemployment.

"Excellent," said a voice behind him. It was Mr. Rumsey, who had preceded Dr. Hansell to the lectern. "A baker's dozen of you, I see. If you will all follow me down the hall, we now have a number of psychological tests to administer."

Charlie frowned in puzzlement. "But he told us to leave. He said—"

Mr. Rumsey smiled. "Of course. This whole procedure is designed to weed out the sadists, leather freaks, psychopaths, professional bullies, military torturers, slaughterhouse killers, and all the other human detritus who suffer from a total lack of empathy for their fellow beings. Do you seriously imagine that the City of San Francisco, under a Democratic mayor, operating a pilot program with Department of Education funding, could let itself hire a bunch of crazy sadists from some Folsom Street leather bar?" He tut-tutted. "Dear me no. What the City of San Francisco needs, ladies and gentlemen, is an elite corps of humane, empathy-laden, Citizen Torturers. Hurting little kittens and lambsies! The very idea! Now follow me, please."

Dr. Hansell and Mr. Rumsey supervised the administration of a battery of tests in a basement classroom. During a rest period, the woman sitting beside Charlie, a slight Hispanic girl with large melting brown eyes, summoned up her resolve to direct a question at the forbidding Dr. Hansell.

"How are we to *learn* these horrible things? You say we are not to use animals? Are we to practice then on human beings? Welfare recipients, perhaps? Or blacks? Or Hispanics? Or women? Or some other group of sub-humans?"

Dr. Hansell smiled indulgently at such childish flippancy.

"Why don't you hire doctors?" she went on. '*They* know how to cause the maximum pain with the minimum effort."

"An excellent suggestion, my dear young lady, and one that has been carefully considered. In the Soviet Union, for instance, doctors are indeed used for that purpose. They have developed a number of drugs which are said to inflict absolutely excruciatingly unbearable pain. Here in the United States, however, the Hippocratic Oath is still relatively meaningful. Any doctor who would violate its strictures against harming a patient by engaging in torture would be an obviously deranged personality and hence to be excluded from our program. Furthermore, the AMA has informed us that the use of doctors would be contrary to the image of the American medical profession, which they are at pains to project. This is, after all, only a pilot project, which will be monitored very, *very* closely by the rest of the country, and we need all the backing we can get."

"But isn't it *illegal*, torturing people?" asked a black man sitting in front of Charlie. "I mean, you're always hearing on TV that the Supreme Court is saying that the Constitution says you can't do this and you can't do that ."

Dr. Hansell waved a hand dismissively. "As Mr. Dooley once said, 'The Supreme Court reads the election returns too.' They've been reading them —and my columns—for some time now, and they know where public opinion stands at present. And you may recall that the court building itself was bombed last year and three of the Justices' clerks killed." He smiled knowingly. "Believe me, I have it from very high authority indeed that there will be no problems from that area."

A camaraderie seemed to be developing among them. Emboldened, Charlie said, "But you still haven't said how we're going to learn how to do this. I mean, it's all very well, saying we're all such nice people that we can't practice on kittens and guinea pigs and stuff like that, but maybe none of us could do it on human beings no matter *how* bad they are, or *how* many people they're gonna blow up. How are we gonna *make* these terrorists talk?"

Dr. Hansell nodded approvingly. "But that's just it, Mr. er, Holbrook. Because you would *empathize* with your, er, participant; because you would *know* from your own deepest fears which tricks and conceits of the torturer would terrorize *you* to the greatest degree; which mere *suggestion* of augmented interrogation would cause *you* to break down before the application of any actual duress. It is our contention that the very fright and despair radiated by the Citizen Torturer will induce the participant to speak before being subjected to actual torture. If not, of course, you will merely apply to the participant those techniques which you feel would cause you yourself the greatest pain and revulsion. It will be a question of the *élan* of the passionate amateur out-performing the crass technical expertise of the bored professional. The most highly trained terrorist will be unable to resist."

Charlie and the other applicants considered these words. "But you still haven't said how we're going to learn,"

he said stubbornly. "Is it puppies, or welfare babies, or what?"

Dt. Hansell frowned. "Actually, you have hit upon an aspect of the program which was not, perhaps, thought out all that thoroughly. We had initially planned on using anatomically-exact simulacra designed expressly for us by Disneyland engineers, and graduating from there to pigs and apes, but a set of circumstances has fortuitously arisen which may obviate such a need. We have one more test to administer this afternoon and then the three people actually chosen will be more fully briefed tomorrow morning. Now then, this particular test is designed "

"The seven Sisters of Celestial Discontent," said Dr. Hansell grandly, gesturing in proprietarial fashion at the seven women shackled to heavy metal chairs. Charlie found himself unable to look at them directly. They were condemned fanatics, he knew: murderers, terrorists, kidnappers, and extortionists, justly convicted for the deaths of dozens of innocent people, many of them children, most of the deaths by methods too sickening to contemplate. If ever there existed a group of people who deserved torturing, it was these grim-faced females, none of them yet over thirty years old. And yet he was unable to face them squarely, unable to really conceive of himself raising his hand against them.

Bernadette Hernandez, the slight Hispanic girl, squeezed his hand comfortingly. Along with Mrs. Pacini, a motherly middle-aged woman from North Beach, they were now San Francisco's three official Augmented Interrogation Technicians, Class G-7 Civil Service, Probationary.

"You recall the threat some time ago to drop nerve gas into the city's water supply?" asked Dr. Hansell. "To prevent a panic, we've since managed to keep it out of the media while negotiating with the terrorists, who are members of the Sisters of Celestial Discontent. The army has confirmed that nerve gas is indeed missing from Fort Ryder Biological Laboratories in New Mexico, and some five hundred people were killed almost instantly last evening in a three-block area of Palo Alto, all of them after drinking tap water. The Sisters have taken the credit for what they call 'a demonstration of intent.' The final deadline before they attempt to kill all of San Francisco and the Peninsula is now something less than eleven hours away. Which is why we have been brought here to San Quentin in such great secrecy. We all know of the prison grapevine; of how drugs and weapons are routinely smuggled into even the most tightly guarded facilities. Are we to believe that these seven miserable creatures confronting us know not one detail which would enable the authorities to track down their genocidal colleagues?"

The seven women glared defiantly. "We don't know what *you're* talking about, skinny," said one, "but whatever it is, *we're* not talking. About anything."

Dr. Hansell nodded bleakly. "So we assumed. Well, Mr. Holbrook? Ms. Hernandez? Mrs. Pacini? Is there really any question of what must be done?" They shook their heads hopelessly. "No? Sergeant Kimura here, and Mr.

Tessler of the Anti-Terrorist Squad, will pose the actual questions. You will merely augment the attention span given to the questions by these foul creatures." He indicated a table across the room. "None of us has had any practical experience along these lines, of course, so we have assembled a number of tools and implements which seemed likely aids. The rest we leave up to your imaginations."

Charlie caught the eye of the third girl from the left. She was about twenty-two, and slender. She stared at him unblinkingly. Acid suddenly burnt a fiery course up from his stomach, and he ran from the room, hands clenched to his mouth. When he returned, his eyes still watering and the taste of vomit in his mouth, he found that no one had moved in his absence. He walked slowly over to the girl. "Please," he said to her softly. "You're a little older than my daughter, but you remind me of her, there's something about you. . Please, *please* don't make me do anything to hurt you. Please tell us what we need to know. *I beg you.*"

The girl's mouth twisted into a rictus of hatred. "Fuck you," she grated, "*and* your fucking daughter."

Tears came to his eyes. "You really want to kill my family, don't you?" he whispered wonderingly. "You really do want to hurt my wife and daughter. *Why* do you want to hurt them? I hate hurting people," Charlie murmured as if to himself, "I don't even want to hurt *you*. But I'm frightened by you, and all the others like you. But I'm frightened by lots of things, I guess. Airplanes; I don't like airplanes. And I don't like swimming out over my head, I almost drowned when I was a kid. And going blind, that's something else that frightens me. That's the *worst* thing I can think of, sometimes I wake up at night and I can't see anything and I think for a moment I've gone blind and I break out in a sweat and it takes me hours to go back to sleep again."

"Hey, who *is* this nut," muttered the girl nervously, "get him away from me, willya?"

"Yeah," said Charlie softly, almost dreamily. "Blindness, *that's* what scares me." He gulped, and wiped the streaming tears from his eyes and cheeks. "It doesn't scare *you?*" The girl shook her head uncertainly. "No? That's terrible, it *should* scare you. Just imagine, all the rest of your life, not seeing *anything*. Please, *think!* Then I wouldn't have to do this. ." He turned to Kimura and Tessler. "See if you can hold her head," he whispered. "Maybe there's some tape over there, to tape her eyes open."

He began to sift through various objects with a trembling hand. "Yeah, here's some tape. Ice-pick, that wouldn't hurt so much, maybe. Soldering iron. Screwdriver, chisel. Jesus. Maybe just a cigaret, that's the easiest. Do either of you ladies smoke?"

"I do," said Bernadette hesitantly. "Shall I light one? You're really going to to. "

Charlie's stomach spasmed, and raw bile burned a path to his mouth, but there was nothing left to vomit. "Yeah," he said weakly. "I just hope I don't pass out when I smell her eye begin to burn."

The girl began to scream.

"Excellent," said Dr. Hansell, "really

excellent. That's exactly the sort of reluctant torturer we had in mind. We shouldn't have any trouble at all selling this to the public: family man, devoted husband, father of adoring teenage daughter, sickened and revolted by his gruesome duty, but nevertheless doing it for the good of the city and the country. Charlie, all by yourself you've proved the worth of my program. The observers from Education and Justice were very, *very* impressed, let me tell you."

Charlie nodded feebly from the hospital bed where he lay under heavy sedation to calm the stomach cramps which had racked him for the past three hours. "But she didn't say anything," he said in a dull monotone, "she didn't tell us anything. And I I her . she burning ." His head began to shake frenziedly from side to side.

"Nurse!" shouted Dr. Hansell. "But that's not *your* fault," he soothed, "that's only because *she* didn't know anything. But don't you remember? Two of the others did, and they sang like Caruso before you ever laid a hand on them. The Anti-Terrorist Squad has rounded up the entire gang, and recovered the nerve gas." He laid a hand on Charlie's shoulder, and drew himself up as if photographers were present. "San Francisco will sleep sounder tonight because of you, Charlie Holbrook. All America is proud of you."

A thin keening began to escape Charlie's lips.

"Oh *no*, a customer?" groaned Charlie to Mrs. Pacini. "It's been six months since they brought any terrorists in. I was just beginning to enjoy the job."

"Who wouldn't," said Bernadette Hernandez, "with nothing to do?"

"We've been too good," said Mrs. Pacini complacently. "We've worked ourselves right out of a job."

"That's okay by me," said Charlie. "It was four months after that last job—remember all that *blood?*—before I stopped getting those cramps. Man, I was just *living* on Maalox and tranks."

"I knew it was too good to last," said Bernadette, "but I really thought we'd run out of terrorists. Who could be *stupid* enough to want to have his fingers boiled off or—"

"*Please,*" protested Mrs. Pacini. "Don't *remind* me!"

"The customer today is a kidnapping," said Charlie. "The DA figures a kidnapping is enough like a terrorist and his hostages to take a chance with the courts."

"*Nobody* likes kidnappers," Mrs. Pacini agreed. "Who's the customer?"

"A shyster lawyer acting as middleman. The cops and the DA say they've had their eye on him for quite a time. They've got a couple of clues that make them think he's really one of the kidnappers."

"I certainly *hope* so," said Bernadette. "I have *nightmares* about having innocent people in here."

Mrs. Pacini shorted. "A lawyer? *Innocent?* Did I ever tell you what lawyers did to my Angelo?" Her matronly breast heaved indignantly. "Where *is* this kidnapper-lawyer? Bring him on!" she shouted.

The lawyer, a small grey-haired man in a threadbare suit, was dragged into

the room. His eyes were round with terror, and spittle ran from his mouth.

"You can't *do* this," he screamed, "You can't *do* this!"

"Just give us back that baby, you monster," said Mrs. Pacini firmly.

The lawyer's screaming came to an abrupt halt a minute later as a consequence of having his tongue deftly sliced off at the root by Mrs. Pacini. He was narrowly saved from choking to death on his own blood, then shakily printed instructions on how to locate the missing child.

The baby was recovered about the time Charlie was coming out of his faint.

"Did you hear the news?" asked Bernadette. "We've been upped in grade. That's another three thousand a year. Now I can get married."

"Congratulations," said Charlie sourly. "It means I can buy a better grade of baby food."

"Still suffering from those ulcers?" said Mrs. Pacini sympathetically. "That's really a shame. You really ought to go into another line of work, Charlie. You're just too sensitive for what you have to do here."

"It's five years now," said Charlie apathetically, "and I'm over forty. What's the job market for used torturers?"

"At least we've gotten the kidnappers and murderers and trash like that off the streets," said Bernadette brightly. "I actually saw some old folks out walking around in the Tenderloin a few nights ago. They wouldn't have been doing *that* a couple of years ago."

"I wasn't throwing up blood every morning, either."

"Oh Charlie, why don't you take the day off?" said Mrs. Pacini. "Bernadette and I will cover for you."

"You think I could?" said Charlie, brightening. "What's the schedule?"

"Just those two guys they caught holding up the Safeway down in the Fillmore a couple of nights ago. There was a car outside the cops think was the getaway car. They want to know who was driving it."

Charlie hid his face in his hands and moaned. "So now we're torturing kids to find out the name of another kid whose only crime is driving a car. Jesus, Jesus, Jesus."

"Really, Charlie, sometimes I don't understand you," admonished Mrs. Pacini. "Those holdup men could have *killed* somebody; they had guns, you know, and that kid in the car is an *accessory*. You don't really want criminals to get *away*, do you?"

"I don't know," said Charlie miserably, "sometimes I just don't know."

"Well, you just run along home now and have a nice glass of warm milk," soothed Mrs. Pacini. "If you're feeling a little fragile today, you'd just be underfoot. Bernadette and I were thinking that for these holdup men we could put their hands in a vise and then use maybe a winch to pull their trigger fingers off. ."

"I hear your daughter got married," said Bernadette. "That must have thrilled you. Was it a beautiful wedding?"

"I dunno," said Charlie dully, running a hand through thinning hair. "She wouldn't let me attend."

"Wouldn't let you *attend?*" exclaimed Mrs. Pacini. "My goodness, I never heard of such a thing! Why on Earth oh. Oh."

"Yeah. My father the torturer. Well, the hell with it."

"That's the spirit," said Bernadette. "Lose yourself in your work, that's what I always say."

"Exactly," agreed Mrs. Pacini. "Now, today's going to be something a little different. You know, Charlie, how we've heard you say a thousand times that a banker's someone who lends you an umbrella when the sun is shining, and takes it back when it starts to rain? Well, today we've got three bankers."

"No kidding," said Charlie, his spirits rising in spite of himself. "What did they do?"

Bernadette frowned, uncomfortable. "Wellll, these aren't *real* bankers, just sort of clerks, you know? It seems like there was this computer fraud in the bank and some guy siphoned off a couple of hundred bucks before the accountants discovered what was happening. The only problem is, they can't tell which one of these three clerks was actually doing it. It seems like any one of them could have."

A sharp pain stabbed Charlie in the upper chest. "Gimme those pills," he gasped. "Thanks. That's better." He sat slumped at his desk, inhaling deeply. "You mean we *know* that *two* of these guys are *innocent?*" Mrs. Pacini nodded unenthusiastically. "And we're gonna torture all *three* of them just to find out which one stole a couple hundred crummy bucks?"

"It's a *crime*, after all," said Bernadette, without conviction. "Mrs. Pacini thought that since it was a computer-type crime, we might try dipping their fingertips in a saucepan of boiling lead. That would Oh dear, call the doctor; Charlie's fainted again!"

"I've put in for early retirement," said Charlie.

"Oh no!" said Mrs. Pacini. "I don't know how we'll get along without you. All these years "

"It's like you're part of my own *family*," said Bernadette.

"I know, said Charlie, sadly. "And you're about the only family *I've* got now. My wife left last month. I didn't tell you before, I thought she might change her mind and come back, but " His voice tailed off.

"People just don't understand," said Mrs. Pacini indignantly. "Why, we're just like garbagemen and street cleaners and firemen and stuff like that. It's a nasty job, but *somebody*'s got to do it. My goodness. Can you *remember* what this city was like twenty years ago? People murdered in their beds every night! And now! Why, I don't even bother to lock my door when I go to work."

"It's true," admitted Charlie, rubbing the shiny dome of his hairless skull. "It's certainly true. But I still wonder ."

"Fiddlesticks," said Mrs. Pacini cheerfully. "You wonder too much, that's your trouble. When do you leave?"

"Another eight months," said Charlie regretfully. "Gotta put in twenty full if I wanna get my pension."

"Great!" exclaimed Bernadette. "We don't lose you right away, then. So you can give us your opinion on this: We

got a whole bunch of witnesses to an accident at the Washington Street off-ramp yesterday morning at rush hour. It tied up the freeway all the way down to Candlestick and back across the Bay Bridge. And get this: the guy who caused the accident just drove calmly away. What we've got waiting for us is a couple dozen witnesses who pretend they can't remember the license-plate number of that guy. Traffic Control figures it's just these motorists all sticking together: they want us to jog their memories a little."

Charlie gagged.

"It's really a question of both their eyes *and* their memories," mused Mrs. Pacini, "so I'm wondering if we should try popping their eyes out with that little melon scoop, or should we go to all the trouble of opening up their skulls and poking around in their brains with a knitting needle?"

"An awful lot of work," said Bernadette dubiously. "But it sure is effective, especially when you've got three or four of them twitching while the others are watching and waiting their turns."

"It certainly stimulates their memories," agreed Mrs. Pacini.

"But is it labor-effective?" argued Bernadette.

"Oh *no!*" said Mrs. Pacini reproachfully to Charlie's writhing body. "*Must* you have these convulsions?"

"My last day," said Charlie, with a tremor to his voice. "Twenty years and out." He raised a palsied hand and attempted to wipe the sweat from his brow. "Sometimes I think I'd have been better off being one of those poor people we used to work on. At least, for them it's generally a little suffering and then it's over once and for all."

"There's not much repeat business," agreed Bernadette.

"Or much business at all these last couple of years," said Mrs. Pacini. "There's no doubt about it: America's become a God-fearing, law-abiding country."

"Just as long as it's law-abiding for the rest of the day," said Charlie, slopping coffee over his desk as he tried to lift a cup to his lips with a quavering hand.

"Only one customer, as far as I know," said Bernadette.

"Dear God," murmured Charlie, "please let me survive this one last time, though why You should I really don't know. What is it now," he asked with resignation, "a third-grader sticking out her tongue at Teacher?"

"Oh, Charlie, you and your jokes," said Mrs. Pacini, hugging him impulsively. "We're going to *miss* you, you old baldie, you."

"This one won't be bad at all," said Bernadette comfortingly. "It's just some old geezer who's the jury foreman in a civil suit. The judge wants the jury to award damages to the plaintiff, and the jury's holding out to let the defendant off. Hizzoner thinks we might be able to sway the foreman to read the evidence a little more the way Hizzoner reads it."

Charlie shook his head feebly. He had long since exhausted the vocabulary of indignation.

An outraged bantam cock of a man was marched into the room and shackled to the table. Abuse and vituperation of some originality issued from his mouth.

Charlie examined him with sympathetic interest. He was even older, scrawnier, and balder than himself, an uncommon sort of visitor to these parts. Charlie peered more closely. There was something about that face.

"He looks too old to ever use his unmentionables again," said Mrs. Pacini primly, "so it's probably no use attacking him there. "

" the Supreme Court will *never* permit such "

That voice. Charlie stood up and made his way haltingly to the table. He looked down, squinting quizzically. Those pale-blue eyes .

"As I understand it, it's just a simple case of disobedience," said Bernadette. "Why don't we just give him a good whipping?"

"Hmmm," said Mrs. Pacini, considering. "We *do* have those new metal-tipped whips.

"I don't believe it," breathed Charlie wonderingly. A corner of his mouth twitched in what might have been taken for a smile.

"Don't believe what?" asked Mrs. Pacini absently, as she flexed the whip experimentally.

A vast peace had suffused Charlie's features. "Don't you recognize him, Mrs. Pacini? *It's Dr. Hansell!*"

" sue for *triple* damages

Charlie removed his coat and moved purposefully forward. His hands were steady. His course lay clear before him: he knew what must be done. "If you ladies would put down that whip," he said incisively, "I think we'll begin with the flensing knives. Once we have his skin nicely off "

He began to hum a merry little tune. ■

● The relationship of language to thought is an old and hotly debated issue. At one pole are those who assert that thought and words are coextensive. . . . At the opposite pole are those who argue that we think without words, and that words are simply the labels we attach to our thoughts. One piece of evidence offered in support of this view concerns the words for colors in various languages. Anthropological studies have shown that in many other cultures, people do not have the same boundaries for color categories that English-speaking people do; some have fewer basic color terms than we, and one people, the Dani of New Guinea, have only two color terms—*mili* ("dark") and *mola* ("light"). Morton Hunt, *The Universe Within*

Jay Kay Klein's biolog

Things being what they are, probably not many science fiction writers get to paradise, though some do visit what is reputed to be the closest place to it on Earth; and one lives there. Ben Bova, Robert Heinlein, Fred Pohl, and this columnist have spent time in Tahiti with Hayford Peirce, who has been a resident since 1964. He is generally on hand when science fiction writers land at Papeete's airport, to fling a lei of frangipani over one's neck and salute one's cheeks French-style.

A far cry from Hayford's birthplace of Bangor, Maine, Tahiti originally was simply a place to visit during summer vacation from Harvard, where Hayford received a B.A. in English and history. At that time the jet strip had just opened, and Papeete resembled a waterfront town in an old South Seas movie. Hayford fell in love, first with the island and then with a blond, blue-eyed Parisienne who worked in the Air France office. Three years later, when he returned to stay, the French army and atomic energy commission—on Tahiti for bomb tests—were changing things rapidly.

Life is still relaxed, however, in a small-town atmosphere congruent with a cosmopolitan, sophisticated social life. And one can park a car downtown with the keys in it. In paradise one does the same sort of things one does in Westport with a big house, kids, a pool whose filter clogs up regularly, and business interests. Hayford engages in real estate activity, and several years ago started a dry cleaning store after noting the lack of an American-style establishment. (By the way: living in a hot, sticky climate where electricity costs are so high that air conditioning is unaffordable makes one appreciate attempts to achieve a high-tech, atomic-energy solution to low-cost power generation.)

Hayford's interest in science fiction began in high school, where he started spreading the word about Robert Heinlein at a time when high school kids knew little of science fiction. When *Analog* published a guest editorial by Heinlein in the January 1974 issue giving five rules for becoming a published writer, Hayford decided to give them a try. Sure enough, his first story appeared in the following November issue. Blessed with a wild sense of humor, he specializes in hilarious spoofs of real-life idiocies, sometimes starring Chap Foey Rider and the galactic mail service.

Hayford wrote his first mystery novel last year. It is set in Tahiti and still looking for a publisher. A second has just been completed. And lest anyone think Tahiti lacks the ingredients for first-class detective fiction, one night the Peirces were returning from a restaurant located high on a volcanic peak when they came across a battered, nude girl who had been driven over a cliff in a murder attempt. So the Peirces became involved in a murder trial locally and the retrial earlier this year in Paris. Hayford's mysteries should prove as well founded in improbable actualities as his science fiction has been on actual improbabilities. ■

Hayford Peirce


Champio

DEBORAH'S CHILDREN

Grant D. Callin

The second ring of the phone got them both half awake.

"Your turn, Dal."

"Prove it."

"Last Thursday. We were in the bathtub." She turned over and buried her head under a pillow.

"How come you're always right?" He reached over and picked up the receiver. "This is Draper . . . say that again? . . . Jesus. Is this a joke? Stan, is that you? So help me I'm gonna . . . What? . . . Yes, she's here; I'll tell her. Where do we . . . okay, we'll be there soon."

He hung up and turned back around; her head was still buried. He raised the pillow and kissed a silken cheek. "Debs. It's a Red 47. For both of us."

"Tell 'em I'll come in the morning."

"Hey, sweetheart, shuttle pilots aren't supposed to pout."

"I pout, you whine. Nobody else knows. Us against the world." She sat up and rubbed his rump affectionately. "We haven't had a practice alert in two years. And why in the middle of the night?"

"It's not a practice, Debbie. Bring clothes for a week; we're going to the Cape."

"What in the world for?"

"Beats me. The duty officer acted like he was doing me a favor telling me we were going to Kennedy."

At the Johnson airstrip they were met by a guard who checked their faces carefully against their IDs, then crossed their names off a short list and gestured to an old T-39 two hundred yards downstrip; it was lit up and the ground generator was purring. "Tail number 802.

It would be nice if all goals could be achieved by purely rational means. Unfortunately, when you're dealing with human beings, it may take more than that.

Bruce Sheaffer

You're the last ones; they're waitin' for you to take off."

The woman looked at him irritably. "Isn't there something we can use to wheel our luggage with? This stuff weighs a ton."

The guard said: "Sorry, Ms. Champion. They sprung this on us all of a sudden. Duty officer says: 'Minimum personnel and materiel involvement—and don't even tell your wife about it!' " He grinned apologetically. "Hell, I don't even know where you're goin' "

As they labored toward the aircraft, Dallas broke the silence with three words: "Curiouser and curiouser."

"Yeah, maybe it'll be something to tell our grandchildren about."

"Grandchildren? We've got to have children first. And before that, we ought to get married. Better hurry; you're not getting any younger."

"Dallas, you are an old-fashioned gentleman and I love you very much. Seven more flights and I'm eligible for pension."

"Is that a proposition?"

They had arrived at the plane. She put her luggage down and looked at him. "I think so." Before he could reply she turned and began to climb the boarding ramp. Over her shoulder she said: "You get to stow the bags. I'm going to flirt with our fellow passengers before I get too old."

Dallas whistled to himself as he helped the ground crew with the luggage.

Aboard the aircraft were three other Orbiter pilots and two of Draper's fellow encrypted voice communicators. One of the latter spoke first: "Hello, Chief. Guess the party can start now."

"Hello Mike; hi Stan. Anybody know what this is all about?"

One of the pilots said: "Hell, no. We were hoping one of you EVCOMs could tell us; you're the ones with the hairy clearances."

For the first part of the flight there was wild speculation among the seven passengers; then the late hour and the filtered white noise of the jets overcame them one by one. They slept as southern cities sparkled underneath the wings.

"Ladies and gentlemen, the information I'm about to impart carries the highest possible security classification "

During the stir that followed, Dallas leaned over and spoke in Deborah's ear: "Listen, Deb; this whole charade has the smell of a volunteer mission. Do me a favor and remember your contract. You can refuse any mission without prejudice if it entails a higher than normal—"

She shushed him as the speaker resumed.

"—ree weeks ago, in response to a cryptic call, the Deuxième searched an abandoned house in a Paris suburb. In it they found a horrible thing: a very large nuclear device containing a very stubborn computer. It was planted by an unknown—at least it was unknown at the time—French-Italian terrorist organization.

"They left a complicated set of instructions and demands. Among them was a requirement for the delivery of the equivalent of $800 billion in gold bullion "

The CIA agent waited patiently for the audience to quiet down, then con-

tinued: "The terrorists seemed to have every expectation that the major industrial nations would pool their resources to meet this demand. You see, part of the package they left contained detailed plans and specifications of the device. These, together with X-rays and radiation measurements, lead us to believe that it is the largest nuclear weapon ever assembled—somewhere between 400 and 700 megatons. "

There were gasps and exclamations from the crowd. The agent continued in a louder voice to make himself heard: "The effects of detonating such a device in the center of Europe are so terrible they defy description. The loss of land, industrial base, and technical skills would run into the trillions in Europe alone. The loss of life—well, a lot would depend on atmospheric conditions during the first years after the formation of the mushroom; but I assure you that no nation in the northern hemisphere would be unaffected. We calculate somewhere between 300 and 800 million lives—"

The noise in the room rose to a roar, forcing him to stop again. Draper looked over and met Deborah's eyes; he was surprised to find them dripping tears. She spoke in a broken voice: "Oh, Dallas, we didn't make it!"

He reached over and gently rubbed the tears into her cheeks. "What do you mean, sweetheart?"

"When I was in college in the early '80s and found out what a mess the world was really in, I made kind of a bet with myself: if we could hang on until the year 2000, if we could just keep the technology and space exploration and science chugging along till then without any major wars or disasters to set them back, we'd make it."

She sniffed, looking very young in the dim auditorium lighting. "And we were doing it, Dal. All the good stuff is getting started—smart computers, and fusion, and genetic engineering, and plans for high colonies. But now they're going to blow it all. And we still have three years to go!" She sniffed again and half-smiled. "Oh shit, Dal, I know there's nothing magic about the year 2000. But somehow ."

He leaned over and kissed her ear, handed her a handkerchief. "Here. Let's listen; he's starting again. Maybe it isn't as bad as all that."

"—also left a schematic of the computer logic and communications setup. They gave us ten days to arrange a global communications network involving four geosynch satellites and dedicated frequencies—duplex channels from all four to the device, and also channels for voice communications.

"We were ready in seven days, and broadcast a prearranged signal two days later. Immediately information began flowing to and from the device; the communications are dual-key encrypted, of course. There's no way to crack the code in the foreseeable future."

He paused again while the listeners quieted down. It didn't take long; most of them seemed to be in shock.

"We're reasonably certain the information coming from the computer inside the device consists only of temperature and pressure readings from monitoring transducers. We presume, of course, that any attempt to break into the device or to disrupt communications will result in its detonation."

A voice from the back of the room interrupted: "Why are you telling us all this? I'm getting a sinking feeling in the pit of my stomach."

The speaker allowed himself a slight smile. "Sir, that sinking feeling is something we have been living with for some time. I'll answer your question by saying that every major nation is cooperating in this affair. There are thousands of agents involved, even though most of them don't know the exact nature of the danger. And we have unlimited funds, of course. The United States, for its part, has contributed dollars, electronics and computer experts—and," he looked out over the audience, "we have tentatively agreed to use NASA facilities to attempt to place the device in Earth orbit."

"What the hell—!"

"How can you—"

"You can't just—!"

The agent let chaos reign for a moment, then raised both hands to quiet the group. "Please, ladies and gentlemen! I said *tentatively!* We will not do this without your voluntary cooperation. We—"

"Just a second!" This was a stentorian voice from one of the VPF crewchiefs. "How do you know you can even move the bomb without setting it off?"

The CIA man smiled tightly. "Research with unlimited funds. We know now that this terrorist group is a front for the dictator of a North African country. He has invested his entire private fortune in this venture—and he must protect that investment. Accelerometer triggers are too risky; there are only pressure and temperature sensors. No, they employed a very conservative technique to be sure the device wasn't moved: they simply established watchers in nearby buildings. We found them, of course; five of them. It was easy to buy them off—we just showed them the truth. There might be more at long range, but we circumvented that problem by moving the device on a very dark night and keeping away from street lights. Our—"

"My God!" This was from a woman who worked in Mission Control. "You mean to tell us that you took even the slightest chance with something that monstrous?"

The speaker pursed his lips. "Madam, we were very scared, believe me. But by then, we'd found out something even scarier: you see, we quickly penetrated their headquarters electronically—please don't ask how—and now have a deep surveillance team listening in. We know with certainty that they intend to detonate the device anyway, after they get the bullion. "

A roar was growing in the audience, and the agent had to shout to finish: "You see, with Europe in chaos, and other nations mobilizing to protect themselves from fallout, they believe they can use the bullion to gain economic control of the world!"

Pandemonium reigned.

After a while, one of the audience stood: it was the NASA Chief Astronaut. As the members of the group recognized him, quiet spread once again. His words dropped into silence:

"Could you please tell us where the device is now?"

The agent looked at him. "Certainly. It's in the Shuttle Payload Integration

Facility. The SPIF, I believe you call it."

The SPIF was on the Canaveral side of the Banana River—about three miles from where they were sitting. Dallas Draper's immediate reaction was identical to that of many others in the room: he started up from his seat without thinking. The impulse he followed was universal—to get a thousand miles away from there as fast as he could. Then he checked himself and looked at Debbie, who had remained in her seat. He sat back down and said ruefully: "You didn't even blink. I guess that's what they mean by 'the right stuff.' "

She pointed to the Chief Astronaut, who was surveying the room with his eyes. "That's what Steve is checking out. I think he knew the answer already, and just wanted to see the reactions of his pilots. You can bet he's already eliminated a few of the nervous nellies."

Draper's face clouded up. "Deborah—"

"Shhh, Dal; he's started again."

"—been here for three days, in fact. Volunteer groundcrews are modifying it to fly in the shuttle. When it's ready to—"

An impatient question was shouted from the floor: "Why orbit the thing? Why not put it in Siberia, or Antarctica, or a mineshaft?"

The agent answered patiently: "It turns out, to the best of our ability to calculate, that there is literally no safe place on Earth to put it. We might be able to prepare such a place, but that would take longer than we have. We're delivering the bullion as slowly as possible; but when enough of it is in their hands, we think they won't hesitate to detonate the device at the least suspicion of further delay."

The speaker looked at his watch as the murmur from the crowd died down. "Now, ladies and gentlemen, I must return to Washington, so I'll turn this meeting over to your Mission Director. Thank you for your attention."

The agent stepped offstage to be replaced by the familiar portly figure of Frederick Fishbein. He smiled apologetically.

"Please excuse our abrupt handling of your affairs this morning—but I think you can appreciate the necessity. Now once you leave this room it is imperative that you speak with no one about this, unless you know that person is aware, and you are in a most secure area.

"Those going back to Houston, we'll get you back right away. You'll be pretending this was a Red 47. Those staying—primarily some of the Orbiter pilots—will have cover stories prepared on an individual basis. All unusual activity here will be covered by a routine DOD-sensitive Mission Change Notice."

Fishbein looked over his notes before continuing. "You will all be briefed in detail; for now I'll give an overview so you'll know generally what the others will be doing.

"The device is being externally modified to mate with an IUS Airborne Support Equipment cradle; that means we'll be flying essentially an IUS mission. All components of the IUS will be replaced with breakout boxes, except those needed for the functioning of the ASE and Super Zip.

"Furthermore," he looked at the

Chief of Range Safety, "all launch decision criteria will be liberalized to the maximum. We'll use redundancy management to the fullest extent possible.

"The role of the EVCOM will be especially important." Now it was Dallas's turn for a hard look. "As far as the world will know, the four crew members originally scheduled for the upcoming mission will be aboard. In fact, they're making tapes right now for playback during ascent and the first two orbits. Actually, only one pilot will be aboard, and all communications will be through Houston EVCOM."

Dallas felt Deborah stir, and looked over; her face was unreadable. Uneasily, he gave his attention back to Fishbein.

"—so it'll be your show, Dal. John Falkes will be talking off a script to the playback tapes out front, but the real situation will be tracked from your shop."

Draper nodded, unable to speak. There was a knot growing in his stomach.

The Mission Director continued: "Okay, a final word. The CIA agent said this job would be contingent on our voluntary cooperation. In truth, it's our only choice; madmen have forced this on us, whether we like it or not. So now we're simply two groups of people: those of us who know, and those who don't. The latter are the lucky ones, of course."

He smiled thinly. "Good luck, and now I'm going to turn you over to Steve Shannon. I'll see you at your debriefing." He exited the stage as the veteran astronaut strode from the audience to take his place at the podium.

Shannon was in his early fifties, barely grizzled. He'd flown thirty-seven missions before retiring and accepting the post of Chief Astronaut. His professionalism and honesty were held in wide respect. As he began to speak, all side conversations stopped.

"All right, we've had the bad news and the pep talk; we're going to do this because we have to, like it or not.

"In a minute I'm going to call for volunteers, and here's what I'll be looking for: unmarried pilots with IUS experience, and with plenty of simulator time on fly-alone missions. That means you newer pilots will be low on the totem pole for consideration."

As Shannon spoke, Dallas's chest tightened. He knew Debbie qualified in all three categories mentioned by her chief. Almost in a panic, he leaned over and whispered to her: "Listen, Debs, you've got to—"

"Hush, Dal; Steve's still talking." She put a hand on his arm. "I want to hear what he's saying."

"—kay, so here's the drill: I'm going to ask everyone but volunteers to leave the room. There will be no stigma — repeat *no stigma*—attached to non-volunteers. Furthermore I will not consider anyone who isn't well qualified to fly this mission—so please don't stay just to impress me or your fellows; you'll only be wasting my time and yours.

"All right, everyone but volunteers please leave. Go to room 348 for your debriefing by Fred Fishbein and the security team. Thanks for your attention."

Dallas took Deborah by the hand and stood up to go. "C'mon, Glibs."

She stood and looked at him. "I'm going to stick around for a while. You go ahead."

He held her hand tightly. "Deborah, you know damn well you're a prime candidate, and you know further damn well I don't want you to go. What I want is for you to come with me on a sudden vacation to New Zealand."

She looked to the front of the auditorium; Dallas followed her gaze to see the Chief Astronaut looking at them. Shannon raised his eyebrows. Deborah nodded with a movement so slight as to be almost imperceptible.

The interchange wasn't lost on Dallas. "Damn it Deb, for the last time ."

"Please, Dal. Steve's waiting. Don't try to change what I am."

He released her hand. She kissed him on the chin and said: "I'll see you later, sweetheart." Then she was off down the aisle. By the time Draper got to the door, she was already in earnest conversation with Shannon; the six other volunteers stood back, listening.

"Dal, you've got to pay attention; there won't be any written instructions."

"Sorry, Freddie; my mind was wandering."

"Listen, chum: You know and I know that Debbie's probably going to fly that mission. And if I didn't need you so badly in Houston I'd just lock you in a padded cell for the next eight days. But dammit man, can't you see that you'll give her the best chance by doing your own job right? We've got to have airtight links into the back room at Johnson."

Draper took a breath, let it out. "I know, Freddie." He rubbed his eyes

with tired hands. "Okay, go over it again, then I'll get the hell out of here."

The last time he saw her was outside the Headquarters building. False dawn was a ghost of brightness over the Atlantic to the east; a staff car waited impatiently to take him to the airstrip.

"Thanks for sticking, Dallas. It would have hurt bad if I didn't get to see you again."

"Come with me, Glibs. There's lots of pilots, but only one of you."

"I can't, Dal. I'm Steve's first choice. Jake's the backup, and he's got less than half my simulator solo time."

"Then I'll stay, too."

"Come on, Dal; you know they need you—*I* need you—to give us an airtight EVCOM. You're acting like a kid."

"I whine, you pout. Us against the world. Deb, listen. I love you, and I want you to come back. Get that sucker in orbit and retroburn your butt back here."

She smiled. "I'll see what I can do." Rising on tiptoes, she leaned into him with a short, hard kiss. "My love. Go catch your plane, and I'll see you in nine days."

The next week was one of the busiest in Draper's life. He set up and coordinated secure links with Paris, New York, Moscow, and Washington. There was a permanent sick feeling in his stomach. He wasn't allowed to phone Deborah.

As the communications links were established one by one, the EVCOM Center became a beehive of agents. He overheard quiet conversations that made him increasingly uneasy. The gold shipments were being deliberately slowed by the European powers; negotiations and excuses became increasingly elaborate as the terrorists grew more impatient and suspicious. Dallas slept little, ate less.

The night before launch Stan Michaels approached him and spoke earnestly: "Dal, I've had a talk with Fred Fishbein. He says to tell you that you've done a hell of a job, and he wants you to take the day off tomorrow and sleep. I'll handle the EVCOM for the flight."

"Stan, in the first place, if Debbie climbs into that Orbiter tomorrow and doesn't hear my voice, she's going to think something's wrong no matter what you tell her; in the second place, if Fishbein wants me off that mike while Debbie's flying, he'll have to shoot me. So go tell Freddie to blow it out his ear."

MAIN ENGINES AT 90 PERCENT 3 2 1 SRB IGNITION LIFTOFF TOWER CLEARED PITCHOVER

"Turn that damned thing off!" The annoyed command came from Fred Fishbein as the voice from Mission Control blared over the wall speaker in the EVCOM Center. The voice was for the benefit of the listening public out front. The real action was centered around Dallas Draper's EVCOM post; here were huddled Fishbein, Steve Shannon, and the Chief of CIA Operations. Flight data were read and interpreted by computer; in case of problems, seven top engineers were at standby consoles. Debbie herself would be only medium busy; but if the flight monitoring software hiccupped, she'd have to do the jobs of two crewmembers.

Tension was high. During the next minutes the bomb would be put to a severe test. Vibration and noise levels well over 120 db existed in the cargo bay during atmospheric flight; such levels could shake circuit boards loose, and even back screws out of their sockets. The bomb had been sealed in an airtight cowling, and cushioned heavily; but there had been no time for tests, no guarantees. Even the construction of the device, and fitting it to the IUS ASE cradle, had been a miracle of sweat and ingenuity. Dallas tried to keep the tension from his voice as he activated the communicator.

"Champion, Houston. Encrypted voice check. How's the ride, over?"

"Houston, Champion. Copy you five by. The ride's rough and noisy as usual, Dallas. How's our friend in the bay, over?"

Draper glanced up to a large wall display where the digital readouts of communications to and from the bomb were shown in real time on a split screen. Since its installation the screen had never been idle; there had been messages continuously from one side or the other. At the moment traffic was from the bomb; the ones and zeroes flashed across its half of the screen in unbroken rhythm.

"Ticking away like clockwork, Champion. And we're showing max Q in 20 seconds. Strap down your false teeth, Granny."

This was one of the worst times of all. But as the Orbiter punched through the aerodynamic barrier the digital readout from the bomb continued without a falter. Finally Dallas was able to report with great relief:

"Champion, Houston. Through max Q. Main engine throttle-up. You're now at seven nautical miles altitude and four downrange. And according to the experts here, you're probably high enough so that very little ocean water would be sucked into the radioactive fireball. You have just saved an indeterminate but large number of millions of lives. Congratulations."

"Houston, Champion. Goodie for us. Now showing fifty-five seconds to booster sep—"

"Stand by, Champion. We're getting traffic from the terrorists." A receiver at the other end of the room had come alive and was blaring in an unfamiliar language; the harsh tones made Draper's skin crawl. When the voice stopped, the agents began speaking among themselves in low, urgent tones. The CIA Chief had left Draper's post and was talking on the Washington link; Dallas thought he recognized the voice of the Secretary of State coming over the speaker. After a moment he broke away and hurried back to speak to Fishbein: "Fred, the Secretary wants to know how much longer until the shuttle ejects the device and moves to a safe distance."

The Mission Director frowned. "Well, our schedule calls for the escape OMS burn about two hours from now. But we—"

"Thanks, Fred. Just a second." The agent hurried back to the Washington link and spoke briefly to the Secretary. Soon the latter's voice issued from another speaker, simultaneously translated into the terrorists' language.

Just then Deborah's voice came over the EVCOM speaker:

"Houston, Champion. I have booster

separation. Hey, what's going on down there, over?'' Her voice was cheerful, with tense overtones which Dallas doubted anyone else recognized. He activated his mike.

"Champion, Houston. Two minutes, thirty seconds. Altitude thirty nautical miles, forty-three downrange. Six minutes to MECO. No news yet on the message. The Secretary of State is just finishing his reply. No doubt they'll tell us working peasants when they get good and ready." He looked up and saw the agent approaching again. "Stand by one, Glibs. I think we're about to get the news. Back in a moment, clear."

The agent looked worried, and Draper's stomach knotted even before he began to speak. "Fred, the Secretary would like to know when is the soonest the device will be in a safe orbit?"

"What do you mean, 'safe orbit'?" Steve Shannon snapped.

The agent looked at him. "So there's no chance that it will ever detonate in the atmosphere—no matter what happens to the shuttle."

Steel showed in Shannon's eyes as he answered: "That would be at the end of the second OMS burn, about thirty-five minutes from now."

"Thank you." The agent left.

Fishbein hurried after him. "Just a minute " His voice faded as both men approached the CIA group.

"Champion, Houston. L plus five minutes mark. Three minutes, thirty seconds to MECO."

''Houston, Champion. That was a pretty long moment, Draper. What's the news, over?'' The worry in her voice was now evident.

"Fishbein's over at the Washington link talking to the Secretary of State, Deb. I'm just as much in the dark as you. Keep the pedal to the metal, over."

''Roger that, Houston.''

"Champion, Houston. MECO at my mark 3 2 1 mark. MECO at eight minutes, thirty-seven seconds; fifty-five nautical miles altitude, 770 downrange. E-T separation in five seconds .3 2 1 mark."

''Houston, Champion. Confirm E-T sep. Where's Freddie now, Dallas?''

Draper glanced over his shoulder. Fishbein was in earnest conversation with the mission sequencer, the IUS expert and the Chief Astronaut.

"He's gabbing with Bert Congdon, Shelly, and Steve. If he doesn't get over here by the end of the OMS burn, I'm personally going to drag him back to the mike. Hang tight, Glibs."

''Champion hanging and clear.''

"Champion, Houston. Confirm OMS-1 termination. We have an orbit of 35 × 132 nautical miles. You're go for OMS-2 in twenty-six minutes Mark."

''Copy go for OMS-2, Houston. What's happening in the rest of the world, over?''

"No word yet, Debbie, but I think we're about to find out. I've got a whole gaggle of people moving this way. Stand by."

"Champion, Houston. Deborah, this is Steve Shannon. Here's the situation: the CIA now thinks there *were* some accelerometers aboard the bomb—simple one-shots that trip only when acceleration exceeds a certain value. Anyway,

during ascent we got a message from the terrorists; they wanted the gold shipments stepped up right away, and also wanted to know why we were moving the bomb. The Secretary gave them a cock-and-bull story about trying to put it in a shockproof mounting in Paris, and it slipping off the hoist. The terrorists said if it happens again, they'll detonate it. In the meantime the shipments are being stepped up a little."

"Copy, Houston. What's the prognosis, over?"

Fishbein took the mike. "Champion, this is Fishbein. I'm afraid it's not good. We've already delivered about 400 billion, and the deep surveillance team says the terrorists are talking seriously about setting the thing off. They also think we're lying, but aren't sure. Deborah, as of now the device is too high to do more than token damage. I want you to know that whatever happens, we'll be in your debt for—"

Draper reached over to grab the mike, but Shannon beat him to it. "Can that crap, Freddie. Debbie, listen to me. Starting now, we're throwing the book away. I've got Bert and Shelley here, and we've worked out an accelerated mission sequence. We'll open the bay doors before OMS-2; then as soon as the burn terminates, we'll raise and separate the bomb. We'll initiate an emergency OMS burn about thirty seconds after the Super Zip, with the bay doors still open. After the OMS we'll close up shop and let the computers figure out what we did. You copy, Champion?"

"Copy manual mission. Steve, I'm going to need a little help; I've got a lot of buttons to push and I don't want to screw it up, over."

Bert Congdon was already taking the mike. "Champion, this is Congdon. We've worked out the sequencing down here, so put away your T-O and take my direction." He glanced at a sheet of notepaper in his hand. "In the order in which I give them to you, open the following safety interlocks "

Draper took the Mission Director by the arm and led him to one side. "Listen, Freddie, is it really as bad as you said?"

Fishbein looked at the floor. "It may be even worse. I think it's a toss-up between the terrorists' greed and fear. They're right on the edge; they could blow the thing any time."

"Jesus," said Draper, "why couldn't the Secretary—"

They were interrupted by one of the agents. "Excuse me, but we have some bad news: we've lost contact with our deep surveillance team. We must presume they've been found out and captured or killed."

Dallas groaned with a dry throat. "Oh, God. Now we've had it."

"Not necessarily," the agent said. "This might give them pause to think. They know we have the location of their headquarters, and that they assure their own destruction if they detonate the device."

"On the other hand," Fishbein said sourly, "they might just blow the thing out of spite if they figure the game is up." He looked over to the mission clock. "Fifteen minutes to OMS-2."

"Champion, Houston. On my mark, five seconds to OMS ignition
Mark 4 3 2 1

ignition at thirty-seven minutes, forty-five seconds."

"Houston, Champion. Confirm; we're burning. It's good to hear your voice, Draper. Where you been, over?"

"Twiddling my thumbs while you threw switches and pushed buttons. You know what you're going to do after cut-off, over?"

"Roger, Dal. I'm going to hoist my fanny aft and throw more switches and push more buttons."

2 1 OMS termination. Orbit 132 × 136 nautical miles. Unstrap and go, Champion. And I'm turning the mike over to Segal."

"Houston, Champion. Confirm OMS term. Unstrapped and heading aft. Let's have the drill, Shelley. Over."

Segal had already pushed Draper aside. "Okay, Champion, first give us lights and TV from the forward bay camera."

After a ten-second wait: *"Camera on, confirm?"*

Five pairs of eyes went to the video monitor; after a moment the picture formed in sharp relief. They were looking at the forward ASE, which was normally used to cradle the front end of an IUS vehicle. It looked much like the fork of the Palomar telescope: half circle, open at the top. It enveloped an ugly, unfinished-looking metal cylinder about nine feet in diameter—the hastily constructed shell surrounding the bomb. They saw it head-on; communications antennas jutting out along its length were in profile. As Dallas stared, a shiver crawled across the back of his neck; he was sitting in the middle of civilization, looking at chaos.

Suddenly there was movement at each side of the bomb; he started, then realized that the latches holding the device to the forward ASE had been activated.

"PRLAs open, Houston."

Draper had missed some of the conversation. Now Segal was talking again:

"Confirm, Champion. Now switch on the AFTA." The Aft Frame Tilt Actuator was the screw-driven piston which would pivot the aft ASE and bomb upward through a fifty-eight-degree angle.

"Roger, Houston." For five seconds, only the sound of Deborah's breathing came over the speaker, then: *"AFTA activated. Confirm, Houston."*

This time Dallas was ready for movement on the monitor—but there was none. Segal spoke while taking the mike over to the IUS console: "The damn thing isn't elevating. Stand by one, Champion." He looked carefully at the readouts. Suddenly he said: "Champion, switch off immediately! We've got stall current on the AFTA motor."

"AFTA off, Shelley. Shall I go to backup, over?"

"Affirmative, Champion. But be ready to de-activate immediately; we've probably overheated the primary already."

"Roger, Houston. Activating backup AFTA on my mark, ready mark."

"Turn it off, Champion!"

"Backup off, Houston. Suggestions, over?"

Segal's face was a study in concentration. "Deborah, it's got to be the keel pin. That's the only place it could be stuck. You know what a kludge that payload is—and we sure as hell didn't have time to figure twist and sway

forces during ascent. What you've probably got is a lateral pressure freezing the keel pin in the ASE guide slot."

"Sounds like a crowbar job, over." The crowbar had found its way informally into the Orbiter's on-board inventory back in the '80s. It was used on about one mission in five—never by design.

"Roger that, Champion." Segal was still frowning in thought. "But give me control of the Power Control Panel before you go EVA. We'll save time if we work it together, over."

"Copy, Shelley. Switching control okay, you've got it. Heading for the airlock to suit up. Stand by five, clear."

During the wait that followed, the Chief Astronaut approached Draper. "Dal, once she's back inside you'll have her again. The emergency OMS maneuver has already been punched in; all she'll have to do is an attitude correction, then burn. I want her to stay suited. It'll save time, and—" he looked hard at the pilot's lover—"it will be an extra bit of protection in case that thing goes off a little too—"

Suddenly the terrorist link came to life again. Dallas's hackles rose; the knot in his stomach tightened. The message was short. Almost as soon as it was over, he heard the Secretary's voice over the closed link into the EVCOM Center. Shortly an agent almost ran over to Fishbein and began to speak. Draper moved up to listen in.

"—sking why the temperature of the bomb is dropping. They're threatening immediate detonation if the situation continues."

They all looked at the TV monitor. The Orbiter had been in Earth shadow since the beginning of the second OMS burn, and would not emerge for another half hour. The cargo bay lights illuminated the scene coldly.

Draper had never felt so helpless. He growled inaudibly, then reached out and grabbed the agent's arm. "Listen," he said, "that temperature's going to be dropping for another forty-five minutes and there's not a damned thing we can do about it. So you go back and tell the Secretary to buy us some time. An hour. Even half an hour. But goddammit, tell him to get us some time!"

The agent looked at Fishbein; the Mission Director nodded. The agent hurried back to the CIA group, spoke briefly. Soon the Secretary's message to the terrorists was on its way. Their reply was short, then their link went silent. The agent turned to Draper and shrugged, palms up.

"Houston, Champion. Suit check, over."

"Champion, Houston. Five by. Commence EVA at your discretion."

"Copy, Houston. Airlock cycling."

Soon the monitor picked up Deborah's figure as she made her way into the cargo bay, umbilical trailing, crowbar in hand. Her movements were clumsy; as a pilot, she'd had very little EVA time.

She worked her way carefully back to the cargo and examined the keel pin. It jutted down from the bottom front of the makeshift bomb cover, to fit into a matching hole in the forward ASE. The pin was inserted just a few inches into the cradle; it was for alignment purposes only.

"Shelley, you there, over?"

"Affirmative, Champion. Ready to activate AFTA on your mark, over."

"Stand by."

She moved back to the ASE and, holding onto it with one hand, reached down and inserted the crowbar into the narrow gap between the bomb casing and the cradle near the pin. Her feet tumbled upward; almost immediately her breathing became labored.

"Shelley it's stuck, all right gotta get better leverage stand by."

Slowly she worked both legs down until she could hook her boots between the ASE and the floor of the cargo bay. By this time she was panting.

"Okay, gonna give it a try unnnh! it gave a little one more try unnh —ahhh! that's got it!"

She was gasping for breath, but now the casing was free and bouncing slightly between the fork arms of the forward ASE. She removed her feet and backed cautiously from the device.

"Try the AFTA, Shelley . I'm going to stay out here until we're sure everything works okay over."

Segal started to reply but Draper cut him off. "Negative, Champion. Throw that crowbar away and get inside fast. We're on a tight timeline."

Nevertheless, she hesitated a moment until the device actually began to rise.

"Champion, Houston." Segal was speaking again. "Backup AFTA functioning on specs. Suggest you follow Draper's advice. If the Zip doesn't go, we're dead in the water anyway, over."

"Roger, Houston. Heading for the airlock. Keep me posted, clear."

"Champion, this is Draper. Keep your suit on through the OMS burn; Shannon's idea, and I concur—we'll save a few minutes, over."

"Copy, but I think both you guys have a mother complex. Shelley, how's it going, over?"

Draper watched the monitor as Segal spoke: "Payload at fifty-eight degrees and locked. Activating Super Zip on my mark " With the bomb case tilted to its full extension Dallas could see the underside along the whole length of the structure. The device was mated to the aft ASE by a hardened aluminum ring about three inches wide. In the middle of the ring, around its entire circumference, was a groove—a deliberate weakening of the metal. Detonation of an explosive cord sealed within the ring would cause a clean separation precisely at the groove.

" mark!" Segal looked from his console up to the monitor. "Bomb's away!" Without so much as a puff of smoke the device separated, pushed off by the eight powerful springs in the aft ASE. Ponderously it rose up, until finally it was out of the field of the monitor.

"Jesus Christ!" Fred Fishbein's exclamation turned their stares. He was pointing to the screen monitoring signals to and from the bomb. It was blank on both sides. "The terrorists were transmitting, then stopped, and the bomb didn't answer. It was like they cut off in the middle of a sequence."

Suddenly a signal came from the bomb; the ones and zeroes flashed on the screen for a second, then stopped.

No reply came from the other side. After about five seconds the bomb again initiated a short transmission; again there was no reply. Another five seconds, then the sequence was repeated.

Draper's heart was in his throat. He jumped at the sound of Steve Shannon's voice from behind his shoulder: "So there's a built-in delay. Question is, how long?"

"Attitude tracking."

"Copy, Champion, and you're go for OMS. Get the hell out of there."

"Okay, Houston, punching in OMS burn at L plus fifty-nine minutes, thirty seconds. Ignition on my mark plus ten seconds mark."

"Copy that, Champion. OMS at L plus 59:30."

"Four seconds . 3 . 2 1 ignition. Whew. It's good to be moving away from that thing." Her voice then became tentative. *"You know, Draper, I've been thinking "*

"Don't strain yourself, Glibs."

"Seriously, Dallas. About children. After this week that pension doesn't look so inviting any more. So why don't we—"

Static.

"Champion, Houston, over."

"Champion, this is Houston, over."

Draper felt a hand on his shoulder, and turned his head; the Chief Astronaut was there. "Dallas, look at the monitors."

The video screen showed only static. The screen monitoring bomb communications was blank, and stayed that way.

The engineers were all talking to Fishbein; he broke away and approached with a worried look. "All telemetry from the Orbiter has stopped." He started to add something else, then saw the look in Draper's eyes and changed his mind. "I'm sorry, Dal."

The Washington link had come to life; the agents were all listening. One of them left and hurried over to the three men at Draper's post. "Sir, Washington just got a report from Darwin. There was a brilliant light in the sky—brighter than the sun, they said. It lit up the entire western half of Australia. The Secretary wants to know if the Shuttle is safe."

In a flat voice Shannon said: "The Orbiter was only a few hundred feet from the bomb when it detonated. There's nothing left of it."

The agent said: "Sir, we all wish to express our deepest—"

"Thank you," said Shannon. "Please go away."

Draper stared at the floor for a long time. When he finally raised his head he saw that the Chief Astronaut was looking at him.

"Steve, Deborah's gone."

"Yes."

Draper got up and walked over to the mission clock. The digital display flashed the seconds mockingly: 00:01:06:46 00:01:06:47 00:01:06:48 . He reached up and pressed the reset button, then buried his head in his hands.

estimated that her funeral rites were seen by more than three billion people. Yes, Deborah Champion is truly the heroine of the millennium. But more than saving millions of lives and preserving our civilization, her act of heroism and sacrifice set an example that

the leaders of nations are finding impossible to ignore. As of this morning, with France finally signing the Global Nuclear Control Treaty, every nation on Earth with nuclear technology has now placed itself under the strictest international control agency ever formed.

"And the U.S. is also using its renewed world prestige to good advantage. Under this nation's leadership Russia, China, France, India, Pakistan, Israel, Saudi Arabia, Kenya, Brazil, Japan, Argentina, Great Britain, Mexico, Australia, and Canada have convened in the World Conference to Restrict Nuclear Arms Deployment on Earth and in Space. Thus we can predict with some certainty that the reverberations of Deborah Champion's act will echo for many years in the—"

Draper shut off the HV with a savage motion, then collapsed back in his chair as if the act had drained him of all energy. He spoke in a whisper to Steve Shannon:

"You know, she was scared the whole time."

"I know, Dal. She took all our fears up with her."

"Now you sound like the holo commentators. Dammit, Steve, she was a vibrant woman, full of love and life. We were going to have children. ." He blinked hard, tried to swallow the lump in his throat.

Shannon reached over and put a hand on Draper's shoulder. "Dallas, I'm not going to ask you to put away your grief, but I'd like you to think about something. For the past hundred years our technology has been running way ahead of our human rules of conduct. We've been dealing with dangerous problems nation by nation, one at a time. The world needed a hard kick in the ass; the only problem was, that kick was likely to destroy us.

"So now it's come. And thanks to Debbie, we're all still here. Now I think we'll grow instead of dying—and don't kid yourself; those were the only two choices."

Dallas spoke with a cracked voice: "But just a few more minutes, and she could have come home safe. . "

Shannon was shaking his head. "No, Dal. That would have made her just another risk-taker. Thousands of us did that, and we only got passing mention. Her sacrifice was important; we needed that ultimate act of altruism. Yes, she could have made it home, and eventually had children. But grandchildren? I don't know."

"It just doesn't help, Steve. I loved her so much. I'll always love her."

"And so will I, Dal. Because now *I'm* one of her children. One of billions. " ■

● Computer people have often spoken of the "gigo" effect, meaning "garbage in—garbage out." What gives some of us chills is the thought of a second meaning of "gigo": "Garbage in—gospel out." It can happen here.

Kelvin Throop III

ON GAMING

(continued from page 63)

version to use in the game.

How successful were they? Only a trivia fan would be able to find fault with their research. As a game, it's equally impressive. Just how much fun it is depends a lot on the referee; but judging by the quality of the adventures available so far, players will find each one creative and challenging. Considering that much of the data comes from familiar shows, that's no mean feat of inventive writing—there *are* genuine surprises.

As for the graphic quality, the ship deck plans provide the best examples. Two sets of plans have been published as supplements so far: the *U.S.S. Enterprise* (Constitution-class heavy cruiser), and Klingon D-7 class battlecruiser. There are nine double-sided large sheets measuring 22 × 33½ inches for the *Enterprise*, and six such sheets for the D-7. Each shows a deck or several decks of the ship—with every corridor, compartment, and piece of machinery in meticulous detail. You can even see the silverware on the tables in the mess areas!

While the *Enterprise* shares certain common facilities with the D-7 (both have beds, baths, toilets, chairs, tables, transporters, etc.), the layouts are different, and the Klingons' culture requires interesting areas. These include an "inspirational media room" for propaganda, an "interrogation center" (torture chamber), and a very large brig. The paranoid Klingons also use half their security to watch their own people, while the design of the ship keeps the crew separated from the officers for sleeping, eating, and recreation.

Merely to complete the physical drawing and pasteup of the rules and deck plans took six months. The entire project required the equivalent of a year's worth of man-hours.

Although only a few months on the market, *Star Trek: The Role Playing Game* boasts quite a line of after-market products. Besides the basic game set, nine supplements have been published, and more are soon to come. There are also three lines of metal miniatures: small 15mm scale figures of characters for use on the ship deck plans; larger 25mm scale figures for adventure encounters; and 1/3600 scale models of the starships for space combat (the *Enterprise* is about three inches long).

Other supplements available include a book on the Klingons to enable gamers to play one of these nemeses of Star Fleet; another book on trade and commerce and playing a trader character; a supplement on ship construction that enables you to design and "build" ships for any race; several adventures; two ship recognition folders (similar to World War II aircraft recognition posters, except these look like computer displays in full color); a *Gamemaster Pocket Folder* for the referee to keep materials in; and an update kit that uses information from the movie *The Wrath of Khan* to bring the game forward fifteen years to the time when Kirk is an admiral and technology has improved.

Even if you don't play games, you'll enjoy reading through the materials in *Star Trek: The Role Playing Game*. FASA has managed to make an interesting SF subject even better. ■

Again Monopoles

John G. Cramer

A few years ago, physicists at UC-Berkeley and the University of Houston called a well-attended press conference to announce that they had discovered a *magnetic monopole*. They reported that they had found a very special track in a stack of photographic emulsions and plastic sheets flown in a balloon over Nebraska, and asserted that this track "could only have been produced by a magnetic monopole or by an energetic nucleus with a nuclear charge greater than 137." Since the nuclear charges of known nuclei go up only to 107 or so, they concluded that they had observed a magnetic monopole. This announcement was met with great excitement and some skepticism. The magnetic monopole is an object which has been sought for several decades, ever since Dirac pointed out the possibility of its existence and determined the basic unit of a monopole's magnetic charge.

Unfortunately, the initial skepticism about the monopole's "discovery" was well justified. It turned out that there were some problems with the Cal/Houston measurement, and it was later essentially declared "inoperative." But the false alarm had an interesting result. It prompted the Dutch physicist Gerald t'Hooft to consider the possibility that monopoles might be produced by the Big Bang. What he found was that in the early stages of the Big Bang there are intense "Higgs" magnetic fields, which become very tangled. During the rapid expansion of the early universe they become "snarled," leaving behind "clumps" of magnetic lines which are magnetic monopoles.

These primordial monopoles are *very* heavy, about 10^{16} times heavier than a hydrogen atom. Ever since t'Hooft's discovery of this mechanism, cosmologists have been desperately seeking ways of "turning off" the production of such monopoles, but have found them to be essentially inescapable. Their presence represents a serious criticism of the Big Bang cosmology, for no such monopoles have ever been observed.

There are problems with detecting

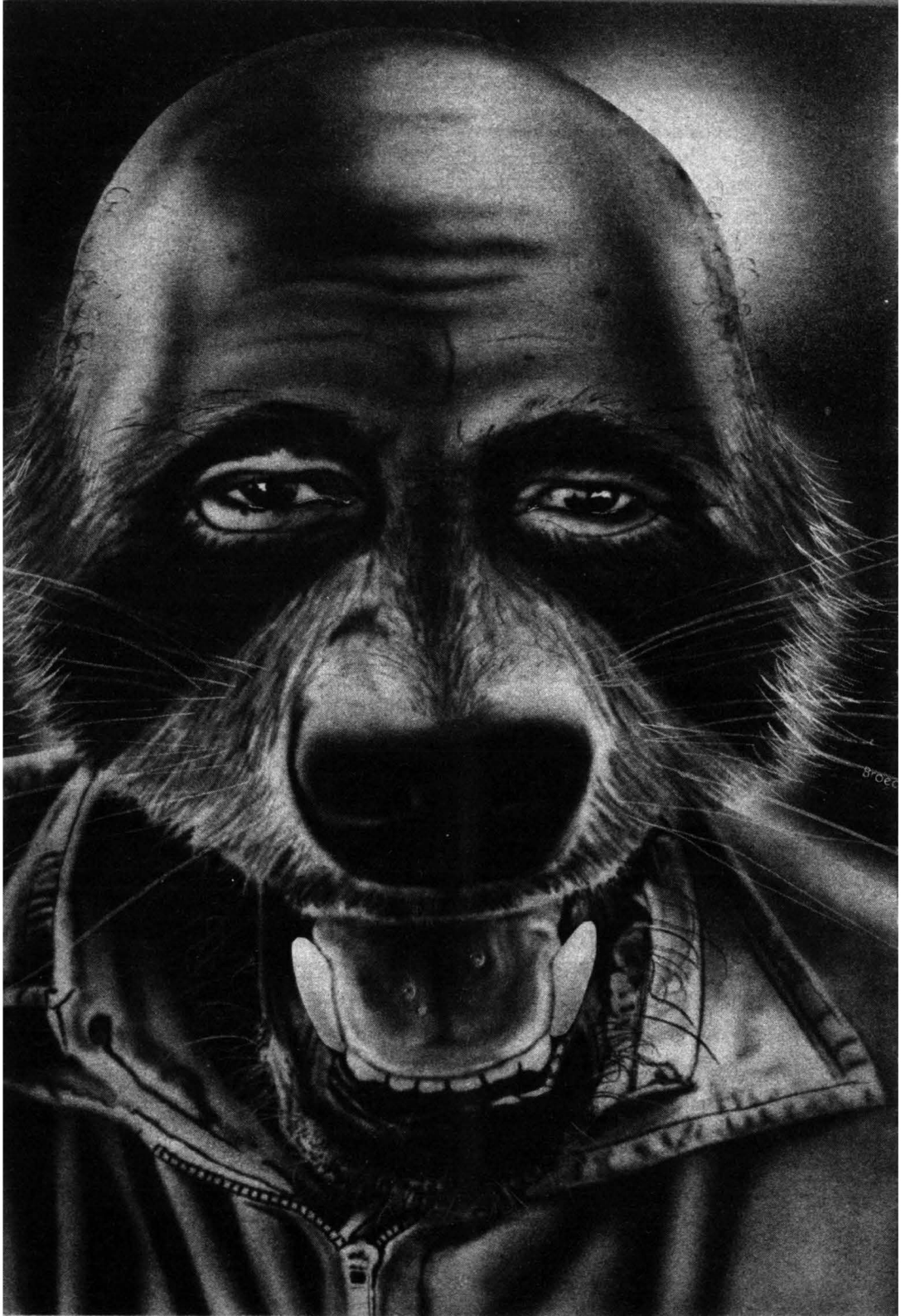
heavy monopoles: they are likely to move very slowly and will not produce much ionization in detectors. But their detection *may* have been accomplished. Professor Blas Cabrera of Stanford University recently constructed a "monopole trap" consisting of a loop of four turns of superconducting wire connected to a SQUID (Superconducting QUantum Interference Device) magnetometer capable of detecting extremely small magnetic fields. Cabrera reasoned that if a slow monopole passed through his detector, even if it were very massive and moved very slowly, it would necessarily "thread" its trailing lines of magnetic flux through the loop, and this would be registered by the SQUID.

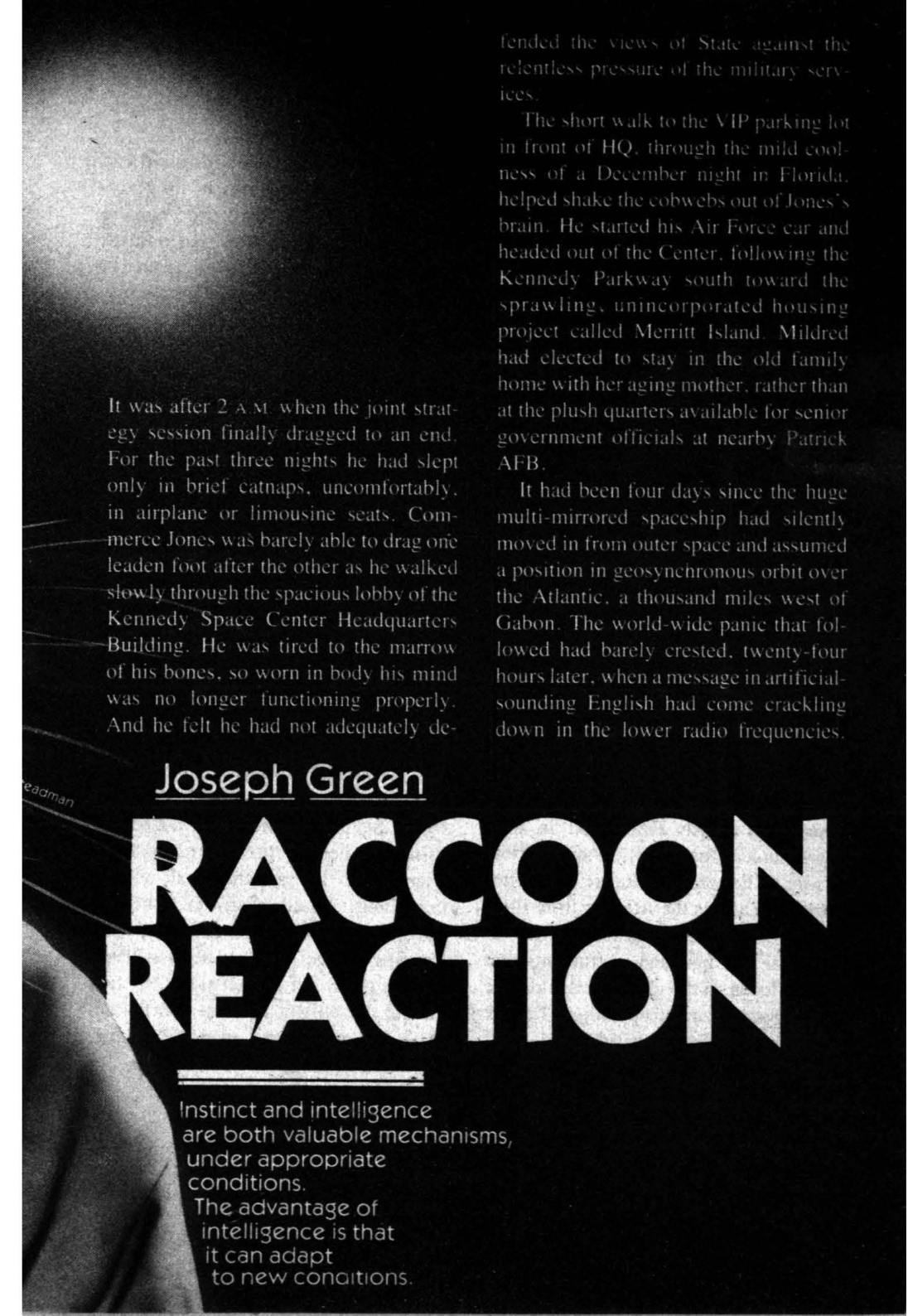
After this device had been in operation continuously for 126 days, on St. Valentine's Day, February 14, 1982, the apparatus showed a flux change of exactly the right size to correspond to the passage of a magnetic monopole with one Dirac unit of magnetic charge through the loop. So far, only one such event has been recorded.

There is an amusing sidelight to this result. Cabrera works at the Stanford laboratory of Professor William Fairbank, who has recently announced the observation of fractionally charged objects on superconducting niobium spheres (see "New Phenomena," *Analog*, February 1983). The Dirac estimate of the size of a quantum monopole magnetic charge was based on the assumption that the charge on the electron is the minimum electric charge. Fairbank's fractionally charged objects, if taken seriously, would indicate that the minimum electric charge is three times smaller. And this would make the monopole charge *three times larger* than the value which Cabrera has observed. Thus, if Dirac's calculation is applicable, these two remarkable results from the same laboratory, monopoles and fractional electric charges, *cannot both be correct!* Or is Nature even trickier than we thought? ■

● Would beings from another world covet our gold or other rare substances? Do they want us as cattle or as slaves? Hardly, considering the astronomical cost of transport between solar systems. Any civilization able to cover interstellar distances would hardly need us for food or raw material, which they could far more easily synthesize at home. The most interesting item to be transferred from star to star is information, and this can be done by radio.

Ronald N. Bracewell





Joseph Green

RACCOON REACTION

Instinct and intelligence are both valuable mechanisms, under appropriate conditions. The advantage of intelligence is that it can adapt to new conditions.

It was after 2 A.M. when the joint strategy session finally dragged to an end. For the past three nights he had slept only in brief catnaps, uncomfortably, in airplane or limousine seats. Commerce Jones was barely able to drag one leaden foot after the other as he walked slowly through the spacious lobby of the Kennedy Space Center Headquarters Building. He was tired to the marrow of his bones, so worn in body his mind was no longer functioning properly. And he felt he had not adequately defended the views of State against the relentless pressure of the military services.

The short walk to the VIP parking lot in front of HQ, through the mild coolness of a December night in Florida, helped shake the cobwebs out of Jones's brain. He started his Air Force car and headed out of the Center, following the Kennedy Parkway south toward the sprawling, unincorporated housing project called Merritt Island. Mildred had elected to stay in the old family home with her aging mother, rather than at the plush quarters available for senior government officials at nearby Patrick AFB.

It had been four days since the huge multi-mirrored spaceship had silently moved in from outer space and assumed a position in geosynchronous orbit over the Atlantic, a thousand miles west of Gabon. The world-wide panic that followed had barely crested, twenty-four hours later, when a message in artificial-sounding English had come crackling down in the lower radio frequencies.

The aliens required some unknown amount of deuterium, which they would extract from the ocean themselves. They had no other designs on humanity's resources.

The brief message had done much to calm a fearful world, though it had not halted the extensive military preparations already underway. Then forty-eight hours ago, without warning or explanation, the aliens had started a giant waterspout in the ocean immediately below their ship. It rose in a misty cylinder over a thousand feet wide, speeding directly into space. In nine hours it reached the strange, undefinable vehicle, apparently undiminished in size, and emerged out the other side as water vapor.

And then the *real* panic began.

The president had decided to ignore the slow-moving United Nations, establishing a joint government task force instead. Undersecretary Jones, with extensive experience in dealing with some of the stranger cultures still unassimilated on Earth, had been designated to represent State. The Defense Department had already established an alien communications effort at Patrick AFB, using its Eastern Test Range. The latter stretched across the Atlantic from Florida to southern Africa, with a wide variety of antennas and instruments that could focus on the alien spaceship. The Task Force had set up shop at Patrick and started a two-pronged effort —extensive preparations to attack the aliens if necessary, and unceasing efforts to open a dialogue leading to negotiations.

Commerce Jones, his wife, and their youngest daughter returned home, to the island where the adults had been born, growing up black and poor in the shadows of the towering gantries of the Kennedy Space Center.

The fatigue that dulled his mind had also slowed the reactions of the sixty-one-year-old body Jones tried hard to exercise into good health. His reflexes were slow when he started around a curve and saw the low dark form crossing the road ahead; his reach for the brake tentative.

The Kennedy Space Center was still largely open land, covered by trees, marsh, and orange groves. Wildlife, protected on government property, abounded here. The creature caught in the glare of his headlights was a raccoon, a large one, making his nightly prowl for food.

Jones saw the recognition of danger enter the animal mind as the lights suddenly exposed it: the instant, unthinking reaction. The raccoon whirled to face the oncoming attacker, lips drawn back over small fangs in a fighting snarl, tail up, the black mask across the bandit face wrinkling into menace.

Time seemed to slow for Jones as he found and pressed the brake, not daring turn the wheel on this curve. In clear, sharp focus he saw the small animal crouching, poised, ready to fight, responding in the only way it knew to imminent danger . and a second later felt the *thump!* of impact as the bumper caught the defiant raccoon and hurled it aside, crushed and mangled, dying before it hit the ground.

The car shuddered to a stop.

Jones sat there for a moment, gripping the wheel—then realized getting out was useless. He touched the accelerator again. If the stupid animal had

been a street-wise dog, and had simply kept going but that was not its nature. He should know. He had hunted 'coon many times on this island as a boy, almost half a century ago.

Shaken, regretful, thinking this was a bad ending to an already miserably long day, Jones drove on off the Center and the few miles to his mother-in-law's house on North Tropical Trail. His fatigue had returned, worse than before. But tomorrow, at least, he did not have to be at Patrick until eleven o'clock. He could get several hours of badly needed sleep.

At a late breakfast next morning with Mildred, Jones dawdled over his food. His mind was circling around the urgent problem of the aliens, probing, reexamining, shifting among the endless possibilities for a better solution. After this morning's meeting, he knew, the task force was going to recommend the military option to the president. And he had a terrified feeling this was the wrong answer, a deadly mistake that could have unthinkable repercussions. But he was in a minority.

Naomi came bouncing in from visiting friends in the neighborhood. She was a slim, dark-haired girl of thirteen, an accident that had happened after their first two children were almost grown. Mildred had been forty-one when the pregnancy was confirmed, but had refused to have an abortion. Over the years since they had both come to feel it was a happy decision.

Naomi danced across the room and hugged her father. She had hardly seen him since they had arrived at her grandmother's house. She helped herself to a link of sausage off his plate and talked around it as she ate. "What's the latest, Dad? The kids are saying the Air Force is going to send up a space shuttle with three solid rockets tipped with tactical atomics, try attacking them from three sides at once. Anything to it?"

Jones tried to keep the startled look off his face. That had been one of the three possible military attack plans proposed by the Air Force last night. The NASA and Air Force space shuttle experts had ruled it out. The fastest possible time to prepare and launch such a cargo would be three weeks.

And by then, Jones knew, what the aliens did hardly mattered. The inescapable damage would have been done.

"Is it true that just one more week will throw the world into another ice age?" Naomi went on, her gamin face open and guileless, but the bright brown eyes watchful. Her father usually answered with nothing more than a brief smile if she touched on a sensitive area.

"The NOAA people have said that in the news, Naomi. The amount of vapor already up there will give us four or five bitterly cold winters."

"How can the scientists be sure of such a thing, dear?" asked Mildred, her deep, soothing voice now troubled and uncertain. "We've never had water vapor in space before."

"No, but when the Mexican volcano El Cinchón blew its top twice in one day, ten years ago, the amounts of ash and sulfur dioxide thrown into the upper atmosphere were carefully measured. The ash came down in about a year, but the gases lingered for several more. The cloud was thin, but it spread around the entire world in the northern hemisphere.

There were a lot of temporary weather changes. For the next three years, until the gas naturally changed into sulfuric acid and came down as acid rain, the temperature under the cloud averaged being one or two degrees cooler, worldwide. That was the most-studied rapid change of that sort we've ever had, and it gave the atmospheric scientists a good data base. They claim their predictions on what the vapor cloud will do to the world climate are quite reliable."

"But won't that take thousands of years?" asked Mildred.

"Within Naomi's lifetime the ice will come marching down across Canada, Scandia, and Siberia, if the aliens continue spewing water into geosynchronous orbit for just one more week."

"Then why don't we just *give* them the deuterium from our own supply!" Naomi demanded. "Don't we have a lot of the stuff?"

"Honey, our physicists think that big ship uses the deuterium-deuterium fusion cycle in some way that supplies them with power while also producing tritium. We can't determine precisely how they apply their system, or why they need our deuterium. Our best guess is that they've had an accident of some kind that cost them their supply, and they have to have more to continue on their way—to home, or wherever they're going. But as best we can tell that's an awfully big ship, and if it's really hydrogen fusion-powered it will take maybe hundreds of millions of pounds of deuterium to get it up to relativistic speeds —you know, fast enough to get somewhere in under a thousand years. That means—and remember, these are just educated guesses—they'd need to run that column of water through their ship for another three weeks. We don't have a hundredth of that amount in stock, and the aliens obviously aren't willing to wait."

"So we're going to attack them, and maybe get blasted off the face of the Earth," said Naomi, with a look of angry resignation that made her seem older than her years.

"We're still searching for a peaceful solution, honey. That's my job. But I can't do anything if they won't talk to me, and they haven't responded to any of our messages except with that single announcement."

"Well, if all they need is the deuterium, why can't they just dump the water back in the ocean instead of letting it loose up there where it spreads out and hangs in orbit?" asked Naomi.

Jones automatically started to point out the idea wouldn't work—and realized he had closed his mouth again without speaking. The best guess of the physicists was that the aliens had a technology capable of creating localized fields of nullified gravity, or actual antigravity. It seemed reasonable that if they could pull the water up, they could also send it down again—if they wanted to go to the trouble.

"That's an interesting idea, my darling. And if the aliens ever return my calls, I'll certainly ask them about it." Jones was trying as always not to treat Naomi like a child. She was a very bright young lady with an I.Q. just below the genius level.

Naomi gave her father a chilly look, suddenly realized he wasn't making fun of her, hastily kissed him on the cheek, and left.

Jones hurried through the rest of his breakfast and finished dressing. He had just enough time to reach Patrick before the meeting. He hated leaving without brushing his teeth, but he had wasted too much time. And he had to be there. The president was pressing for a decision. If the State Department position of waiting and continuing to try to contact the aliens did not prevail—Jones did not like to think of the probable consequences.

Commerce Jones always drove his own car to work in Washington, though he was entitled to limousine service. Driving was an automatic function for him, something requiring little conscious attention. He had solved many a tough problem while driving to or from work, his mind free in the isolation of his slowly moving car to worry and twist, reexamine and weigh, until his special gift for synthesizing divergent facts and opinions enabled him, often, to come up with an answer acceptable to all parties.

The memory of the raccoon he had inadvertently killed last night returned, and he again saw the masked face, the gleaming white teeth, the crouching figure ready to charge or retreat. It was not a total fake, a show—'coons would certainly fight when cornered—but a good 'coon dog could almost always kill its prey. Raccoons took to the water when they could, or left a false trail and doubled back. As a last resort, when nothing else had worked, they climbed a tree, from which they snarled defiance at the hated animals baying at them from the ground below.

There was something marvelous, an atavistic thrill deep in the soul of the hunter, in hearing the yapping barks of a trailing dog change to the deep, mellow baying of a hound who has treed his quarry.

Jones tried to pull his mind back out of the memories of his boyhood on this island. All of humanity was up a slim tree at the moment, and the limb was bending dangerously.

The news media were having a holiday—perhaps the last one before the ice formed on their presses and antennas—covering the most newsworthy event of the 20th century. The entire world was watching this small group at Patrick. The Soviet Union had sent the most angry message in recent history, direct from the Party chairman to the president, informing her that being left out of these deliberations was an intolerable affront. Their allies in NATO were pushing hard for representation on the negotiation committee. (They thought actual negotiations were going on?) An accident of geography and preeminence in space had placed the United States at the forefront here, and the president had chosen not to encumber the task force with innumerable second-guessers.

But they were not doing all that well at saving the world.

The main gate at Patrick AFB was open, but Jones had to flash his State Department I.D. to get past the guard at the temporary command center. He was two minutes late reaching his seat at the long and crowded table, and the meeting was just getting started.

"If you'll come to order, gentlemen." The chairman was a surprisingly young three-star general named Iverson, the commander of the North American

Air Defense forces. "We have updates for you from NOAA, NASA, Air Force, and CIA representatives. Please keep your reports brief; executive summaries only."

Jones knew that frantically busy background groups had been organized to support every activity reported here, that what reached this room was the distilled essence of needed data. At this level no one read through detailed reports.

A gray-haired, wizened little man with a wrinkled brown face leaned forward in his chair, cleared his wattled throat, and said, "Briefly, then. We have refined the set of figures given to this task force when it first met. They are quite close to my agency's original estimates. At the present rate at which the water molecules are spreading both north and south of the equator and along the geosynchronous orbit circumference, NOAA's figures show the band will have enough mass in orbit after four more days to create a thin 'cloud' over four thousand miles wide. It will take several months to encircle the entire globe, at 22,000 miles altitude, but molecular action in a high vacuum will ensure it doing so."

The old meteorologist picked up a new piece of paper. He looked around the table, and his voice became so low Jones had to strain to hear him. "We estimate the shading effect of this cloud as sufficient to drop average world temperatures along the equatorial regions by as much as one point two degrees Fahrenheit for perhaps the next four years. Each day increases the expected temperature drop by point four degrees, in rough figures. If they stop tomorrow they will leave us a legacy of extremely bitter winters for at least five years. I have breakdowns for specific regions, but all you probably want to know is how this affects the grain belts of Canada, the United States, and Russia. The answer is, up to fifty percent crop loss each year. Seven more days of this will start the ice-sheets marching south again. Ten more will throw the world into a deep freeze such as we haven't seen since the last great glacial stage, the Wisconsin. Fifteen more and we have nothing with which to compare. It becomes possible for the oceans to freeze over entirely except for a band of unknown extent centered on the equator."

The tired little meteorologist leaned back in his chair, shuffling his papers into some mysterious but precise order. There was a moment of silence before Iverson said, "CIA?"

The CIA representative was a large, soft-looking man with white hands and a pink-skinned face, dressed in an excellent mohair suit. He wore thick glasses, which he kept taking off and holding briefly before putting them on again. In the soft light of the overhead fluorescents his almost bald head gleamed with a sweaty luster. He had a slow, measured way of speaking that lent weight to his words. He was no more than thirty-five years old.

"We have completed our psychological analysis of the aliens, and made best-guess projections as to their probable future actions and reactions. Our data base is slim, and conclusions somewhat speculative; please bear that in mind.

"We have made certain *a priori* assumptions—such as that the aliens are

not only far more advanced than ourselves scientifically, but considerably more intelligent—or at least much better educated. We think they neither fear nor hate us, but are in fact indifferent to our fate. Their failure to respond to requests to stop drawing up our water is possibly explained by some cultural quirk in their—to us, completely unknown—background. We think they could do us great harm if they chose to do so, and that we provoke them at our peril.

"We think they will continue to siphon and mine our ocean water some unknown number of days—hopefully, less than a week more—and then leave with no more notice than they gave when they arrived. They are unlikely to do us any harm if we leave them alone—and that is what my study group strongly recommends. Leave them alone. Let them go in peace. We'll try to ameliorate the climatic problems they leave us after they've gone."

There was a small stirring around the table. Jones knew, when he saw the set, cold look on Iverson's face, that the CIA's view was in the minority here.

As was his own.

"NASA?" said Iverson. "No more than four minutes, please. The president, cabinet members, and congressional leaders are gathering in the war room now. I'm supposed to call them before twelve. They want our recommendations to open the meeting."

The man from NASA reported on what had been decided at the meeting Jones had attended the night before: that it was physically impossible to use the space shuttle as a weapons carrier in time to be effective.

Looking at the big-bellied, ruddy-faced NASA executive, Jones remembered for the first time in years how much he disliked the space agency. His parents had been poor black orange grove workers on Merritt Island in 1951, when the U.S. Air Force had first established the Cape Canaveral missile firing station. He had attended segregated schools before the great Supreme Court decision declared them "separate and unequal" in 1952. Somehow his parents had scraped up the money to start him at Howard, and he had worked his way through three more years to a student instructor's stipend and a chance for a master's. Back home with his degrees, he had taught in the slowly integrating local school system at ridiculously low pay, while he watched the prosperous engineers and technicians drive their large cars to work at "the Cape." In the late fifties a labor relations job for the school system threw him into local prominence, and a chance for a job in the State Department. There, his ability to synthesize vast amounts of barely related data, and reach surely for the compromise that all parties to a dispute could unwillingly accept, had kept him moving steadily up the ladder. And his personal rise had been paralleled by a tremendous growth of consciousness among black people during the tumultous decade of the '60s, when the United States did the incredible in reaching the moon; while their society went to the brink of anarchy, the flames of revolt caught in the ghettos, and the inner cities began to burn.

But somehow the country had survived, the fires had simmered down to a sustained glow, and the space program had lost its former glory. Now it launched

an occasional scientific planetary explorer and a vast number of commercial satellites whose owners paid the bills. But Jones's dislike for the overpaid space workers had never faded, though he only thought about it upon returning home.

The NASA representative finished, having added nothing new to what Jones knew, and he tried to concentrate on the next speaker. This was the Air Force general representing the Strategic Air Command, a two-star who seemed to feel nervous at being here. He gave a brief recital of SAC weapons capable of reaching geosynchronous orbit. Jones learned to his surprise that the old Minuteman and new MX missiles could be used only for sub-orbital "lobs" across the oceans, and were virtually useless here. But in approximately eighty hours the Air Force could prepare one Titan-Centaur and one Titan 34-H at the Cape, and one space shuttle with a Centaur upper stage at Vandenberg, for simultaneous launches. In anticipation that the president would give the go-ahead, all three hydrogen warheads had already been loaded aboard and countdown preparations were underway. The general carefully emphasized the point that the launches could be stopped on a minute's notice, but could only occur after extensive preparations.

So a variation of the three-warhead attack becomes possible after all! The thought sent a cold fear spreading out from the pit of Jones's stomach. *And that's what they're going to recommend, and the president will do it!*

Jones glanced along the table at the grim, intent faces of men charged with saving their snug little world, and couldn't blame them. Billions dead of cold or hunger, the ferocious battles for the warm belts in Africa and South America, the abrupt descent into savagery and total anarchy when civilization failed besides, men had always been fighters, holders of territory who unquestioningly defended their boundaries.

But Jones still felt that attacking the aliens was a suicidal move.

There was only one more report and a little discussion before General Iverson held up a quieting hand, looking around the table. The Air Force had presented the only specific plan of action. Their choices seemed limited to leaving the aliens alone and hoping they would stop their activity before much longer—or to attack.

And the president, an ex-military woman and a born fighter, would almost certainly use this task force recommendation to back up her own inclination to launch the warheads.

The bright, eager face of Naomi appeared in Jones's mind, and he saw death and destruction flaming down out of the depths of space, to end her young life he saw a raccoon snarling defiance, and something clicked into place and he was on his feet, demanding the floor.

Jones saw an angry expression flit briefly across General Iverson's lean face, but he ignored it. They had at least to listen to him.

Jones stood silent a moment, the only member to have risen to speak, trying to marshall his arguments. In his mind he saw the raccoon whirling to confront the onrushing light and noise, hair raised, mouth open, ready to fight.

"I killed a wild animal as I was driving out of KSC last night," he began slowly, and saw the somewhat amazed looks of interest at this unexpected opening. He went on to tell them of the raccoon's defiant stand, of his slowness in reaching for the brake, the fighting instinct that had carried the brave animal to its death. "I was raised on Merritt Island. I hunted 'coons there as a boy. My father kept four dogs around the house. There's nothing quite like the baying of a hound when he has an animal treed—a lovely sound."

Jones saw that he had started to lose his audience. But it was necessary that they understand the fundamental point he was making, that animals reacted as their instincts dictated—and mankind had to rise above that primitiveness here.

"My point is that I think we're starting to react to imagined attack just like that raccoon," he said earnestly, looking around the table. "We're showing our teeth, taking a stand and rearing back to fight. And the assessment of State agrees with that of the CIA: that we'll be overwhelmed by a force so superior we don't even know how it functions, so powerful it can hurl us aside, crushed and dying. I think an attack will be writing our own death warrant."

"What would you do, then?" demanded General Iverson, a controlled anger in his voice. "Will you wait and let them shade our world with a cloud we have no way of removing? That's a big ship!" His voice rose slightly. "The CIA estimates agree with our own in regard to quantities needed to push such a mass. If they were quite low, which seems only logical, we're talking here of a minimum of two more weeks of that vapor pouring into orbit. That means it isn't just our children's future at stake here. Most of us will live to see those glaciers sliding down from the northlands."

"Oh, I quite agree; we have to stop them. But your way won't do it. I have a better suggestion." Jones looked around the table once more to gather his thoughts, wondering what these men of decision would think if they knew his idea for saving the world had come from an imaginative thirteen-year-old black girl, of sheltered upbringing.

"I propose we inform the aliens we are going to attack them unless they

accede to our demand," Jones went on, lifting his voice slightly. "And that one demand is that they start returning the water that's now emerging from their ship as vapor, in a second column descending into the ocean. If their antigravity device allows them to control and lift the water, surely they can return it the same way. This may create considerable havoc in the Atlantic coastal regions, but our world can survive that."

Jones saw at once that he had gotten their interest. As the silent men were thinking through the implications, the beefy young CIA man suddenly spoke, without waiting for recognition. "You know, we really think the aliens haven't answered us because they don't want to be bothered. Like ignoring the squirrels in the tree you're stripping of pecans. Do we respond to their jabbering and squeaking?"

"Because there's nothing those squirrels can do to hurt us?" asked the SAC general. There was a deep-seated anger and frustration in his voice. "But if the squirrels actually threaten to attack us "

"I recommend we let the launch preparations continue at full speed," said Jones, "but tell the president we're going to make a final effort to contact the aliens and ask them to send the water back down. And let the message we send up inform the invaders we intend to attack unless they accede to our very reasonable request. Maybe we can at least get their attention."

Jones and the other task force members who were not totally exhausted were in the mission operations room at Patrick when the new message was transmitted. It replaced one that had been in effect for the past thirty-six hours, simply demanding the aliens stop the waterspout.

The verbal statement, on the same frequencies on which the aliens had originally transmitted, was sent out at five-minute intervals, and would continue until launch time. Jones was convinced they would hear from the hovering interstellar ship fairly quickly, or not at all. The first hour spent waiting in the ops room was the longest of his life. The second was even longer. And he had just started to relax during the third, having difficulty staying awake by then, when the answer came.

"Any hostile action against us will result in retaliation of a type you are not prepared to endure." The remote but now almost human-sounding voice filled the room with jarring abruptness. "We strongly advise against sending any form of force to attack our ship."

Jones felt suddenly sick to the stomach; the walls wavering as dizziness hit him like a physical blow. Their last real hope was gone: the missiles would be launched regardless of the threat, and the aliens would respond in dreadful kind. He remembered one of the oldest axioms of his trade, the code by which diplomats lived: *War is the last resort of the incompetent negotiator.* It had come down to that, and his failure to reach an agreement here might be the last negotiation conducted by mankind for untold millennia. *Again he had a vision of fire raining out of the sky, and the sad face of Naomi lifted to receive it. Around her the world burned.*

"It has taken some time to evaluate

your request," the distant voice resumed. "We will require another nine of your hours to prepare the equipment to return the water to the ocean in a second column. We regret any disruption this has caused to your world and people."

There was a collective sigh throughout the small and somewhat crowded room. Jones felt that he would have fallen if not for the support of his hard-backed chair.

General Iverson rose from his seat near the front and looked back at the senior diplomat. His taut face slowly crinkled into a boyish grin of respect and triumph. But all he said was, "I'll call the president."

"I understand that descending column of water is digging out a giant hole in the bottom of the Atlantic," Mildred said, gazing out the plane window. True to their estimate, the aliens had suddenly started the second column of water descending just before midnight the previous day, and it had hit the Atlantic about six in the morning. The Joneses were on a 4 P.M. flight back to Washington.

"Yes, and creating some flooding in the closest coastal areas of South America." Jones was waiting for the plane to stop climbing so that his stomach could settle down again. "But the damage is relatively minor. Now that they are talking with us, the aliens have admitted they intend to keep the columns flowing for another three weeks. We'd have had a snowball for a world in ten years, and the devastation caused by the extremes of weather would have ruined us even sooner."

Naomi was sitting quietly in the row of seats ahead, watching the ground fall away. She had said very little about supplying her father with the idea that had saved the world, accepting the fact it had worked almost as a matter of course, as something not of great importance.

"And some of us got more credit out of the experience than we deserve, and some less," Jones added, glancing ahead at his daughter. He had been assured by a presidential assistant that he stood an excellent chance of becoming the first black Secretary of State, if the incumbent retired after recovering from the serious heart attack he had suffered in the War Room yesterday.

Mildren gave him a troubled look. "You aren't getting one bit more credit than you deserve, my darling."

But Jones was thinking of coon hunting as a boy, of baying hounds, and of wisdom learned from listening to bright children. The aliens, apparently quite friendly now that they had decided to speak with humanity, had offered to leave an interstellar beacon capable of being heard by any ship passing within about six lightyears of Earth. There would be more contacts in the future. And the beacon would be sent to Earth on an antigravity platform, which they could also keep.

Jones heaved a long sigh that he kept internal, and tried to rise above the prejudices and experiences of his youth. He promised himself that tomorrow he would ask the president to appoint him to the National Space Future Objectives Advisory Council. It was again time that he learned to see matters from another point of view. ■

The Alternate View

TO ESTABLISH JUSTICE

Jerry Pournelle

The administration of justice is the major justification for the existence of government. "To secure these rights, Governments are instituted among Men," says the Declaration of Independence; the rights in question are life, liberty, and property.

Of the fifty-five who met in Philadelphia that grand summer of 1787, the practice of law was the chief source of income for fifteen. Another dozen were qualified lawyers, but earned their livings as planters or state officials. Thus a majority, or nearly that, had been called to the bar. This tradition of the prominence of lawyers in our governing institutions has continued ever since.

In fact, in the history of the United States there appears to have been no major legislative body—Congress or state legislature—that did not contain a majority of lawyers. In addition, almost every political chief executive—city mayor, state governor, U.S. president—has a counsel (and many are themselves lawyers). The counsel is traditionally a high official, often the second highest official in the executive establishment; and every state as well as the national government has an attorney general.

The judicial branch is completely directed by those qualified to practice law.

The legal profession is not under-represented in our governing bodies. Yet, curiously, according to a recent poll taken by ABC Television, most U.S. citizens do NOT believe that we have achieved the constitutional intent to establish justice.

I look at random at today's papers. In Los Angeles an interminable trial involving the estate of Groucho Marx continues, week after week. Whatever is decided in the trial is irrelevant: both sides have served notice that they will appeal if they lose. One would have to be a fool to bet that this will be settled within the next year.

In one of the desert counties the county treasurer is in jail. He hasn't committed any crime. A crime was committed in Los Angeles County. A man alleged to be guilty of the armed robbery was arrested in the desert. Through legal manipulations I do not profess to understand, the public defender—a lawyer paid by county taxes—secured a ruling that the desert county must provide two Los Angeles legal specialists to assist in the preliminary defense. The county pleads that it has not the money. The supervisors refuse to appropriate the twenty grand. The treasurer refuses to spend county funds without an appropriation. The judge sends him to jail for contempt. He's been there a week.

There will, of course, be an appeal.

In today's *Wall Street Journal* I note that the state of Connecticut, back in 1981, adopted a law allowing the state

to "intercept" government payments destined for parents delinquent in their payments of child support. However, a class action suit was filed, and U.S. Judge Burns holds that constitutional rights have been violated, and certainly the state can't seize "earned-income credits" "refundable" to low-income taxpayers.

There will, of course, be an appeal.

In Northern California one county is considering political suicide: the costs of some highly publicized trials, trials, and retrials have exceeded the total county budget, and there doesn't seem to be any way they can possibly get the money required to hold another round of trials.

Los Angeles County spent several million dollars to try Sirhan B. Sirhan. There didn't seem to be an awful lot of room for doubt about the issues, Sirhan having been caught with the smoking gun in his hand (both gun and hand being pinned under the ample foot of Roosevelt Greer).

Millions more were consumed in the trials of the Manson Family. Juan Corona was tried for the murder of more than a dozen transients, then granted a new trial on the grounds that his counsel in the first trial was incompetent. The appeals court didn't really examine the question of guilt or innocence. Corona was tried again, and convicted, at an expense of two million dollars.

In Italy an American general was kidnapped. Not long afterwards, the president of the United States was shot. In less than a year Italy had located the American officer, rescued him, captured those responsible for the kidnapping, tried them, sentenced them, heard their appeals, and sent them off to the hoosegow. In the same period, the United States had not yet been able to bring to trial the man who shot the president in full view of the TV cameras.

These are the big horror stories. The small ones are in many ways worse. For example, a good friend's house burned down several years ago. It was insured. Even so, last time I asked, the insurance company hadn't paid off. It wasn't that they weren't supposed to. They even admitted as much. It's just that they know they can delay any trial for years and years, so they feel justified in offering to settle out of court for considerably less than they owe.

This is, apparently, done all the time. It's just good business practice. Justice delayed is justice denied, says the legal maxim; what we have done is to institutionalize the denial of justice. Nor is it a new situation brought on by the rapid expanse of population; Woodrow Wilson, while still a professor of political science, said that delays had effectively denied use of the courts to tens of millions of American citizens.

In 1919 a Carnegie Foundation report said, "The delays which mar the administration of justice originate in and are made possible by our faulty court organization they can be abolished whenever we so will it."

A 1934 report by the Commission on the Administration of Justice in New York State noted "there is unwarranted delay in nearly every court in the state. Commencement of unfounded litigation and the interposition of unfounded defenses are alike stimulated and made profitable by the delays. Our method of procedure leaves the conduct of litiga-

tion almost entirely to the counsel for the two litigants. Our administration of justice has proceeded on the theory that what they do to each other is of little concern to the state or to any other third party."

The situation is worse now, although few doubt that the public pays for these trials by combat and consequent lengthy delays.

The Chief Justice of the United States has recently asked for more judges, and for judicial reform. We all know that nothing will happen. Every chief justice in history has made similar requests, with the same outcome.

Even if there were legal reform, we would have the same sad spectacle: state-paid groups of lawyers would challenge other tax-paid lawyers, arguing before still more tax-paid lawyers (called judges) over the legality of the reforms! Although all three branches of the government are dominated by lawyers, and certainly do not lack for legal advice, we are apparently not able to settle *anything* until a vast body of legal harpies has been paid off.

Periodically the proposition is put forth that what is needed is still more tax-paid employment for lawyers; that if we had enough judges, we wouldn't have the mess we're in.

There are more *state* judges in California (population 23 million) than in all of England and Wales (population 56 million). In England the average delay between apprehension of a criminal and final disposition of the case, including trial and all appeals, is a few months. We can't even select a jury within that time; and once all the state appeals have been made, we can start up the federal ladder. At each stage will be lawyers: for the defense (possibly tax-paid), for the state (certainly tax-paid), and on the bench (also tax-paid).

Every authority admits that our prison system is a failure. Too many criminals are crowded too close together, at too great an expense. Meanwhile, it is argued that the "infra-structure" of America is deteriorating. There is no money to fix bridges, fill potholes, built fire breaks and roads.

It's obvious that the prison system could be used to do much of the necessary work. One might even try an experiment: let the convict earn money to be paid in restitution to the victims of the crime. Allow the convict to work off part of the sentence through restitution.

Certainly work is itself not objectionable, and if the social sciences have discovered anything useful about "rehabilitation," it is that work habits are useful; that people accustomed to doing no work are unlikely to work for a living, while those who have developed good work habits are more likely to find and keep jobs.

It would be no great trick to set up self-supporting prison centers. If German and Italian prisoners of war could do farm work—and they did, under contract to local farmers—something of the sort can be devised now. Prisons need not be revolving doors through which, for lack of room, someone must be released each time a new convict is incarcerated.

It would be no great trick—except that we all know it isn't going to happen. Even if the legislature were to adopt

such laws, or if they were enacted through the initiative, they would never go into effect. Instead, there would be an interminable series of trials, in which teams of tax-paid lawyers would argue before more tax-paid lawyers

Another problem with the legal system is that it steadfastly refuses to make use of modern technology. Charles Beardsley, formerly president of the California Bar Association, said, "There has been no substantial improvement in the administration of justice for many generations. Lord Coke (Chief Justice of England under James I) died 296 years ago; but if he came back to Cook County (Chicago) today and went into one of your trial courts, he would feel very much at home. He probably would not know whether the lines of the pleadings, or the pages, must be numbered; but, outside of such minor details, he would fit very readily into the practice of the law. But, if he left the court house and saw an automobile parked at the curb, he would not know which end to hitch the ox team to. And the situation would be the same with every other instrumentality that is serving the public today. All would be unfamiliar to Lord Coke, all except the administration of justice."

Alas, those words were written in 1930. The situation hasn't changed.

In the United States there is one lawyer for every 400 citizens. England and Canada make do with a third that many, and if in England you count only those entitled actually to plead in court (barristers), a tenth as many. This may or may not be relevant. What is certain is that filling the state and federal legislatures with lawyers, creating legal aid foundations, eliminating the "lay" justice and magistrate courts in favor of "professional" courts staffed by tax-paid lawyers, and in general following the dictates of the legal profession which dominates our government has not produced anything we could be induced to call justice while actually sober.

The diagnosis is easy. The cure is not. Commission after commission, study group after study group, all have come to the same conclusions: we must pay more attention to justice, and less to the "rights of lawyers." The purpose of a trial is to discover truth, not to demonstrate the ability of counsel. The "adversary" system, derived at bottom from the old Norman concept of trial by combat (May God grant the right!) has proven itself as absurd in practice as it is contrived in theory.

President Hoover was vehemently unhappy about the failure of American justice. He appointed a commission to look into the problem. It consisted of ten lawyers and one educator.

Will Rogers's analysis of the situation could have been made yesterday: "Hoover appoints ten lawyers and one woman. Well, it is up to the lone woman to do something. I can think of nothing that the public would have less confidence in than ten lawyers put together. It looks as if he would have appointed one fellow with just horse sense."

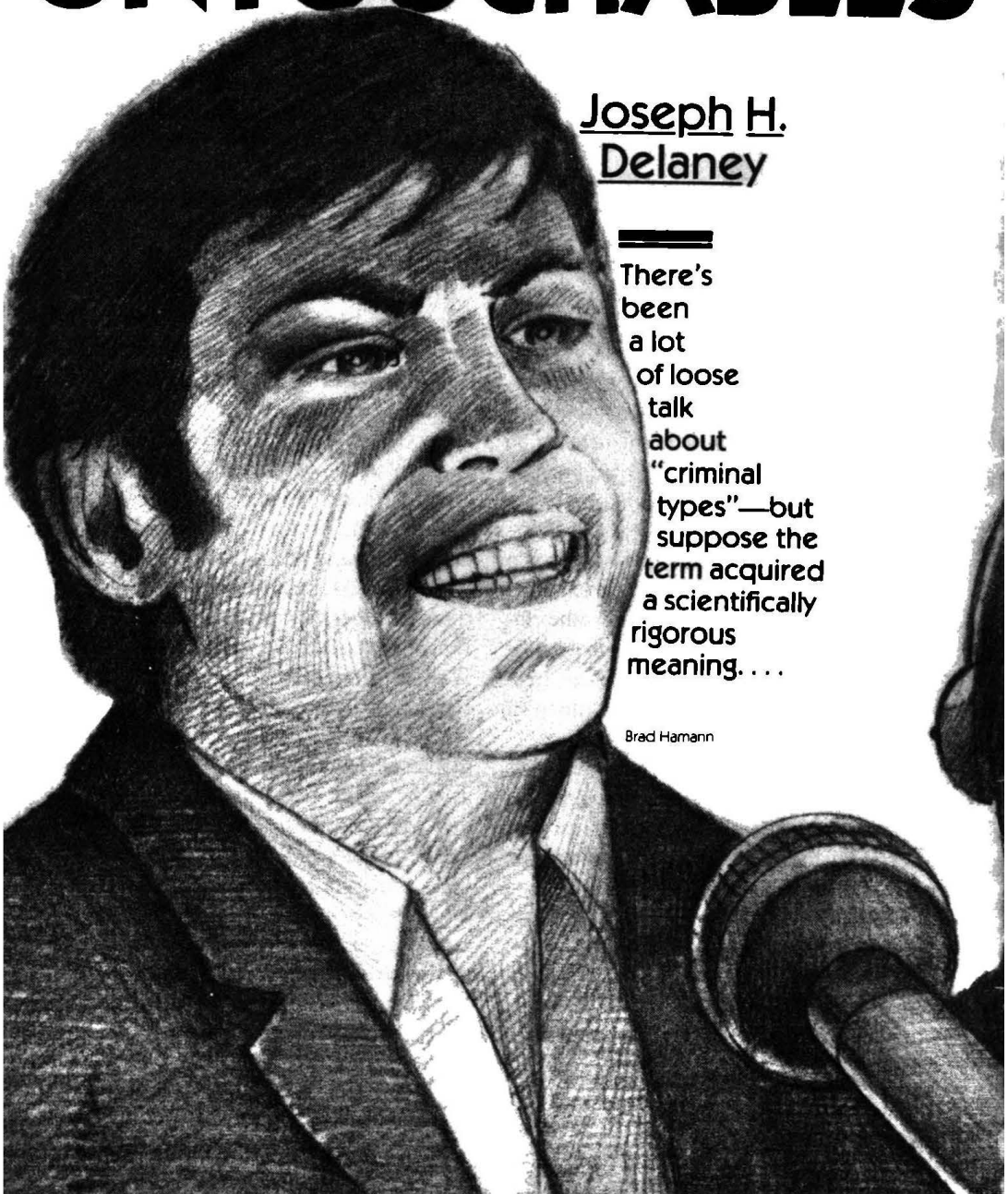
The social scientists and the lawyers have utterly failed to establish justice. Shouldn't we consider taking the monopolies—all of them, including judgeships—away from them for starters? Why not turn the justice system over to engineers? Surely they couldn't make things worse? ■

Part One of Two

THE NEW UNTOUCHABLES

Joseph H. Delaney

There's been a lot of loose talk about "criminal types"—but suppose the term acquired a scientifically rigorous meaning. . . .



Brad Hamann

Justin Sudano, wearing baggy white coveralls emblazoned in red embroidery with the words *Capitol Antenna & Electronics*, watched without emotion as Secret Service agents pawed through his tool kit and probed the cardboard carton of "parts" on his two-wheeled dolly.

He was nervous—sweating profusely and his heart was palpitating—but he kept as calm a face as he could.

A nod from the agent nearest him took him through the metal detector, which beeped and flashed a red light. As sheepishly as he could, he stepped back, slipped off his shoes, and re-entered. "Steel safety toes," he explained.

Looking relieved, the agents passed him and placed him in charge of a butler, who led him to the attic stairway.

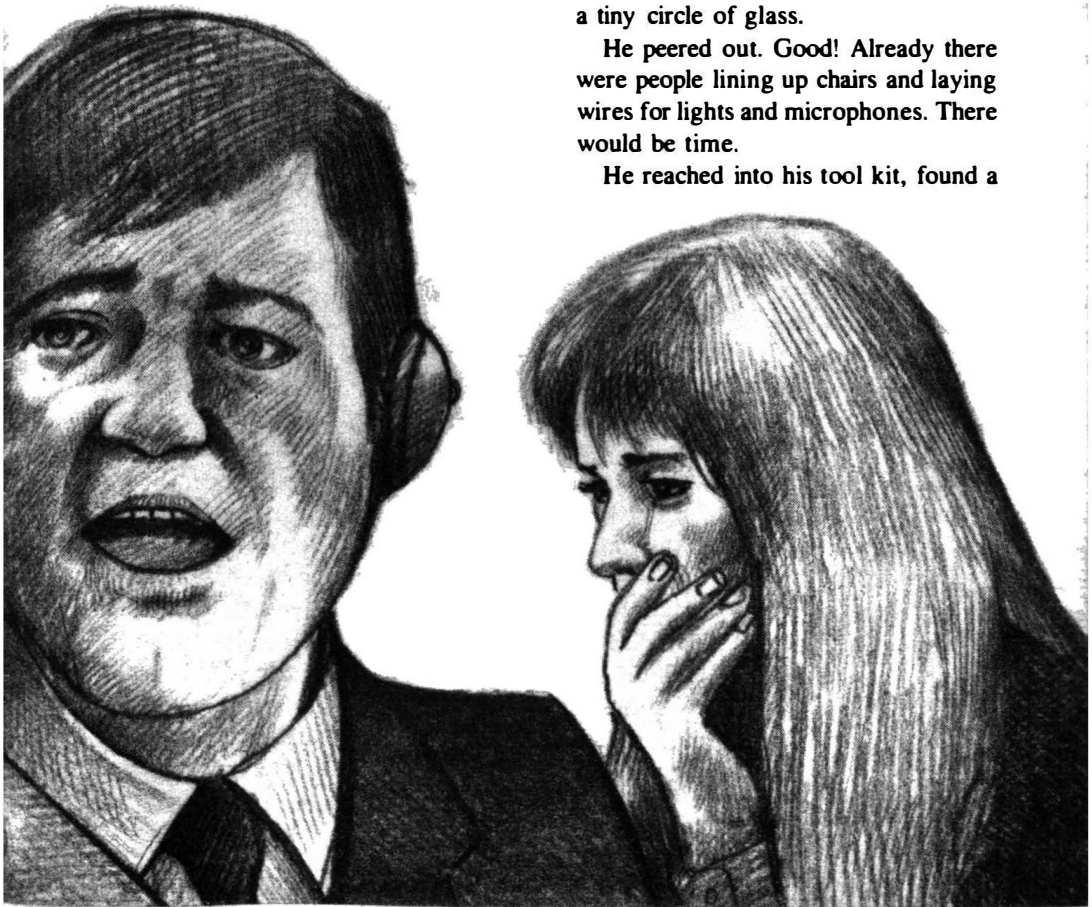
Sudano saw no sense whatever in hauling his paraphernalia up those steps, so he didn't. What little he needed could be deftly removed in seconds from the carton. He plunged his hand inside it and jerked out three filmy plastic sacks connected by a string, slung them around his neck, and raced up the stairs.

The attic was huge and crammed with articles of furniture, trunks full of old pictures, ancient dishes, linens, and cobwebs. Sudano clawed his way through these to a window high on the south wall, which he reached by pushing an old oaken table beneath it.

Springing up, he brushed away still more cobwebs and rubbed the grime off a tiny circle of glass.

He peered out. Good! Already there were people lining up chairs and laying wires for lights and microphones. There would be time.

He reached into his tool kit, found a



large, flat screwdriver, and began prying the moulding from the casement which held the glass. When he had the sides and bottom free he slid the pane out and set it carefully down on the table.

He ripped open the first bag. From it he took blocks of oddly shaped plastic, some threaded, some with tongue and groove. Others were rabbeted and bored for pins. Under his flying fingers an aggregation of blocks and pins became a curiously curved shape, parts of it molded into the precise configuration of Sudano's fingers.

There was more in the next bag: springy slats of epoxy-coated boron fiber in graduated lengths which, when bound together with custom-fitted shackles, became one solid piece half again as long as Sudano's arm.

He slid this deftly into its place within a slot perpendicular to the end of his first construction.

Next he took the measured length of dacron rope whose ends looped thickly, bound with dacron thread which had cost Sudano much blood and no little pain in their winding.

Into each loop, straining mightily to bend them, he slipped each tip of the shackled laminate, and it became the bow it was meant to be.

Now he was ready—almost. Two plugs, one at each end of the plastic stock, slid into holes bored to receive them and became pre-ranged sights.

From the third bag he took a hinged object. Its long arm ended in a hook; a short arm formed a grooved block. This he placed on top of the front slot. Then, positioning the block in front of the rope, he braced the mechanism on his knee and pulled. The rope slid back and there was a click, after which Sudano removed the hinged object and put the two down, side by side, on the table.

One more thing. He reached into the third bag; took from it a smaller bag closed by a drawstring. Opening this, he slid forth a finger-thick plastic tube the length of his forearm. Into one hollow end he inserted a clear plastic, cone-shaped object whose shaft was turned to fit the bore of the tube. The tube was thus tipped with a needle point. On the other end he slipped a fabric sleeve.

There was a groove atop his construct, into which the tube-object fit, held in place by a springy finger of plastic, which gripped its blunt end lightly.

Now Sudano was ready. He stood, unzipped the coveralls, and stepped out of them. The light gray suit he wore underneath was missing only a tie, which he now drew from his pocket and leisurely donned, taking great pains to get a balanced knot.

He waited patiently until the music started. When the band struck up "Hail to the Chief" the last note would find him poised and resolute, and when the sound of that note died, so would the 43rd president of the United States.

Clifton Chadwick shivered, gave his shoulders a shrug to hitch the collar of his camelshair coat farther up around his neck. In the failing autumn sunlight a misty rain had started to fall, some of which found its way under the overhang of the porch where he stood, waiting for someone to acknowledge his presence.

Perhaps, he thought, the bell was out of order. He raised his hand to knock, but at that instant a light went on in the foyer and a figure could be seen ap-

proaching. Then a rattle of a key in the lock, and the door opened.

"Dr. Nelson Alban?"

"Yes."

"I'm Clifton Chadwick. We talked on the telephone this morning."

"Yes. Well, come in. I really wasn't expecting you until tomorrow morning and my housekeeper's out. I'm afraid I wasn't paying much attention to the doorbell."

Chadwick entered and waited while Alban relocked the door.

"We can hang that coat here, Mr. Chadwick," Alban said, grabbing a hanger from the rack near the inner door and holding out his hand. "You must be used to better weather than this."

"It doesn't get cold quite this early where I live, Doctor."

"Well, actually, I'm not all that fond of the climate myself, but the location suits my work. There's a federal maximum security facility within fifty miles and two state correctional centers within seventy miles. Scithersville is located conveniently in the middle."

Chadwick surrendered his coat to Alban, who promptly hung it up.

"Let's go back to my study, Mr. Chadwick. I've got a fire going, and there's a bottle of pretty good sherry waiting to be uncorked. It's this way."

In a few moments Chadwick was comfortably seated in an armchair in front of the fireplace, sipping the smooth, dark liquid. It was good. Alban's taste in wines, it seemed, was excellent. And Chadwick used the time he'd been here to good advantage; to size Alban up and evaluate his potential as an expert witness. That evaluation, so far, was promising.

Alban appeared to be in his fifties. His black hair was short, combed conservatively back, and without a trace of gray. He was of medium height; not fat, not skinny. He wore horn-rimmed glasses and was dressed in casual though conservative clothes, and his speech and manner were those of a mature, settled professional.

He was, in short, a completely ordinary-looking individual; and not, as Chadwick had feared from reading his rather radical-sounding book, a crackpot type.

"Tell me, Doctor, have you ever been a witness in a criminal case before?"

"Oh yes. Many times. I'm called quite frequently to testify, usually at parole hearings. My work naturally takes me into contact with hundreds of convicts. Sometimes I testify at their request; sometimes the prosecutors call on me."

"That's going to be helpful, but what I really had in mind was the trials of new cases, actual cases. You know: guilt or innocence, and punishment."

"I've done that too, though naturally not as frequently. But I thought you said you didn't want a professional witness."

"I don't. Especially not for this case. But then, what brought me here in the first place was your book, and it's the book that makes you different from the usual expert witness."

Alban took a sip from his glass, then said cautiously, "You're trying to decide whether the hypothesis *and* the man can stand the strain, is that it?"

"You said it, Doc. This is not an ordinary case. It's an attempted assas-

sination of the president of the United States, in his own front yard, by an assailant who immediately afterwards blabbed his head off to the news media and still claims to be one hundred percent sane."

"They're all sane—before and after, that is. It's only *during* that they claim to have lost control. You're certainly no stranger to that sort of thinking."

"True. But Justin Sudano's different in that respect, too. He's in it for the glory, the immortality such an act confers. He wants his name in the history books. But—he's not your typical wacko; he's calm, cool, collected, *and* bright. Ver-ry bright."

"So I gather. But then, many criminals are bright, and some are every bit as resourceful as Sudano was. His choice of weapons was particularly clever, I thought."

"The arbalest? Yes it was, wasn't it? You know, that was his own design. It went together like a jigsaw puzzle. He took it right past the Secret Service, knocked down, and assembled it later. It was made of epoxy-bound boron fiber—not a bit of metal in it. Very powerful, very silent, and uncommonly deadly. Quite ingenious, really, but—that aggravates my problem. His planning was so thorough, the prosecution won't have a bit of trouble with the premeditation issue; and because he is so bright, it's harder to sell a jury on an insanity defense."

"We don't use that term in medicine, Mr. Chadwick. It's not a medical word, anyway; it's a legal term. And there are lots of manifestations of mental illness, any one of which might have robbed your client of his reason at a critical time. However, I'm sure you have something to equal the weapon's novelty in mind."

"Yes. The reason I'm here is to solicit your assistance in my client's behalf. The fact that you'll have an opportunity to test your hypothesis in a court of law is "

"It's not an hypothesis. I have data: hard data, from almost 6,000 case histories. Everything's documented, and every case has been subjected to statistical analysis by outside experts. My position is as solidly founded as any actuarial table. It'll stand scrutiny. I thought you said you'd read my book."

"I did, though I must admit to less than perfect comprehension. But if I understood it completely I wouldn't need to be here." Chadwick made himself a mental note to be more careful. The doctor seemed to be quite touchy about his work.

"The theory's the simple part, Mr. Chadwick. I laid it all out in the first two chapters of the book. The hard part's collecting the data. But if your question's what I think it is—can I tell you whether or not Justin Sudano's nuts—the answer's yes."

"Just like that?"

"Just like that."

"Okay, so where do we start?"

"Well, first I'll have to examine him."

"He's at Fort Meade. How soon can you leave?"

"Not so fast, Mr. Chadwick. I'm not talking about a rap session between patient and shrink. I mean a really thorough physical examination, the kind I do here."

Chadwick looked around the room.

The old house was big, and somewhere inside it he imagined there was some sort of lab. And, from the sound of things, Alban must have a dilly. "I can get court order for an exam easy, if the prosecution won't agree to it, which I know they will; but bringing him here's a tall order. I don't know "

"How about Bethesda? Could you arrange that?"

"Sure, but what about your equipment?"

"I'll use an interface to get into it from wherever I am. I have a diagnostic computer here; part of a grant from the Blatchley Institute. I'm sure the Navy's got something comparable. Hopkins probably does too, but Bethesda's closer. Anyway, as long as I'm there to supervise it'll be okay."

"Where's your phone, Doc? I'll set it up right now.

Alban was poised for the next question. He sat in the witness chair, holding the printout of the results of Sudano's exam in both hands.

He looked around the courtroom. At the defense table Sudano was slouched in his seat. He seemed to be indifferent to what was going on around him. Chadwick sat beside Sudano, making notes. He wasn't lead counsel in the defense case; J. Walter Hamilton was. Hamilton was taking Alban on direct, and having just laid the qualifying predicate, winked at Alban to signal that from now on the questions would be substantive.

"Now, Dr. Alban, you've testified that for the last nineteen years you've conducted scientific research into the medical causes of criminal conduct; is that correct?"

"Yes sir."

"Specifically, what types of causes have you investigated?"

Alban cleared his throat. "Well, my research has dealt principally with metabolic causes; tendencies which are inborn, so to speak—or if you want to be very, very technical, chemical."

"Are you saying your research wasn't psychiatrically oriented?"

"Psychiatry figured into it, but no it wasn't. I've explored the physical reasons for the psychiatric manifestations of mental illness. The traditional approach has been environmental."

"What do you mean by that?"

"The old explanation of mental illness was that the symptoms were produced, in most instances, by purely functional means; that stresses in the patient's surroundings caused the behavioral abnormalities. And, it was thought, the symptoms could be relieved in certain cases by exploring the stress areas by means of psychoanalysis. That was the basic Freudian philosophy: to get at suppressed thoughts, to bring conflicts to the patient's conscious attention so that he could deal with them."

"Doctor, would you explain to the jury the basic theory you applied in your testing of the defendant, Justin Sudano."

"Yes, of course. Some background information will be necessary, though."

"You may include it," Hamilton replied with an eye on his opponent, mindful that this sort of thing usually led to objections.

"As I said, research started nineteen years ago. I became interested in the behavior of a set of twin brothers, John

and Donald Boyle. At the time they were both in the Illinois Correctional facility at Menard, where they met for the first time, having been separated from each other in infancy. Each had been ignorant of the existence of his twin before that time.

"The thing that was unusual about them was the basic identity of their crimes. Each had a wife. Each killed her at nearly the same time, and each used an ax. Upon closer investigation I learned that each had a history of mental illness, and from the records I discovered an uncanny similarity in their respective psychiatric histories. It was as though they were one person.

"These coincidences were so remarkable that I suspected a genetic connection, so I began the investigation with a genetic scan, computer-enhanced, of course. But I found nothing to explain the effect in that relatively gross examination, so I went on to selected samples of individual cells, gathered from all parts of the body. Using what was then the most sophisticated analytical equipment, I scanned for trace chemicals . "

"Just tell the jury what the results were."

"Yes sir. Studies showed that in both cases the test subject's body produced an unusual enzyme not commonly found in the systems of the general population."

"What is the significance of this finding, Doctor?"

"The significance has to do with the so-called 'blood-brain barrier.' "

"Please explain what that is."

"O.K. Again, some background information will be required."

He paused and gazed at Hamilton for an instant. Meeting no objection, he continued. "The blood-brain barrier results from certain differences in the structure of the capillaries of the brain, which furnish its blood supply, from those elsewhere in the body. In the brain's capillaries the cell walls are joined far more tightly.

"The reason is that, besides carrying oxygen and nutrients, the human bloodstream is a sort of cloaca maxima; in other words, it's the body's sewage system. Everything goes into it; body wastes of all kinds use it for transport.

"Brain cells, or neurons as we call them, are the prima donnas of human tissue: real snobs, and delicate ones at that. Where the rest of the body's cells have learned to live with garbage and ignore it, brain cells simply die when exposed to it.

"So, in deference to the royal whim, the body evolved a way to keep the brain's environment pure.

"Brain capillary walls are so constructed that they will normally admit only glucose and oxygen, plus selected large-molecule substances which the brain needs, such as fatty lipids. In the case of the larger molecules the barrier cells respond to a type of molecular programming which opens them, but they slam shut again as soon as the desired material is past.

"Thus the brain isolates itself from things the blood normally carries to the rest of the body. When the barrier works as it's supposed to, it means a healthy brain. But the barrier works from both sides, and this means that once some harmful substance does manage to get inside you have a devil of a time getting

it out, because the barrier is so effective it even excludes the body's antigens. In other words, the immune system doesn't protect the brain from enemies.

"Nor is it easy for medicine to help. Large-moleculed drugs, such as penicillin, can't make it; and that means brain infections are almost impossible to treat.

"There are ways, however, and I digress only because it is important to the understanding of the enzyme to do so. There is the so-called 'Trojan Horse' effect. This is a mechanism by which the barrier can be breached. The brain can be fooled if the antigen or other harmful substance attaches to other things the brain wants, such as salts and the fats I mentioned earlier. One of the principal exponents of this system is L-Dopa, which is highly useful in treating Parkinson's syndrome. Science suspects that some microorganisms have learned this technique and enter this way, and that some of them are responsible for a wide range of important brain problems.

"At first I thought this was the way the enzyme entered. I was wrong. Subsequent studies showed that there is another way. What the enzyme really does is stimulate the body to concentrate sugars in the area of the barrier. This concentration causes the barrier cells to shrink in size, and the interstices become correspondingly larger. The enzyme then enters—accompanied by some other substance as yet unidentified. We don't know what it is, but we know what it does: it drastically inhibits the brain's power to exercise judgment; it produces mental aberration. We suspect it is a trace substance of extreme potency, something with effects comparable to LSD-25."

Hamilton had waited patiently for the end of the dissertation. Now he was ready for the next question. "How many detailed case studies have you made in which you tested convicts for the presence of the enzyme, Doctor?"

"Slightly more than 2,500."

"How many were positive for the presence of the enzyme to which you have referred in your testimony?"

"All but fourteen."

"Were these fourteen unusual in any way, Doctor?"

"Yes. They were all innocent; justice had miscarried. In four cases other individuals later confessed to the commission of the crimes for which these individuals had been incarcerated. Eight others proved to be cases of mistaken identity; of identification so shaky that appellate courts reversed their convictions. In one case the prosecuting witness later admitted she lied in her claim that she'd been raped, and had actually consented. In another case, new evidence established that the accused had been in South America at the precise time the crime was committed."

"How many subjects did you test from outside the prison population, Dr. Alban?"

"I myself tested over 1,500. Other researchers participating in the program tested a total of 3,800 more."

"Now, you have collated the test results, have you not?"

"Yes, I have."

"Were you able to determine how many subjects in the general population, outside of prison, produced the enzyme?"

"Yes, we were. The statistical incidence in the general population is approximately eighty per thousand."

"That is eight percent of the general non-institutionalized population?"

"Yes, that's right."

"How does this compare with the rate for inmate population?"

"The incidence among prison inmates is over ten times greater, constituting ninety-nine percent of all individuals tested."

"Did you do any follow-up studies on the subjects who were tested in connection with the general population ratio?"

"Yes, I did. Or, I should say, *we* did, since raw data came from everywhere. It was collected on a regional basis by many collaborators."

"Were you able to identify any additional statistical trends?"

"Yes sir. Two of significance."

"Tell the jury what they were."

"Well, first of all, the affected individuals appear more frequently in large population centers. The incidence is more than five times higher in the industrial northeast than in farming or ranching areas. Second, out of those individuals tested in the last eight years and found to produce the enzyme, forty-four percent have since been arrested and charged with crimes, and thirty-two percent of those have been convicted. Out of the total tested, about fifty percent of those producing the enzyme have been arrested or charged at some time or other in their lives, as compared with less than twelve percent of the country's population taken as a whole. In addition to these trends, there appears to be an age plateau, occurring around the fiftieth year. After that age is reached the presence of the enzyme ceases to be statistically important."

"Have any studies been done by you or your associates which establish a correlation between the presence of the enzyme and the classical varieties of mental illness?"

"Yes sir."

"What correlation do these studies show, if any?"

"The incidence of enzyme production among schizophrenics who exhibit paranoid behavior approaches a hundred percent. For other types of mental illness, including other schizoid reactions, the ratio conforms to that of the general population."

"Dr. Alban, did you have occasion, at my request, to examine Justin Sudano, the accused in this case?"

"Yes sir. I examined him on October 19th of this year, at Bethesda Naval Hospital."

"Did your examination disclose whether or not Mr. Sudano's body produces the enzyme which you've just described in your testimony?"

"Yes. Mr. Sudano's body produces it. He tested positive."

"How old was Mr. Sudano at that time?"

"According to my records, he was twenty-six."

"Now, Dr. Alban, I'm going to ask you a question about a hypothetical situation and supply you with stated facts which you must assume to be true. At the end of the question I'll ask you whether or not you have an opinion as to whether or not the person those facts concern had the capability to conform his conduct to the requirements of the

law as it has been stated in the indictment in this case. In forming your opinion you will also take into consideration the results of the test you administered to Mr. Sudano. If you have, by that time, formed an opinion I shall ask you to tell the jury what that opinion is."

Alban waited for the question.

"Please assume, Dr. Alban, that the following facts are true: The hypothetical subject of the question is a caucasian male twenty-six years of age who is a lifelong resident of South Philadelphia.

"Please further assume that he is a high school graduate with an I.Q. of 160; that despite this he is an underachiever, who did not pursue a college curriculum but has technical school training as a communications technician.

"Assume further that the subject is an outspoken person of mildly radical political views.

"Assume further that on the date this crime is alleged to have been committed the individual faked a job order for his employer of seven months and used it to gain access to the White House, ostensibly to repair a micro-dish antenna, which was located in the attic.

"Assume further that he took with him a crossbow of his own design and construction which had taken him months to make, and that he concealed himself in the attic for over three hours, during which time he removed a windowpane from its casement.

"Assume further that upon the appearance of the president at a diplomatic function on the lawn outside, he fired a quarrel from his weapon, which struck and wounded the president.

"Assume further that, not at that time knowing whether the president was living or dead, he immediately sought out the newspeople, and although he was not at that time suspected, made a spontaneous and detailed confession on live TV.

"Assume further that in the course of this confession he made radical and inflammatory statements of his political views, proclaiming himself to be a patriot of the calibre of Nathan Hale and the successor to the wounded president, and that he stated he expected to be sworn into office within the hour.

"Assume further that the individual had no previous history of mental illness, but tested positive for the presence of the enzyme you just described.

"Based on these assumed facts, do you have an opinion as to whether or not that individual would have the capacity to appreciate the wrongfulness of the act or that, if so, he had the capability of conforming his conduct to the requirements of law at the time of the alleged offense?"

"Yes, I do have an opinion."

"Please state your opinion."

"It is my belief, assuming the facts to be as stated in the question, and taking into account the results of my studies with respect to the enzyme, this individual could neither appreciate the wrongfulness of the conduct nor resist the impulse which resulted in the commission of the wrongful conduct."

With a flourish, Hamilton turned from the witness stand. He faced the prosecution table. "Pass the witness," he said.

Winter crept from the scene. It was

followed by a tormented spring, as the country first found itself seized by the significance of the Sudano Decision. And as the Earth moved into summer, the true meaning grew obvious and descended upon the common man, who went into the streets to vent his mounting despair in sweaty protest. Autumn brought calmer days, if only because the initial shock was wearing off, and winter's cold drove his agony indoors where, though it continued to fester, it was unseen.

Clifton Chadwick shivered, and gave his shoulders a shrug to hitch the collar of his camelshair coat farther up around his neck. Snow, falling heavily, had settled on its edges during the short walk from the car, and now tumbled in wet lumps into the space around his shirt collar, where it melted and ran down. He shifted his bag of groceries from right to left hand, pushed the key into the lock, and half fell, half walked into his apartment.

There was a crash, and shards of crockery whizzed by his head. He dropped the sack on the floor, kicking the door shut with his foot, and ducked a water-filled glass vase now hurtling toward him.

"Abbie wha—?"

Crash! The water splashed with the impact, soaking his shoulder. A splinter of glass imbedded itself in his scalp just above his right ear.

Chadwick lunged forward, racing to disarm his roomie, who now held not crockery, but a long pair of heavy scissors, one of the items she'd obviously been packing in the suitcase which lay open on their bed. Half a dozen steps took him across the living room. What had gotten into her?

"Abbie! Abbie! Put it down! I mean it! You're acting crazy. What's wrong?"

He approached her, and she retreated, backing into a closet, scissors grasped resolutely in her right hand. Still not a word of explanation.

Chadwick stopped just out of what he thought was her striking range. Her eyes were red, as though she'd recently done a lot of bawling, and she had a king-sized case of the sniffles. Whatever the trouble was, it looked serious, and it appeared he'd interrupted her in the act of packing. If he'd arrived home at the usual time, she'd no doubt have been gone.

"Get away from me, you creep," she yelled, brandishing the scissors. "Leave me alone! Don't touch me! I'll kill you if you come any closer!"

He didn't come closer. But feeling some progress had been made now that she was talking, he again demanded, "Abbie, what have I done?"

"Don't you know, Big Man? Mr. Big Shot, who beats the system. Aren't you the man who walked Justin Sudano out of court?"

"What are you talking about? Abbie, what's that got to do with us? I left you in that bed this morning with a big smile on your face. What more does it take to satisfy you?"

"I had a job to go with the smile *this morning*, a career with the National Security Agency. Now I'm unemployed and probably unemployable, thanks to you and your bunch."

"Why? How?"

"You still haven't figured it out? I flunked the test, you slob! They gave

all of us the test, and I flunked it. I'm a statistical nut, which means I'm also a security risk and can't be trusted. They fired me just after lunch. The guards stood over me while I cleaned out my desk and then threw me out of the building."

"Abbie! I

Chadwick took a step forward, intending it as a peace gesture, raising his hands to embrace her.

Her rising foot caught him in the groin, and as he doubled up in pain she took the scissors in both hands and plunged their long blades deep into his back. Then she stepped aside, out of the way, and watched him sink slowly to the floor. When at last he moved no more, she withdrew the scissors, wiped them off, stuck them in the suitcase, and finished packing.

Tyree Hosey stood, braced against the chill wind, wishing this assignment was over. He was on the fifth take, tired of grit in his eyes and tired of cold feet. This was not his favorite neighborhood, and he knew the microphone he held in his hand would not make much of a weapon.

Abdul Hibib Watkins, the cameraman, big as he was, shared this feeling, apparently, and he seemed torn between doing his job and the need to keep an eye on their car and equipment. He made a minor adjustment to his camera, then gave Tyree his cue.

Tyree began. "This is a typical day in the South Bronx. Behind me is a building that once was famous as Fort Apache. They don't call it that anymore; they call it the 'Sky Slide.' It's part of the great American 'zeme machine.' All day long, all night long, the police bring in a steady stream of arrestees. They go in that door, up the elevator to the top floor, and then, likely as not, down again and out the service doors on the alley in the back, not into the jail van but back onto the street.

"Those who've made the trip don't even bother to run from the police anymore. Those with positive 'Zemes' know that, on any charge short of murder, armed robbery, or rape, they won't even be booked. The jails don't have the room to do anything with minor offenders, and prosecutors know that since the Sudano assassination trial ended in acquittal for Sudano seven months ago, there is virtually no chance of convicting these individuals. The most they can do is keep them off the streets for a short time.

"And there are more of these people on the streets today than ever before. Not only here in New York, but in Chicago, Los Angeles, Pittsburgh, and every other large American city, since the lure of immunity has overcome the caution some of them once had.

"They have the time to be here too; idle time. Most of them no longer work, since they can't find jobs. Unemployment, always high among the urban minorities, now has a new cause—and, of course, has reached a new high.

"The test for Alban's syndrome is simple. The enzyme can now be detected by an ordinary office blood test, during the most superficial examination. Employers, whom the courts have said are well within their constitutional rights to do so, now insist on physicals whose sole purpose is to identify the individual positives: those unfortunate

people whom modern America has started to call 'The New Untouchables.'

"The result: pandemonium, in places where the norm has been, up until now, merely chaos. The inevitable result would seem to be eventual revolution in America's streets. The world waits and watches, to see what our free society will do to counter what must surely be—to them—inexplicable: the world's most powerful country, frozen with indecision and with anarchy rampant in its streets.

"Anywhere else on Earth the problem would be solved with bayonets and concentration camps. In many it already has been. Alban's syndrome recognizes no national boundaries; it respects neither race nor sex nor status. But here, in our country, it seems the game must be played out to the end, whatever that end may be; and many believe that our society—as it once existed—will end with it.

"This is Tyree Hosey, WBC News, reporting from the 41st Precinct in the South Bronx."

"I don't know why I agreed to see you, Dr. Alban, after what you did."

"I didn't do it, Mr. President; nature did. Someone else would have stumbled onto the connection if I hadn't. And while I'm personally sorry to find you are one of its victims, it doesn't change the fact of the enzyme's existence."

"Alban's syndrome; that's what they call it now. It's quite an honor, I understand, for a doctor to have a disease named after him. Gets him into the history books, doesn't it?"

"Mr. President, let's not beat around the bush. I know you're a positive. I'm not guessing, either; I know."

"Assuming I was, why should I tell anybody, when my own record should be enough by itself to shoot your theory down. I'm sixty-four years old, never spent a day in jail; never even been arrested. You can't tar me with that brush."

"I'm not trying to tar you. After all, I'm a positive too."

"HUH!"

"I said I've got it too, and like you I haven't said anything. And I've got a clean record too, on paper; but that doesn't mean there aren't things in my past I'm ashamed of, or would be if I had the capacity. That's not the point. You and I are probably old enough and well enough insulated from the effects that neither of us constitutes, nor are in, danger. But between the two of us we've put an awful lot of less fortunate people in a desperate bind; close to a quarter of a million of them in this country alone."

"That's not my doing; it's yours. I was simply a victim."

"Of course. I understand that. But you can see what's happening out there. In spite of the fact that there have probably been people like us since the dawn of history, things have now suddenly changed. The test now enables society to identify a particular segment of itself as criminal types—not just statistically, as in the past, but as individuals."

"I've lived with that. Apparently, so have you. If we can, they can."

"So, that's the way it's going to be, is it? You're O.K., I'm O.K., tough buns for the rest of them?"

Kinney didn't respond.

Alban was now on his feet. "Don't you realize what's happened out there? Everybody's getting the test these days, a test which says unequivocally that anybody who shows up positive is a potential crook, maybe a mass murderer, and totally immune to punishment under our judicial system. A test so completely unchallengeable that the United States of America can't punish a man who tried to assassinate its president. Have you got any idea what the average employer does when a positive comes in and asks for a job? Points him out the same door he came in, and as quickly as possible, that's what. And the government's no exception.

"Do you remember Chadwick? Chadwick's dead. His girlfriend killed him, because she blamed him for getting her fired from her job at the N.S.A.

"What do you do with people like that, Mr. President? Can you tell me? Oh, sure, the ones who commit really big crimes you can now lock up in the bughouse in some states—for a while. But what about the rest, the ones who haven't cracked yet and maybe never will, but have the potential; how do you tell an otherwise law-abiding citizen you're punishing him for what he *might do*, someday?"

"What do you expect me to do about it?"

"Come out of the closet, Mr. President. Join with me, use your influence with other prominent secret positives. Let's come out of the bushes together and own up to our positive status, and prove to the world that not all of us are bad. Give the people out there in the streets some hope.

"Face the facts, Mr. President; you're as much to blame for what's happened as I am. In the natural course of medical development all this would have been digested slowly. My book was very controversial, and I wasn't getting all that much mileage out of it before Sudano. Without presidential involvement and a nationwide audience, the thing would never have had the impact it did on the public's mind, and the shock would have been spread out over years. There would have been time to adjust."

"Now wait a minute, Dr. Alban. I wouldn't go that far. I was a simple victim, remember "

"And as I said, I'm aware of that. Still, your special status imposes on you the obligation to do something about it, if for no other reason than that something terrible is going to happen to the country if you don't."

"What do you mean?"

"I mean, if you and I and the rest of the people with influence don't help the victims, then they'll help themselves. It's starting to happen already, and the time to stop it is now, before things get completely out of hand."

"You're talking in riddles, man; explain yourself."

"O.K., I'll make it real plain, Mr. President. Being crazy's not the same as being stupid. You and I are living proof of that. But if we weren't, there's one other statistic that didn't come out at the trial: relative intelligence. The afflicted group is uniformly bright. On the average the I.Q.s measure 125, with many spectacularly higher. You don't push a smart guy around, Mr. President, because a smart guy'll find a way first to push back, and then to get even; that

was true before the discovery of the enzyme. It's still true today.

"Now, these people know about each other and they've got a common cause. What's more, they know that they not only constitute a minority, but a persecuted minority. They can identify with each other, and more importantly they can identify each other. That's a subtle but important distinction.

"So they'll organize. In fact, this has already begun. Any minority that wants power has to organize and concentrate what clout it has. And just like any other human group which finds normal society closed to them, they'll create their own. If employers won't hire them as workers, and states won't license them in professions, and customers won't patronize them as merchants, what's open?

"Crime's open, Mr. President. That's a tailor-made business for the positive because it's low-risk; there's no penalty for getting caught. He's crazy, remember? Medical science says so, and so does the law of the land.

"You think the Mafia's tough and resourceful? Just you wait and see what this bunch can do. Or how about revolution? Do you want that? Well, that's coming, too. The cream rises to the top of the bottle, Mr. President. If crime's the only way a positive can get to the top, that's the route he'll take."

"All right, Dr. Alban. You've made your point."

"Then you'll do it? Good! Believe me, it's the only way."

"I didn't say that, but I'll think about it. I'm not a completely free agent; I have political allies to think about, but I'll consider it. How long will you be in Washington?"

"I'm leaving Friday. I'm at the Mayflower; room 1938."

"O.K., I'll be in touch with you before you leave. Give my secretary the phone number on your way out."

And that, thought Alban, *is a very slick way to end the interview.* He shook the president's hand and left.

As soon as he was alone, Kinney reached into a desk drawer and took out a green phone without a dial. He held the receiver to his ear until he heard a click, then spoke: "Get over here right away—I want to talk to you." Then he hung up.

Nelson Alban felt greatly relieved. He wended his way down the aisle of the 767 to seat A-17, threw his coat into the overhead locker, and sat down to strap in. Then he opened the box the Secret Service man had given him when he picked up his boarding pass. "With the president's compliments," the man had told him.

The package was wrapped in brown paper, and inside was a leather-covered box with the name "Cartier's" embossed in gold. It opened to a blue velvet interior, and inside was a fist-sized case of brushed gold. It was a clock; a travel clock.

He slid the ends back, revealing the time in softly glowing red numerals. Very nice. He closed the case, slipped it back into the box, tucked it under the seat, and forgot about it.

At 9:35 P.M. Eastern Standard Time, forty thousand feet over southern Indiana, the alarm went off.

* * *

The green phone buzzed. Kinney's hand lunged for the drawer, fumbled it open. "Yes"—pause—"No survivors?" —pause—"Tragic; a real shame. Look, now that the immediate danger is over with, we have to get back to business. Alban's case proves we made some mistakes. One mistake was getting rid of all those positives back in the early days. Find them. Retest them if you have to, but put them back to work—for us."

Pause.

"What do you mean, it'll take time? We haven't got time. In sixteen months my term runs out. The Constitution might say two's the limit, but that was for ordinary times. I'm not about to turn power over to *them; they're* out to get me. *They* always have been, but now it's worse. Now get busy."

Kinney slammed the receiver down and slid the drawer shut. He looked at his desk. He liked this desk, and he liked this office. He really liked his job, too. Give it up? The very idea appalled him. Why, he'd have to be crazy to do a fool thing like that.

Tyree Hosey reached one long brown arm up to the dash control and pushed the "Cool" lever as far down as it would go. Then he shot a look of disgust toward the driver.

Dave Herrick shrugged. "It's no use, Tyree. That thing's been dying ever since we left Paducah. Why don't we just shut it off and open the windows?"

"No thanks, Dave. Not on this road. I'd sooner sweat." Hosey turned to look behind their rented car, where great clouds of dust followed their progress down the rough gravel road. "Can't be too far now to to what's the name of that town we're going to?"

Dave was plump. He had a moon face, and his brown hair, worn fairly long, was curly, but the hairline was receding. This accentuated the roundness. When he turned his head slightly and the sun hit it just right, he could have been mistaken for the man in the moon.

And Dave was careful. Moreover, he was aware of Hosey's reputation as a jokester, so he formed the word carefully. "Scithersville," he said.

"Sounds obscene," Hosey commented.

"Stay sober and you won't have a thing to worry about. I hope it's not much farther. My bladder won't take a whole lot more of this bouncing."

"We'd be there now if we'd have come through St. Louis instead of Paducah. We could have gone right down the interstate and we'd have gotten a decent car there, too."

"I didn't plan the trip, Tyeee; Nate Roth did. He must have had a reason for doing it that way."

"Cheaper, no doubt. What's he expect us to find here, anyhow? The guy's dead. They didn't find enough of him to bury."

"His records, Tyree. All his records are here, and somewhere in those records Nate thinks there might be a clue or two as to who bumped Alban off."

"I never did buy the murder theory, much less the conspiracy theory. He could have been deliberately killed, of course, by reason of accidently being on board. The way things are, there're all kinds of nuts running around doing all kinds of things."

"Maybe it was accidental, Tyree, maybe not. But you've got to admit that Nate's hunches sometimes pay off. Besides, we get a chance to see all this pretty country."

"Big deal. Cornfields, gravel roads, and cows. I grew up with that stuff, down in Mississippi. That's why I live in New York. I like my cows dead, sliced and covered with fungus, on a plate. I like my corn in a can. And you can have this stinking gravel. On you it don't show; on me it's dirt. I'll probably have to take a bath."

Dave pointed out the window to a roadside sign. "Two miles, Tyree." Then he looked ahead. "Gawd!—what's that coming?"

"It's called a combine. And it's a big, fat one. Give it plenty of room."

"There's something behind it—and I hear a siren."

Hosey turned and looked behind their car. He saw nothing. "It's not us. It must be the combine. It's coming at us, too; must be doing fifty or better."

Dave slowed down and looked for a place to pull off the road. There wasn't any. The road was narrow and had no appreciable shoulder. On each side was a deep drainage ditch. For want of a better solution, he simply stopped the car.

The speeding combine was only about half a block away when out of the cloud of dust it was stirring up there emerged a car: a police car with siren wailing and red lights flashing.

Too late, the driver realized the reporter's car was there and an obstruction. But by that time its driver was too far into his attempted cutoff to do anything but floor the brakes. There began a long skid that portended disaster.

Meanwhile, the combine flashed by the two gawking reporters, providing them with a brief view of its driver: a wizened old geezer dressed in a checkered shirt and straw hat, who didn't even wave at them.

Tyree relived an experience he had had before. He knew what was coming. Right on cue, time slowed to a crawl or his perception speeded up, he didn't know which; and he watched with calm detachment, feet braced against the floor of the car, as the squadrol crept toward their left front.

Below its front wheels gravel rose in a steady stream, while gouts of dust curled up through the interior of the wheel wells and out the sides. Everything continued in slow motion.

Hosey could see the car's driver, a hulk of a man whose face was twisted above his massive red mustache and whose eyes rolled in terror. His blanched fingers desperately gripped the wheel, straining to turn the car to the right.

Then, suddenly, time flowed normally again, as it always did for Hosey the instant contact was made. There was a resounding thump, after which the left front fender of their car peeled back like a sardine can, hooked in the squadrol's rear bumper.

Hosey relaxed as soon as the other car zoomed by, fish-tailing down the road another 150 feet or so before coming to a stop perpendicular to the roadbed.

Its engine had stopped. So had the siren, but the red dome light continued to flash. The driver restarted his engine, backed up, and pulled forward to turn around and park behind them.

A big man wearing a dark blue uniform got out, then reached inside, pulled out a wide-brimmed hat, and put it on. He walked over to their car. His face was red, and when he spoke, his voice was subdued.

"You fellas all right?"

Dave spotted the name tag on the man's chest and said, "Yes, I think so, Officer—uh—Erwin. How about you, Tyree?"

"I'm O.K., Dave."

"Look," said Erwin, "I'm real sorry about this. I didn't know you were there."

"What was the chase all about, anyway?" Dave asked. "What'd the old man do?"

"That's old Art Fensky. He's one of the crazies; uses that combine like other people use a car or a pickup. He's got plenty of dough and he don't need to. He's just peculiar. It was bad enough before, but since he went and got himself tested there's just been no livin' with him.

"Best I can do is run him outta town now. Uh, can I see your driver's license and registration, please? I gotta write this up."

Dave found the documents and gave them to Erwin, who went back to his own car to get a clipboard.

"I'm gonna stretch," Hosey said. He opened the car door and got out.

A moment later Herrick followed suit. By this time Erwin was back to return his documents.

"Thought your face looked familiar," he said to Dave. "You're on TV, aren't you?"

"Yes," replied Dave, "we work for WBC."

"I watched you cover the Sudano trial a while back. You here on a story now?"

When neither of the two reporters answered, Erwin simply assumed they were, and went on. "Only one person in Scithersville ever made the news: Dr. Alban. Nobody else is that important. You know, that whole business has a bad smell, if you ask me. Did you know, the F.B.I. was here not an hour after the news came out that he was dead?"

Hosey was firing up his pipe, struggling to keep his match lit in the stiff breeze, but he stopped when the cop said that. "What were they doing here, officer?"

"LeRoy—call me LeRoy; that's my name. What were they looking for? You tell me. They went right out to his house without even lettin' me know they were in town. It's common courtesy to tip the local authorities off when that happens, but they didn't say a word to me. I'm the chief of police here, you know," he said proudly.

"No, we didn't know," said Dave. "Are they still around?"

"Not so far as I know. Ceil was kinda' tight-lipped about it, but the way I understand it, they came to cart off all Doc's records. They didn't have no warrant or nothin' so she ran 'em out—probably with a shotgun, if I know Ceil."

"Who's Ceil?"

"Ceil Edwards, Doc's housekeeper. Been with him since he came to town, years ago. 'Course, there's them that says she was more than that to him. Good-lookin' woman, she is."

"She still has the stuff, I take it?"

"I guess. Unless Rich Hogan took it.

Rich was Doc's lawyer. He's takin' care of the estate."

LeRoy held up the clipboard and said to Dave, who'd been standing there listening, "You want to take a look at this, then sign it?"

Dave took the clipboard, gave the report a quick scan, decided trying to read LeRoy's scrawling was a waste of time, and scribbled his own name at the bottom. He handed it back to the chief.

"Thanks, Mr. uh—Herrick," he said, glancing down to refresh his memory of the name. "City'll get in touch with the rental agency about the damage. Shouldn't be any trouble to you at all. You guys need any directions?"

"Well, yes," Dave replied, "I guess we do."

"Ain't that big a town, really," said LeRoy, "but I guess a few introductions wouldn't hurt anything, 'specially with Ceil, if you're goin' to see her. Are you?"

"It's a thought, LeRoy. But maybe we could drop in on Mr. Hogan first. That all right with you?"

"Sure. I ain't that busy. I run a tight little town here and most folks know it. I get respect, 'cept for guys like Art Fensky. No sir, nobody wants to tangle with the law in my town." To accentuate, he gave his Sam Browne belt a hitch. It promptly slid right back down over his paunch. "Just follow me into town."

LeRoy led them down the main street to an old two-story red brick building. Here they parked, and went in to meet Rich Hogan.

The meeting was brief. Hogan didn't have any of the records and though he was nice enough about it, he did let them know he had other things to do. But he did take time out to call Ceil and tell her there were two reporters in town and that he didn't see any reason why she shouldn't talk to them if she wished. "She'd have called me anyway if you'd gone there cold," he explained.

Their next stop was the Alban house. It was an old frame dwelling, though well maintained and quite large. On two sides it had a verandah, which slanted slightly downward on its outer edges, as old verandahs often do when their footings sink. The door was yellow and matched the trim around the windows.

LeRoy gave the big brass knocker one solid rap and stood back, looping his thumbs over his belt and trying to look important.

Nothing happened. "Guess she's in back," he said, and sheepishly reached up again to push the bell button.

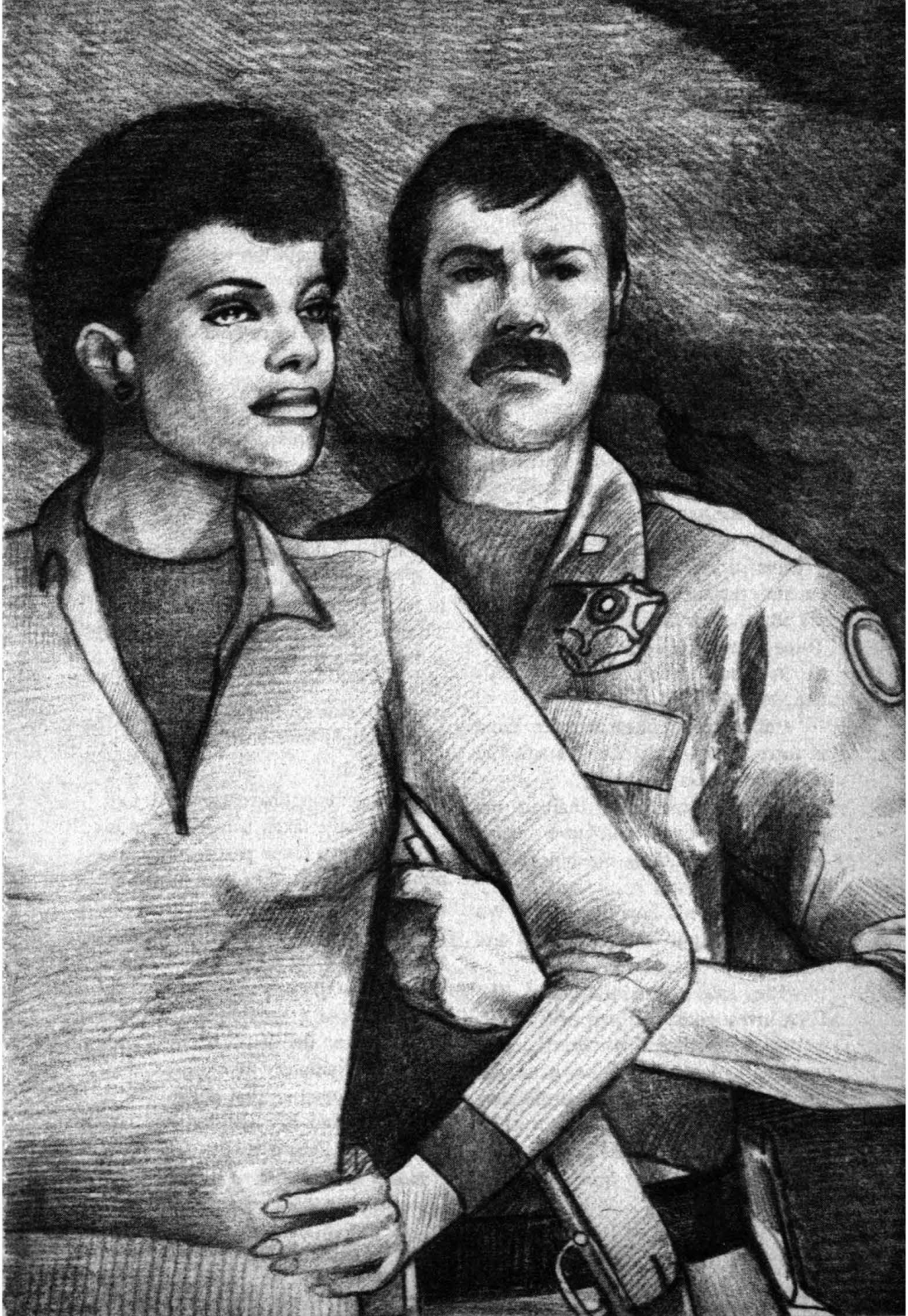
Some ten or fifteen seconds later the door opened, and in the doorway stood a tall, statuesque black woman, about forty. Her gaze went first to LeRoy, then to Dave, and finally to Hosey, where it remained and softened.

"Morning, Ceil. This is Mr. Hosey and Mr. Herrick. Hogan called about 'em."

"Come in. You got here faster than I thought you would." She stepped back out of the doorway to let LeRoy and the others in.

"I smell pie." LeRoy's nose was twitching. "Two kinds: apple and blueberry—coffee, too."

"You lead a charmed life, LeRoy." Ceil was smiling. "Just when you were hungry, too, I'll bet. But then, aren't you always? Why don't we go into the kitchen and have some?"



In a few moments they were seated around the kitchen table drinking coffee, while Ceil cut pies. She had barely gotten around to delivering LeRoy's when the phone rang and she had to stop to answer it.

"It's the station, LeRoy. Art's back in town. He's trimming the hedge over at the First Congregational Church. They want you right away."

LeRoy jumped up, taking the pie with him. "I'll get the plate back to you later, Ceil." He rushed out the door.

"He'll wolf that down before he gets to his car," Ceil said. "It's just an excuse to come back later and get some more." She set out two other plates. "Now, what can I do for you two?"

Dave picked up his fork, started to cut into the tip of his wedge of apple pie. But before he could say anything, Tyree answered her.

"We came to do a story on Dr. Alban, Miss Edwards."

"Call me Ceil. I like that better. What is there to say about Dr. Alban? The man's dead. Let him rest."

For a moment Tyree thought she might become emotional, but if she had any such inclination, she quickly recovered.

"We think it's important, Ceil. We want to find out who killed him and why."

"They said it was an accident. The FAA investigated and they said ."

"Do you believe that? No, of course you don't, do you? Tell us, what was the F.B.I. doing here? What did they want? It was his records, wasn't it?"

"What difference does it make what I believe? That won't bring him back to me."

"Why does the government want his records?" Tyree took a bite of his pie.

"What's this story going to be about, Mr. Hosey? Dr. Alban or his records?"

"Maybe about both. We don't know. But we agree with LeRoy: there's something smelly about the way Dr. Alban died. There were some strange occurrences just before he took that flight. For instance, we know he'd visited with the president earlier that day, and we also know that just before he got on the plane, somebody who had the run of the airport brought him a package."

"What was in it? I never heard that part before. How—?"

"How do we know? Because newspeople have their mysterious sources, Ceil. Actually we found out by chance. In this case it was another newsman's wife, waving goodbye to her husband as he got on the same plane. She recognized Dr. Alban, and remembered seeing the man give him something. We think it might have been a bomb."

"A bomb!"

"Stranger things have happened, Ceil. It would have taken somebody in authority to get a bomb past security, and remember, this world's been turned upside-down since the discovery of the enzyme's effects. You should see what goes on in the big cities. You wouldn't believe your eyes."

"I suppose I wouldn't. I've seen some of it on the news, but in a little farming community like this, things haven't changed all that much. We've always had our Mr. Fensky, and he's always been like he is now."

Hosey pushed his plate aside and leaned toward Ceil in order to get a more

intimate rapport. "Why did Dr. Alban go to see the president?"

"He wanted to do something to help the positives. He felt responsible for their troubles, and he thought he'd be more influential than anyone else."

"Who—who'd have more influence, the president or Dr. Alban?"

"Why, both of them. Would you like more pie?"

"No, no thank you, Ceil. Not right now. It's good pie, though. Tell me, Ceil, if Dr. Alban was murdered would you want the people who did it to go unpunished?"

"Punished! Nobody gets punished anymore. Don't you see, that's what's so horrible about all this. The crazies have a license to kill. There's nothing to stop them anymore."

"There's you, Ceil. Come on, open up. You were more than a housekeeper —that's obvious."

Hosey took a chance here. For all he knew, that kind of talk would get them thrown out of here at gunpoint. He'd already been told Ceil was a strong-willed woman who could take care of herself.

"I should make you leave, after that," she answered. Tears appeared in her eyes. "I would, too, if I didn't think there was an outside chance you really could do something about this mess we're all in."

"You loved him, didn't you?"

"Yes, and he loved me. I wasn't just the housekeeper. I was a wife for almost twenty years. You understand, I'm sure. Back in the old days—well, people just didn't do things like that, especially in this type of community; or if they did, they lied about it. That's what we did. And when things changed we were so used to the lie that we never bothered to set the record straight. I'm Nelson's lawful widow, though. Mr. Hogan knows."

"Then you own the records?"

"Yes, I suppose I do. I guess I own everything Nelson owned."

"That puts you in a fairly solid legal position, and I'll bet the government knows it. I wonder what they were after?"

"I can't imagine. But Nelson had thousands of case histories on thousands of people. He had all of his own research notes to start with, and after he got the interface, why "

"The what?"

"The interface—the thingamajig that hooked him into Public Health's data base. That gave him "

"Everybody's! He got everybody's test result, didn't he?"

"Well, for a while he did. Back when the tests first started he had access to a lot of new data. Everybody was feeding it into here. He was the only one who could handle it then. Later, after the Center for Disease Control got their programming set up in Atlanta, he didn't get it anymore. That's when he started collating old records, some of them from thirty or forty years ago."

"Why would something that old interest him?"

"He wanted to see if any correlation could be established between the enzyme and other diseases, and this gave him a broader base to work with."

"Did he find any such correlation?"

"No. Not as far as I know, anyway. And I'm sure he'd have mentioned it to me if there'd been one. He always dis-

cussed his work. But—he did find mention of the enzyme in some of the old test records. You see, the enzyme isn't new. It was identified many years ago, but it was only after Nelson began studying it that its function within the body was defined. Lots of blood fractions can be distinguished one from another and many of them even have names, despite the fact that their use and effect on the body are still unknown. It was first identified because its presence in an occasional patient's blood causes a false positive for C-Reactive protein. This was regarded as a nuisance; but nobody knew what else, if anything, it did. Most physicians recorded the event when it occurred. Nelson was able to examine old records and gather useful data from them when the people who compiled them would have found that same data useless; useless, because they didn't know what he knew."

"Where did the records come from?"

"Everywhere: Public Health Service, V.A., the military, state institutions."

"I thought that was illegal, a violation of the patient's right to privacy."

"It is if the patient's living, or specifically identified. Most of these weren't, although the people who were sending them weren't all that concerned at first. Besides, many were cases where the government had secured the patient's authorization prior to the rendering of treatment through some government facility."

"Now we're getting somewhere. What agencies would require that sort of thing?"

"Well, I know some of the patients were State Department people. Others were in sensitive security positions. Probably some of them were C.I.A. people; that sort of thing."

"And F.B.I.?"

"Them too, I guess. There was a real panic over in Washington. Nelson was swamped with work. They wanted to find out right away who was positive and who wasn't. People were worried about foreign intelligence services getting hold of them, and with reason; a number of our people did defect when they suspected they hadn't passed."

"They let Dr. Alban get hold of and keep that kind of information?"

"They didn't intend for that to happen, but that was the practical effect. Nelson wanted it, so he got it. It was supposed to stay in the computer over at N.S.A. They tied his terminal in so it would display visually, but they had scrambler codes to prevent him from dumping it into his own data base."

"Then how did he manage to get it?"

"Very simple. He used a videotape machine. I know it sounds absurd, but Nelson was right when he said those people in government were complete idiots. Maybe they never expected anybody would go to all that work."

"You still have these tapes?"

"No. Not any more. We had close to a dozen cassettes at one time, but Nelson said he didn't want all that around for just anybody to see. We played them back into our own system, using our own access codes, and then erased the tapes."

"Ceil—listen. You might not know it, but you're sitting on a time bomb. If anybody ever found out, and it looks like they suspect already, this house might go up some dark night with you in it."

"I've never told anybody but you, Mr. Hosey, and I know Nelson didn't tell anyone either."

"Someday somebody will add it up, Ceil. You're not only more than a housekeeper—you're more than a wife. Your technical education is a whole lot better than you let on, isn't it? I'll bet if I checked I'd find at least one sheepskin hanging in your closet."

"I've got a masters in hematology from the University of Toronto; that's where I met Nelson. I never got any farther than that. I had always wanted to do something to help the people with the sickle-cell trait, but I guess I got sidetracked."

"That's just the sort of thing that'll increase your danger, Ceil."

Dave Herrick had been listening silently, letting his partner handle the interview, and he had to admit that Tyree was using the proper tack. Now, though, he thought it was time to mix in. And he wanted a look at Alban's list, if Alban really had one.

"Ceil," he said. "You know why we're here now. And you know what we want. We have to see what Dr. Alban recorded."

"Why? It won't make any sense to you. It doesn't make sense to me. I've run it back a couple of times. Nelson identified the predicted percentage of positives nearly back to 1945. That's the only significance the old records have. They don't even have names on them; just military serial numbers, and social security numbers. The ."

"How are the new ones identified?"

"The same way: just numbers, no names."

"Then why would Dr. Alban have wanted to record them?"

"I don't know. He just did. Maybe he knew something else he didn't tell me."

"Ceil, can we see it?"

"All of it? That would take hours."

"We could start with the positives on the new list, the one the government had him screen."

Ceil's face took on a troubled look. "Maybe I shouldn't have told you I had it. What are you going to do with the information?"

"Use it to find out who killed Dr. Alban, Ceil. Don't worry. Good newsmen always protect their sources. We won't tell anybody where we got it. In fact, if we can help it nobody will ever know it even exists. You can trust us."

"Yes, Mr. Herrick, I believe I can. All right, follow me."

She led the way to the back of the house, where a massive door appeared. She pulled it open and threw a light switch to reveal a flight of stairs.

They entered after her, noting that the door, while faced with dark wood, was steel in the back, like the staircase and the walls which lined it.

Ceil noticed that Tyree was staring around. "We built it specially. Temperature and humidity have to be carefully controlled, Mr. Hosey. Some of the tests we did are very delicate, and the instruments are quite sensitive to outside interference."

They reached the bottom of the stairs, and she led them past banks of unidentifiable equipment to a corner room. This too had a steel door. "The computer room," she said.

Again she entered first, turned on the

lights, and motioned them to follow her. "Let's turn this thing a little so we can all see," she said, swinging the screen around on its ball-joint pedestal. "There. That's fine." She sat down in front of it and activated the display. "All the positives from the authorized group, right?"

"Right," said Dave.

Fingers flew across the keyboard. Numbers appeared on the screen. Ceil typed others under them, then watched the cursor hop about, seemingly at random, bridging. Once she made a mistake and the screen went blank, forcing her to begin anew, but finally she got them all right and got memory access. There followed a command to display the positives in slow rotation.

The two men watched as 171 numbers rolled by, all plainly social security or military serial numbers. Number 172 was different; there were two numbers listed. It had a name, too; Edward M. Kinney. Ceil gasped.

"How—? That wasn't there the last time I checked—but—the president! The president's a positive?"

"It would seem so," said Hosey. "Unless there's another Edward M. Kinney working for Uncle. I'd bet against that, though, and I'd bet on that as the reason for your visit from the F.B.I."

"That ought to be easy to check out, partner," Dave said. "One of those is an old Army serial number—"O" for officer. Kinney was an Army officer during the Viet Nam War. The number'll be in a book somewhere. The other one looks like a social security number, and our network files will have a copy of his tax returns and disclosure statements. His social security number will be on that."

"Why would he want to cover up a thing like that? Being positive isn't a crime, especially not for a guy his age. And it certainly isn't cause for removing him from office. And he's a lame duck, so it's not because of the next election campaign."

"Maybe he's protecting his ego. I don't think I'd noise it around if I was a positive. I've never even had guts enough to get myself tested."

"Nelson was a positive."

"What was that, Ceil?"

"I said, Mr. Hosey, that Nelson was a positive. Now I think I see why he went to Washington. He went to talk to the president about going public with his own status to help the others. Nelson was that kind of man. I believe he thought the trip might be dangerous, too."

"He did?" Hosey's voice cracked.

"I think so. Evidently he's put some kind of timed instruction on this number. I know the name wasn't on here the last time I looked, and Nelson knew I was the only one who could look at this."

"So you looked. Why the riddles? What did he expect you to do with the information?"

"I don't know, Mr. Hosey."

"He must have had some purpose, beyond wasting his time. Surely there must be more, some other message."

"I can scan for one. I'm sure he'd make it something that would be obvious to me."

She began, trying all sorts of private codes. Nothing! Finally, after fifteen

fruitless minutes of punching buttons, Ceil gave up. "It's just not there."

"It has to be. Why else would he bother?"

"Maybe he expected me to act on my own judgment, Mr. Hosey."

"You mean, publish the information?"

"If that's what Nelson wanted me to do, that's what I will do."

"Now wait a minute, Ceil," Dave protested, "that might not be a good idea just yet."

"Why not? Once it's out, it's out."

"I have a couple of reasons for saying that. First of all, your husband evidently considered this only as a last resort. If he felt endangered, maybe he thought it would protect you to know this. But if you disclose it now, you could lose any bargaining power it might otherwise have given you. That's one reason; there are others. For instance, if his death was murder and the president had a hand in it, then we want him out of office. Being positive might not be impeachable, but murder certainly is. And even if he escapes criminal responsibility, he's out on his neck.

"Then there's this possibility: he might not have been involved in that, but—he might have his own plans for disclosure, and he might be picking his time to do it.

"Or there might be a conspiracy against him, by other persons in government, and they might already have this information. This is the possibility that worries me. There's little enough stability these days without cutting the ground out from under our leaders."

"So what's my alternative, Mr. Herrick?"

"Pass the information along to somebody powerful enough to protect it and honest enough to trust."

"Who?"

"Us, Ceil; Tyree and me. We've got First Amendment protection and the network's got the clout. Besides, we might break out with some more interesting names if we had a chance to dig deeper. What do you say?"

Ceil thought about that proposition for a minute. She eyed both men severely, and her face took on a worried look. Long moments passed and she remained silent. "O.K.," she said, finally, and with resignation. "I'll print out a hard copy."

"I've got a better idea," Dave interrupted. "I'll call network headquarters, set up an interface. We can dump your data into WBC's banks, use our codes to get at it. Then we'll find some subtle way to let the opposition know we've got it, and they'll lose their incentive to bother with you anymore. Now how about that?"

Ceil nodded approval, and Herrick rushed to a nearby phone. Soon he was talking directly to Nate Roth, picking his words carefully in case they were overheard. Then, using the interface at each end, he spent the next four minutes transmitting data at ultra-high speed from Alban's banks to WBC. After that, random tests confirmed that all of it had gotten through, and he then hung up.

"Done," he told Ceil. "Feel better?"

"I don't know. What if they were listening?"

"It would surprise me if they weren't, in view of what's happened; but it'll take them a while to break the codes,

if they *can* break them. And by that time we'll have something else figured out. Now, while we're here and if you can spare the time, maybe we'd better get started on what Tyree and I are supposed to be doing here."

"What's that?"

"Exploring the personality of the late Nelson Alban, M.D. WBC would like to do a special on his life."

"But you haven't got any video equipment."

"Yes we do. It's out in the trunk of the car. Our stuff is a little smaller than what you have. Tyree and I will take turns as cameraman."

"Well, old buddy, what do you think?"

"I'm past the stage where I can think, Dave. She stuffed me from head to toe. My brain's displaced by what I ate."

"You were a pig, Tyree, but that was a mighty fine supper. It puts us behind schedule, though." He took their last piece of equipment as Tyree handed it to him, arranged it in the trunk, and closed the lid. "I'll drive."

"I'll sleep." Hosey climbed into the right front seat and stretched out while Herrick started the engine.

The house was on the far side of town from where they'd come in, so they'd have to drive back through "downtown" to get back to the gravel road. On the way they spotted LeRoy coming out of the combination city hall and police station. Herrick pulled up and yelled at him.

"Thanks, LeRoy. Hey, did you catch your wild man?"

"Yep. Finally got him out of his 'tank.' He's locked up inside."

"Tank?"

"That's what he calls his combine. He's being General Patton today. Tomorrow it'll be somebody else."

Dave looked out the opposite window. Behind the station house, in the dim glow of the street light, was a monstrous bulk, its sheetmetalwork beat up in the front, its windshield splattered with mud.

Then, from off in the distance, there came a baleful sound.

"Oh-oh!" said LeRoy. "Trouble."

"What kind of trouble?"

"Jailbreak. Sounds like Marion. Too close to be any of the state facilities. I'll have to write you boys out a pass."

"What do we need a pass for?"

"To get through the road blocks without a hassle. This whole area'll be sealed off until they catch whoever's loose. Come on inside. I'll do it now." He stalked back into the building.

"Tyree! Tyree, wake up!"

There was a snort from the other side of the car. "I was awake, Dave. Just resting my eyes. I heard the whole thing, and I don't like it."

"I don't either. Marion's federal. It might be just a coincidence, but what better excuse could they use to flood this area with their own people just when we're ready to leave?"

"We'd better get inside." Tyree straightened up and opened his door.

Inside LeRoy was laboriously pecking away with two fingers on an ancient typewriter. It needed a new ribbon, and its margin controls were shot.

"Just take a minute, guys," LeRoy said.

"Hey, Kraut!" The voice came from

the back of the building. "Caught yourself a couple more, huh Kraut?"

LeRoy held up a finger. "Don't answer him. It'll make him worse. He wants attention."

"How long will you keep him in there, LeRoy?" Hosey asked, mildly intrigued. He'd long ago decided that the nuts of this world were its most interesting inhabitants.

"Until he has a mood swing. That's what Doc always called it. Sooner or later he'll snap back to reality and stay there for a while. Most of the time Art's all right. He's usually lucid, and I've seen him go months being just plain old Art Fensky. I think it's all the excitement lately that's thrown him off course. Funny thing; he ain't really locked up. That cell's had a broken door for the last four months. He thinks he saw me lock it so he ain't tried it. I'm givin' him sort of an intelligence test, and it looks like he's gonna flunk. Course, it'll give you guys a chance to clear out without him in the way. Art's an awful pest."

"Why don't somebody ship him out to the funny farm?"

"Cause he's got too much money, Mr. Hosey. The old coot's loaded. Not only did he start out pretty good—his people left him a big farm—but they found a big pool of oil under it, so people around here know Art can pay for anything he breaks. Always does, too, and people always try to cheat him on the damages.

"Besides, in order to commit him we'd have to establish he was dangerous to himself or others, or that he can't manage his own affairs; and he can."

"Seems to me he gets pretty dangerous with that 'tank.' "

"Yeh. Well, I don't usually chase him. He minds me pretty good most of the time. He's worse when he's Patton, is all. A while back he was Admiral Halsey. The combine was a battleship. He drove that thing up and down Coon Creek. Busted up all the canoes, cracked the dam, finally flooded out his engine and got stuck. He's a bird, I tell ya. Well, here's your pass. All I gotta do is sign it."

LeRoy took an old-fashioned steel nib pen from a drawer, dunked it in a half-full ink bottle, and scratched his signature on the paper. The pen caught a couple of times, flinging small droplets of ink into a fan pattern. He waved the paper back and forth through the air to dry the ink, and when it met with his satisfaction, handed it to Hosey.

"Here you are; should get you through O.K."

He held his hand out and both reporters shook it in turn, promising to drop in to see him if they ever got back that way again.

The darkness concealed the dust clouds but did nothing to ease the monstrous bumping of the road. Tyree complained loudly that it interfered with his digestion, but there was no help for it. Dave drove at a slow but steady speed for about ten minutes, and soon the lights of the town were lost in the distance.

They came to a crossroads, and the crossroads was occupied.

"What's that, Dave?"

"Must be a police checkpoint. But there's no markings on that car." He strained to see and flicked on the high

beam of the lights. Ahead were several "horse"-type barricades painted with black and white stripes and bearing red reflectors. There was a man standing behind one of them, holding a flashlight in one hand.

Dave approached to about twenty feet, then stopped the car. The man walked over, taking care to stay out of the car's headlights. Then he turned up the light and shone it into Dave's face.

"F.B.I.," the man said. There was a flash of a leather folder in his other hand, but it disappeared again before Dave could make out its contents. "Let's see some I.D.s."

"We've got a pass from Chief Erwin. Here."

The man took it, unfolded it, and perused it thoughtfully. "This doesn't tell me who you are. Pretty sloppy typing job, too. You got a driver's license?"

"Yes." Dave reached carefully for his wallet, found his license in the dark, and handed it to the man.

"No picture?"

"My state doesn't have that."

Keeping Dave's license, the man flashed his light at Hosey. "Let's see your driver's license."

Tyree knew what was coming, but went through the motions anyway. His state didn't use pictures, either.

"You boys are going to have to do better than that. This is serious business. Out of the car."

"Come on, man," Tyree protested. "You know who we are. He covered the Sudano trial; I'm on national T.V. ten-twelve times a month. Take a look at us, man."

The response was a click—the slide going back on a .45 automatic. Its muzzle came to rest on Tyree's neck. Then another man appeared on his side of the car, his arm through the open window.

"OUT!"

They piled out of the car, only to be immediately flung against its side, patted down, and then cuffed together.

"Keys," one of the men demanded.

"In the ignition," Dave answered, "but you can't "

Evidently they could. While one man kept them covered, the other rooted through the car's trunk. He took their video equipment out and put it in the trunk of the F.B.I. car. Then he began pulling out their car's seats and rifling the glove box. Finally he turned, pulled his gun, and said: "They've got video tape and nothing else. We'll have to play it all back to find out what's on it."

"Something's coming. I hear an engine," the other man replied. "Get their car off the road. Sounds like a truck, but I can't see it yet."

Quickly the other man got into the reporter's car, started its engine, and drove it off the shoulder into the ditch. He threw their keys into the cornfields when he got out. "Where is that thing?"

"I don't see it yet," the other replied. "But let's get these two in the car and get out of here before it gets here." He motioned the two reporters ahead with his flashlight.

The rumble grew louder. It sounded like whatever was coming was almost on top of them, and the two government men cast nervous glances in both directions down the road.

Hosey had his foot into the left rear door of the black government sedan just

as a shot rang out. He looked up to see it strike and create a shower of sparks a short ways into the cornfield.

Fensky's combine, running without lights, rose above the stalks.

It was met by a fusillade of gunfire, during which Dave used the distraction to jerk Tyree back to his feet and around to the back of the car.

In the meantime the two F.B.I. men had dropped their flashlights and were peppering away at the "tank."

As if of one mind, they knew what to do. Hosey quickly chopped the man closest to him across the back of the neck, then helped Dave in his attempts to subdue the other one.

That man struggled violently, and his .45 went off twice before they finally forced him to drop it. By this time Dave was puffing furiously from the exertion.

"Belt him, Tyree! What are you waiting for?"

Tyree did, reluctantly, then stood there as the man sank to the ground. He held and massaged his aching left hand. "God! I hope nothing's broken. I hate to hit anybody in the head with a bare fist."

The "tank" rolled up to them and stopped. Its one remaining headlight went on, and a voice, high-pitched and squeaky, called out, "Git them hands up where I can see 'em, Kraut."

Both complied at once. "You think he's got a gun, Dave?"

"We'd better humor him, just in case."

"Hey, you," came the voice again. "You—you ain't no Kraut. There ain't no black Krauts. Come over here."

"I can't," Tyree replied. "We're cuffed together. The uh, Gestapo grabbed us; we're G.I.s."

"What's your outfit?"

Disaster! Dave had to think fast; search his memory. That documentary he'd watched last week—D-Day—yeh! He answered, "6th Armored."

"Where'd you come ashore?"

"Uh—uh—Utah; Utah Beach."

"Who won the World Series in 1938?"

Dave had had enough. "How should I know. Look, General, there'll be more Krauts coming if we stick around here and yak. Let's "

"Watch your mouth, sonny; you're talkin' to a superior officer. But you're right. Get aboard."

"Can we get these cuffs off first? One of these Krauts has the key. It won't take long to get it."

"Well, O.K., but make it snappy."

Hosey was already going through the pockets of the man nearest him. He'd picked up one of the dropped flashlights, which made the job easier. Soon he had a pile of junk on the road: guns, an extra magazine, I.D.s, another pair of cuffs, a walkie-talkie, and—a key ring.

The cuffs came off them quickly, and went just as quickly on their former captors.

"Bring the guns and flashlights, Tyree. The radios, too. Maybe we can eavesdrop."

Hosey snatched these items up. As he did so, he was struck with an idea. "General," he said, "we've got film; intelligence film. German battle plans, troop deployments, maps. Everything we need to win the war. It's in their trunk. We need it. We have to get it to Eisenhower."

"Get it—quick!" came a joyful squeal. "Dang! What a break! We'll be in Berlin by Christmas."

Hosey found the trunk unlocked. He quickly scooped up their equipment and threw it up to Dave, who was already on the "tank." Then he too climbed up.

Fensky threw the "tank" into reverse and killed the light. He backed up for about a hundred yards, then turned around and took off across the rows.

"Where are we going, Mr.—uh, General; what's the matter with the road?" Dave had visions of being trapped in these fields and slowly hunted down at daybreak.

"Fulla Kraut patrols; you know that. Probably mined, too. We gotta get back to my headquarters."

"Where's that?"

The old man pointed ahead. "Coupla miles that way."

"Oh. Look—General; we have to get away from here. We have to get this information to Eisenhower's headquarters before the Germans get wise. Have you got any other transport at your place besides this 'tank'?"

"Got an old truck. Don't run, though. Motor pool's understrength. Too much stuff gettin' shot up. Hey, what's that noise?"

Faint voices were coming out of Tyree's pocket; voices from the walkie-talkie. He turned it up. There was a conversation going on. He couldn't tell how many stations were talking, or exactly what the subject was, but he could guess.

"Krauts probably got every road blocked," said Fensky. He increased the "tank's" speed to a gut-wrenching fifteen M.P.H., and with its short wheelbase crossing rows instead of following them, the effect was like a motorboat in choppy seas.

"H-H-How much farther, General?" Hosey was holding his overfull stomach, and there was agony in his voice.

"Up there; just ahead, by the trees."

Abruptly they broke out of the cornfield, and the "tank" rolled smoothly across uncultivated ground. Its big tires ended both their jolting and Hosey's distress.

They were on a long, flat meadow, and the "tank" rolled ahead at a steady speed, passing a row of ramshackle buildings. Ahead they could see an old house with one of those 19th-century turreted roofs.

"Got m'headquarters in that chateau. You boys want a drink? Found some pretty good wines in the cellar. These Froggies sure do know how to make wine."

"Uh—no thanks, General. Not right now. Uh—could we see the truck?" Dave was hoping for a break.

"You fellas never did tell me your names," was Fensky's answer.

"I'm Herrick; This is Hosey. Uh—Colonel Hosey."

"That right? A colonel, huh. I remember when I was a colonel; course, I was older'n you. But then, rank comes fast in wartime. I got two of m'stars since Africa. Come on. I'll show ya th' truck."

The truck turned out to be a mess. It was all over the dirt floor of one of the sheds.

"Even if we knew how to reassemble that transmission we'd be days doing it," Hosey told Dave.

Fensky had been hovering near.

"Well, I can't let'cha have muh tank. I'm holdin' this whole sector with that. But, how 'bout an airplane? Artillery keeps a spotter here."

"A what!"

"A airplane, Colonel; an L-5."

"Oh." More of Fensky's phantasmic forces.

"No—I mean it—looky here." Fensky started off at an agile hop toward the next building. They followed.

Hosey and Herrick looked inside, then at one another.

"I don't know what an L-5 looks like, Dave, but that's an airplane all right," Tyree whispered.

"It's a duster," Herrick whispered back.

"What's he doing with it?"

"I don't think it's his. It's got somebody else's name on the sides. Maybe the owner just keeps it here. Do you suppose the old coot can fly it?"

"Not with me in it, he won't. I'm not sure I'd get in that with anybody."

"It's a way out, Tyree. It beats walking. They couldn't chase us. By the way, didn't you say you'd done some flying?"

"Yeh, but look, Dave; I've only had a couple of lessons, and never in one of those. Have you got any idea what can go wrong, even in the daytime, much less at night? Besides, it's only got one seat. There's a tank in the back cockpit. And look at the size of that engine."

"What's wrong with the engine?"

"There's too much of it. It's 'way overpowered. It'd be real touchy to fly."

"Could you get it off?"

"Sure. Your grandmother could get it off. That's the easy part. The hard part comes later when you want to land. Getting down is the tricky part."

"Like I said, this looks like the only way out. They've got this whole area sealed off. And if they catch us again, they'll kill us. Personally, I'd rather take my chances on that." Dave gestured at the plane. "And it's 10 P.M. now. If we get right to work, we can have that tank out of the back in a couple of hours. That'll give us another four or five hours of darkness. If we leave about 4 A.M., we can be out of here while it's still too dark for them to see us, but it'll be light by the time we have to think about landing."

Tyree found himself both convinced and committed.

"What're you guys whisperin' about? We're on the same side, y'know."

"Sorry, General; we forgot. General, we'd like to borrow the spotter. We promise we'll bring it back just as soon as we're finished with it, and Colonel Hosey will take good care of it. O.K.?"

"Sure. Just make sure Eisenhower knows I'm the one who helped you. He's a little peeved with me now, y'know."

"I heard," said Dave. "Don't worry, though; you're doing great now."

"Yup! And first thing in th' mornin' I'm gonna bust into Avranches. That's the key, y'know."

Avranches? Avranches? The name didn't register with Dave, but he said, "Yes, that'd be the way to go, General."

Two hours proved to be an overly optimistic estimate. Working without lights and with few tools, they took nearer four hours to get the insecticide

tank out. The problem was, the spray tubing was welded to it, and it ran along the trailing edges of both wings. It had to be removed, and in doing so they tore the fabric in two or three places.

Finally, though, they got the job done and started fueling from a barrel, using an old-fashioned hand pump that promised both of them charlie horses later.

"We're going to have to prop this thing, Dave. There's no starter. I'm not sure I remember how."

Fensky had evidently been listening. "Need some help gettin' started, Colonel?"

"Uh—well, yes, General. You know how to prop an airplane?"

"Sure. Do it all the time for old Harvey Steffes. Every time he flies it, in fact. Get in there and give it a shot with the primer. Make sure the switches are off."

Hosey climbed in; made the adjustments. "O.K., go ahead."

The old man grabbed the prop and gave it one turn, loading the cylinders with fuel. "O.K.," he said: "switch on your left mag."

Hosey fumbled around for a minute in the dark before locating the switch. He turned it one click. "Contact!"

Fensky positioned himself on one heel, grasped the upper blade, and very sprightfully stepped down and backward. The engine didn't catch, so he repeated the procedure. This time the engine roared to life.

Hosey held the brakes, switched to both mags, and eased the throttle up a hair, waving to Fensky, who was now standing off to the side. The plane now had instrument lights, and Hosey began a checkoff.

Everything looked all right to him except the altimeter, which read high. He decided he liked the other extreme better, so he turned it down as low as it would go. Then, Dave having climbed in in the meantime, Tyree gave the plane some throttle and taxied off, wondering just how much runway he had.

It proved adequate. He reached the end of it, turned, checked his mags, and slapped the headrest to let Dave know that they were ready. Then he gave it full power and raised the tail. He intended, not knowing the stall speed, to hold it down as long as possible, jerking it off at the last minute with all the speed he could build up.

But that plan died halfway down the runway when headlights appeared, racing toward them. The F.B.I. was evidently back, and General Patton could be seen behind them, about to engage them with his "tank."

Tyree glanced at the airspeed indicator. The needle was struggling toward ninety. Hoping that would be enough, he closed his eyes, prayed, and pulled the stick all the way back into his lap. In an instant turmoil was behind and below, as the "L-5" headed skyward, its engine humming and under perfect control.

Nate Roth felt an immense sense of relief to hear the voice on the other end of the phone. His first impulse was to yell, "Where are you, Dave?" which is what he did. But he quickly added, "No; don't tell me—call me at Won's. Twenty minutes, O.K.?"

"But Nate—this is my last quarter."

"So panhandle another one. Talk to you later." He hung up, buzzed his sec-

retary, ordered her to hold his calls, and told her that he'd be out for an hour.

Fifteen minutes later, having taken a circuitous route through stores and alleys and gotten on and off three buses, Nate loped up the six highly polished stairs, strode between the stone dragons, and entered the House of Wu by the front door.

He went directly to the bar, where a lone bartender, looking bored, stood polishing a glass. There were only two or three patrons inside, all sitting at the end near the entrance.

Nate went to the other end and sat down. The bartender walked over.

"What'll it be, Mr. Roth?"

"Ah, Won Long Por, the bountiful bartender. Gimme a ginger ale. Don't water it."

"Mr. Roth! How unkind! Our mark-up's big enough on ginger ale. It's the Suntory you have to watch."

"Gimme the phone, too."

"That'll be an extra two bits."

"I'm not gonna call; I'm gonna get a call."

At that instant the phone rang, and Won picked it up. He handed it to Nate, then poured the ginger ale and stood by, listening.

"Hello, Dave?

"Dave—just a minute. Get outta here. No, no—not you, Dave. Big Ears was here. Listen, where are you?

"Neosho? Where's that? Oh, Missouri. What're you doing in Missouri? I sent you to Illinois." There was a long pause while he listened.

"O.K. Yeah, I see—good thinking. Tell me, what's the nearest big town? Joplin—yeah, I got it. Look, I'll send Abdul. Watch for him. Yeah, I realize you guys are broke. What do you want me to do, wire you money in your own name? Not with all the heat that's on you. Take your belt in a couple of notches. Yeah. I'll get you out today. Trust me.

"Look, Dave, while I've got you on the phone, there's something else you might find interesting: there was a fire in—guess where—Scithersville. Alban's house burned down. No. We don't know if anybody was inside. An affiliate's covering it. Yeah, I'll try to find out." Pause. "Who? LeRoy who? Wait a minute, let me write that down. Won!"

Fingers snapped. Won waltzed over. Nate grabbed the pen from the bartender's pocket, snatched a napkin to write on, and shooed the bartender away again.

"O.K. Give me that again. Yeah, I got it. Hang in there, Dave; help is on the way."

Nate hung up and started toward the door.

"Two twenty-five, please, Mr. Roth," said the smiling Won.

Nate handed him a five. "Keep the change, Won. Yeah, I know, it's too big for a tip and too small for a bribe. But then, you really didn't hear anything this time, did you?"

Out on the street Nate found another pay phone and began shoving quarters into it. He dialed LeRoy's number, but the station said he was out.

"Just how much trouble are we in, boss?" Tyree Hosey had just crawled out of a packing crate labeled "Fiber Towels," and was getting his first good stretch in several hours.

Dave was in a drum marked "Liquid Soap," from which Nate labored to remove the lid.

"A b-bunch," Nate grunted. "Legal's taking care of it. We'll buy Steffes off for the wrecked airplane or Fensky will, if he ever gets loose again. The Feds are another matter. I'm sure they'll try to throw the book at you: obstruction of justice, assault, that sort of thing."

"But they never formally arrested us. They didn't have any business doing what they did. The detention was illegal to start with."

"Sure it was. I believe you. So would any jury. We'll work the political angle, twist a couple of arms; make them back down with it. Meanwhile, you guys can stay right here at WBC."

"This'll be the first place they'll look for us, boss."

"Not where I'm planning to put you. This building's got a small suite that's not in the architect's plans."

The cover came tumbling off the drum, making a loud clank on the shipping room floor, and Dave hoisted himself out of it, kicking his legs to relieve cramping.

"What a relief! Where to, boss?"

"Executive suite—my office. Come on."

He led the way to the private elevator, jammed in his key, and turned it. The shaft hummed for a full minute; then the door opened, and they all got in.

At the top they went directly to Nate's office. With no office staff and few lights on, the place had an eerie look. But Nate's office was lighted, brightly so. He went over to the window and quickly closed the drapes, even though they were fifty-four stories up.

"Over here," he said. He went to the bookcase at the far wall and started slapping at the books; not the most rational behavior for a network president. There was, however, a rational result: the bookcase hinged out from its top, its bottom supported by polished stainless steel rods extending from hydraulic cylinders recessed into the wall. Soft lights went on inside.

"Wow!" Tyree said. "Some pad."

"Every hard-working executive needs a place to go where he can relax, Tyree."

And pick pumpkins, Tyree thought. But he said, "How come it's round?"

"Because it's supposed to be a water tank. Well, actually, some of it is. But you should be all right in here for a few days, until it's safe to come out. In the meantime, I've had a mini-computer tied into our mainframe system. I want you guys to get to work on the list you sent the other day."

"We're reporters, boss, not

"Reporters—*good* reporters—do their own legwork, Dave. I know it looks like a tough job, and it is, but it's not hopeless, and I'm going to help. If you two feel up to it we can start now. How about it?"

"Why not. We've got nothing else to do but sleep."

"Sleep, Hosey? Why didn't you do that on the plane ride from Joplin?"

"O.K., here goes: first, our subscriber list. We should have social security numbers to match some of Alban's list. Let's see." Nate pushed the button.

The computer's display screen began to flicker. Lines appeared under certain numbers. Nate typed rapidly, and the

unlined numbers vanished. Then the display closed up. Nate typed in some more, and again the display changed. "Now, would you look at that!"

They did, and Hosey read them off aloud; "Freeman Moseby—Associate Justice, U.S. Supreme Court; Jason Abelard—U.S. Secretary of Defense; Patrick Gosnell—? Who's Patrick Gosnell?"

"I know," Dave replied. "I interviewed him once. He's the regional supervisor of the F.B.I.'s Central Region, based in St. Louis."

"Yeah, well, I see a definite connection between that and our recent travails."

"Maybe not, Hosey." Nate was inclined to be a little cautious at times. "We have to make certain he's still in office, and in *that* office. He might not be. This list is old. Do you guys see any more names you recognize?"

"Only one," Dave replied, "Kinney. But then, we knew he'd be there. I wonder who all the others are."

"Small fry, I guess," said Nate. "It's up to you to find out. Let's start the other list through."

"Hadn't we better print out first, boss?"

"Good idea, Dave. Make us a couple of hard copies. That way, you two can go through them while I'm setting up the other one."

They fed in the second list, the big one. Old as it was, they still made over 300 hits on it, though these were mostly nobodies. Arthur Fensky was on it.

"Big deal," Hosey remarked. "It'll take a month to run these down, and even then we won't have anything. We could do just as well by tying into the Central Police Records Computer. They'd have a list of the local positives."

"Don't be impatient," Nate replied. "It's slow, sure; but somewhere in this mess is a key, a pattern. I think it'll come out when we start identifying military serial numbers. By the way, that's not a bad idea you just had. I like the thought of tapping into police records. I wish I could think of a way to do it. Maybe Little Skinner—my Uncle Hymie—can help us there."

"What about the veterans' organizations—would they be worth contacting?"

"Maybe, Tyree, but their records are probably manual."

"In the little towns, maybe, but how about the big chapters—New York, Washington, Chicago? Washington'd have a master list on computer if anybody would."

"We can put some people on that, I guess. Tomorrow's soon enough, though. I'm beat. I'm gonna hit the bricks. You guys can keep going if you like."

Morning found Nate arriving at the office late but looking dapper. He wore a powder-blue suit and tie with a navy shirt and white shoes. Nate liked fine clothes, and he was ever conscious of his personal image, which had been a big factor in putting him and WBC where they were today.

This morning he came up in the regular elevator, so that he could be seen strolling through the executive branch. He stopped only long enough to grab a cup of coffee and take a sheaf of memos and messages from his secretary.

Inside his office he flopped down in his chair, sipped coffee, and sifted through the memos. He stopped suddenly when he spotted one with a familiar name.

Then he rose swiftly, did his number on the bookcase and, as soon as the door was up, entered his darkened lovenest. On went the lights.

Nate looked down in disgust. On the floor to each side of the round bed was a body curled up in bedclothes. One of them stirred a little.

"All right, you guys, rise and shine —time to go to work."

Hosey's head came up first, rising like a snake from some fakir's basket. He yawned and stretched.

Herrick, on the other side, simply groaned.

"Why didn't you guys just start out on the floor? Then you wouldn't have to make the bed."

By that time Herrick was on his feet, plainly not feeling rested. "Boss, I don't want to sound like an ingrate, but how about some regular sheets for this thing? And how about unplugging that massager? Satin sheets might be fine for some things, but not for sleeping. We can't stay in it."

"I'll see what I can do, Dave. Now, who do you suppose called me?"

"Who?"

"Chief Erwin. I haven't called him back yet. I thought I'd put it on the speaker and let you listen. Put your pants on and come on out."

He turned and went to his desk to dial the number. "Don't either of you say anything. I'll handle this."

A voice came through the speaker: "Scithersville Police Department, Chief Erwin."

"Hello, Chief? This is Nate Roth, WBC, returning your call. What can I do for you?"

"Are you recording me, Mr. Roth?"

"No."

"Can you?"

"Yes."

"O.K., do it. I've got something important to tell you."

"Go ahead."

"The federal government's trying to take over my town. I don't like it. I want the world to know I don't like it."

"That's a pretty strong statement, Chief. Just what is it they've done?"

"Well, first off, they've got an escaped prisoner who belongs to me. His name is Arthur Fensky. I don't know where they're holding him, but I know they've got him. Mr. Fensky is one of the positives."

"Uh-huh. O.K., so how do you know he didn't do something? I heard there was a prison break, and that the federal people had the area sealed off to catch the prisoners."

"That's bull, Mr. Roth. There wasn't any break, 'cept at my jail. The story's phony. I talked to two lawyers who'd been there all night. They went in earlier that day to take a deposition in a civil case from a prisoner-witness, and got stuck there until morning. They said the prison was as quiet as a church. All the action was out in the boonies. The cons told the lawyers there wasn't really anybody missing."

"Uh-huh. Well, why would they stage a show? Tell me that."

"They wanted those two guys you sent in. They needed an excuse to stop

them. That's why. Then they used it to cover arson. They burned out an old friend of mine."

"Yes, we had a local crew there covering that fire. How come you didn't talk to them?"

"I figure you've got more clout."

"Chief, you're not talking sense. What you've told me so far doesn't sound to me like it'll stick. Can you prove that arson charge?"

"Yes. But I don't want to say any more on the phone, Mr. Roth. Can you get me out of here?"

"I suppose. What do you need, money?"

"No, no. That's not my problem. I don't want to leave town alone. I need a crowd around me. I want a network news crew, with cameras, and a chopper; a big one, to come to Scithersville and take me out on live T.V."

"What?!"

"You heard me, Mr. Roth."

"I can't do that. It'd cost a mint. Besides, you're not national news."

"Want to bet? Mr. Roth, do you love your country?"

"Sure, but

"Then save it. Trust me, Mr. Roth. There's more at stake here than my life."

Nate glanced up at the two reporters, who'd been listening carefully. He found each head nodding "yes." He himself didn't yet have a hunch, but if two experienced reporters thought he should humor Erwin, Nate was willing to do it. "O.K. Chief, tell me when and where."

"How long will it take you to get here?"

"Me?"

"I said I needed clout, and I'm sure you already know a lot about this."

"Uh-huh. O.K., Chief." Nate looked at his watch: 10:23 A.M. "Figure an hour to get to the airport on this end—another two and a half hours to St. Louis—chopper from there—maybe an hour, hour and a quarter. About two, two-thirty P.M."

"That late, huh?"

"That's not so bad, Chief. Puts us right in line with the evening news shows in the Eastern time zone. Where will you be?"

"At the Alban house—or what's left of the Alban house. You shouldn't have any trouble spotting that."

"All right; on my way. Stay out of trouble until I get there."

"Right—goodbye."

"Boss, can we

"No, Tyree. You guys stay in there. You're my insurance."

"But "

"No. I don't want them getting all of us." He buzzed his secretary.

"Yes, Mr. Roth?"

"Becky, call over to KFEX. Tell them we want a camera crew and the biggest chopper they can get their hands on, standing by the Lambert at three o'clock. —No, make that two o'clock —different time zone. Tell them it'll be a live hook-up and they should reserve lines."

"Yes, sir. Anything else?"

"Yes. Find Abdul. Pull him off whatever he's doing and tell him to get over to JFK, unless he happens to be in the building. If he is, send him in here. Do you know where Max is?"

"At his station, on the roof. The helicopter's up there, too."

"Good. Tell him to get ready to take me to the airport, and buzz me as soon as you find Abdul. Also, I almost forgot: call the airport and tell them to get my jet ready for cross-country."

"Yes, sir. I'll get back to you."

"Boss," said Hosey, "there's something I don't get; if you're going to use KFEX, what do you need Abdul for?"

"Because my mama didn't raise any stupid boys, Tyree. I'd be shocked if I found out Uncle wasn't tuned in on that call to Scithersville. If another aircraft blows up I don't want to be on it. It'd be too easy for something like that to happen at Lambert; that's why we'll go in from Paducah again. That's also why we'll use a satellite link instead of Ma Bell's telephone lines. We'll file a flight plan for St. Louis, divert to Paducah, and be there and gone before they have a chance to figure it out."

"What do you want us to do?"

"What you've been doing, Dave. I've got people jerking other records. We'll get them into the banks as soon as possible. Keep this place buttoned up while I'm gone."

"We don't know how to get out, boss. The door doesn't seem to want to open from the inside."

"There's, uh—there's a little trick to it," Nate said, grinning wolfishly. "I'll show you."

Roth stood at the edge of the blackened ruin and surveyed it, noting with dismay that it was impossible to keep the wind from blowing little pieces of soot onto his suit. He hoped it wouldn't look too bad on camera, as he waited for Abdul to give him the "on the air" signal.

Chief Erwin also waited nervously. He glanced around at friends and neighbors who'd gathered around to watch. Helicopters didn't usually land in their quiet neighborhood, nor did national news originate in Scithersville, except lately. In any other town there would have been hucksters, hawking souvenirs, and professional protesters trying to get in on the act. But not here.

Abdul raised his arm, looked at his watch, then brought his arm down swiftly. His eyes went nervously toward the dish antenna standing on the roof of a nearby van, through which his signal would go out.

Nate began. "This is Nate Roth, WBC News, with live coverage from Scithersville, Illinois. We have here with us this afternoon Chief of Police LeRoy Erwin.

"Chief, this interview was arranged because of a call you made to WBC earlier today. Would you tell our viewers why you requested this coverage."

LeRoy, nervous but trying his best to appear calm, cleared his throat, squared his hat, and said: "Because, among other things, I believe I'm going to be killed."

"Chief, before we go on, you're not a positive, are you?"

"No sir. We were all tested. Everybody in the Police Chiefs' Association got tested. I'm negative."

"What makes you think your life's in danger?"

Nate and LeRoy had had only a few minutes to go over the story, and Nate earnestly hoped LeRoy would stick to the agreed format.

He did. "Well, in the first place, there's Dr. Alban's death. I know there's

been an investigation of that and that they claim it was an accident. But I don't trust the people who made the investigation. They've done other things since that make me think there's some kind of a cover-up going on."

"Tell our viewers why you think so, Chief."

"O.K. As many people may already know, we've got two industries around here. One of them's farming. The other one's prisons. The biggest, toughest prison in the country is over at Marion, just a few miles away. So there's always been a strong federal presence in Scithersville. We always worked together before. Now they're working against me."

Don't make yourself sound paranoid, Nate screamed silently to himself. Aloud, he continued, "Have you got reasons for saying that, Chief?"

"I have. Right after Dr. Alban was killed, the F.B.I. sent men in here to get his records away from his widow."

At that statement, eyes bugged on the locals in the crowd. LeRoy paid no attention. He went on: "They didn't have any business with them; they didn't have a court order and Ceil wouldn't turn them loose. So the other day, after a WBC news team came in here, they staged a phony prison break, sealed off the town, and tried to kill the reporters. When they failed at that, they went back again to try to get Ceil's records."

"The F.B.I. did all this?"

"Yes. Part of them, anyhow. Maybe not all of them. Some of the F.B.I.'s people are positive, including the regional supervisor at St. Louis."

Good—LeRoy's got a better memory than I'd hoped, Nate thought.

"O.K., Chief. How does being positive affect professional responsibility? The test has only potential validity."

"There's more. When the reporters got away, the F.B.I. had no way of knowing what they took out with them. They had to try to find out, so they went back to Dr. Alban's house to steal the records."

"Again, Chief, that's pretty strong stuff. Where's the evidence?"

"For that we'll need some shovels. We have to 'dig up' a witness. Can we take this stuff over there by the edge of the foundation?"

From the crowd a couple of men with shovels appeared. They went to work on the pile of rubble, mostly charred wood and shingles, that had fallen around the house. For a long time the camera stayed on them and the others were silent.

Then the shovels began emitting a scraping noise, and soon the camera monitor showed a flat steel door set in concrete. One of the men took his shovel to the edge and pried. The door opened a crack, then rose all the way up. A murmur began in the crowd.

LeRoy faced the microphone and said, "The lady coming up is Ceil Edwards Alban, Dr. Alban's widow. The fire was supposed to have killed her. As everybody can see, it didn't."

Abdul zoomed in on her as she walked up to the microphone. LeRoy stopped her to give her a hug.

Nate began, "Mrs. Alban, I'm sure the viewers would like to hear from you now."

"Gladly," Ceil responded. "I've been cooped up in there for almost four

days, just waiting to tell somebody. It's good to be back in daylight again.

"I know I'm supposed to be dead. I'm not dead, and I don't intend to die. When I do, I want it to be from old age, not by 'accident' like they planned.

"Three days ago two WBC reporters came to see me. They stayed the day, and we talked a lot. I gave them information out of Nelson's records; then they left.

"After it got dark I heard the sirens go off at Marion. I knew that probably meant trouble, so I got ready. Sure enough, just as I was about to go to bed, I heard a noise downstairs. It sounded like somebody breaking into the house.

"I went downstairs with my shotgun. I saw a man, and I yelled at him to stop. I turned my flashlight on him. I could see it was one of the men from the F.B.I. who'd been out bothering me before, and I asked him what he thought he was doing, breaking in. His answer was to pull a gun on me.

"I shot him. Then I ran down to the basement, because I could hear other people in the house, yelling back and forth, and I knew they'd be all around the outside doors.

"I wanted to call LeRoy, so I went into the record room because there's a phone in there, and I barred the door. I thought I'd be safe there until help came, because the record room is specially built; two steel walls with glass wool between them, to keep its temperature and humidity constant.

"I couldn't get an answer at the police station; I guess everybody was out. Anyway, somebody started banging on the door.

"I knew it would hold; against most things, that is. But then I could feel the door starting to get hot around the edges, and I knew they'd brought a cutting torch and were trying to burn the hinges off.

"I had to do something to stop them. I looked around to see what there was. I saw the cable on the copy machine; nice and thick, because it has to carry a heavy current. I took a knife and cut the cord off. Then I stripped the insulation off the end and wrapped it around one of the locking bars.

"We have 220 volts in there and heavy amperage. When I plugged the cord back in, it sent a current through the door. There were screams; the lights went out, because it tripped all the circuit breakers. A few seconds later there was an explosion. LeRoy told me later he thought I electrocuted the guy with the torch, and that the flame probably cut through the gas lines and blew up the acetylene tank. Anyhow, something set the house on fire.

"It got awful hot in there, in spite of the heavy insulation, and for a while I had a breathing problem, too. But we had medical oxygen, quite a bit of it, stored in there, and I used that. Later, when the fire department got the fire out, the air got better.

"I could hear the water gurgling around, and when I thought it was safe to come out I tried the door. But it wouldn't open, and nobody seemed to be able to hear me. Fortunately there's also a refrigerator in there, and there was some food. There was enough water for a few days, too.

"I tried the phone. I thought that might work because all the circuits came through the record room from outside.

The dial lit up, probably from battery power in the line, but I couldn't get a dial tone. I tapped into the line to get light. Not much; they only carry seven volts, but it helped. I stayed in there for two more days before something finally happened to the phone and it started working again. That's when I called LeRoy. He arranged to dig me out after you got here."

"That's amazing, Mrs. Alban. You're a remarkable woman. You're a negative, I suppose."

"I am. Nelson himself tested me."

"Mrs. Alban, can you explain any of this? I mean, what is it about Dr. Alban's records that makes them worth burglary, arson, and murder? Do you have any idea why these people are so desperate to get at them?"

"Yes, I do. I think the positives, at least those who were in positions of power when all this started, are trying to organize so that they can stay in power. I think they want to suppress, or destroy, whatever record exists that they are what they are, and that are an embarrassment to them because they go back to a time before these people knew they were different, so they weren't part of a modern cover-up. These may be the last such proofs in existence."

"You said 'an embarrassment.' To whom?"

"Many people in government, Mr. Roth. But when I said that, I was thinking principally of Edward M. Kinney, the president of the United States."

Nate took the mike. This had been the bombshell he'd been waiting to drop. He gave a short commentary and signed off, then handed the mike to Abdul.

"Let's go, you guys; everything that'll fit, into the chopper. LeRoy—Ceil—come on."

Abdul left his antenna on top of the van. He dropped his battery pack, too. It was a long haul to Terre Haute, where their jet, now airborne, was waiting in a holding pattern.

The helicopter rushed off to meet it, touching down at the end of the runway as soon as the jet stopped rolling.

They climbed hurriedly aboard, and off they went again. Three hours later, they landed in Montreal.

Within the oval office the midnight oil burned. Kinney had a roomful of people, not all of them happy to be there, and he himself had a king-sized problem to deal with. A latecomer entered.

"About time you got here, Gosnell," the president roared.

"Sorry, but with all that's happened I just can't move without some reporter jumping me. They're all over the place. The networks, the wire services, every two-bit newspaper in the country has got somebody camped on I Street."

"There's little wonder in that, Gosnell. How could you have been so clumsy?"

"Clumsy! Do you realize what I've got to work with? In the whole region I've got ten—count them—ten agents I can really trust. All the rest are straight. They had to be kept out of it. And what I did have, I had to move slowly. When are you going to get rid of that director, anyway? If you'd done that, at least I wouldn't have to dupe the front office."

"Well, I can't do it now. That's for

sure. It'd look like a real cover-up then. I'm not even sure I can keep the heat off you."

Gosnell's face turned ashen. "It was that crazy old man. He screwed it all up. We'd have had those reporters if it hadn't been for him. We fixed him, though. We put "

"I don't want to hear about that, Gosnell. The point, now, is that the public knows about *ME*. The people will be wondering why I didn't come out with my status before."

"There's lots of other positives in office, Mr. President, and "

"So what. I'm different; I'm the president. I run the whole show. It's true: elected officials can't be removed just for their status, but they can be impeached. All it takes is the overt act, which you've probably given them. If they tie me into it, or into a cover-up, it's all over. Remember Watergate?"

"Who doesn't? Look, Mr. Pres—"

"No, you look, Gosnell. I intend to clean this mess up, right now. You hear? And you're going to keep quiet and take your lumps until things calm down. You're positive, remember, and they wouldn't be able to convict you even if they prove you did commit murder. I've got scars on my back that say so.

"Now, you'll get your pension; I'll see to that. That's a promise. So on your way out of here, see my press secretary. He'll have a letter of resignation for you to sign. He'll also tell you what to say—and what not to say. And remember, I promised you only your pension. Whether or not you ever collect any of it is dependent on how much sense you've got. Clear?"

"Clear, Mr. President." Gosnell got up and left.

"Abelard!" Kinney roared.

"Yes, Mr. President," answered the tall man who rushed over.

"I want a tail on that guy."

"Already done, sir. We started covering him right after the broadcast. I must say, I think you're using the best strategy in getting rid of him, sir."

Kinney looked up at Jason Abelard. He'd always thought the secretary looked like an English butler, and indeed, he now did. Bald, gaunt, and serious-featured, he was. And, Kinney thought, positively embarrassing to his cabinet.

"What about your strategy, Abelard? What kind of shape are we in there?"

"Well, it's hard to tell, sir, when you come right down to it. Most of our 'repositioning' is over with. With the junior officers, I mean. But I don't dare get too frisky with the old-timers. We just can't bounce senior military people around too much or too fast. We have to go slow or it'll cause talk."

"There'll be talk anyway, if we have to get tough."

"True, and we have their orders cut. But there's more to worry about than just domestic reaction. Like it or not, we have to consider what's going on in other countries and how they'll react to what we do. I'm thinking principally of the Russians, of course."

"They'll understand. They're purging their own armed forces."

"That's also true, Mr. President. However, they're a nervous bunch to begin with. I'm sure they've made complete studies of all our top people, just as we've made on theirs. If we dump all our senior commanders and put in

unknown people, especially now, when they know you're a positive well, anything could happen."

"I see. What's your recommendation?"

"I think we ought to get rid of as many as we comfortably can, certainly the biggies—Mannerheim, Cavassos, and Pellitier. We can move them into overseas commands, or get them out of field commands altogether and into desk jobs. That we could get away with; Pentagon assignments mean promotions."

"What can we do about Second Army? Second Army's a must. We have to control that. And Aberdeen; half the armor on the East Coast is at Aberdeen."

"Aberdeen's O.K. So is Bragg. We've got our people in firm control. Not so at Meade. There's no way to get rid of General Gatheral, short of uh, termination. God, you're not taping this, are you?"

"Of course not. One man who sat in my chair tried that. Not me. I'm crazy, not stupid. Look, Abelard, you heard what I told Gosnell. Do what's necessary. You personally risk nothing as a positive. You're immune to prosecution and punishment. That's what's going to make this whole thing work—understand? Only one thing can stop us: if somebody catches on before we have all the loose ends tied up. You—you're one of the keys. Do your job, Jason, and let me worry about the politics. O.K.?"

Kinney's charm still worked. The worried look left Jason Abelard's face, and he left the room with that warm feeling you get when the president uses

your first name in conversation with you.

"Beautiful! How did you manage that?"

"Glennadean did it," replied Hosey. "Glennadean, meet Mr. Roth."

A shy-looking girl, who'd been off to the side scanning a printout, came over.

"You're from Accounting," Nate said. "I've seen you there."

"Yes, sir. But I used to work at Post Headquarters at Ft. Leonard Wood when my husband was stationed there. I remembered some of the old access codes to the Post Locator system.. And they still work."

"Yeah, boss," Tyree smiled. "And how, they work. Once we busted in we got to the whole system. We got names to match the numbers; plus duty status and current station. We've made over a thousand hits, and wait'll you see who."

"Flash it, Tyree."

Tyree did.

Nate bent over and went down the screen name by name, emitting a low whistle as he went. "Incredible," he said. "And look; positives are moving around like crazy. I don't see one here who's had his present job more than six months. Can we get a continental overlay across this?"

"Coming up, boss." Tyree entered commands and waited. An outline map of the lower forty-eight appeared. "Shall I spread them?"

"Please."

Again Hosey's fingers flew across the keys. Spots of light appeared on the screen.

"That's everywhere where there's a positive in top command as of this instant, boss."

Nate whistled softly. "My God! They're all over us. Look: Dix, Drumm, Aberdeen, Bragg, Gordon, Quantico, Cherry Point, Polk, Riley, Sheridan—all the big East Coast infantry and armored posts; all the East Coast Marine bases; all the Airborne divisions. Why, the whole East Coast is under crazy command!"

"We ran this before, boss. Not quite this way, though. We threw in all the senior army commanders who tested out negative. Most of them are in their late fifties or early sixties, and there're surprisingly few positives in the top echelons. And very few negative seniors have moved around lately, except to Pentagon jobs or overseas."

"How many of these assignments have there been?"

"Four—four in the last ten days."

"Now, doesn't that strike you as a little odd, Tyree: non-positives going into staff positions where they don't have any troops, at the same time that positives are being shifted into combat commands."

"Yes, it does. It surely does."

"Print out the senior non-positives and show their stations."

Keys clicked immediately. The dots on the map changed. Nate took a long look at them.

"Hmm—Gatheral's still at Meade; Cavassos still has Hood. But Pellitier was moved from Rucker to staff, and Mannerheim from Riley to Far East Command. Tessiatore went to foreign service. Foreign service? Put him on the screen."

The map disappeared. In its place was a line of type. "Tessiatore, Alfredo J., Lt. General—assigned 7 July—U.S. Legation to U.S.S.R.—status—en route to station."

"Why? Who sends a three-star general out as a military attaché, even to Russia?"

"General Tessiatore's not a positive, boss. Maybe they just wanted to get him out of the country."

"Well, that may be part of it, but I wonder; he's supposed to be a pretty level-headed guy. Maybe he's there for some other reason. Maybe they need a cool hand over there when they make their move. I think they're trying to insure stability. The Russians would give a situation like that plenty of weight."

"You know what I think, boss; I think I'm getting scared. Something terrible is about to happen, and it's moving fast."

"I agree, Tyree. The next question is, what are we going to do about it? Got any ideas?"

"Sure, lots of them. They all say the same thing—get out of the country before they get YOU."

"Individually, that might be all right for a few people. But it's bad for the country, Tyree. If one crack appears in American solidarity, it's all over for the rest of the world, too. Despite all that bull you hear about 'collective security,' the peace of this world depends on one thing, and one thing only: the armed might of the United States, backed by a responsible civil government. And," he exclaimed, "that's where Tessiatore fits in. I'd book it."

"There's something else bothering me, boss."

"What?"

"Us—me and Dave. Why are they laying off?"

"Well for one thing, Tyree, they don't know where you guys are. Not for sure, anyhow. And me; me they don't dare touch. Not now; maybe later. For some reason they don't want to mess with the media, probably because public uproar could still stop them; and whatever else happens, we'll be the last target."

"Are we just going to wait until they're ready to take us on, boss?"

Nate didn't answer.

CONCLUDED IN NEXT ISSUE

● All warfare is based on deception. Hence, when able to attack, we must seem unable; when using our forces, we must seem inactive; when we are near, we must make the enemy believe that we are away; when far away we must make him believe that we are near. Hold out baits to entice the enemy. Feign disorder, and crush him.

Sun Tzu, *The Art of War*, 500 BC

the reference library

By Tom Easton

Maurai & Kith, P. Anderson, Tor, $2.75, 239 pp.
Orion Shall Rise, P. Anderson, Timescape, $16.95 (cloth), $8.95 (paper), ? pp.
Aurelia, R.A. Lafferty, Donning, $5.95, 185 pp.
The Three-Legged Hootch Dancer, M. Resnick, Signet, $2.50, 154 pp.
Against Infinity, G. Benford, Timescape, $14.95, ? pp.
Prelude to Chaos, E. Llewellyn, DAW, $2.75, 256 pp.
There Is No Darkness, J. Haldeman and J.C. Haldeman II, Ace, $2.75, 245 pp.
Tea with the Black Dragon, R.A. MacAvoy, Bantam, $2.75, 192 pp.
The Dragon of the Ishtar Gate, L.S. de Camp, Donning, $5.95 (paper), $12.95 (cloth), $35.00 (boxed, signed, and numbered), 341 pp.

Poul Anderson is an acknowledged master of SF and fantasy. Like too few others, he is capable of great feats of imagination, leaping tall postulates at a single bound, faster than a speeding Selectric, more powerful than ————. Hmmmm. If I try to fill in *that* blank, I run certain risks of purpleness, obscenity, or just plain excess.

Let's leave it out: He's hot, and we know it. The trouble is, he sometimes takes a long time to develop an idea. He begins with a scattered handful of short stories. Later he returns to their world and builds one or more novels. And he has done it again.

The stories introduced the Maurai, post-holocaust descendants of the Maori of New Zealand, expanded to absorb all the races of the South Seas. Their technology is one of nonviolence: seducing the world, not raping it, to satisfy their needs. They are biologists and traders, using sun and wind for energy. They insist on preserving cultural independence and variety, but they also veto anything that looks as if it might lead to a technical civilization like our own. They

believe such a thing to be abomination; and besides, they say, the Earth cannot stand another such assault. Their path, they believe, is the only one consistent with long-term human survival.

Maybe so. Anderson may even have believed it himself when he wrote "The Sky People" in 1959, "Progress" in 1962, and "Windmill" in 1973 (the stories appear together in **Maurai & Kith**, along with two unrelated tales, one of which is "The Horn of Time the Hunter"). He may believe it still, but he seems to be considering the idea more carefully, more thoroughly, even more skeptically.

The early stories now appear as history. They describe events that helped shape the world of **Orion Shall Rise**, an intricate, large, and largely satisfying novel. Here the Maurai dominate most of the planet, enforcing their anti-high-tech view on everyone within their reach. They forbid nuclear power, even fusion, for fear both of a new holocaust and of the planet-rape unlimited energy would make possible. They have fought a war over just this issue with the Northwest Union, a nation of freedom-loving, technically oriented anarchists, centered on what had been the Northwestern U.S. Yet they are also opening relations with the Domain of Skyholm, a Europe overshadowed by a stratospheric aerostat (a high-tech hot-air balloon) kept in repair and aloft through the centuries by the descendants of a few survivors of the holocaust. These descendants now dominate a feudal society of peace and plenty.

Among the story's central characters are Talence Iern Ferlay, heir to the Domain's Captaincy; Terai Lohannaso, a Maurai merchant captain and intelligence agent; and Ronica Birken, daughter of a Union friend of Terai's, killed in the Power War. Ronica is important to the Union, for she is a retriever of antique warheads, essential to the project that will let the Union dominate the planet. Her slogan, and the Union's, is the book's title. With a Machiavellian schemer, Mikli Karst, she goes to the Domain, seeking warheads *and* offering a usurper aid in taking over Skyholm. Terai, on behalf of a suspicious Maurai Federation, follows. Ronica succeeds and returns to her ship with warheads. The usurper succeeds as well, and Iern, fleeing for his life, takes refuge on Ronica's ship. Ronica, Mikli, and Iern then flee by plane toward the Union. Terai pursues, and all crash somewhere in North America. In time, they do reach the Union, and Terai and Iern find out just what Orion is—a fleet of nuclear-powered spaceships, among the highest of high-tech dreams, complete antithesis of the Maurai vision.

Here, then, is a confrontation of cultures, of ideologies, and of personalities. The Anderson who wrote the early Maurai tales might have resolved the confrontation in favor of the Maurai, giving them the victory in war and scheme. The present Anderson, more complex, more realistic, perhaps more thoughtful, seeks a compromise. He wants both to protect the Earth in the Maurai way *and* to reach for the stars. He recognizes two necessities, and he shows us a way to attain them.

Like other tillers in this too-small vineyard of ours, I have called for myths that might guide us into the future. Anderson is also aware of this need, and he knows who best can meet it. Our guide must be less the writer or philosopher, he tells us, than the poet, and he offers us Plik, a troubadour, who continually reminds the characters that they are in a new myth: one of power, threat, and promise.

An ambitious novel, *Orion* lives up

to its own aims. It is good, and I recommend it. Don't be surprised to see it on this year's Nebula and Hugo ballots.

Less good by far is R. A. Lafferty's **Aurelia.** The book offers us a naive and empty-headed teen-aged girl come from her advanced civilization to govern Earth for a brief spell, as a final stage in her education. Earth, of course, is full of evil and exploitation, and Lafferty tries hard to show us how little sense it all makes as he leads Aurelia to her crucifixion. However, the best he achieves is a semi-surrealistic confusion and profound irritation in the reader. The book fails even in its own terms, and I don't recommend it.

It's a shame. Lafferty has done some marvelous short work. If he could only sustain the quality for a novel, he would give us marvels! Sadly, he seems incapable of that gift.

The second of Mike Resnick's four volumes of "Tales of the Galactic Midway" is now out. It's **The Three-Legged Hootch Dancer**, with one of the niftier titles of recent years. The tale itself seems less nifty, at least at first, and less impressive than volume one, *Sideshow*.

The book's major problem seems a confusion of foci. It purports to tell how Thaddeus Flint and his carny make out on their first exposure to Galactic civilization. They have been booked into backwater worlds, where aliens lack the background to appreciate Earthly jokes and strippers. The solution turns out to be, first, barking the stripper as a cultural exhibition, and second, shifting emphasis to the classic grifts. The latter, especially, make the carny a hit, and clearly bigger and better bookings await.

Yet this is *not* the story, and we don't learn better till well into the book, when we realize the importance of the totemically-named stripper, Butterfly Delight. Frustrated beyond bearing by lack of audience response, remembering the raunchy boors of past Earthly audiences as paragons of appreciation, she insists that stripping is for her. Yet the aliens are not turned on. At Thaddeus's insistence, she tries her hand at other carny jobs and fails miserably at each. Finally she learns that galactic technology offers a solution. Surgery can give her an alien body, and then she can appeal to her audiences. She can appeal to only one species at a time, but she can and will go back for more surgery when she is ready to change worlds.

The real story is that of Gloria Stunkel's metamorphosis from homely caterpillar into a delighting butterfly. For those who miss the metaphor, Resnick hands her her solution with the aid of a human who has been surgically transformed into a slug-like or caterpillar-like alien.

Resnick's point seems to be that humans cannot truly adapt to the stars unless they are willing to change drastically. He makes his point with a literal metamorphosis, and he sets it off against the carny's lesser adaptation by relying on old tricks, the grifts. Yet there are clues that the carny may find its own metamorphosis. What form or forms will it take? Perhaps volumes three and four will tell us.

To return to my objection, is there really a confusion of foci? On the surface, yes. Resnick's larger theme becomes clear only as one pursues a tale of sheer entertainment, and that theme is a serious one. On thinking back, I realize that *Sideshow* too dealt with adaptation. The next two volumes will too, I suspect, once we see past the yarns in which Resnick wraps his theme. Con-

fusion? Not really. Resnick integrates story and message well, and he puts his story in the foreground, just as a pharmacist puts his pills' sugar-coating on the outside. Yet the message is there, and it is plainly identified as such.

Greg Benford's **Against Infinity** is a whole 'nother thing. Here we are hard put to find a story worthy of the word. Message, on the other hand—well, it's gotta be there. You can tell. The thing's lit'ry as all get out in tone, so there's got to be one. In fact, the message is clearly more important than the story.

So what's the message? Damfino! But enough mock philistinism. There *is* story, and the message isn't that hard to pin down. The moons of Jupiter have long been settled by colonists from socialist Earth, and they are being terraformed, even unto wrapping Io in a plastic baggy. Too, the moons are studded with artifacts: mysterious, incomprehensible, abandoned billions of years ago.

Both the story and the only active artifact are on Ganymede. There the colonists curse the Aleph, a juggernaut that burrows through the moon, erupting randomly to squash people and their shelters. The terraforming is by means of bioengineered beasties prone to mutation, and the colonists periodically hunt down and cull the mutants. On their hunts, they at times see the Aleph, chase it, shoot it, all futilely.

The story opens when Manuel Lopez, on his first culling, meets the Aleph. Thereafter, their destinies are linked. He assumes a hunter's mission, uses cyborg dogs on his hunts, and finally prevails. The Aleph, the mystery of the frontier, is dead, and the air is thick with futility.

It's a tale of growth, maturation, fate, and destiny. It's Hemingway SF. Perhaps it's a rewrite of Faulkner's "The Bear." Certainly it does *not* really deserve the hyperbole with which I began this review, for hyperbole my remarks were. There's story here, and story of a sort we're more accustomed to seeing in "higher" forms of literature. There is theme, too, and theme as valid as anything we might ask for.

Perhaps I don't appreciate lit'ry doings well enough. If I did, I suspect I'd like *Infinity* a lot more. After all, it does at least one thing I love to see—the technical "furniture" of Benford's future are practically invisible, almost as taken for granted by the characters as they might be in life. Here is the stamp of thorough imagination, and of a fictional world that feels real.

My ambivalence is clear, isn't it? *Against Infinity* is good, but it's not quite my cup of tea. Is it yours? Maybe. Try it and see.

Edward Llewellyn impressed me favorably with his first two novels, *The Bright Companion* and *The Douglas Convolution.* Now he gives us their prequel, **Prelude to Chaos**, in which we see just how Impermease, a selective inhibitor of cell division, brought down civilization. It was a nifty contraceptive, you see, as well as an anticancer drug and insecticide. People took it on purpose and with their food, and it built up in their bodies, sterilizing them. Only a lucky few Believers, cultists who eschewed post-1990 chemicals and nonorganic foods, remained fertile.

To keep its secrets, including this one, a repressive U.S. government jailed whistle-blowers in the one remaining federal penitentiary, on the coast of Maine. Here paced hero Gavin Knox, who knew who killed the president, and heroine Judith Grenfell, who knew other secrets. Threatened with mind-erasure, they escaped, found out about Imper-

mease, and sought refuge with a Believers' Settlement in the Shenandoah Valley. When Sherando was subverted, they fled to Maine, where they successfully held out against rising chaos. They fought, for the Believers' women and children were widely coveted, and they found a refuge.

I would like to think Llewellyn overestimates human selfishness and folly. I would like to think people would cooperate even in the face of such a grossly unfair reproductive shaft.

I know better, I think. In the actual event, Llewellyn would probably prove a wild-eyed optimist. There would be such things as international raids to steal or destroy fertile women. Yet a novel of such events would be far starker than Llewellyn must find congenial. As is, his tale is full of optimism. It points to a future that may be better, and even wiser.

Chaos is an action-adventure yarn, and not a bad one. The characters are adequately drawn and events are rarely too implausible to accept. If it is not as serious as Benford's book, that is no reason not to recommend it. It is good entertainment, not too light to have a point, nor too sharply pointed to be fun.

Joe Haldeman and his brother Jack have given us **There Is No Darkness**. Unfortunately, here Joe once more fails to match his earliest performances. This is no *Forever War*, even though the book's cover seems designed to suggest that fame-bringer.

Darkness is a school-kid's tour. In this way much like Joe's *Worlds*, it varies in exploiting a different model: not the old Grand Tour of Europe, but the "floating campus" cruise ship. The school is a starship, *Starschool*, that picks up kids poor (on planetary scholarships) and rich, exposes them both to classes and to foreign cultures at various stops, and turns them out as potential leaders.

The kid is Carl Bok, a giant from a harsh farm world. He is naive but willing, and he accepts adventure. Faced with a punitive landing tax on Earth, he seeks to repay the school by becoming a gladiator. He tackles a bull, a bioengineered polar bear, sharks, and men, revealing in the process a decadent Earth. On Hell he is press-ganged to help fight a war. At Construct, an artificial world maintained as a meeting ground for the galaxy's sentients, he finds apotheosis and knowledge.

The book is no novel, but a trio of novellas (two of which appeared in *Asimov's SF Adventure Magazine*). Unfortunately, though the novellas *go* together, they fail to strengthen each other as they must to make a novel of any worth. As a triptych, the book remains fun, as adventure stories should be, but don't expect too much.

Robert MacAvoy's **Tea with the Black Dragon** is a delight from the cover onward, but perhaps not quite the delight it might have been. Martha Macnamara, middle-aged zen sitter and Irish fiddler, comes to San Francisco at the invitation of her troubled daughter, a computer programmer. At her hotel she meets Mayland Long, an urbane Oriental gentleman. They enjoy each other's company, and when daughter Liz seems to have disappeared, he volunteers to help find her. Then Martha is kidnapped, and Long must search for both women. Shot, stomped, and wired to a concrete block, he yet succeeds, putting paid to a pair of embezzling villains and finding true love.

So much sounds like standard amateur detective fare. What makes the difference is Long himself, for he is well

over a millennium old, and until recently an imperial Chinese dragon. He still retains a dracoid strength of grip, will, and wisdom.

How did he get to be a man? Long ago, he sought to understand humans. However, he could only collect scholarly references. When he approached a Formosan wise man, alone on a hilltop to die, he earned laughter for his presumption and a prophecy for his future. He should go to California, where he would in time find Truth. He passed the night coiled around the Formosan. In the morning the man was dead, and the dragon was a man. As a memento, he keeps a statue of a dragon in his quarters, and it is this elegant artifact that graces the book's cover.

MacAvoy handles all this well, with a graceful sense of restraint. So what do I mean when I say the book could be more delightful? I think what I missed lay in the book's characters. Long did not seem as much like a dragon as I would like. He wasn't alien enough. Too, MacAvoy calls him a jokester early on, but we see very little of this. He is good-humored, yes, but ultimately serious. Martha and others also fail to live up to their introductions, and we are left with a nagging sense of false advertising.

Starblaze (Donning) has embarked on a large and welcome project: restoring to print L. Sprague de Camp's "Novels of Heroic Adventure" as a series, with illustrations by Fabian. First comes **The Dragon of the Ishtar Gate**, which sounds and reads like fantasy but is actually historical fiction.

The story: Persia's King Xerxes, eager to prolong his life, seeks the ingredients for a magical spell—the heart of a hero, the ear of a king, and the blood of a dragon. The last seems hardest, but the priests tell him the dragon pictured on Babylon's Ishtar Gate lives at the headwaters of the Nile. Anyone who could fetch from there a dragon would be a hero, and on his return Xerxes would have two ingredients in hand. The third would be easy to obtain.

Who will play hero? Fortunately Xerxes has a suitable chump on tap, a prisoner already assuming his seat on a sharpened stake. Pardoned, Bessas will happily hunt dragons!

And so he does, through intrigues, plots, ambushes; past cannibals and other savages. In the end he returns with a king's ear (from an Egyptian mummy), but no dragon. Instead, he offers trade routes and pygmy emissaries, and even his own Arab chieftainship. There's action aplenty, and a good read for anyone who favors the fantastic side of reality. ■

● In a world short of raw materials, it is not hard to predict that by the turn of the century employment will be 80 to 85% in the service trades. The economy will grow, and will be stimulated to grow, *not* by expanding our physical production but by expanding our service economy.

Louis Harris

brass tacks

Dear Mr. Schmidt:

Mr. Jerry Pournelle's Alternate View in *Analog*, January '83, typifies from my perspective the problems with space exploration. Every booster and booster organization of the space program seems to suffer from the same myopic lobby-the-government-for-funds syndrome. Why? Who is The Government? Who supplies The Money that The Government spends on space research? We do; and if we can indirectly fund, without control, The Government's space program, why can't we directly fund, and exercise direct control over, our own damned space program?

Mr. Pournelle rightly notes that the development of a "waldo," or EVA robot, is necessary for space exploration. He pegs the cost at $100 million —big deal. How many people are there in this world who see space exploration and development as the ultimate reality and are willing to invest cash in their concept? If they number one million *worldwide*, an investment of $100 each would fund the "waldo" program, and they would own and benefit from its exploitation. Assuming it would take ten years to create the "waldo," how many plastic pizzas or pasteurized beers would each have to give up annually to fund the program —how many "waldo"-type programs could one million investors fund?

We like to think of ourselves in this nation as big-time pioneering-type, can-do, go-getters. The fact is we suffer from a perceptual paralysis which translates to: Can-do, if we go-get The Government to do it for us. Why should we need the government, when 25,000 people could fund a ten-year program, with a $100 million net cost, for small change annually?

No government, other than at gun-

point, ever did anything for anybody unless it improved government's control of the governed. Can anyone name one government creation that they would like to preserve, as is, where is, without modification? Further, governments have to try to satisfy everybody, the greatest good for the largest number of citizens—people who view space exploration as the best use of resources are round-world believers in a flat-world society.

Practical space exploration and exploitation requires the development of practical space tools by practical, hard-minded, independent people. Tools such as: a space Prairie Schooner, a space Log Cabin, a space Union Suit, space Trail Rations, a space Freight Line, and eventually, space Tin Lizzies. These are the types of devices that will open up space exploration; and if we want them, we are going to have to build them.

No government is going to provide its citizenry with this kind of practical independence, and the sooner we collectively disabuse ourselves of that fantasy, the better off we will be. The solution to space exploration and exploitation is to stop following and start leading, to commit our individual fortunes to the arena of our collective mouth. We Americans now allegedly own *our* space program. Does anybody really believe that? What is the possibility of us or our children, ad infinitum, ever riding anywhere on *our* space ships unless our government decides to have a space war? The only way ordinary citizens like us will ever directly benefit from a space program is if we own it—Lock, Stock, and Barrel.

It does not seem unreasonable to me that there are enough people reading this magazine to form the nucleus of a practical, people-oriented, free enterprise, space development company. Really Free Enterprise, free of government control, which is what the term means. How about it Jerry Pournelle, and all you other space enthusiasts out there, are you enthusiastic enough to put some Bucks into some programs that you might not live long enough to enjoy? It is time we stopped talking about space exploration and started doing something about it. If there is anyone out there who agrees with me, write to me and perhaps we can start a private space development company. Maybe we can call it the 'I Remember Columbus Memorial Space Co.'—If we are lucky, some of us might even sail over the edge.

JOHN Q. COSTON
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Dear Editor:

It has oft been said that those who can't write become critics. This has been remarkably demonstrated by critic Easton's scathing review of L. Ron Hubbard's *Battlefield Earth: A Saga of the Year 3000* in the February 1983 issue.

I would like to point out that most readers, well versed and ignorant alike, look to a fiction novel for an interest-catching and even adventurous story. They don't care about nitpicky technical details (I haven't bothered to verify Easton's complaints)—they read theses and college texts for that stuff. As I make it my business to keep up with the latest in SF&F, I read *Battlefield Earth* shortly after its release, and I found that once I began reading, I couldn't put it down. The same phenomenon went for all my friends and associates who read the book, and it would seem that we are not alone, looking at some of the many other reviews that have been done (i.e., A.E. van Vogt). And as for "gonads

forgotten," at least not all of us rely on sex alone for our jollies.

As an aside, I don't feel a man's religion has anything to do with anything else. Does anyone care what religion Heinlein chooses for himself? For a "civilized" magazine such as *Analog* to stoop this low is immature at best.

JOJO ALBERT
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As I've said a wearisome number of times before, but have to keep repeating for some people, a book review is nothing more or less than a statement of the reviewer's personal opinion—just like your letter. And incidentally—if you think readers don't care about details, you don't know Analog*'s readers. My mail every day shows loud and clear that they want interest-catching, adventurous, and accurate—and they can be very nitpicky indeed with writers (and editors!) who they think have given them anything less. Which, in my view, is entirely as it should be.*

Dear Stan:

The December 1982 editorial invited arguments about the High Frontier scheme for a space-borne antiballistic missile (ABM) system against Soviet missiles. Such a scheme will undoubtedly affect the nuclear balance of terror currently existing under the precept of MAD (Mutual Assured Destruction).

MAD is grounded in two axioms: (1) each side having sufficient nuclear power, even after a surprise first-strike attack, to inflict an "unacceptable" level of damage on the other and (2) that neither side has an effective defensive system (passive or active) that could neutralize the other's ability to inflict damage. These axioms are the foundations of SALT I and the ABM treaty and are basic to defense and foreign affairs policy. These axioms are not hard and fast rules, either—each side has its own idea of how much nuclear weaponry is needed to present a viable threat or how well to defend the country.

The best way to explain how a space-based ABM system would affect the current balance of terror is to envision a scenario where the Soviets plan to build such a system. Despite its defensive nature, it would be a threat to U.S. security because it makes our intercontinental range missiles (ICBMs) vulnerable to attack after they are launched.

Let's have a scenario in which the Soviets build their space-based ABM system. The Soviets launch a nuclear attack against key strategic military installations (such as missile silos) in a so-called "surgical strike." They avoid the cities and seek to destroy the means of nuclear retaliation—our ICBMs mostly. Any American missiles surviving the first strike and launched in retaliation would be destroyed on the way to their targets. The U.S. loses its nuclear arsenal and is no longer a threat to the Soviets (whose military machinery is virtually untouched). However, the Soviets will still retain a sizable number of their ICBMs to destroy American cities if the U.S. does not capitulate.

If both sides constructed similar space-based ABM systems, the net effect would be to cancel out each other's missile suppressive defense and—poof!—we're back to a balance of terror. That is, neither side will be able to launch an attack because it only sacrifices its nuclear weapons to destruction. Neither side would find it favorable to even consider an attack.

The concept of a defensive shield is only another military instrument, and

ways will be sought to circumvent its capabilities. Passive or active missile in-flight defense systems, evasive maneuvering, low flight paths, multiple false targets, and attacking the ABM system itself are only some of the options available.

The Russians are in a better position to build a space-based defensive ABM system than we. They have more near-Earth-orbit experience than we; they launch larger payloads more often; their military already dominates the Soviet space program; Soviet laser technology (the weapon of choice for a space-based ABM system) is uncontestably years ahead of us; and Soviet political leadership will ensure their military supremacy at any cost (meaning that it doesn't matter if it costs x billions and creates y deficits, it will be built).

Because the Soviets are ahead, we should plan to build a space-based defensive system. I like the idea personally, despite the $10 billion price tag. At best, such a system gives us time to work out our problems at home while building the infrastructure to live and grow in space.

ELLIOTT J. ALVARADO
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Dear Dr. Schmidt:

I read with some interest your suggestion in the February 1983 issue for a *Journal of Questionable Science* to be published by AIP. Fortunately, we have a good excuse not to consider your proposal: our purview is only physics, not all of science. Thus we would have to call the publication *Journal of Questionable Physics* and apply another criterion to those you suggest, namely "Is it physics?". I don't really think we need a separate crackpot journal for each discipline: *Journal of Questionable Chemistry*, *Journal of Questionable Biology*, etc.

However, there is an organization that does concern itself with science as a whole, namely the American Association for the Advancement of Science, although it is not obvious that your journal would contribute to the *advancement* of science. Since the AAAS already publishes *Science* and *Science '83*, it would seem natural to call the new journal simply *Science?*

BRUCE M. FOREMAN

I like your final suggestion, but as a member I'm a little disappointed that the only comment I've seen on AIP stationery is one of relief that "We don't have to get our hands dirty with that stuff because we have a handy excuse!" I, too, would rather not see a separate "questionable" journal for every science, if only because it's not clear which pigeonhole (if any) some of these things might belong in. But I'd rather see somebody *do it, even if it occasionally means overflowing conventional boundaries a bit, than see a whole ring of people pointing at each other and saying, "Let* him *do it!" While it is indeed not clear that this journal will contribute to the advancement of science, it's very clear that it* won't *if nobody ever tries it.*

Dear Mr. Schmidt:

I am a 20-year *Analog* subscriber with a six-month-old son. I am looking for books on space travel and other science fiction themes for *very young* not-yet-readers, of the type that parents can read to their babies or toddlers (to get them accustomed to books and verbal expression), with lots of accompanying brightly colored pictures. Later on, when the child begins to read, he can make his way through the text himself.

There are thousands of books of this

type dealing with farm animals, cartoon characters, and similar Earthbound concepts and beings. There is nothing wrong with them, but I'd like to get my little boy started on interplanetary and interstellar matters as well as Farmer Brown. If any of your readers have any titles of such books, I'd appreciate hearing from them.

ROBERT L. GOLDICH
3238 Ledbury Court
Annandale, VA 22003

Random House has a couple of books—Joanne Ryder's The Incredible Space Machines *and Diane L. Moche's* Astronomy Today: Planets, Stars, Space Exploration*—which they say are good for readers in the 9- or 10-year-old category. But what is there for the younger ones?*

Dear Dr. Schmidt:

One of the high points of our recent attendance at Chicon IV, our first science fiction convention, was the chance my husband and I had to meet you personally and tell you how much we enjoy *Analog*. "Absent Thee from Felicity" certainly deserved to win an award as far as I'm concerned. It's a story I wish I'd written.

Now, on to the letter we talked of my writing you. I hope you will share it with your readers. Thank you, and thanks for *Analog*.

Some time ago, an editorial by G. Harry Stine listing the six books he would choose to help civilization survive, assuming he had to eliminate all others, created quite a controversy. Lots of people had other ideas such as the inclusion of the Bible, the Constitution, and a book from the social sciences. Despite the fact that my own background is in the social sciences, and I'm as much concerned about religion as anybody, I thought Dr. Stine's defense of his position was admirable and I agree with it.

My concern about those surviving books was completely different. What if none of the people who needed them could read the language in which they were written? Contrary to popular misconception, everybody does not know English. Actually fewer than one out of ten know it; and some who do, don't like using it. The United Nations now has six working languages, and makes translation into a number of other languages. If we follow this example, we will end up with more dictionaries than books.

To my collection of books I would add an Esperanto picture dictionary, and I would have all books translated into Esperanto. Then I would hope for the best. If you assume that your reader may have to learn the language from scratch, Esperanto is by far the easiest language in which scientific material can be written. Its grammatical regularity, political neutrality, and demonstrated practical usefulness make it the ideal international language.

But the trouble is that no one is looking for an international language. We are stumbling along into greater and greater confusion and no one, including the United Nations, is doing anything to solve the problem. The annual translating budget for the U.N. alone is now well over $170 million, and the problem is likely to grow worse with the addition of more languages. Mario Pei, the famous linguist, said that if this problem is not solved by the year 2000, the price of talking at the U.N. will drive it out of existence, and we will have chaos.

The Esperanto Society of Chicago wants to do something about bringing this linguistic inflation to a halt. We are launching a national campaign to petition our government to insist that the

U.N. put the choice of one international working language as close to the top of its agenda as possible. While we recommend Esperanto, we will accept any language unanimously agreed upon. The important thing is that it be one language. If you would be interested in lending your support to this idea, please write for a petition or other information.

JANET BIXBY

4921 N. Whipple St.
Chicago, IL 60625

Dear Stan:

I have been a great fan of Dr. Pournelle's for many years. I am really puzzled, however, by his January '83 "Alternate View." This was particularly disturbing in light of the fact that I have seen similar views in "SpaceWorld" and elsewhere. What I'm talking about is the rather wishful thinking point of view that President Reagan supports the space program. C'mon! There's been no sign so far that gives any indication of that. Sure, Mr. Keyworth is out there making speeches about how the administration is committed to the program, but he then runs back to Washington and hacks off something else. Even space opponents have publicly expected more space support than Mr. Reagan has given, and are pleasantly surprised. The OMB, which is the president's mouthpiece, has come out unequivocally *against* a fifth Orbiter *ever* (once the production line is broken, Rockwell probably will not restart it)! Many science fiction enthusiasts eagerly await the coming of fusion energy. How many are aware that in 1980 Congress mandated a fusion energy development program with timescales, funding levels, demonstrators, and a national goal of bringing fusion on line? What happened? In 1981 and 1982 the administration blocked funding and implementation.

Does this mean we should just fold up our tents and slink away? No, of course not. But we do have to change our tactics. Unless your district happens to have a lot of space employment, everyone working for their local candidates simply dilutes the strength to the point where it becomes ineffectual. What is needed is for a few key candidates to be identified nationwide and everyone work for the election, or defeat, of said candidates.

Targeting specific key committee members is a job for the "long-range planning department" that Jerry Pournelle advocates. This may seem like a single-issue constituency, but isn't that what L-5, NSI, etc., have been? This is merely the logical next step. There is indeed large public support for the space program, but the public believes that the program is much larger than it actually is. It really doesn't appear that the pro-space lobby has sufficient power to have any meaningful results by continuing the present tactics.

ART HANLEY

Carmichael, CA

Dear Dr. Schmidt:

In discussing the origin of the moon (October), George W. Harper is quite misinformed about the viability of the fission alternative. Mr. Harper apparently thinks that Lyttleton's 1953 refutation of Darwin's specific fission model applies to all fission models. Mr. Harper thus appears totally unaware of new developments with the fission hypothesis since 1953. Unfortunately his statement that "the Darwin hypothesis is dead, and nothing appears likely to resurrect it" does not apply to fission in general as the article implies.

Harper's pronouncement is especially misconceived, considering that Lyttleton himself has proposed a fission origin

for the moon [*Science Journal* (May 1969), pp. 53–58]. Whereas Darwin envisioned the moon as a secondary body, Lyttleton sees the moon as a tertiary body, *i.e.*, a droplet formed at the neck where the two main bodies separate, with the secondary body escaping to become Mars. This scenario has been repeatedly discussed approvingly by William McCrea, most recently in S. F. Dermott (ed.), *The Origin of the Solar System* (Wiley, 1978).

Furthermore, also in 1969, NASA's John A. O'Keefe countered all of Lyttleton's objections to the moon as a secondary fission product [*J. Geophys. Res.* 74 (1969), pp. 2758–2767; also see *Astrophysics and Space Science* 16 (1972), pp. 201–211]. The problem cited by Harper of fission causing "a net *increase* in the total energy of the system" arises in Darwin's model because the two bodies were *assumed* to co-rotate, i.e., each body keeping the same face toward the other. When this assumption is dropped, O'Keefe showed that fission of an ellipsoidal proto-Earth due to a third harmonic distortion can occur without the proto-moon escaping. Since most of the energy remains with Earth, the moon does not escape. Moon and Earth do not later collide primarily because the elongation of proto-Earth at the time of separation is so great that when the bodies contract the resulting spheroids do not overlap at perigee.

Upon fission, the mass ratio of proto-moon to Earth is on the order of 0.1 to 0.2. Tidal friction subsequently heats both bodies, especially the proto-moon, driving off the volatiles and probably up to 90% of the proto-moon's mass. Angular momentum is also lost, thereby explaining why the present system does not have enough angular momentum to produce rotational instability in the combined mass.

Because we now know that the physics of the fission process requires that it occur after core formation is complete, the moon would be, as observed, deficient in iron as well as volatile elements. This sequence is not *ad hoc*. This fission model enabled O'Keefe in 1969 to predict the depletion of volatiles compared to the Earth's mantle and later persuaded H. C. Urey to be favorably disposed towards fission.

The foregoing refutes all of Harper's objections to fission. While such an origin for the moon is by no means proven, neither is it impossible, as Harper represented. In fact, considering A. E. Ringwood's thorough survey of the topic in light of the Apollo findings in *Origin of the Earth and Moon* (Springer-Verlag, 1979), a fission origin is highly presumptive. The purveying of patently false ideas in a "Science Fact" article is quite surprising, and disappointing.

P.S. The topic of the moon's possible fission origin seldom gets reported accurately. Even the March (1982) *Science '81* blew it.

C. LEROY ELLENBERGER

Landover, MD

The author replies:

Lyttleton was obsessed with the idea of playing cosmic billiards with stars and planets. In pursuit of some mathematically *possible* collisional origin for solar systems he postulated a binary star with one going nova to leave a condensing ring about the other, a trinary system where a rogue star either near-missed or caromed off another to leave a condensing nucleus, and even a double-binary system. His later postulation that both the moon and Mars were consequent to a spinning disruption of the proto-Earth was a by-product of one of these minor endeavors. To the best of my knowledge, McCrea is the only person who even bothered looking at these

mathematical exercises.

Ellenberger misquotes me in paragraph three. I *did not say* fission *causes* "a net increase in the total energy of the system" I said that " for the process of fission to occur at all there would have to be a net *increase* in the total energy of the system." If we have a condensing body of gasses or solids cohering because of self-gravitation, no matter how far it condenses it can never acquire enough momentum to eject matter from the surface into orbit. What *can* happen as I pointed out in the article is that some secondary condensation nucleus or nuclei can be left behind when the resisting medium, i.e., gasses and smaller particulate matter, condenses out from under it. As an incidental, I might also point out that even with Ellenberger's argument accepted *pro tem* the orbit of any such material would have an eccentricity of around 0.9 or so, and it is not immediately obvious how the moon's orbit could have reduced its eccentricity to a mere 0.0549 in the short span of 4.5 billion years 50 billion would be more like it, especially when we also hear the moon must have been ten times more massive at the start of its career.

As for the heating of the moon being capable of driving off up to 90% of the proto-lunar mass, I am frankly skeptical. Gasses yes, but to suggest that the moon was initially 10% solids and 90% gasses seems stretching things considerably for this region of the solar system. To suggest a boiling lunar surface could eject significant quantities of normally solid matter (particularly from a body some 10 times more massive than the present moon) seems highly unlikely.

Summarizing briefly, Ellenberger would apparently have us believe the Earth started off perhaps 50% more massive than now. For some reason it speeded up its rotation beyond anything called for in the condensation process, pinched off a lobe and a droplet with the lobe departing the scene to become Mars while the droplet lingered to become the moon. Somehow we also find both Mars and the moon becoming non-co-rotating while still formally part of Earth. The Earth then snaps back to roughly spherical in an hour or so in order that the newly formed moon will miss impact. Now unknown new forces take over to reduce lunar eccentricity from around 0.9 to its present value. Tidal friction heats the moon to something on the order of solar surface temperatures (5,000° C or so), driving out vast quantities running up to 90% of the lunar mass and leaving us with our present body or approximately so because later, after the lunar surface has congealed, it was subjected to a massive bombardment from space which left it heavily cratered.

Frankly he is welcome to believe it if he wishes or flat Earth or Velikovski for that matter. But it requires some interesting tinkering with the orders of magnitude of the forces he is working with.

GEORGE W. HARPER ■

● There are two ways to slide easily through life; to believe everything or to doubt everything. Both ways save us from thinking.

Alfred Korzybski

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a calendar of analog upcoming events

5–7 August
ATLANTA FANTASY FAIR IX at Omni Hotel and Georgia World Congress Center, Atlanta, Ga. Guests—Theodore and Jayne Sturgeon, Chuck Jones, Wendy and Richard Pini; MC—Forrest J Ackerman. Program, films, art show, gaming, etc. Info: Atlanta Fantasy Fair, Box 566, Marietta GA 30061.

5–7 August
STARCALL (Space-oriented conference) at Rosslyn Westpark Hotel, Arlington, Va. Science Fiction and space, workshops, talks, exhibits, films, video, gaming. Info: International Star Foundation, 225 Church Street N.E., Vienna VA 22180. 703–281–2711. (Include S.A.S.E.)

12–14 August
MYSTICON 2.5, Jefferson Inn, Roanoke, Va. Guest of Honor—Orson Scott Card. Info: Send SASE to Mysticon, P.O. Box 1367, Salem, VA 24153.

1–5 September
CONSTELLATION (41st World Science Fiction Convention) at Baltimore Convention Center, Baltimore, Md. Guest of Honor—John Brunner; Fan Guest of Honor—Dave Kyle; TM—Jack Chalker. Registration—$15 supporting at all times. Attending—$40 until 15 July 1983, more at the door. 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. Info: ConStellation, 41st World Science Fiction Convention, Box 1046, Baltimore MD 21203.

12–14 September
IEEE International Conference on Computer-Aided Design at Santa Clara, Calif. Info: IEEE, 445 Hoes Avenue, Piscataway NJ 08854.

12–14 September
36th Annual Conference on Engineering in Medicine and Biology at Columbus, Ohio. Info: Patricia I. Horner, A.E.M.B., 4405 East-West Highway, Suite 210, Bethesda MD 20814. 301–657–4142.

12–15 September
Mythopoeic Conference XIV at Scripps College, Claremont, Calif. Guests of Honor —Stephen R. Donaldson, C.S. Kilby. Theme: Mythic Structures in Tolkien, Lewis, and Williams. Info: Mythopoeic Conference XIV, Box 711, Seal Beach CA 90740.

23–25 September
INVENTION (Glasgow SF conference) at Central Hotel, Glasgow. Guest of Honour —Chris Boyce; Fan Guest of Honour—Jim Barker. Info: 10 Woodlands Gardens, Bothwell, Glasgow, G71 8NU, Scotland, U.K. (use airmail).

23–25 September
AD ASTRA III (Toronto-area SF conference) at Cara Inn, Toronto, Ont. Pro Guest of Honour—Ben Bova; Fan Guest of Honour—Ken Fletcher. Info: AD ASTRA III, Box 7276, Station 'A', Toronto, Ontario, Canada M5W 1X9.

26–29 September
Compcom Fall 83 at Arlington, Va. Info: Compcom Fall 83, Box 639, Silver Spring MD 20901. 301–589–8142.

—ANTHONY LEWIS

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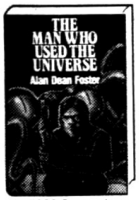

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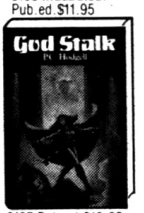

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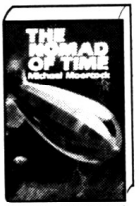
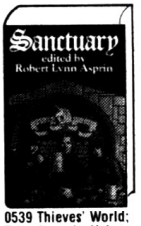


0430 The Warlord of the Air; The Land Leviathan; The Steel Tsar. Spec.ed.

7799 Murder and Magic: Too Many Magicians; Lord Darcy Investigates. Spec.ed.



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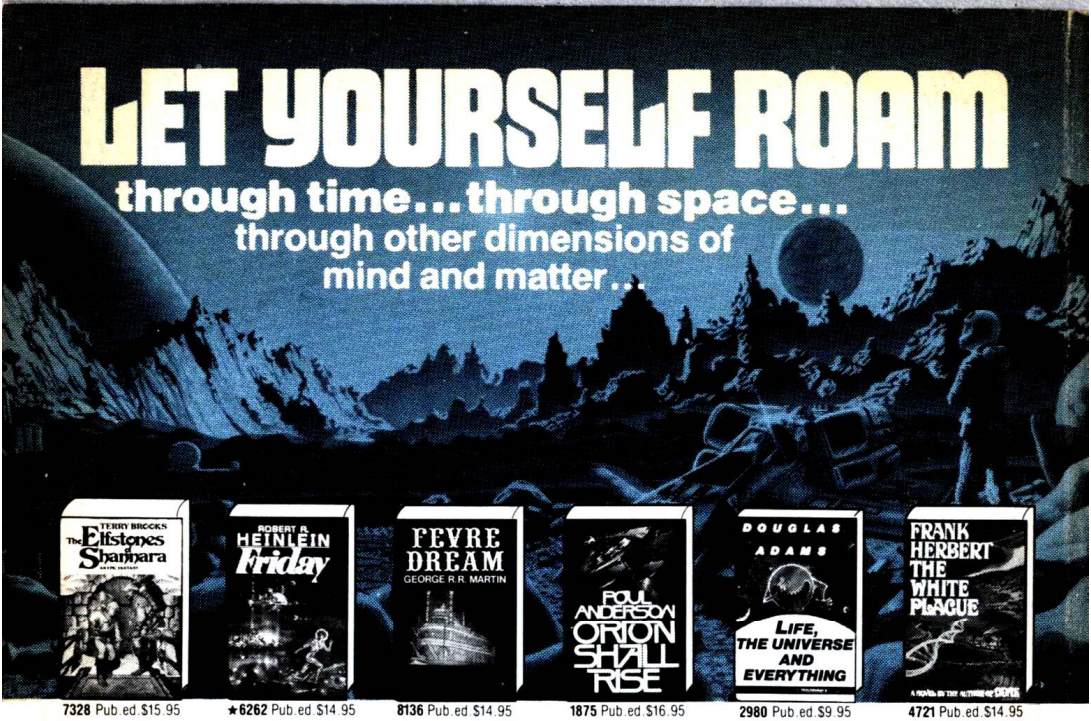

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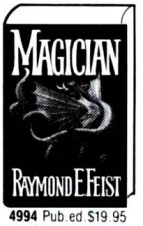

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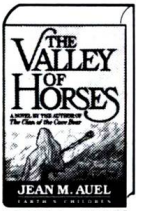

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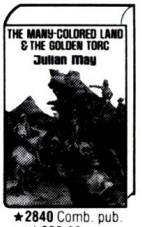

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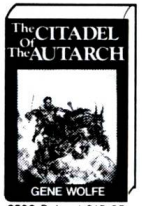

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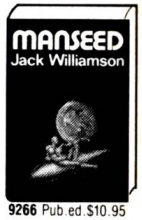

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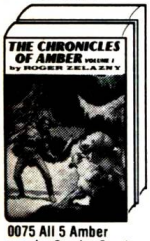

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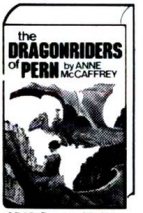

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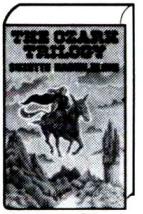

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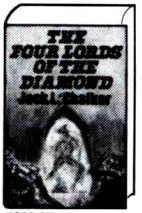

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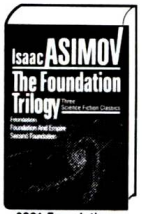

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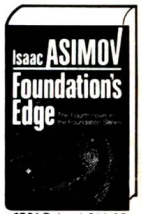

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