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Galaxy

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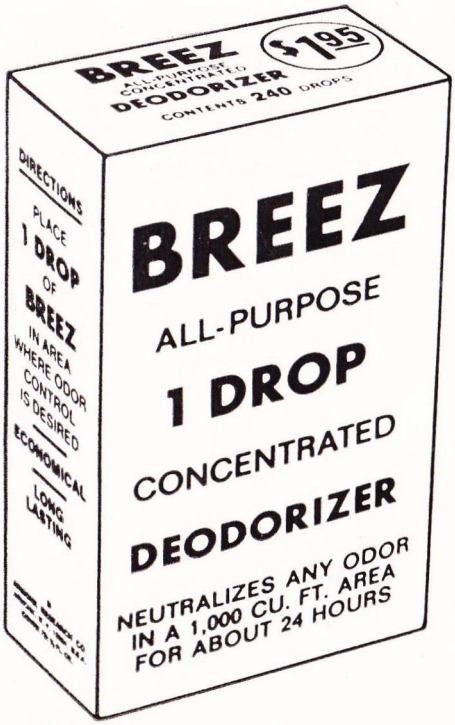


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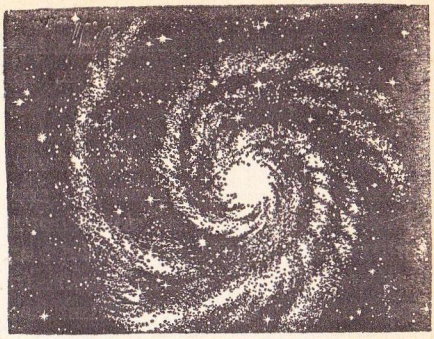
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MORROW from FOEMAN, WHERE DO YOU FLEE?

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TRICKS AND TREATS

The other day we were asked to talk to a group of management types about The Future of Everything. In the course of making some remarks about probabilistic mathematics we discovered we had invented a new magic trick, which we pass on to you now. It has to do with calculating the results of flipping coins.

First we draw you a picture of a single coin:

O

If you flip it, there are two possible results: It can come up either heads or tails. If we flip two coins:

OO

there are four possible results: heads-heads; heads-tails; tails-tails; tails-heads. If you flip three coins there are eight possible results, and so on.

The trick is this. You draw a row of as many coins as you like — two, three, a hundred, a googolplex of coins:

OOOOO . . . OO

And we undertake to write down, in ten seconds or less, the *exact* number of possible results of flipping that many coins. And, just to make it harder, we undertake to do so *even if you cover up all the coins but the first, so we can't count them.*

Now, obviously there is a trick involved. If you want to see what the trick is, you're welcome to hunt around in this issue for the answer; we'll print it at the bottom of a page somewhere. But then come back, please, because we'd like to talk for a minute about "tricks."

A "trick" may be defined as that solution to a problem which causes an observer to say, once he sees how the solution is obtained: "Oh, I didn't know you meant to do it that way." That's what the Spanish nobles said when Columbus stood the egg on end; that's what your friends will say if you elect to do this coin-tossing trick for them.

It is also what scientists say when somebody does something which is defined as impossible. Create or destroy matter? Impossible, said the 19th-century mechanistic physicists; and along came Einstein and Fermi and Hahn and showed that matter could be transformed into energy, and the other way around; and, "Oh," said the last of the mechanists, "I didn't know you meant to do it *that* way." Select the sex of a child in advance? Impossible. Except, of course, that you can do it by means of a trick: you remove a fertilized ovum, examine the cells to see which sex it is; if the right one, you reimplant it and let it come to term; if wrong, you throw it away and try again. ("Oh, you mean *that* way.") Put Maxwell's demon to work and sort out the hot air from the cold in a stream of gas? Impossible. Except by means of a Hilsch tube, which will deliver hot gas from one vent and cold from another as long as you keep pumping gas through it. ("Oh.") And so on.

It is true that all these solutions are tricks, in that they do not solve

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the stated problem in the unspoken context in which it was conceived. They change the context on you, which is manifestly unfair, and probably also destructive of those good solid values on which second-rate reputations are based.

First-rate reputations, however, are based on other kinds of values; they depend very often on enlarging contexts. Newton enlarged the context of problems involving a planet's orbit and an apple's fall with his theory of universal gravitation. Einstein enlarged the contexts again, so that Newton's world-view became only one special case in an infinitely larger system of references.

It is a good gambling bet that any *physical* problem which can be shown to have no possible solution (traveling through time, exceeding the speed of light, you name it) is likely to turn out to be merely another example of a problem which was framed according to narrowly construed contexts. That is to say, the reason you can't get an answer is because you've had the bad luck to ask the wrong question. (We said "physical" problems. It is true that certain *mathematical* problems do have no possible solution; but mathematical problems are by definition meaningless outside their own contexts; the rules of mathematics are essential parts of the problems.)

Travel through time? Certainly it's impossible; no one can even suggest a possible way of attacking that problem, much less a solution for it. As of this hour of this day. Yet it has been shown that it is possible to write a mathematical description of the behavior of nuclear particles on the assumption that some of them (the positron, other "anti-particles") are merely standard particles which happen to be traveling backward through time. Do they *really* go backward through time? That's a hard question; it depends, you might say, on what you mean by "really".

Go faster than light? Impossible. Yet Gerald Feinberg has his own mathematical description of the world in which there are entire classes of things which have *c* as a limiting velocity — but as a *lower* limit; they cannot go as *slow* as light. Do these things "really" exist?

It is considered bad form in this hard-headed day to invoke faith as an answer to a challenge. But we have always been guilty of bad form when we felt it to be good sense; and we do have faith. We have faith that the contexts in which the basic laws of the universe are formed are rather larger than human beings as yet understand and faith that there will always be an end-run that is possible around even the most formidable "proof" of impossibility.

We even have faith that, sooner or later, we (or our descendants) will be catching the 4:15 Feinberg Drive spaceship to Rigel VII, arriving twenty-five minutes later in time for tea. Impossible? Of course it was impossible, the conservatives will say; we didn't know that you meant to do it *that* way.

They may even say, "Why, that's only a trick." And maybe they'll be right. But meanwhile we'll be there on Rigel VII, laughing merrily, on our way to explore the universe.

— FREDERIK POHL

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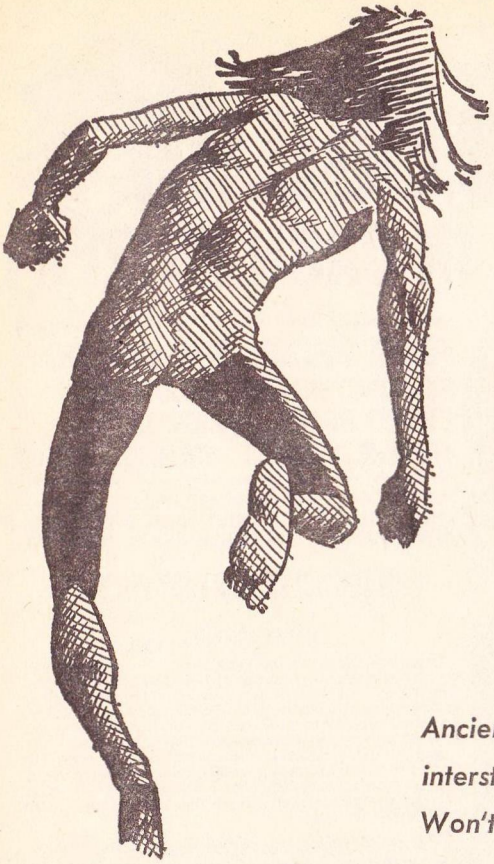
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FOEMAN, WHERE DO YOU FLEE?

by BEN BOVA

Ancient enemy, we've crossed interstellar space to find you. Won't you show us your face?

Illustrated by REESE

I

Deep in cryogenic sleep the mind dreams the same frozen dreams, endlessly circuiting through the long empty years. Sidney Lee dreamed of the towers on Titan, over and again, their smooth blank walls of metal that was beyond metal, their throbbing, ceaseless, purposeful machines that ran at tasks that men could not even guess at. The towers loomed in his darkened

dreams, standing menacing and alien above the frozen wastes of Titan, utterly unmindful of the tiny men that groveled at their base. He tried to scale those smooth, steep walls and fell back. He tried to penetrate them and failed. He tried to scream. And in his dreams, at least, he succeeded.

He didn't dream of Ruth, or of the stars, or of the future or the past. Only of the towers, of the machines that blindly obeyed a builder who had left Earth's solar system countless millenia ago.

He opened his eyes.

"What happened?"

Carlos Pascual was smiling down at him, his round dark-skinned face relaxed and almost happy. "We are there . . . here, I mean. We are braking, preparing to go into orbit."

Lee blinked and sat up. "We made it?"

"Yes, yes," Pascual answered softly as his eyes shifted to the bank of instruments on the console behind Lee's shoulder. "The panel claims you are alive and well. How do you feel?"

That took a moment's thought. "A little hungry."

"A common reaction." The smile returned. "You can join the others in the galley."

The expedition's medical chief

BB Ballantine Books

It's a great, big, beautiful world, (disregarding the elections where just about everybody was a born loser anyway — especially the voters.) In our last ad, we mentioned something about your glorious future. Starting with February publications, BB will be doing two s.f.'s and/or fantasy titles a month, plus block reissues of oldtime goodies, plus (you all, by now, know of this but it delights us so) Walker & Co., displaying remarkable editorial acumen, has selected several BB titles for reissue in hardcover. Not only that, they are doing Spinrad's *BUG J.B.* which proves their interest in s.f. is serious. Support them, fans. It may just be that, with s.f. and Walker's help, Recognition is about to dawn in the misty logic of the laggard mainstream. It's debatable, of course, but kindness must assume that the *literati* will eventually stop navel-gazing and find out where the real action is at. For their sakes, we keep hoping, and meantime let us not be churlish. Incidentally, back at the Bay-Con, did anyone notice the local news write-ups on what was of interest to s.f. people (economics, riots, cultural

conditions, sexual relations, the population explosion, politics, the space program, etc. etc.) and what was apparently the main concern at the psychologists' convention? Fascinating contrast.

Anyway, in case you want to order any *BB* titles on the above subjects, we're at the same old stand — Dept. GCS, 101 Fifth Avenue, New York 10003. Send money (which includes postage in the prices listed below) with your order:

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helped Lee to swing his legs over the edge of the couch, then left him and went to the next unit, where a blonde woman lay still sleeping. With an effort, Lee recalled her: Doris McNertny, primary biologist, backup biochemist. Lee pulled a deep breath into his lungs and tried to get himself started. The overhead light panels, on full intensity now, made him want to squint.

Standing was something of an experiment. *No shakes,* Lee thought gratefully. The room was large and circular, with no viewports.

Each of the twenty hibernation couches had been painted a different color by some psychology team back on Earth. Most of them were empty now. The remaining occupied ones had their lids off and the lifesystem connections removed as Pascual, Tanaka and May Connearney worked to revive the people. Despite the color scheme, the room looked uninviting, and it smelled clinical.

The galley, Lee focused his thoughts, *is in this globe, one flight up.* The ship was built in globular sections that turned in response to g-pulls. With the main fusion engines firing to brake their approach to final orbit, "up" was temporarily in the direction of the engines' thrustors.

But inside the globes it did not make much difference.

He found the stairwell that ran through the globe. Inside the winding metal ladderway the rumbling vibrations from the ship's engines were echoing strongly enough to hear as actual sound.

"Sid! Good morning!" Aaron Hatfield had stationed himself at the entrance to the galley and was acting as a one-man welcoming committee.

There were only a halfdozen people in the galley. *Of course,* Lee realized. *The crew personnel are at their stations.* Except for Hatfield, the people were bunched at the galley's lone viewpoint, staring outside and speaking in hushed, subdued whispers.

"Hello, Aaron." Lee didn't feel jubilant, not after a fifteen-year sleep. He tried to picture Ruth in his mind and found that he couldn't.

She must be nearly fifty by now.

Hatfield took his arm and towed him to the dispenser counter. "Coffee, spirits, adrenalin . . . take your pick."

Hatfield was the expedition's primary biochemist, a chunky, loud-speaking overgrown kid whom it was impossible to dislike, no matter how he behaved. Lee knew that Hatfield wouldn't go near the viewport because the sight of empty space terrified him.

"Hey, here's Doris!" Hatfield shouted to no one. He scuttled toward the entrance as she stepped rather uncertainly into the galley.

Lee dialed for coffee. With the hot cup in his hand he walked slowly toward the viewport.

"Hello Dr. Lee," Marlene Ettinger said as he came up alongside her. The others at the viewport turned and muttered their greetings.

"How close are we?" Lee asked.

Charnovsky, the geologist, answered positively, "Two days before we enter final orbit."

The stars crowded out the darkness beyond their viewsport: against the blackness like droplets from a paint spray. In the faint reflection of the port's plastic, Lee could see six human faces looking lost and awed.

Then the ship swung, ever so slightly, in response to some command from the crew and computers. A single star — close and blazingly powerful — slid into view, lancing painfully brilliant light through the polarizing viewport. Lee snapped his eyes shut, but not before the glare burned its afterimage against his closed eyelids. They all ducked back instinctively.

"Welcome to Sirius," somebody said.

II

Man's flight to the stars was made not in glory, but in fear.

The buildings on Titan were clearly the work of an alien intelligent race. No man could tell exactly how old they were, how long their baffling machines had been running, what their purpose was. Whoever had built them had left the solar system hundreds of centuries ago.

For the first time, men truly dreaded the stars.

Still, they had to know, had to learn. Robot probes were sent to the nearest dozen stars, the farthest that man's technology could reach. Nearly a generation passed on Earth before the faint signals from the probes returned. Seven of the stars had planets circling them. Of these, five possessed Earthlike worlds. On four of them, some indications of life were found. Life, not intelligence. Long and hot were the debates about what to do next. Finally, manned expeditions were dispatched to the Earthlike ones.

Through it all, the machines on Titan hummed smoothly.

"They should have named this ship *Afterthought*," Lee said to Charnovsky. (The ship's official name was *Carl Sagan*.)

"How so?" the Russian muttered as he pushed a pawn across the board between them. They were sitting in the pastel-lighted rec room. A few others were scattered around the semicircular room, reading, talking, dictating messages that wouldn't get to Earth for more than eight years. Soft music purred in the background.

The Earthlike planet — Sirius A-2 swung past the nearest viewport. The ship had been in orbit for nearly three weeks now and was rotating around its long axis to keep a half-g feeling of weight for the scientists.

"We were sent here as an afterthought," Lee continued. "Nobody expects us to find anything. Most of the experts back on Earth didn't really believe there could be an Earthlike planet around a blue star."

"They were correct," Charnovsky said. "Your move."

Picture our solar system. Now replace the sun with Sirius A the Dog Star: a young, blue star, nearly twice as hot and big as the sun. Take away the planet Uranus, nearly two billion kilometers from the sun, and replace it with the white dwarf Sirius B, the Pup: just as hot as Sirius A, but collapsed to a hundredth of a star's ordinary size. Now sweep away all the planets between the Dog and the Pup except two: a

bald chunk of rock the size of Mercury orbiting some 100 million kilometers from A, and an Earth-sized planet some seven times farther out.

Give the Earth-sized planet a cloud-sprinkled atmosphere, a few large seas, some worn-down mountain chains, and a thin veneer of simple green life clinging to its dusty surface. Finally, throw in one lone gas giant planet, far beyond the Pup, some 200 billion kilometers from A. Add some meteoroids and comets and you have the Sirius system.

Lehman, the psychiatrist, pulled up a webchair to the kibitzer's position between Lee and Charnovsky.

"Mind if I watch?" He was trim and athletic looking, kept himself tanned under the UV lights in the ship's gym booth.

Within minutes they were discussing the chances of finding anything on the planet below them.

"You sound terribly pessimistic," the psychiatrist said.

"The planet looks pessimistic," Charnovsky replied. "It was scoured clean when Sirius B exploded, and life has hardly had a chance to get started again on its surface."

"But it *is* Earthlike, isn't it?"

"Hah!" Charnovsky burst. "To a simple-minded robot it may seem Earthlike. The air is breathable. The chemical composition of the rocks is similar. But no man would call that desert an Earthlike world. There are no trees, no grasses, it's too hot, the air is too dry. . . . "

"And the planet's too young to have evolved an intellignt species," Lee added, "which makes me the biggest afterthought of all."

"Well, there might be something down there for an anthropologist to puzzle over," Lehman countered. "Things will look better once we get down to the surface. I think we're all getting a touch of cabin fever in here."

Before Lee could reply, Lou D'Orazio — the ship's geophysicist and cartographer — came bounding through the hatchway of the rec room and, taking advantage of the half-gravity, crossed to their chess table in two jumps.

"Look at this!"

He slapped a still-warm photograph on the chess table, scattering pieces over the floor. Charnovsky swore something Slavic, and everyone in the room turned.

It was one of the regular cartographic photos, crisscrossed with grid lines. It showed the shoreline of one of the planet's mini-oceans. A line of steep bluffs followed the shore.

"It looks like an ordinary . . ."

"*Aspertti un momento* . . . wait a minute . . . see here." D'Orazio pulled a magnifier from his coverall pocket. "Look!"

Lee peered into the magnifier. Fuzzy, wavering, gray . . . .

"It looks like —"

Lehman said, "Whatever it is, it's standing on two legs."

"It's a man," Charnovsky said flatly.

III

Within minutes the whole scientific staff had piled into the rec room and crowded around the table, together with all the crew members except the two on duty in the command globe. The ship's automatic cameras took twenty more photographs of the area before their orbit carried them over the horizon from the spot.

Five of the pictures showed the shadowy figure of a bipedal creature.

The spot was in darkness by the time their orbit carried them over it again. Infrared and radar sensors showed nothing.

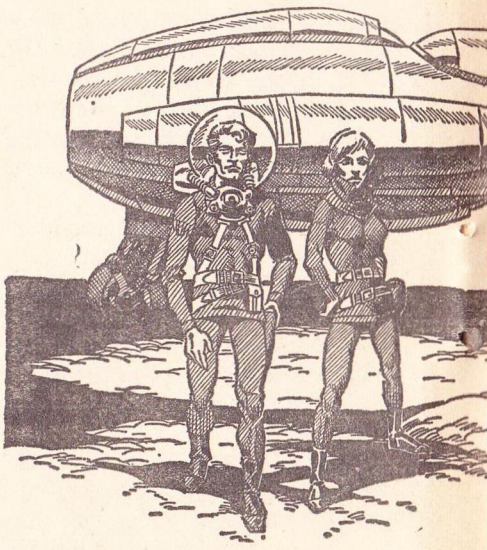
They squinted at the pictures, handed them from person to person, talked and argued and wondered through two entire eight-hour shifts. Crewmen left for duty and returned again. The planet turned beneath them and once again the shoreline was bathed in Sirius's hot glow. But there was no trace of the humanoid. Neither the cameras, the manned telescopes, nor the other sensors could spot anything.

One by one, men and women left the rec room, sleepy and talked out. Finally, only Lee, Charnovsky, Lehman and Captain Rassmussen were left sitting at the chess table with the finger-grimed photos spread out before them.

"They're men," Lee murmered. "Erect bipedal men."

"It's only one creature," the captain said. "And all we know is that it looks like a man."

Rassmussen was tall, hamfist-



ed, rawboned, with a ruddy face that could look either elfin or Viking but nothing in-between. His voice, though, was thin and high. To the everlasting applause of all aboard, he had fought to get a five-year supply of beer brought along. Even now, he had a mug tightly wrapped in one big hand.

"All right, they're humanoids," Lee conceded. "That's close enough."

The captain hiked a shaggy eyebrow. "I don't like jumping at shadows, you know. These pictures —"

"Men or not," Charnovsky said, "we must land and investigate closely."

Lee glanced at Lehman, straddling a turned-around chair and resting his arms tiredly on the back.

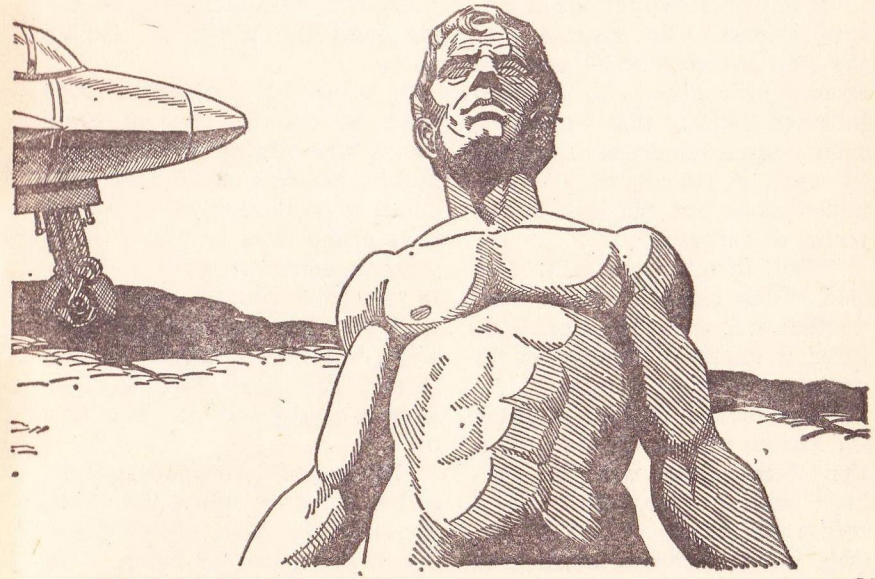
"Oh, we'll investigate," Rassmussen agreed, "but not too fast. If they are an intelligent species of some kind, we've got to go gingerly. I'm under orders from the Council, you know."

"They haven't tried to contact us," Lee said. "That means they either don't know we're here, or they're not interested, or —"

"Or what?"

Lee knew how it would sound, but he said it anyway. "Or they're waiting to get their hands on us."

Rassmussen laughed. "That



sounds dramatic, sure enough."

"Really?" Lee heard his voice as though it were someone else's. "Suppose the humanoids down there are from the same race that built the machines on Titan?"

"Nonsense," Charnovsky blurted. "There are no cities down there, no sign whatever of an advanced civilization."

The captain took a long swallow of beer, then, "There is no sign of Earth's civilization on the planet either, you know. Yet *we* are here, sure enough."

Lee's insides were fluttering now. "If they are the ones who built on Titan . . ."

"It is still nonsense!" Charnovsky insisted. "To assume that the first extraterrestrial creature resembling a man is a representative of the race that visited the solar system hundreds of centuries ago . . . ridiculous! The statistics alone put the idea in the realm of fantasy."

"Wait, there's more to it," Lee said. "Why would a visitor from another star go to the trouble to build a machine that works for centuries, without stopping?"

They looked at him, waiting for him to answer his own question: Rassmussen with his Viking's craggy face, Charnovsky trying to puzzle it out in his own mind, Lehman calm and half-amused.

"The Titan buildings are more than alien," Lee explained. "They're hostile. That's my belief. Call it an assumption, a hypothesis. But I can't envision an alien race building machinery like that except for an all-important purpose. That purpose was military."

Rassmussen looked truly puzzled now. "Military? But who were they fighting?"

"Us," Lee answered. "A previous civilization on Earth. A culture that arose before the Ice Ages, went into space, met an alien culture and was smashed in a war so badly that there's no trace of it left."

Charnovsky's face was reddening with the effort of staying quiet.

"I know it's conjecture," Lee went on quietly, "but if there was a war between ancient man and the builders of the Titan machines, then the two cultures must have arisen close enough to each other to make war possible. Widely separated cultures can't make war, they can only contact each other every few centuries or millennia. The aliens had to come from a nearby star . . . like Sirius."

"No, no, no!" Charnovsky slapped a hand on his thigh. "It's preposterous, unscientific! There is not one shred of evidence to

support this, this . . . pipedream!"

But Rasmussen looked thoughtful.

"Still. . . . "

"Still it is no nonsense," Charnovsky repeated. "The planet down there holds no interstellar technology. If there ever was one, it was blasted away when Sirius B exploded. Whoever is down there, he has no cities, no electronic communications, no satellites in orbit, no cultivated fields, no animal herds . . . nothing!"

"Then maybe he's a visitor too," Lee countered.

"Whatever it is," Rasmussen said, "it won't do for us to go rushing in like berserkers. Suppose there's a civilization down there that's so advanced we simply do not recognize it as such?"

Before Charnovsky could reply, the captain went on, "We have plenty of time. We will get more data about surface conditions from the robot landers and do a good deal more studying and thinking about the entire problem. Then, if conditions warrant it, we can land."

"But we don't have time!" Lee snapped. Surprised at his own vehemence, he continued, "Five years is a grain of sand compared to the job ahead of us. We have to investigate a completely alien culture and determine what its attitude is toward us. Just learning the language might take five years all by itself."

Lehman smiled easily and said, "Sid, suppose you're totally wrong about this, and whoever's down there is simply a harmless savage. What would be the shock to his culture if we suddenly drop in on him?"

"What'll be the shock to our culture if I'm right?"

Rassmussen drained his mug and banged it down on the chess table. "This is getting us nowhere. We have not enough evidence to decide on an intelligent course of action. Personally, I'm in no hurry to go blundering into a nest of unknowns. Not when we can learn safely from orbit. As long as the beer holds out, we go slow."

Lee pushed his chair back and stood up. "We won't learn a damned thing from orbit. Not anything that counts. We've got to go down there and study them close up. And the sooner the better."

He turned and walked out of the rec room. *Rassmussen's spent half his life hauling scientists out to Titan and he can't understand why we have to make the most of our time here,* he raged to himself.

Halfway down the passageway to his quarters, he heard footsteps padding behind him. He knew who it would be. Turning,

he saw Lehman coming along toward him.

"Sacking in?" the psychiatrist asked.

"Aren't you sleepy?"

Completely bushed, now that you mention it."

"But you want to talk to me," Lee said.

Lehman shrugged. "No hurry."

With a shrug of his own, Lee resumed walking to his room. "Come on. I'm too worked up to sleep anyway."

All the cubicles were more or less the same: a bunk, a desk, a filmspool reader, a sanitary closet. Lee took the webbed deskchair and let Lehman plop on the sighing air mattress of the bunk.

"Do you really believe this hostile alien theory? Or are you just — "

Lee slouched down in his chair and interrupted. "Let's not fool around, Rich. You know about my breakdown on Titan and you're worried about me."

"It's my job to worry about everybody."

"I take my pills every day . . . to keep the paranoia away."

"That wasn't the diagnosis of your case, as you're perfectly well aware."

"So they called it something else. What're you after, Rich? Want to test my reflexes while I'm sleepy and my guard's down?"

Lehman smiled professionally. "Look Sid. You had a breakdown on Titan. You got over it. That's finished."

Nodding grimly, Lee added, "Except that I think there might be aliens down there plotting against me."

"That could be nothing more than a subconscious attempt to increase the importance of the anthropology department," Lehman countered.

"Crap" Lee said. "I came out here expecting something like this. Why do you think I fought my way onto this expedition? It wasn't easy, after my breakdown. I had to push ahead of a lot of former friends."

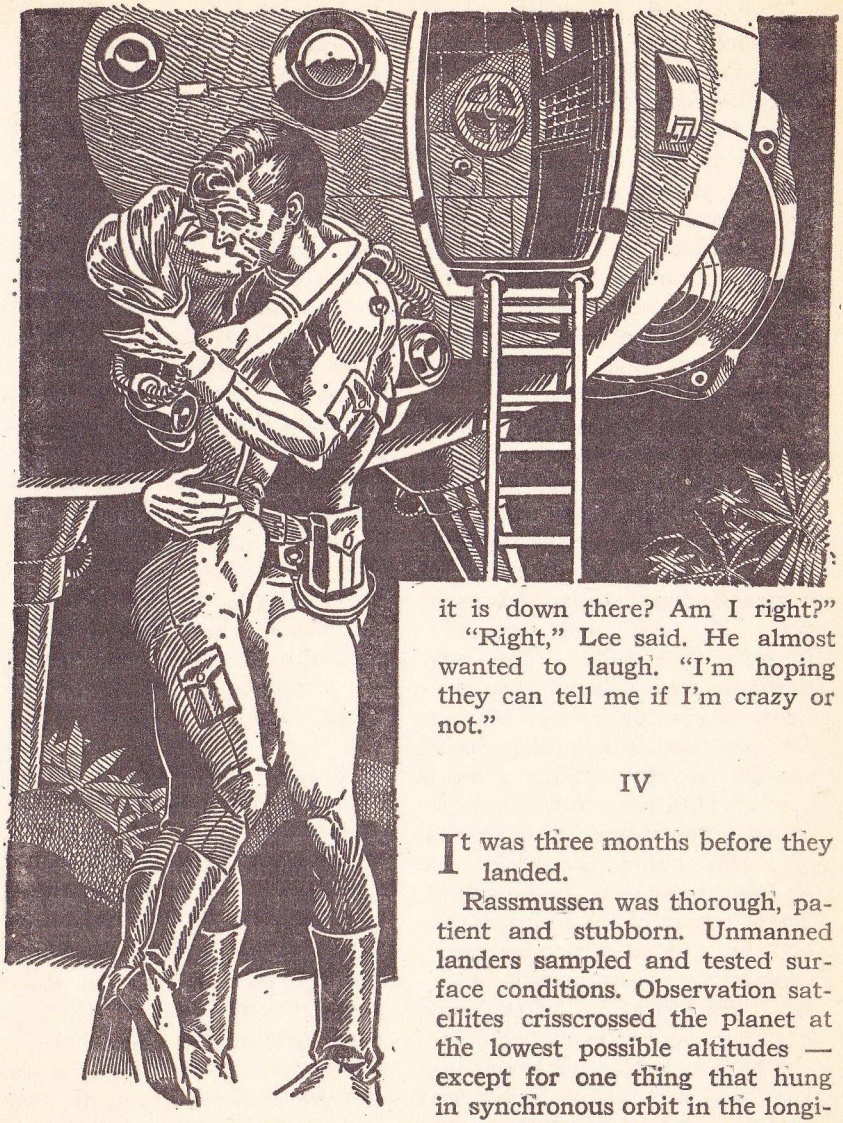
"And leave your wife."

"That's right. Ruth divorced me for it. She's getting all my accumulated dividends. She'll die in comfort while we're sleeping our way back home."

"But why?" Lehman asked. "Why should you give up everything — friends, wife, family, position — to get out here?"

Lee knew the answer, hesitated about putting it into words, then realized that Lehman knew it too. "Because I had to face it. had to do what I could to find out about those buildings on Titan."

"And that's why you want to rush down and contact whoever



it is down there? Am I right?"

"Right," Lee said. He almost wanted to laugh. "I'm hoping they can tell me if I'm crazy or not."

IV

It was three months before they landed.

Rassmussen was thorough, patient and stubborn. Unmanned landers sampled and tested surface conditions. Observation satellites crisscrossed the planet at the lowest possible altitudes — except for one thing that hung in synchronous orbit in the longitude of the spot where the first humanoid had been found.

That was the only place where humanoid life was seen, along that shoreline for a grand distance of perhaps five kilometers. Nowhere else on the planet.

Lee argued and swore and stormed at the delay. Rassmussen stayed firm. Only when he was satisfied that nothing more could be learned from orbit did he agree to land the ship. And still he sent clear word back toward Earth that he might be landing in a trap.

The great ship settled slowly, almost delicately, on a hot tongue of fusion flame, and touched down on the western edge of a desert some 200 kilometers from the humanoid site. A range of rugged-looking hills separated them. The staff and crew celebrated that night. The next morning, Lee, Charnovsky, Hatfield, Doris McNertny, Marlene Ettinger and Alicia Monteverdi moved to the ship's "Sirius globe." They were to be the expedition's "outsiders," the specialists who would eventually live in the planetary environment. They represented anthropology, geology, biochemistry, botony, zoology and ecology, with backup specialties in archeology, chemistry and paleontology.

The Sirius globe held their lagoratories, workrooms, equipment and living quarters. They were quarantined from the rest of the ship's staff and crew, the "insiders," until the captain agreed that the surface conditions on the planet would be no threat to the rest of the expedition members. That would take two years, minimum, Lee knew.

Gradually, the "outsiders" began to expose themselves to the local environment. They began to breathe the air, acquire the microbes. Pascual and Tanaka made them sit in the medical examination booths twice a day, and even checked them personally every other day. The two M.D.'s wore disposable biosuits and worried expressions when they entered the Sirius globe. The medical computers compiled miles of data tapes on each of the six "outsiders," but still Pascual's normally pleasant face acquired a perpetual frown of anxiety about them.

"I just don't like the idea of this damned armor," Lee grumbled.

He was already encased up to his neck in a gleaming white powersuit, the type that crew members wore when working outside the ship in vacuum. Aaron Hatfield and Marlene Ettinger were helping to check all the seams and connections. A few feet away, in the cramped "locker room," tiny Alicia Monteverdi looked as though she were being

swallowed by an oversized automaton; Charnovsky and Doris McNertny were checking her suit.

"It's for your own protection," Marlene told Lee in a throaty whisper as she applied a test meter to the radio panel on his suit's chest. "You and Alicia won the toss for the first trip outside, but this is the price you must pay. Now be a good boy and don't complain."

Lee had to grin. "*Ja, Fraulein Schluemeisterein.*"

She looked up at him with a rueful smile, "Thank God you never had to carry on a conversation in German."

Finally Lee and Alicia clumped through the double hatch into the airlock. It took another fifteen minutes for them to perform the final checkout, but at last they were ready. The outer hatch slid back, and they started down the long ladder to the planet's surface. The armored suits were equipped with muscle-amplifying power systems, so that even a girl as slim as Alicia could handle their bulk easily.

Lee went down the ladder first and set foot on the ground. It was bare and dusty, the sky a reddish haze. *The grand adventure,* Lee thought. *All the expected big moments in life are flops.* A hot breeze hummed in his earphones. It was early morning Sirius had not cleared the barren horizon yet, although the sky was fully bright. Despite the suit's air-conditioning, Lee felt the heat.

He reached up a hand as Alicia climbed warily down the last few steps of the ladder. The plastic rungs gave under the suit's weight, then slowly straightened themselves when the weight was removed.

"Well," he said, looking at her wide-eyed face through the transparent helmet of her suit, "what do you think of it?"

"It is hardly paradise, is it?"

"Looks like it's leaning the other way," Lee said.

They explored — Lee and Alicia that first day, then the other outsiders, shuffling ponderously inside their armor. Lee chafed against the restriction of the power-suits, but Rassmussen insisted and would brook no argument. They went timidly at first, never out of sight of the ship. Charnovsky chipped samples from the rock outcroppings, while the others took air and soil samples, dug for water, searched for life.

"The perfect landing site," Doris complained after a hot, tedious day. "There's no form of life bigger than a yeast mold within a hundred kilometers of here."

It was a hot world, a dry world, a brick-dust world where the sky

was always red. Sirius was a blowtorch searing down on them, too bright to look at even through the tinted visors of their suits. At night there was no moon to see, but the Pup bathed this world in a deathly bluish glow far brighter yet colder than moonlight. The night sky was never truly dark, and only a few strong stars could be seen from the ground.

Through it all, the robot satellites relayed more pictures of the humanoids along the seacoast. They appeared almost every day, usually only briefly. Sometimes there were a few of them, sometimes only one, once there were nearly a dozen. The highest-resolution photographs showed them to be human in size and build. But what their faces looked like, what they wore, what they were *doing* — all escaped the drone cameras.

The robot landers, spotted in a dozen scattered locations within a thousand kilometers of the ship, faithfully recorded and trasmitted everything they were programed to look for. They sent pictures and chemical analyses of plant life and insects. But no higher animals.

Alicia's dark-eyed face took on a perpetually puzzled frown, Lee saw. "It makes no sense," she would say. "There is nothing on this planet more advanced than insects . . . yet there are men. It's as though humans suddenly sprang up in the Silurian period on Earth. They *can't* be here. I wish we could examine the life in the seas . . . perhaps that would tell us more."

"You mean those humanoids didn't originate on this planet," Lee said to her.

She shook her head. "I don't know. I don't see how they could have. . . . "

V

Gradually they pushed their explorations further afield, beyond the ship's limited horizon. In the motorized powersuits a man could cover more than a hundred kilometers a day, if he pushed it. Lee always headed toward the grizzled hills that separated them from the seacoast. He helped the others to dig, to collect samples, but he always pointed them toward the sea.

"The satellite pictures show some decent greenery on the seaward side of the hills," he told Doris. "That's where he should go."

Rassmussen wouldn't move the ship. He wanted his base of operations, his link homeward, at least a hundred kilometers from the nearest possible threat. But finally he relaxed enough to allow the scientists to go out overnight and take a look at the hills.

And maybe the coast, Lee added silently to the captain's orders.

Rassmussen decided to let them use one of the ship's two air-cushion vehicles. He assigned Jerry Grote, the chief engineer, and Chien Shu Li, electronics specialist, to handle the skimmer and take command of the trip. They would live in biosuits and remain inside the skimmer at all times. Lee, Marlene, Doris and Charnovsky made the trip; Grote did the driving and navigating, Chien handled communications and the computer.

It took a full day's drive to get to the hills. Grote, a lanky, lantern-jawed New Zealander, decided to camp at their base as night came on.

"I thought you'd be a born mountaineer," Lee poked at him.

Grote leaned back in his padded chair and planted a large sandled foot on the skimmer's control panel.

"I could climb those wrinkles out there in my sleep," he said pleasantly. "But we've got to be careful of this nice, shiny vehicle."

From the driver's compartment, Lee could see Marlene pushing forward toward them, squeezing between the racks of electronics gear that separated the forward compartment from the living and working quarters. Even in the drab coveralls, she showed a nice profile.

"I would like to go outside," she said to Grote. "We've been sitting all day like tourists in a shuttle."

Grote nodded. "I got to wear a hard suit, though."

"But — "

"Orders."

She glanced at Lee, then shrugged. "Very well."

"I'll come with you," Lee said.

Squirming into the armored suits in the aft hatchway was exasperating, but at last they were ready and Lee opened the hatch. They stepped out across the tail fender of the skimmer and jumped to the dusty ground.

"Being inside this is almost worse than being in the car," Marlene said.

They walked around the skimmer. Lee watched his shadow lengthen as he placed the setting Sirius at his back.

"Look . . . *look!*"

He saw Marlene pointing and turned to follow her gaze. The hills rising before them were dazzling with a million sparkling lights: red and blue and white and dazzling, shimmering lights as though a cascade of precious jewels were pouring down the hillside.

"What is it?" Marlene's voice sounded excited, thrilled, not the least afraid.

Lee stared at the shifting mul-

ticolored lights. It was like playing a lamp on cut crystal. He took a step toward the hills, then looked down to the ground. From inside the cumbersome suit, it was hard to see the ground close to your feet and harder still to bend down and pick up anything. But he squatted slowly and reached for a small stone. Getting up again, Lee held the stone high enough for it to catch the fading rays of daylight.

The rock glittered with a shower of varicolored sparkles.

"They're made of glass," Lee said.

Within minutes Charnovsky and the other "outsiders" were out of the ship to marvel at it. The Russian collected as many rocks as he would stuff into his suit's thigh pouches. Lee and Grote helped him; the women merely stood by the skimmer and watched the hills blaze with lights

Sirius disappeared below the horizon at last, and the show ended. The hills returned to being brownish, erosion-worn slumps of rock.

"Glass mountains," Marlene marvelled as they returned to the skimmer.

"Not glass," Charnovsky corrected. "Glazed rock. Granitic, no doubt. Probably was melted when the Pup exploded. Atmosphere might have been blown away, and rock cooled very rapidly."

Lee could see Marlene's chin rise stubbornly inside the transparent dome of her suit. "I name them the Glass Mountains," she said firmly.

Grote had smuggled a bottle along with them, part of his personal stock. "My most precious possession," he rightfully called it. But for the Glass Mountains he dug it out of its hiding place and they toasted both the discovery and the name. Marlene smiled and insisted that Lee also be toasted, as co-discoverer.

Hours later, Lee grew tired of staring at the metal ceiling of the sleeping quarters a few inches above his top-tier bunk. Even Grote's drinks didn't help him to sleep. He kept wondering about the humanoids, what they were doing, where they were from, how he would get to learn their secrets. As quietly as he could, he slipped down from the bunk. The two men beneath him were breathing deeply and evenly. Lee headed for the rear hatch, past the women's bunks.

The hard suits were standing at stiff attention, flanking both sides of the rear hatch. Lee was in his coveralls. He strapped on a pair of boots, slid the hatch open as quietly as he could, and stepped out onto the fender.

The air was cool and clean, the sky bright enough for him to make out the worn old hills. There were a few stars in the sky, but the hills didn't reflect them.

He heard a movement behind him. Turning, he saw Marlene.

"Did I wake you?"

"I'm a very light sleeper," she said.

"Sorry, I didn't mean — "

"No, I'm glad you did." She shook her head slightly, and for the first time Lee noticed the sweep and softness of her hair. The light was too dim to make its color, but he remembered it as chestnut.

"Besides," she whispered, "I've been longing to get outside without being in one of those damned suits."

He helped her down from the fender, and they walked a little way from the skimmer.

"Can we see the sun?" she asked, looking skyward.

"I'm not sure, I think maybe . . . there. . . . " He pointed to a second-magnitude star, shining alone in the grayish sky.

"Where, which one?"

He took her by the shoulder with one hand so that she could see where he was pointing.

"Oh yes, I see it."

She turned, and she was in his arms, and he kissed her. He held onto her as though there was nothing else in the universe.

If any of the others suspected that Lee and Marlene had spent the night outside, they didn't mention it. All six of them took their regular pre-breakfast checks in the medical booth, and by the time they were finished eating in the cramped galley the computer had registered a safe green for each of them.

Lee slid out from the galley's folding table and made his way forward. Grote was slouched in the driver's seat, his lanky frame a geometry of knees and elbows. He was studying the viewscreen map.

"Looking for a pass through these hills for our vehicle," he said absently, his eyes on the slowly-moving photomap.

"Why take the skimmer?" Lee asked, sitting on the chair beside him. He came across these hills in the powersuits."

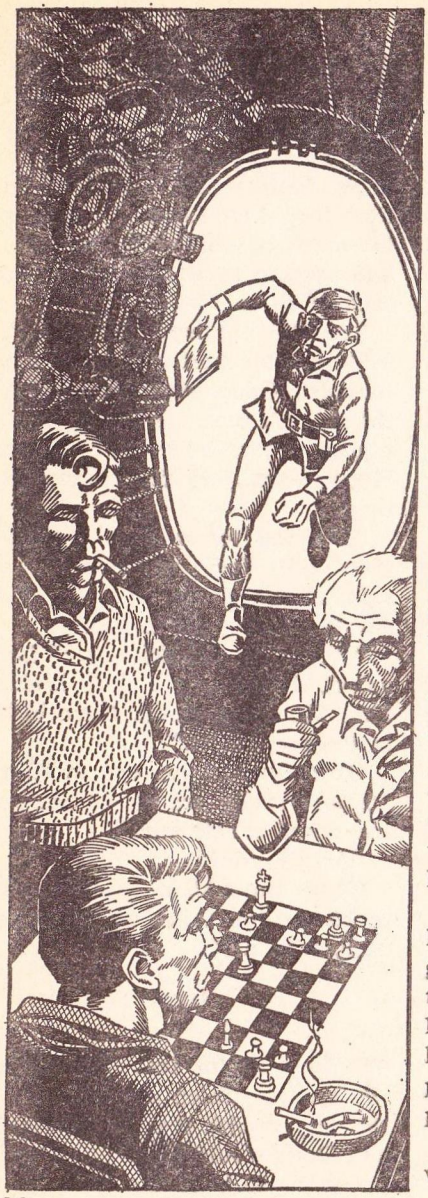
Grote cocked an eye at him. "You're really set on getting to the coast, aren't you?"

"Aren't you?"

That brought a grin. "How much do you think we ought to carry with us?"

VI

They split the team into three groups. Chien and Charnovsky stayed with the car; Marlene and Doris would go with Lee and Grote to look at the flora and



fauna (if any) on the shore side of the hills. Lee and the engineer carried a pair of TV camera packs with them, to set up close to the shoreline.

"Beware of the natives," Charnovsky's voice grated in Lee's earphones as they walked away from the skimmer. "They might swoop down on you with bows and arrows!" His laughter showed what he thought of Lee's worries.

Climbing the hills wasn't as bad as Lee had thought it would be. The powersuits did most of the work, and the glassy rock was not smooth enough to cause real troubles with footing. It was hot though, even with the suit's cooling equipment turned up full bore. Sirius blazed overhead, and the rocks beat glare and heat back into their faces as they climbed.

It took most of the day to get over the crest of the hills. But finally with Sirius edging toward the horizon behind them, Lee saw the water.

The sea spread to the farther horizon, cool and blue, with long gentle swells that steepened into surf as they ran up toward the land. And the land was green here: shrubs and mossy-looking plants were sprinkled around patchily.

"Look! Right here!" Doris's voice.

Lee swiveled his head and saw her clumsily sinking to her knees, like an armor-plated elephant getting down ponderously from a circus trick. She knelt beside a fern-like plant. They all walked over and helped her to photograph it, snip a leaf from it, probe its root system.

"Might as well sleep here tonight," Grote said. "I'll take the first watch."

"Can't we set the scanners to give an alarm if anything approaches?" Marlene asked. "There's nothing here dangerous enough to — "

"I want one of us awake at all times," Grote said firmly. "And nobody outside of their suits."

"There's no place like home," Doris muttered. "But after a while even your own smell gets to you."

The women lay down, locking the suits into roughly reclining positions. To Lee they looked like oversized beetles that had gotten stuck on their backs. It didn't look possible for them to ever get up again. Then another thought struck him, and he chuckled to himself. *Super chastity belts.*

He sat down, cranked the suit's torso section back to a comfortable reclining angle, and tried to doze off. He was dreaming of the towers on Titan again when Grote's voice in his earphones woke him.

"Is it my turn?" he asked groggy.

"Not yet. But turn off your transmitter. You were groaning in your sleep. Don't want to wake up the girls, do you?"

Lee took the second watch and simply stayed awake until daybreak without bothering any of the others. They began marching toward the sea.

The hills descended only slightly into a rolling plateau that went on until they reached the bluffs that overlooked the sea. A few hundred feet down was a narrow strip of beach, with the breakers surging in.

"This is as far as we go" Grote said.

The women spent the morning collecting plant samples. Marlene found a few insects and grew more excited over them than Doris had been about the shrubbery. Lee and Grote walked along the edge of the cliffs looking for a good place to set up their cameras

"You're sure this is the area where they were seen?" Lee asked.

The engineer walking alongside him, turned his head inside the plastic helmet. Lee could see he was edgy too.

"I know how to read a map."

"Sorry, I'm just anxious —"

"So am I."

They walked until Sirius was almost directly overhead, without seeing anything except the tireless sea, the beach, and the spongy-looking plants that huddled close to the ground.

"Not even a damned tree," Grote grumbled.

They turned back and headed for the spot where they had left the women. Far up the beach. Lee saw a tiny dark spot.

"What's that?"

Grote stared for a few moments. "Probably a rock." But he touched a button on the chest of his suit.

Lee did the same, and an electro-optical viewpiece slid down in front of his eyes. Turning a dial on the suit's control panel, he tried to focus on the spot. It wavered in the heat currents of the early afternoon, blurred and uncertain. Then it seemed to jump out of view.

Lee punched the button and the lens slid away from his eyes. "It's moving!" he shouted, and started to run.

He heard Grote's heavy breathing as the engineer followed him, and they both nearly flew in their powersuits along the edge of the cliffs.

It was a man! No, not one, Lee saw, but two of them walking along the beach, their feet in the foaming water.

"Get down you bloody fool" he heard Grote shrilling at him.

He dove headlong, bounced, cracked the back of his head against the helmet's plastic, then banged his chin on the soft inner lining of the collar.

"Don't want them to see, do you?" Grote was whispering now.

"They can't hear us, for God's sake," Lee said into his suit radiophone.

They wormed their way to the cliff's edge again and watched. The two men seemed to be dressed in black. *Or are they black-skinned and naked?* Lee wondered.

After a hurried council, they unslung one of the video cameras and its power unit, set it up right there, turned it on and then backed away from the edge of the cliff. Then they ran as hard as they could, staying out of sight of the beach, with the remaining camera. They passed the startled women and breathlessly shouted out their find. The women dropped their work and started running after them.

About a kilometer or so further on they dropped to all fours again and painfully crawled to the edge once more. Grote hissed the women into silence as they hunched up beside him.

The beach was empty now.

"Do you think they saw us?" Lee asked.

"Don't know."

Lee used the electro-optics again and scanned the beach. "No sign of them."

"Their footprints," Grote snapped. "Look there."

The trails of two very human-looking sets of footprints marched straight into the water. All four of them searched the sea for hours, but saw nothing. Finally, they decided to set up the other camera. It was turning dark by the time they finished.

"We've got to get back to the car," Grote said, wearily, when they finished. "There's not enough food in the suits for another day."

"I'll stay here," Lee replied. "You can bring me more supplies tomorrow."

"No. If there's anything to see, the cameras will pick it up. Chien is monitoring them back at the car, and the whole crew of the ship must be watching the view."

Lee saw there was no sense arguing. Besides, he was bone-tired. But he knew he'd be back again as soon as he could get there.

VII

"Well, it settles a three-hundred-year-old argument," Aaron Hatfield said as he watched the viewscreen.

The biochemest and Lee were sitting in the main workroom of the ship's Sirius globe, watching the humanoids as televised by the cameras on the cliffs. Charnovsky was on the other side of the room, at a workbench, flashing rock chips with a laser so that a spectrometer could analyze their chemical composition. The other outsiders were traveling in the skimmer again, collecting more floral and insect specimens.

"What argument?" Lee asked.

Hatfield shifted in his chair, making the webbing creak. "About the human form . . . whether it's an accident or a result of evolutionary selection. From *them*," he nodded toward the screen, "I'd say it's no accident."

One camera was on wide-field focus and showed a group of three of the men. They were wading hips-deep in the surf, carrying slender rods high above their heads to keep them free of the surging waves. The other camera was fixed on a close-up view of three women standing up the beach, watching their men. Like the men, they were completely naked and black-skinned. They looked human in every detail.

Every morning they appeared on the beach, often carrying the rods, but sometimes not. Lee concluded that they must live in caves cut into the cliffs. The rods

looked like simple bone spears, but even under the closest focus of the cameras he couldn't be sure.

"They're not Negroid," he muttered, more to himself than anyone listening.

"It's hard to tell, isn't it?" Hatfield asked.

Nodding, Lee said, "They just don't look like terrestrial Negroes . . . except for their skin coloring. And that's an adaptation to Sirius's brightness. Plenty of ultraviolet, too."

Charnovsky came over and pulled up a chair. "So. Have they caught any fish this morning?"

"Not yet," Lee answered.

Jabbing a stubby finger toward the screen, the Russian asked, "Are these the geniuses who built the machines on Titan? Fishing with bone spears? They don't make much of an enemy, Lee."

"They could have been our enemy," Lee answered, forcing a thin smile. He was getting accustomed to Charnovsky's needling, but not reconciled to it.

The geologist shook his head sadly. "Take the advice of an older man, dear friend, and disabuse yourself of this idea. Statistics are a powerful tool, Lee. The chances of this particular race being the one that built on Titan are fantastically high. And the chances. . . ."

"What're the chances that two intelligent races will both evolve along the same physical lines?" Lee snapped.

Charnovsky shrugged. "We have two known races. They are both human in form. The chances must be excellent."

Lee turned back to watch the viewscreen, then asked Hatfield. "Aaron, the biochemistry is very similar to Earth's, isn't it?"

"Very close."

"I mean . . . I could eat local food and be nourished by it? I wouldn't be poisoned or anything like that?"

"Well," Hatfield said, visibly thinking it out as he spoke, "as far as the structure of the proteins and other foodstuffs are concerned . . . yes, I guess you could get away with eating it. The biochemistry is basically the same as ours, as nearly as I've been able to tell. But so are terrestrial shellfish, and they make me deathly ill. You see, there're all sorts of enzymes, and microbial parasites, and viruses. . . ."

"We've been living with the local bugs for months now," Lee said. "We're adapted to them, aren't we?"

"You know what they say about visiting strange places: don't drink the water."

One of the natives struck into the water with his spear and instantly the water began to boil

with the thrashing of some sea creature. The other two men drove their spears home, and the thrashing died. They lifted a four-foot-long fish out of the water and started back for the beach, carrying it triumphantly over their heads. The camera"s autotracker kept the picture on them. The women on the beach were jumping and clapping with joy.

"Damn," Lee said softly. "They're as human as we are."

"And obviously representative of a high technical civilization," Charnovsky said.

"Survivors of one, maybe," Lee answered. "Their culture might have been wiped out by the Pup's explosion . . . or by war."

"Ah, now it gets even more dramatic: two cultures destroyed, ours *and* theirs."

"All right, go ahead and laugh," Lee said. "I won't be able to prove anything until I get to live with them."

"Until what?" Hatfield said.

"Until I go out there and meet them face to face, learn their language, their culture, live with them."

"Live with them?" Rassmussen looked startled, the first time Lee had seen him jarred. The captain's mono-molecular biosuit gave his craggy face a faint sheen, like the beginnings of a sweat.

They were sitting around a circular table in the conference room of the Sirius globe: the six "outsiders," Grote, Chien, Captain Rassmussen, Pascual and Lehman.

"Aren't you afraid they might put you in a pot and boil you?" Grote asked, grinning.

"I don't think they have pots. Or fire, for that matter," Lee countered.

The laugh turned on Grote.

Lee went on quitely, "I've checked it out with Aaron, here. There's no biochemical reason why I couldn't survive in the native environment. Doris and Marlene have agreed to gather the same types of food we've seen the humanoids carrying, and I'll go on a strictly native diet for a few weeks before I go to live with them."

Lehman hunched forward, from across the table, and asked Lee, "About the dynamics of having a representative of our relatively advanced culture step into their primitive — "

"I won't be representing an advanced culture to them," Lee said. "I intend to be just as naked and tool-less as they are. And just as black. Aaron can inject me with the proper enzymes to turn my skin black."

"That would be necessary in

any event if you don't want to be sunburned to death," Pascual said.

Hatfield added, "You'll also need contact lenses that'll screen out the UV and protect your eyes."

They spent an hour discussing all the physical precautions he would have to take. Lee kept glancing at Rassmussen. *The idea's slipping out from under his control.* The captain watched each speaker in turn, squinting with concentration and sinking deeper and deeper into his Viking scowl.: Then, when Lee was certain that the captain could no longer object, Rassmussen spoke up:

"One more question. Are you willing to give up an eye for this mission of yours?"

"What do you mean?"

The captain's hands seemed to wander loosely without a mug of beer to tie them down. "Well . . . you seem to be willing to run a good deal of personal risk to live with these eh, people. From the expedition's viewpoint, you will also be risking our only anthropologist, you know. I think the wise thing to do, in that case, would be to have a running record of everything you see and hear."

Lee nodded.

"So we can swap one of your eyes for a TV camera and plant a transmitter somewhere in your skull. I'm sure there's enough empty space in your head to accommodate them." The captain chuckled toothily at his joke.

"We can't do an eye procedure here," Pascual argued. "It's too risky."

"I understand that Dr. Tanaka is quite expert in that field," the captain said. "And naturally we would preserve the eye to restore it afterwards. Unless, of course, Professor Lee — " He let the suggestion dangle.

Lee looked at them sitting around the big table: Rassmussen, trying to look noncommittal; Pascual, upset and nearly angry; Lehman, staring intently right back into Lee's eyes.

You're just trying to force me to back down, Lee thought of Rassmussen. Then, of Lehman, *And if I don't back down, you'll be convinced that I'm crazy.*

For a long moment there was no sound in the crowded conference room except the faint whir of the air blower.

"All right," Lee said. "If Tanaka is willing to tackle the surgery, so am I."

VIII

When Lee returned to his cubicle, the message light under the phone screen was blink-

ing red. He flopped on the bunk, propped a pillow under his head, and asked the computer, "What's the phone message?"

The screen lit up: PLS CALL DR. LEHMAN.

My son, the psychiatrist. "Okay," he said aloud, "get him."

A moment later Lehman's tanned face filled the screen.

"I was expecting you to call," Lee said.

The psychiatrist nodded. "You agreed to pay a big price just to get loose among the natives."

"Tanaka can handle the surgery," he answered evenly.

"It'll take a month before you are fit to leave the ship again."

""You know what our Viking captain says . . . we'll stay here as long as the beer holds out."

Lehman smiled. *Professional technique,* Lee thought.

"Sid, do you really think you can mingle with these people without causing any cultural impact? Without changing them?"

Shrugging, he answered, "I don't know. I hope so. As far as we know, they're the only humanoid group on the planet. They may have never seen a stranger before."

"That's what I mean," Lehman said. "Don't you feel that—"

"Let's cut the circling, Rich. You know why I want to see them first-hand. If we had the time I'd study them remotely for a good long while before trying any contact. But it gets back to the beer supply. We've got to squeeze everything we can out of them in a little more than four years."

"There will be other expeditions, after we return to Earth and tell them about these people."

"Probably so. But they may be too late."

"Too late for what?"

His neck was starting to hurt; Lee hunched up to a sitting position on the bunk. "Figure it out. There can't be more than about fifty people in the group we've been watching. I've only seen a couple of children. And there aren't any other humanoid groups on the planet. That means they're dying out. This gang is the last of their kind. By the time another expedition gets here, there might not be any of them left."

For once, Lehman looked surprised "Do you really think so?"

"Yes. And before they die, we have to get some information out of them."

"What do you mean?"

"They might not be natives of this planet," Lee said, forcing himself to speak calmly, keeping his face a mask, freezing any emotion inside him. "They probably came from somewhere else.

That elsewhere is the home of the people who built the Titan machine . . . their real home. We have got to find out where it is." *Flawless logic.*

Lehman tried to smile again. "That's assuming your theory about an ancient war is right."

"Yes. Asuming I'm right."

"Assume you are," Lehman said. "And assume you find what you're looking for. Then what? Do you just take off and go back to Earth? What happens to the people here?"

"I don't know," Lee said, ice-cold inside. "The main problem will be how to deal with the homeworld of their people."

"But the people here, do we just let them die out-"

"Maybe. I guess so."

Lehman's smile was completely gone now; his face didn't look pleasant at all.

It took much more than a month. The surgery was difficult. And beneath all the pain was Lee's rooted fear that he might never have his sight fully restored again. While he was recovering, before he was allowed out of his infirmary bed, Hatfield turned his skin black with a series of enzyme injections. He was also fitted for a single quartz contact lens.

Once he was up and around, Marlene followed him constantly. Finally she said, "You're even better looking with black skin; it makes you more mysterious. And the prosthetic eye looks exactly like your own. It even moves like the natural one."

Rassmussen still plodded. Long after he felt strong enough to get going again, he was still confined to the ship. When his complaints grew loud enough, they let him start on a diet of native foods. The medics and Hatfield hovered around him while he spent a miserable week with dysentary. Then it passed. But it took a while to build up his strength again; all he had to eat now were fish, insects, and pulpy greens.

After more tests, conferences, a two-week trial run out by the Glass Mountains, and then still more exhaustive physical exams, Rassmussen at last agreed to let Lee go.

Grote took him out in the skimmer, skirting the long way around the Glass Mountains, through the surf and out onto the gently billowing sea. They kept far enough out at sea for the beach to be constantly beyond their horizon.

When night fell, Grote nosed the skimmer landward. They came ashore around midnight, with the engines clamped down to near silence, a few kilometers up the beach from the humanoids' site. Grote, encased in a

powersuit, walked with him part way and buried a relay transceiver in the sand, to pick up the signals from the camera and radio imbedded in Lee's skull.

"Good luck." His voice was muffled by the helmet.

Lee watched him plod mechanically back into the darkness. He strained to hear the skimmer as it turned and slipped back into the sea, but he could neither see nor hear it.

He was alone on the beach.

Clouds were drifting landward, riding smoothly overhead. The breeze on the beach, though, was blowing warmly out of the desert, spilling over the bluffs and across the beach, out to sea. The sky was bright with the all-night twilight glow, even though the clouds blotted out most of the stars. Along the foot of the cliffs, though, it was deep black. Except for the wind, there wasn't a sound: not a bird nor a nocturnal cat, not even an insect's chirrup.

Lee stayed near the water's edge. He wasn't cold, even though naked. Still, he could feel himself trembling.

Grote's out there, he told himself. *If you need him, he can come rolling up the beach in ten minutes.*

But he knew he was alone.

The clouds thickened and began to sprinkle rain, a warm, soft shower. Lee blinked the drops away from his eyes and walked slowly, a hundred paces one direction, then a hundred paces back again.

The rain stopped as the sea horizon started turning bright. The clouds wafted away. The sky lightened, first gray, then almost milky white. Lee looked toward the base of the cliffs. Dark shadows dotted the rugged cliff face. Caves. Some of them were ten feet or more above the sand.

Sirius edged a limb above the horizon, and Lee, squinting, turned away from its brilliance. He looked back at the caves again, feeling the warmth of the hot star's might on his back.

The first ones out of the cave were two children. They tumbled out of the same cave, off to Lee's left, giggling and running.

When they saw Lee, they stopped dead. As though someone had turned them off. Lee could feel his heart beating as they stared at him. He stood just as still as they did, perhaps a hundred meters from them. They looked about five and ten years old, he judged. *If their lifespans are the same as ours.*

The taller of the two boys took a step toward Lee, then turned and ran back into the cave. The younger boy followed him.

For several minutes nothing happened. Then Lee heard voices echoing from inside the cave. Angry? Frightened? *They are not laughing.*

Four men appeared at the mouth of the cave. Their hands were empty. They simply stood there and gaped at him, from the shadows of the cave's mouth.

Now we'll start learning their customs about strangers, Lee said to himself.

Very deliberately, he turned away from them and took a few steps up the beach. Then he stopped, turned again, and walked back to his original spot.

Two of the men disappeared inside the cave. The other two stood there. Lee couldn't tell what the expressions on their faces meant. Suddenly other people appeared at a few of the other cave entrances. *They're interconnected.*

Lee tried a smile and waved. There were women among the onlookers now, and a few children. One of the boys who saw him first — at least, it looked like him — started chattering to an adult. The man silenced him with a brusque gesture.

It was getting hot. Lee could feel perspiration dripping along his ribs as Sirius climbed above the horizon and shone straight at the cliffs. Slowly, he squatted down on the sand.

A few of the men from the first cave stepped out onto the beach. Two of them were carrying bone spears. Others edged out from their caves. They slowly drew together, keeping close to the rocky cliff wall, and started talking in low, earnest tones.

They're puzzled, all right. Just play it cool. Don't make any sudden moves.

He leaned forward slightly and traced a triangle on the sand with one finger.

When he looked up again, a grizzled, white-haired man had taken a step or two away from the conference group. Lee smiled at him, and the elder froze in his tracks. With a shrug, Lee looked back at the first cave. The boy was still there, with a woman standing beside him, gripping his shoulder. Lee waved and smiled. The boy's hand fluttered momentarily.

The old man said something to the group, and one of the younger men stepped out to join him. Neither held a weapon. They walked to within a few meters of Lee, and the old man said something, as loudly and bravely as he could muster.

Lee bowed his head. "Good morning. I am Professor Sidney Lee of the University of Ottawa, which is one hell of a long way from here."

They squatted down and started talking, both of them at once, pointing to the caves and then all around the beach and finally out to the sea.

Lee held up his hands and said, "It ought to be clear to you that I'm from someplace else, and I don't speak your language. Now if you want to start teaching me — "

They shook their heads, talked to each other, said something else to Lee.

Lee smiled at them and waited for them to stop talking. When they did, he pointed to himself and said very clearly, "Lee."

He spent an hour at it, repeating only that one syllable, no matter what they said to him or to each other. The heat was getting fierce; Sirius was a blue flame searing his skin, baking the juices out of him.

The younger man got up and, with a shake of his head, spoke a few final words to the elder and walked back to the group that still stood knotted by the base of the cliff. The old man rose, slowly and stiffly. He beckoned to Lee to do the same.

As Lee got to his feet he saw the other men start to head out for the surf. A few boys followed behind, carrying several bone spears for their — what? Fathers? Older brothers?

As long as the spears are for the fish and not me, Lee thought.

The old man was saying something to him. Pointing toward the caves. He took a step in that direction, then motioned for Lee to come along. Lee hesitated. The old man smiled a toothless smile and repeated his invitation.

Grinning back at him in realization, Lee said aloud, "Okay. If you're not scared of me I guess I don't have to be scared of you."

IX

It took more than a year before Lee learned their language well enough to understand roughly what they were saying. It was an odd language, sparse and practically devoid of pronouns.

His speaking of their words made the adults smile, when they thought he couldn't see them doing it. The children still giggled at his speech, but the old man — Ardraka — always scolded them when they did.

They called the planet Makta, and Lee saw to it that Rassmussen entered that as its official name in the expedition's log. He made a point of walking the beach alone one night each week, to talk with the others at the ship and make a personal report. He quickly found that most of what he saw, heard and said inside the caves never got out to

the relay transceiver buried up the beach; the cliff's rock walls were too much of a barrier.

Ardraka was the oldest of the clan and the nominal chief. His son, Ardra, was the younger man who had also come out to talk with Lee that first day. Ardra actually gave most of the orders. Ardraka could overrule him whenever he chose to, but he seldom exercised the right.

There were only forty-three people in the clan, nearly half of them elderly-looking. Eleven were pre-adolescent children; two of them infants. There were no obvious pregnancies. Ardraka must have been about fifty, judging by his oldest son's apparent age. But the old man had the wrinkled, sunken look of an eighty-year-old. The people themselves had very little idea of time beyond the basic rhythm of night and day.

They came out of the caves only during the early morning and evening hours. The blazing midday heat of Sirius was too much for them to face. They ate crustaceans and the small fish that dwelt in the shallows along the beach, insects, and the grubby vegetation that clung to the base of the cliffs. Occasionally they found a large fish that had blundered into the shallows; then they feasted.

They had no wood, no metal, no fire. Their only tools were from the precious bones of the rare big fish, and hand-worked rock.

They died of disease and injury, and aged prematurely from poor diet and overwork. They had to search constantly for food, especially since half their day was taken away from them by Sirius's blowtorch heat. They were more apt to be prowling the beach at night, hunting seaworms and crabs, than by daylight. *Grote and I damn near barged right into them,* Lee realized after watching a few of the night gathering sessions.

There were some dangers. One morning he was watching one of the teenaged boys, a good swimmer, venture out past the shallows in search of fish. A sharklike creature found him first.

When he screamed, half a dozen men grabbed spears and dove into the surf. Lee found himself dashing into the water alongside them, empty-handed. He swam out to the youngster, already dead, sprawled face down in the water, half of him gone, blood staining the swells. Lee helped to pull the remains back to shore.

There wasn't anything definite, no one said a word to him about it, but their attitude toward him changed. He was fully accepted now. He hadn't saved

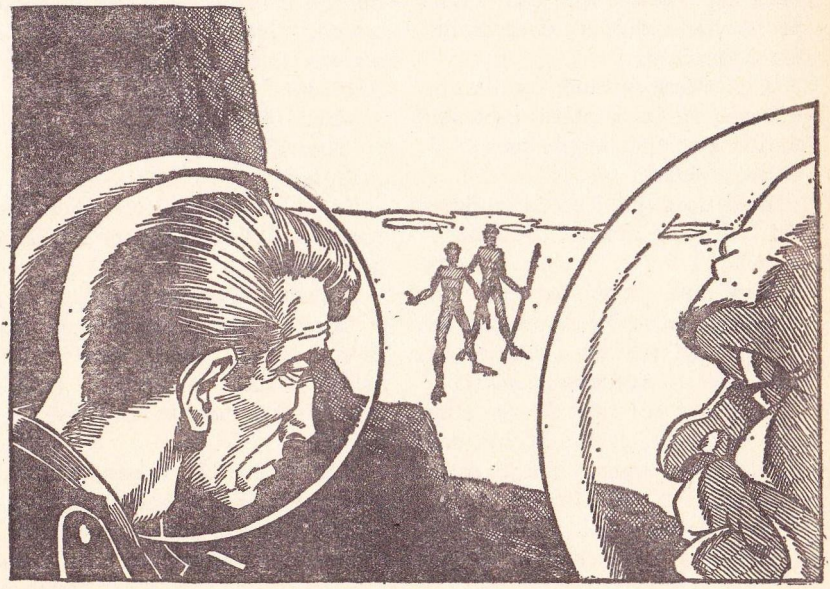
the boy's life, hadn't shown uncommon bravery. But he had shared a danger with them, and a sorrow.

Wheel the horse inside the gates of Troy. Lee found himself thinking. *Nobody ever told you to beware of men bearing gifts.*

After he got to really understand their language Lee found that Ardraka often singled him out for long talks. It was almost funny. There was something that the old man was fishing for, just as Lee was trying to learn where these people *really* came from.

They were sitting in the cool darkness of the central cove, deep inside the cliff. All the outer caves channeled back to this single large chamber, high-roofed and moss-floored, its rocks faintly phosphorescent. It was big enough to hold four or five times the clan's present number. It was midday. Most of the people were sleeping. A few of the children, off to the rear of the cave, were scratching pictures on the packed bare earth with pointed, fist-sized rocks.

Lee sat with his back resting against a cool stone wall. The sleepers were paired off, man and mate, for the most part. The unmated teenagers slept apart, with the older couples between them. As far as Lee could judge, the couples paired permanently, although the teens played the game



about as freely as they could.

Ardraka was dozing beside him. Lee settled back and tried to turn off his thoughts, but the old man said:

"Lee is not asleep?"

"No, Lee is not," he answered.

"Ardraka has seen that Lee seldom sleeps," Ardrake said.

"That is true."

"Is it that Lee does not need to sleep as Ardraka does?"

Lee shook his head. "No, Lee needs sleep as much as Ardraka or any man."

"This . . . place . . . that Lee comes from. Lee says it is beyond the sea?"

"Yes, far beyond."

In the faint light from the gleaming rocks, the old man's face looked troubled, deep in difficult thought.

"And there are men and women living in Lee's place, men and women like the people here?"

Lee nodded.

"And how did Lee come here? Did Lee swim around the sea?"

They had been through this many times. "Lee came around the edge of the sea, walking on land just as Ardraka would."

Laughing softly, the old man said, "Ardraka is too feeble now for such a walk. Ardra could make such a walk."

"Yes, Ardra can."

"Ardraka has tried to dream of Lee's' place, and Lee's people. But such dreams do not come."

"Dreams are hard to command," Lee said.

"Yes, truly."

"And what of Ardraka and the people here?" Lee asked. "Is this the only place where such men and women live?"

"Yes. It is the best place to live. All other places are death."

"There are no men and women such as Ardraka and the people here living in another place?"

The old man thought hard a moment, then smiled a wrinkled toothless smile. "Surely Lee jokes. Lee knows that Lee's people live in another place."

We've been around that bush before. Trying another tack, he asked, "Have Ardraka's people always lived in this place? Did Ardraka's father live here?"

"Yes, of course."

"And his father?"

A nod.

"And all the fathers, from the beginning of the people? All lived here, always?"

A shrug. "No man knows."

"Have there always been this many people living here?" Lee asked. "Did Ardraka's people ever fill this cave when they slept here?"

"Oh yes. . . . When Ardraka was a boy, many men and women slept in the outer caves, since there was no room for them here.

And when Ardraka's father was young, men and women even slept in the lower caves."

"Lower caves?"

Ardraka nodded. "Below this one, deeper inside the ground. No man or woman has been in them since Ardraka became chief."

"Why is that?"

The old man evaded Lee's eyes. "They are not needed."

"May Lee visit these lower caves?"

"Perhaps," Ardraka said. After a moment's thought, he added, "Children have been born and grown to manhood and died since any man set foot in those caves. Perhaps they are gone now. Perhaps Ardraka does not remember how to find them."

"Lee would like to visit the lower caves."

Late that night he walked the beach alone, under the glowing star-poor sky, giving his weekly report back to the ship.

"He's been cagy about the lower caves," Lee said as the outstretched fingers of surf curled around his ankles.

"Why should he be so cautious?" It was Marlene's voice. She was taking the report this night.

"Because he's no fool, that's why. These people have never seen a stranger before . . . not for generations, at least. Therefore their behavior toward me is original, not instinctive. If he's leery of showing me the caves, it's for some reason that's fresh in his mind, not some hoary tribal taboo."

"Then what do you intend to do?"

"I'm not sure yet — " Lee turned to head back down the beach and saw Ardra standing twenty paces behind him.

"Company," he snapped. "Talk to you later. Keep listening."

Advancing toward him, Ardra said, "Many nights, Ardra has seen Lee leave the cave and walk on the beach. Tonight Lee was talking, but Lee was alone. Does Lee speak to a man or woman that Ardra cannot see?"

His tone was flat, factual, neither frightened nor puzzled. It was too dark to really make out the expression on his face, but he sounded almost casual.

"Lee is alone," he answered as calmly as he could. "There is no man or woman here with Lee. Except Ardra."

"But Lee speaks and then is silent. And then Lee speaks again."

He knows a conversation when he hears one, even if it's only one side of it and in a strange language.

Ardra suggested, "Perhaps Lee speaks to men and women from

Lee's place, which is far from the sea?"

"Does Ardra believe that Lee can speak to men and women far away from this place?"

"Ardra believes that is what Lee does at night on the beach. Lee speaks with the *Karta.*"

"*Karta?* What is the meaning of *karta?*"

"It is an ancient word. It means men and women who live in another place."

Others, Lee translated to himself. "Yes," he said to Ardra, "Lee speaks to the others."

Ardra's breath seemed to catch momentarily, then he said with deliberate care, "Lee speaks with the Others." His voice had an edge of steel to it now.

What have I stepped into?

"It is time to be sleeping, not walking the beach," Ardra said, in a tone that Lee knew was a command. And he started walking toward the caves.

Lee outweighed the chief's son by a good twenty pounds and was some ten centimeters taller. But he had seen the speed and strength in Ardra's wiry frame, and knew the difference in reaction times that the fifteen years between them made. So he didn't run or fight; he followed Ardra back to the caves and obediently went to sleep. And all the night Ardra stayed awake and watched over him.

X

The next morning, when the men went out to fish and the women to gather greens, Ardra took Lee's arm and led him toward the back of the central cave. Ardraka and five other elders were waiting for them. They all looked very grim. Only then did Lee realize that Ardra was carrying a spear in his other hand.

They were sitting in a ragged semicircle, their backs to what looked like a tunnel entrance, their eyes hard on Lee. He sat at their focus, with Ardra squatting beside him.

"Lee," Ardraka began without preliminaries, "why is it that Lee wishes to see the lower caves?"

The question caught him by surprise. "Because . . . Lee wishes to learn more about Ardraka's people. Lee comes from far away, and knows little of Ardraka's people."

"Is it true," one of the elders asked, "that Lee speaks at night with the Others?" His inflection made the word sound special, fearful, ominous.

"Lee speaks to the men and women of the place where Lee came from. It is like the way Ardraka speaks to Ardraka's grandfather . . . in a dream."

"But Ardraka sleeps when doing this. Lee is awake."

Ardra broke in, "Lee says Lee's

people live beyond the sea. Beyond the sea is the sky. Do Lee's people live in the sky?"

Off the edge of the world, just like Columbus. "Yes," he admitted. "Lee's people live in the sky — "

"See!" Ardra shouted. "Lee is of the Others!"

The councilmen physically backed away from him. Even Ardraka seemed shaken.

"Lee is of the Others," Ardra repeated. "Lee must be killed, before he kills Ardraka's people!"

"Kill?" Lee felt stunned. He had never heard any of them speak of violence before.

"Why should Lee kill the people here?"

They were all babbling at once. Ardraka raised his hand for silence.

"To kill a man is very serious," he said painfully. "It is not certain that Lee is of the Others."

"Lee says is with Lee's own mouth!" Ardra insisted. "Why else did Lee come here? Why does Lee want to see the lower caves?"

Ardraka glowered at his son, and the younger man stopped. "The Council must be certain before it acts."

Struggling to keep his voice calm, Ardra ticked off on his fingers, "Lee says Lee's people live in the sky . . . the Others live in the sky. Lee wishes to see the lower caves. Why? To see if more of Ardraka's people are living there, so that he can kill *all* the people!"

The Council members murmured and glanced at him fearfully. *Starting to look like a lynch jury.*

"Wait," Lee said. "There is more to the truth than what Ardra says. Lee's people live in the sky . . . that is true. But that does not mean that Lee's people are the Others. The sky is wide and larger . . . wider than the sea, by far. Many different peoples can live in the sky."

Ardraka nodded, his brows knitted in concentration. "But, Lee, if both Lee's people and the Others live in the sky, why have not the Others destroyed Lee's people as they destroyed Ardraka's ancestors?"

Lee felt his stomach drop out of him. *So that's it!*

"Yes," one of the Councilmen said. "The Others live far from this land, yet the Others came here and destroyed Ardraka's forefathers and all the works of such men and women."

"Tell Lee what happened," he said, stalling for time to work up answers. "Lee knows nothing about the Others." *Not from your side of the war, anyway.*

Ardraka glanced around at the Council members sitting on both sides of him. They looked uncer-

tain, wary, still afraid. Ardra, beside Lee, had the fixed glare of a born prosecutor.

"Lee is not of Ardraka's people," the younger man said, barely controlling the fury in his voice. "Lee must be of the Others. There are no people except Ardraka's people and the Others!"

"Perhaps that is not so," Ardraka said. "True, Ardraka has always thought it to be this way, but Lee looks like an ordinary man, not like the Others."

Ardra huffed. "No living man has seen the Others. How can Ardraka say . . . "

"Because Andraka has seen pictures of the Others," the chief said quietly.

"Pictures?" They were startled.

"Yes. In the deepest cave, where only the chief can go . . . and the chief's son. Ardraka had thought for a long time that soon Ardra should see the deepest cave. But no longer. Ardra must see the cave now."

The old man got up, stiffly, to his feet. His son was visibly trembling with eagerness.

"May Lee also see the pictures?" Lee asked.

They all began to protest, but Ardraka said firmly, "Lee has been accused of being of the Others. Lee stands in peril of death. It is right that Lee should see the pictures."

The Council members muttered among themselves. Ardra glowered, then bent down and reached for the spear he had left at his feet. Lee smiled to himself. *If those pictures give you the slightest excuse, you're going to ram that thing through me. You'd make a good sheriff: kill first, then ask questions.*

Far from having gotten his way to the deeper caves, Ardraka threaded through a honeycomb of tunnels and chambers, always picking the path that slanted downward. Lee sensed that they were spiralling deeper and deeper into the solid rock of the cliffs, far below the sea level. The walls were crusted and a thick mat of dust clung to the ground. But everything shone with the same faint luminosity as the upper caves, and beneath the dust the footing felt more like pitted metal than rock.

Finally Ardraka stopped. They were standing in the entryway to a fairly small chamber. The lighting was very dim. Lee stood behind Ardraka and felt Ardra's breath on his back.

"This is the place," Ardraka said solemnly. His voice echoed slightly.

They slowly entered the chamber. Ardraka walked to the farthest wall and wordlessly pointed to a jumble of lines scrawled

at about eye level. The cave was dark, but the lines of the drawing glowed slightly brighter than the wall itself.

Gradually, Lee pieced the picture together. It was crude, so crude that it was hard to understand. But there were stick figures of men that seemed to be running, and rough outlines of what might be buildings, with curls of smoke rising up from them. Above them all were circular things, ships, with dots for ports. Harsh jagged lines were streaking out of them and toward the stick figures.

"Men and women," Ardraka said, in a reverent whisper as he pointed to the stick drawings. "The men and women of the time of Ardraka's farthest ancestors. And *here*—" his hand flashed to the circles — "are the Others."

Even in the dim light, Lee could see Ardra's face gaping at the picture. "The Others," he said, his voice barely audible.

"Look at Lee," Ardraka commanded his son. "Does Lee look like the Others, or like a man?"

Ardra seemed about to crumble. He said shakily, "Lee . . . Ardra has misjudged Lee. . . . Ardra is ashamed."

"There is no shame," Lee said. "Ardra has done no harm. Ardra was trying to protect Ardraka's people. *And besides, you were right.*

Turning to Ardraka, Lee asked. "Is this all that you know of the Others?"

"Ardraka knows that the Others killed the people of Ardraka's forefathers. Before the Others came, Ardraka's ancestors lived in splendor: their living places covered the land everywhere; they swam the seas without fear of any creature of the deeps; they leaped through the sky and laughed at the winds and storms; every day was bright and good and there was no night. Then the Others came and destroyed everything. The Others turned the sky to fire, and brought night. Only the people in the deepest cave survived. This was the deepest cave. Only the people of Ardraka escaped the Others."

We destroyed this world, Lee told himself. *An interstellar war, eons ago. We destroyed each other, old man. Only you've been destroyed for good, and we climbed back.*

"One more thing remains," Ardraka said. He walked into the shadows on the other end of the room and pushed open a door. *A door!* It was metal, Lee could feel as he went past it. There was another chamber, larger.

A storeroom! Shelves lined the walls. Most of them empty, but here and there were boxes, containers, machinery with strange writing on it.

"These belonged to Ardraka's oldest ancestors," the chief said. "No man today knows why these things were saved here in the deepest cave. They have no purpose. They are dead. As dead as the people who put them here."

It was Lee who was trembling as they made their way up to the dwelling caves.

XI

It was a week before he dared stroll the beach at night again, a week of torment, even though Ardra never gave him the slightest reason to think that he was still under suspicion.

They were just as stunned as he was when he told them about it.

"We killed them," he whispered savagely at them, back in the comfort of the ship. "We destroyed them. Maybe we even made the Pup explode, to wipe them out completely."

"That's . . . farfetched," Rassmussen answered. But his voice sounded lame.

"What do we do now?"

"I want to see those artifacts."

"Yes, but how?"

Lee said, "I can take you down to the cave, if we can put the whole clan to sleep for a few hours. Maybe gas. . . ."

"That could work," Rassmussen agreed.

"A soporific gas?" Pascual's soft tenor rang incredulously in Lee's ears. "But we haven't the faintest idea of how it might affect them."

"It's the only way," Lee said. "You can't dig your way into the cave . . . even if you could, they would hear it and you'd be discovered."

"But gas . . . it could kill them all."

"They're all dead right now," Lee snapped. "Those artifacts are the only possible clue to their early history."

Rassmussen decided. "We'll do it."

Lee slept less than ever the next few nights, and when he did he dreamed, but no longer about the buildings on Titan. Now he dreamed of the ships of an ancient Earth, huge round ships that spat fire on the cities and people of Makta. He dreamed of the Pup exploding and showering the planet with fire, blowing off the atmosphere, boiling the oceans, turning mountains into glass slag, killing every living thing on the surface of the world, leaving the planet bathed in a steam cloud, its ground ruptured with angry new volcanoes.

It was a rainy dark night when you could hardly see ten meters beyond the cave's mouth that they came. Lee heard their

voices in his head as they drove the skimmer up onto the beach and clambered down from it and headed for the caves. Inside the caves, the people were asleep, sprawled innocently on the damp musty ground.

Out of the rain a huge, bulky metal shape materialized, walking with exaggerated caution.

"Hello, Sid," Jerry Grote's voice said in his head, and the white metal shape raised a hand in greeting.

The Others, Lee thought as he watched four more powersuited figures appear in the dark rain.

He stepped out of the cave, the rain a cold shock to his body. "Bring the stuff?"

Grote hitched a gauntleted thumb at one of the others. "Pascual's got it. He's insisting on administering the gas himself."

"Okay, but let's get it done quickly, before somebody wakes up and spots you. Who else is with you?"

"Chien, Tanaka and Stek. Tanaka can help Carlos with the anesthetic. Chien and Stek can look over the artifacts."

Lee nodded agreement.

Pascual and Tanaka spent more than an hour seeping the mildest soporific they know of through the sleeping cave. Lee fidgeting outside on the beach, in the rain, waiting for them to finish. When Tanaka finally told them it was safe to go through, he hurried past the sprawled bodies, scarcely seeing Pascual — still inside his cumbersome suit — patiently recording medical analyses of each individual.

Even with the suit lamps to light the corridors, it was hard to retrace his steps down to the lowest level of the ancient shelter. But when he got to the storeroom, Lee heard Stek break into a long string of Polish exultation at the sight of the artifacts.

The three suited figures holographed, x-rayed, took radiation counts, measured, weighed, every piece on the ancient shelves. They touched nothing directly, but lifted each piece with loving tenderness in a portable magnetic grapple.

"This one," Stek told Lee, holding a hand-sized, oddly angular instrument in mid-air with the grapple, "we must take with us."

"Why?"

"Look at it," the physicist said. "If it's not an astronautical sextant or something close to it, I'll eat Charnovsky's rocks for a month."

The instrument didn't look impressive to Lee. It had a lens at one end, a few dials at the other. Most of it was just an angular metal box, with strange printing on it.

"You want to know where these people originally came from? " Stek asked. "If they came from somewhere other than this planet, the information could be inside this instrument."

Lee snapped his gaze from the instrument to Stek's helmeted face.

"If it is a sextant, it must have a reference frame built into it. A tape, perhaps, that lists the stars that these people wanted to go to."

"Okay," Lee said. "Take it."

By the time they got back up to the main sleeping cave and out to the beach again, it was full daylight.

"We'll have to keep them sleeping until almost dawn tomorrow," Lee told Pascual. "Otherwise they might suspect that something unusual's happened."

The doctor's face looked concerned but not worried. "We can do that without harming them, I think. But, Sid, they'll be very hungry when they awake."

Lee turned to Grote. "How about taking the skimmer out and stunning a couple of big fish and towing them back here to the shallows?"

Grinning, Grote replied, "Hardly fair sport with the equipment I've got." He turned and headed for the car.

"Wait," Stek called to him. "Give me a chance to get this safely packed in a magnetic casing." And the physicist took the instrument off toward the skimmer.

"Sid," Pascual said gently, "I want you to come back with us. You need a thorough medical check."

"Medical?" Lee flashed. "Or are you fronting for Lehman?"

Pascual's eyes widened with surprise. "If you had a mirror, you would see why I want to check you. You're breaking out in skin cancers."

Instinctively, Lee looked at his hands and forearms. There were a few tiny blisters on them. And more on his belly and legs.

"It's from overexposure to the ultraviolet. Hatfield's skin-darkening didn't fully protect you."

"Is it serious?"

"I can't tell without a full examination."

Just like a doctor. "I can't leave now," Lee said. "I've got to be here when they wake up, and make sure that they don't suspect they've been visited by the . . . by us."

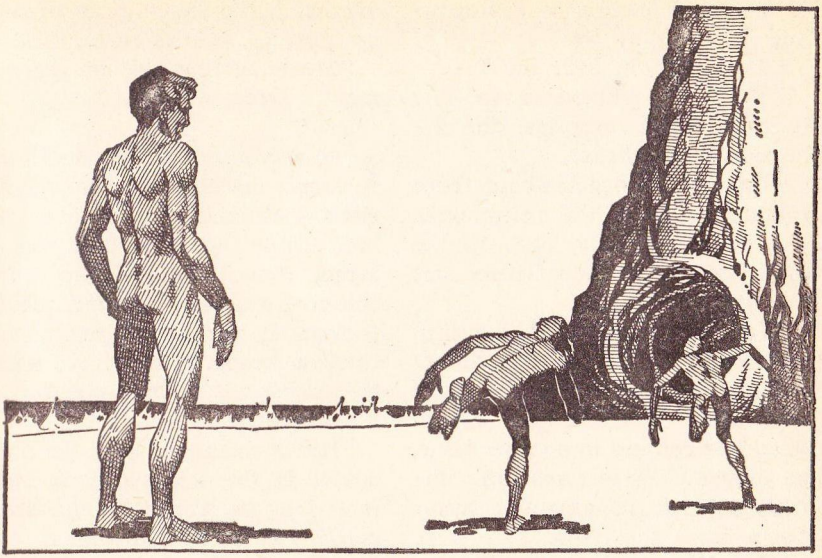
"And if they do suspect?"

Lee shrugged. "That's something we ought to know, even if we can't do anything about it."

"Won't it be dangerous for you?"

"Maybe."

Pascual shook his head. "You mustn't stay out in the open any



longer. I won't be responsible for it."

"Fine. Do you want me to sign a release form?"

Grote brought the skimmer back around sundown, with two good-sized fish aboard. The others got aboard around midnight, and with a few final radioed words of parting, they drove off the beach and out to sea.

At dawn the people woke up. They looked and acted completely normally, as far as Lee could tell. It was one of the children who noticed the still-sluggish fish that Grote had left in a shallow pool just outside the line of breakers. Every man in the clan splashed out, spear in hand, to get them. They feasted happily that day.

The dream was confusing. Somehow the towers on Titan and the exploding star got mixed together. Lee saw himself driving a bone spear into the sleeping form of one of the natives. The man turned on the ground, with the spear run through his body, and smiled bloodily at him. It was Ardraka.

"Sid!"

He snapped awake. It was dark, and the people were sleeping, full-bellied. He was slouched near one of the entryways to the main sleeping cave, at the mouth

of a tunnel leading to the openings in the cliff wall.

"Sid, can you hear me?"

"Yes," he whispered so low that he could only feel the vibration in his throat.

"I'm up the beach about three kilometers from the relay unit. You've got to come back to the ship. Stek thinks he's figured out the instrument."

Wordlessly, silently, Lee got up and padded through the tunnel and out onto the beach. The night was clear and bright. Dawn would be coming in another hour, he judged. The sea was calm, the wind a gentle crooning as it swept down from the cliffs.

"Sid did you hear what I said? Stek thinks he knows what the instrument is for. It's part of a pointing system for a communications setup."

"I'm on my way." He still whispered, and turned to see if anyone was following him.

Grote was in a biosuit, and no one else was aboard the skimmer. The engineer jabbered about Stek's work on the instrument all the way back to the ship.

Just before they arrived, Grote suggested, "Uh, Sid you do want to put on some coveralls, don't you?"

Two biosuited men were setting up some electronics equipment at the base of the ship's largest telescopes dangling in a hoist sling overhead, the fierce glow of Sirius glinting off its metal barrel.

"Stek's setting up an experiment," Grote explained.

Lee was bundled into a biosuit and ushered into the physicist's workroom as soon as he set foot inside the ship. Stek was a large, round, florid man with thinning red hair. Lee had hardly spoken to him at all, except for the few hours at the cave, when the physicist had been encased in a powersuit.

"It's a tracker, built to find a star in the sky and lock onto it as long as it's above the horizon," Stek said, gesturing to the instrument hovering in a magnetic grapple a few inches above his work table.

"You're sure of that?" Lee asked.

The physicist glanced at him as though he had been insulting. "There's no doubt about it. It's a tracker, and it probably was used to aim a communication antenna at their home star."

"And where is that?"

"I don't know yet. That's why I'm setting up the experiment with the telescope."

Lee walked over to the work table and stared at the instrument. "How can you be certain that it's what you say it is?"

Stek flushed, then controlled himself. With obvious patience,

he explained. "X-ray probes showed that the instrument contained a magnetic memory tape. The tape was in binary code, and it was fairly simple to transliterate the code, electronically, into the ship's main computers. We didn't even have to touch the instrument physically . . . except with electrons."

Lee made an expression that showed he was duly impressed.

Looking happier, Stek went on, "The computer cross-checked the instrument's coding and came up with correlations: attitude references were on the instrument's tape, and astronomical ephemerides, timing data and so forth. Exactly what we'd put into a communications tracker."

"But this was made by a different race of people — "

"It makes no difference," Stek said sharply. "The physics are the same. The universe is the same. The instrument can only do the job it was designed to do, and that job was to track a single star."

"Only one star?"

"Yes, that's why I"m certain it was for communicating with their home star."

"So we can find their home star after all." Lee felt the old dread returning, but with it something new, something deeper. *Those people in the caves were our enemy. And maybe their brothers, the ones who built the machines on Titan, are still out there somewhere looking for them — and for us.*

XII

Lee ate back at the Sirius globe, but Pascual insisted on his remaining in a biosuit until they had thoroughly checked him out. And they wouldn't let him eat Earth food, although there was as much local food as he wanted. He didn't want much.

"You've thinned out too much," Marlene said. She was sitting next to him at the galley table.

"Ever see a fat Sirian?" He meant it as a joke; it came out waspish. Marlene dropped the subject.

The whole ship's company gathered around the telescope and the viewscreen that would show an amplified picture of the telescope's field of view. Stek bustled around, making last-minute checks and adjustments to the equipment. Rassmussen stood taller than everyone else, looking alternately worried and excited. Everyone, including Lee, was in a biosuit.

Lehman showed up at Lee's elbow. "Do you think it will work?"

"Driving the telescope from the ship's computer's version of

the instrument's tape? Stek seems to think it'll go all right."

"And you?"

Lee shrugged. "The people in the caves told me what I wanted to know. Now this instrument will tell us where they came from originally."

"The homeworld of our ancient enemies?"

"Yes."

For once, Lehman didn't seem to be amused. "And what happens then?"

"I don't know," Lee said. "Maybe we go out and see if they are still there. Maybe we re-open the war."

If there was a war."

"There was. It might still be going on, for all we know. Maybe we're just a small part of it, a skirmish."

"A skirmish that wiped out the life on this planet," Lehman said.

"And also wiped out Earth, too."

"But what about the people on this planet, Sid? What about the people in the caves?"

Lee couldn't answer.

"Do we let them die out, just because they might have been our enemies a few millenia ago."

"They would still be our enemies, if they knew who we are," Lee said tightly.

"So we let them die?"

Lee tried to blot their faces out of his mind, to erase the memory of Ardraka and the children and Ardra apologizing shamefully and the people fishing in the morning. . . .

"No," he heard himself say. "We've got to help them. They can't hurt us any more, and we ought to help them."

Now Lehman smiled.

"It's ready," Stek said, his voice pitched high with excitement.

Sitting at the desk-sized console that stood beside the telescope, he thumbed the power switch and punched a series of buttons.

The viewscreen atop the desk glowed into life, and a swarm of stars appeared. With a low hum of power, the telescope slowly turned, slowly, to the left. The scene in the viewscreen shifted. Beside the screen was a smaller display, an astronomical map with a bright luminous dot showing where the telescope was aiming.

The telescope stopped turning, hesitated, edged slightly more to the left and then made a final, barely discernible correction upward.

"It's locked on."

The viewscreen showed a meager field of stars, with a single bright pinpoint centered exactly in the middle of the screen.

"What is it, what star?"

Lee pushed forward, through the crowd that clustered around the console.

"My God," Stek said, his voice sounding hollow. "That's . . . the sun."

Lee felt his knees wobble. "They're from Earth!"

"It can't be," someone said.

Lee shoved past the people in front of him and stared at the map. The bright dot was fixed on the sun's location.

"They're from Earth!" he shouted. "They're part of us!"

"But how could . . . "

"They were a colony of *ours*," Lee realized. "The Others were an enemy . . . an enemy that nearly wiped them out and smashed Earth's civilization back into a stone age. The Others built those damned machines on Titan, but Ardraka's people did not. And we didn't destroy the people here . . . we're the same people!"

"But that's — "

"How can you be sure?"

"He is right," Charnovsky said, his heavy bass rumbling above the other voices. They all stopped to hear him. "There are too many coincidences any other way. These people are completely human because they came from Earth. Any other explanation is extraneous."

Lee grabbed the Russian by the shoulders. "Nick, we've got work to do! We've got to help them. We've got to introduce them to fire, and metals and cereal grains — "

Charnovsky laughed. "Yes, yes, of course. But not tonight, eh? Tonight we celebrate."

"No," Lee said, realizing where he belonged. "Tonight I go back to them."

"Go back?" Marlene asked.

"Tonight I go back with a gift," Lee went on. "A gift from my people to Ardraka's. A plastic boat from the skimmer. That's a gift they'll be able to understand and use."

Lehman said, "You still don't know who built the machinery on Titan."

"We'll find out one of these days."

Rassmussen broke in, "You realize that we will have to return Earthward before the next expedition could possibly get anywhere near here."

"Some of us can wait here for the next expedition. I will, anyway."

The captain nodded and a slow grin spread across his face. "I knew you would even before we found out that your friends are really our brothers."

Lee looked around for Grote. "Come on, Jerry. Let's get moving. I want to see Ardraka's face when he sees the boat.

But before he saw Ardraka's face, there was a moment when he realized what he had said.

They hadn't learned who it was who had built the machines on Titan. All they had learned was that whoever those builders were, they had been capable of smashing a civilization fully as advanced as Lee's own. Millenia ago.

Days later, Lee had come to wish that he never would find out the answer to his question about the machine-builders.

And years later than that, he had the answer. And wished even more strongly that he hadn't.

—BEN BOVA

★ ★ ★ ★ ★

FORECAST

In our companion magazine, *If*, we've had a policy for some years of encouraging new talent by publishing some of it in every issue. The *If* "Firsts" (or, as they are sometimes called, the IFirStories) have introduced a fair number of bright new talents to the field of science fiction — Joseph Green, Larry Niven and others who you see in *Galaxy* these days, to name a few. And that's the normal S.O.P. way to do it, we think.

So when you see a "first" author in *Galaxy*, rather than *If*, you probably expect something unusual. Next month we have something unusual for you. His name is J. R. Klugh, his story is called *Golden Quicksand*, and it's the first story he ever wrote. Jack Gaughan has done some rather unusual artwork for it, too. We think you'll like *Golden Quicksand*, and we think you'll be seeing more of J. R. Klugh.

Also next month we'll be bringing another story in the trilogy that began with *Nightwings*, by Robert Silverberg. The name of it is *To Jorslem*, and it ends the pilgrimage that *Nightwings* began. James Blish will be with us with *Our Binary Brothers;* Hayden Howard, who wrote the "Eskimo Invasion" stories a couple of years ago, begins to embroider a rich new tapestry with *Kendy's World;* Willy Ley and Algis Budrys will of course be back with their regular columns.

And we will have a selection of shorts drawn from an inventory that at the moment includes Brian W. Aldiss, R. E. Banks, Philip K. Dick and that same Algis Budrys; we won't know which of them will be in next month's issue till we see how the type sets. Join us and see for yourself . . . .

A Non-Fact Article

The Thing-Of-The-Month Clubs

by JOHN BRUNNER

From EXTRAVAGANZA, a quarterly supplement to the journal of the Consolidated Galactic Federation of Consumers' Associations, Spring issue 2333 ESY

THING - OF - THE - MONTH CLUBS

Foreword

For the benefit of our members on Luxor, Lonestar and Eldorado, with their average income of Cr. 27,000,000 and tax-laws which annually take away all that they haven't managed to spend since last time, three years ago we conceived this supplementary publication and its resounding motto, "The more you spend the less you get!"

Unfortunately there have been delays beyond our control in launching it. It was not until the proceeds from quadrupling the deluxe subscription rate to our regular journal GOOD BUY began to accumulate that we could even make down payments on adequately expensive articles to be tested. When at long last we had the funds at our disposal, we made the dismaying discovery that just about everything costly enough to be worth our attention had already been bought up by citizens of the three above-named planets. There is not, for example, a quunch machine to be had at

present for love or money; they are all in private hands despite their original price-tag of Cr. 16,000,000; and until their builders, the Yog, cycle back into this part of the galaxy in about fifty thousand years presumably no more will come on the market.

For a while we considered opening a special branch on Luxor so that at least we could *borrow* a few articles to test. However, the operation of a non-profit organization like ours is strictly forbidden there, so we had to drop the idea.

Now at last, though, we have come up with a category of services potentially useful to people hunting for ways of bleeding off their excess purchasing power. We have conducted a far more hasty survey of them than we usually do, we must admit, but for once we only had to apply a single criterion to determine their desirability: did they, or did they not, cost a hell of a lot for absolutely minimal return?

Several of the following undoubtedly do that, and we would refer you to the inside front cover for the increased subscription rates we have found it necessary to introduce as a result.

Background

Thing-of-the-Month Clubs have a long history, stretching (according to some authorities) clear back to the Pre-Atomic dark ages. Allegedly the original intention was to offer exceptional value for money, but it did not take long for them to evolve into their modern form: that is to say, they provide a captive group of potential purchasers for just about anything you need to get rid of in quantity. In this century, for instance, we have seen the Bomb-of-the Month Club, which enabled the Neo-Pacifist Party on Bellatrix not merely to fulfill its election pledges concerning general disarmament but also to show a healthy credit balance in its first budget after assuming power — although admittedly the consequences on other planets where subscribers suddenly found themselves in possession of the galaxy's most modern weaponry at a few hundred credits a throw were not quite so satisfactory, and the club had to cease operation rather suddenly.

We have also seen the Virus-of-the-Month Club, aimed at the specialized but enormous market of hypochondriacs who refused to believe their doctors when assured there was nothing wrong with them. This, however, suffered from excessive client wastage as they were compelled to seek ever more exotic diseases, and the management finally suc-

cumbed to a batch of Glotzman's Germ which was accidentally dropped in the packing department and which turned them all livid green with totally ankylosed joints. And so on.

Few of the myriad such ventures currently advertised meet our basic yardstick: outlay per annum of not less than a million credits with negligible value received. Our reports on those which do follow herewith.

Test Reports

We were naturally first attracted to one of the longest established of all TOTM Clubs: the JUNK-OF-THE-MONTH CLUB founded in 2176 by the solitary occupant of the garbage-dump world Gehenna, Lord Albert Grease-Throgmorton. Fired with ambition to create the galactic counterpart of the sort of stately home his ancestors had occupied on Earth in the old days, he advertised rubbish for sale (his own selection) at a rate of Cr. 100,000 a month, which puts the subscription well above our minimum level. Owing to the fact that ever since the club's inception all selections have been shipped in unscrewed sub-lightspeed projectiles built from old plastic buckets and soda-water syphons, there is a good chance that subscribers as far distant as Luxor, Lonestar and Eldorado will not live to see the delivery of their monthly junk.

We must, however, warn you that the delay — sometimes amounting to centuries — between dispatch and receipt can lead to one major difficulty. What was garbage a hundred years ago can easily become today's valuable antique. One Croesian subscriber, for example, received the left hand of a statue by Harrison Grabthrush, which had been missing since the Great Moonquake of 2206. A museum on Grabthrush's birthworld of Moralia bid Cr. 10,000,000 for it; the Croesian government promptly taxed the offer at 500%, and the poor fellow was ruined.

Another package contained a copy of the Forbidden Book of Scritch which some very strong-minded reader must have managed to throw away before becoming caught up in its insidious wheedling. The new owner was not so lucky and committed suicide at page 34 (held by students of the subject to be below average for the course; page 66 is generally regarded as the breaking point).

We can therefore only recommend the JUNK-OF-THE-MONTH CLUB with serious reservations.

The next to attract our attention was the PLANET-OF-THE-MONTH CLUB, operated from a point close to the galactic center by the only race yet known with control over the process of continuous creation, the Flooge. Since this was by a factor of several hundred the most expensive club we had encountered, our hopes ran high for several weeks until we began to wonder why we were unable to trace any customers, satisfied or otherwise. We were sure that the club would not advertise on the extensive scale it does had there not been significant response from human beings.

Perhaps we were obtuse, but it took an advanced computer to spot what the problem is if you join this club. It turned out to be such an acute one that we did not ourselves feel inclined to test any samples of the product.

The trouble is, simply, storage space. As is usual with these clubs, a premium or bonus offer is made to induce people to join, and in this case it consists of a small gas-giant in addition to the regular selection of Earth-type worlds. In the only case we have been able to document, Mrs. Hylla Handelstein, titular owner of the two largest continents on Freesia, decided she would like more elbow-room and duly filled out the application form. Her planets were, we must admit, dispatched very promptly indeed and we are not in any sense implying that the PLANET-OF-THE-MONTH CLUB is not a bona-fide organization. However, that is small comfort to Mrs. Handelstein and the few surviving inhabitants of Freesia — the gas-giant has already dragged away ninety per cent of its atmosphere, and tides and earthquakes are seriously hampering evacuation.

If you *must* join this club, we advise giving an address in an uninhabited system.

A somewhat more innocuous undertaking might appear to be the MASTERPIECE-OF-THE-MONTH CLUB, which operates on a round-robin basis and requires members to dispatch their monthly selection, after four weeks of enjoyment, to the next person on the list. This too, though, has certain drawbacks. Despite an enormous backlog of original masterpieces to draw on (the Club was instituted to make amends for the depredations of the trillionaire art thief Jeremiah Gung-ho Waterboy, who, as is well known, contrived during his century and a half of operation to transfer the entire contents of the British Museum, the Louvre, the Guggenheim and the Leningrad

Hermitage to his private estate on Rafflesworld, replacing each item with a virtually perfect copy to escape detection) the membership has recently expanded to the point where non-human masterworks have been introduced to supplement the existing stocks.

Whatever the pleasure to be derived from a month's contemplation of the Mona Lisa or the Elgin Marbles, we do not feel that it adequately compensates for the experience of one of our test panel, who was sent as his very first selection a flaying-machine by the great Skrinnian artist Three-and-a-half Ug. Admittedly it was of exquisite craftsmanship and unparalleled precision; nonetheless, human beings do *not* count the removal of their epidermis according to predetermined symbolic patterns among the art-forms they are capable of appreciating. (We are glad to report that our tester is expected to leave the hospital soon.)

Administrative oversights of a similar nature likewise prevent us from unreservedly recommending the MATE-OF-THE-MONTH CLUB. We would stress that racial prejudice has absolutely nothing to do with our opinion — no organization with chapters among as many different species as has ConGalFedConAss could possibly be open to that charge. Nor are we square, or prissy; we fully recognize that people's tastes vary very widely, and they should be free to indulge them provided they neither interfere with others against their will nor disturb the galactic peace.

However, we do feel that the warning about the penalty for non-consummation which is included in the MATE-OF-THE-MONTH CLUB's advertisements should be supplemented by a clause concerning non-*consumption.* It was only with the greatest difficulty that the female members of our testing panel extricated themselves from the embrace of their respective selections for the first month of their trial membership, and in two or three cases quite extensive surgery was called for.

The selection for that month happened to be Voracian male, and Voracians — as we were *not* informed by the instruction leaflet — have habits which constitute a sort of mirror-image of those of the Black Widow spiders. In other words, the male achieves climax by ingesting his partner. Luckily, the average size of this species is only about half a meter, and their capacity is accordingly rather limited. Nonetheless, we exercised our option to discontinue membership after an initial trial and

were glad of the chance to do so, as we had been threatened with mass resignations by all our testers.

A new venture, announced a few months ago by the PET-OF - THE - MONTH CLUB, brought them also into our range. They are now operating an ultra-de-luxe category of membership for those wishing to own exceptionally large pets. The idea would seem an admirable one; regrettably, our own experience has not borne it out in practice.

The first selection we received was a Tyrocdon from Haglith's World, a rather beautiful creature standing some twelve meters tall and covered with glistening red and yellow scales. The dietary instructions furnished with it, however, proved to refer to the *previous* selection, a regular African elephant, and by the time we discovered that Tyrocdons subsist exclusively on fluorspar, the beast had felt the first pangs of hunger. This was fatal . . . or very nearly so. When they're hungry, Tyrcodons emit a howling noise in the low supersonic range at sufficient strength to bring down the average Earth-side city-block. Fortunately, experience in the past had persuaded us to establish our testing-labs in a block reinforced against anything short of major meteorite impact, but the consequences might have been alarming.

And our second selection turned out to be a Gigas whale, whose natural environment is a deep ammonia-methane ocean with a pressure of about 100 kg./sq. cm. at -230° C. When opened inadvertently to Earth-normal pressure and temperature, the creature burst and showered long and *disgusting* strands of its internal organs all over everywhere. We have ceded the balance of our membership to an impecunious zoo on Penny-wise and hope that the proceeds from later exhibitions of the selections will cover the suit being brought against us for creating a health hazard in Greater Greater New York.

A club which struck us as very promising but which is suspended at the time of writing for reasons detailed below is the PERSONALITY-OF-THE-MONTH CLUB, a venture launched on Schizophrenia but already so successful as to have attracted members on over twenty planets. Members receive a printed-molecule brain-program and an automatic imposer worn over the scalp (wigs are offered as an optional extra to conceal the device in use). So long as

the imposer remains in position, the wearer's personality is altered towards a desired character chosen from a wide range indeed — currently more than three thousand choices.

As we said above, however, the club is temporarily suspended owing to a legal dispute. The population of a certain town on Puritania joined the club virtually *en masse,* and in a single month ninety-two per cent of the male residents chose the Casanova program, while eighty-six per cent of the female residents selected the corresponding Messalina program. Owing to this imbalance between male and female, fierce rivalry developed over the favors of the available ladies and so many duels were fought in the first week that the planetary government was compelled to step in. The survivors, deprived of their imposers, naturally reverted to the normal customs of their world and at the time of writing there are factorial-17,321 divorce suits pending, sufficient — according to our computers — to occupy the entire time of the Puritanian courts until well into the next universal cycle. Unofficial sources suggest that the government, faced with this problem, plans to change the name of its world to Saturnalia and give up, but we have been unable to confirm the rumor.

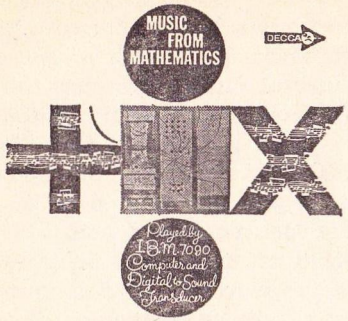
A club which has membership fees well below our minimum standard, but which involves incidental outlay bringing the total cost considerably above it, is the HATRED-OF-THE-MONTH CLUB. This operates on a principle related to that of the last-mentioned club, but instead of an imposer an injection of programmed RNA is employed to induce temporary detestation of items from an imaginatively chosen list. Among other things which our test-panel sampled, we would cite plate-glass windows, water-sculpture, plastic minijerkins, autojazz generators, and (perhaps most useful of all for our purposes) money.

As you will doubtless have realized, though, it's the legal costs which increase the expenditure of this club so substantially, and we can only recommend it to people who have time to spare for frequent appearances in court.

Best Buy

Having read the foregoing, you will by this time probably be wondering: did we not come across any Thing-of-the-Month Club which we can wholeheartedly recommend? We did indeed!

Astonishingly, it is a club with no membership dues, open to anyone on completion of a sim-



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ple application form such as is enclosed with this issue of EXTRAVAGANZA. The only fee charged by the management is for incidental expenses.

We are, of course, referring to the absolutely brand-new THEFT - OF - THE - MONTH CLUB.

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—JOHN BRUNNER

PARIMUTUEL PLANET

by JAMES TIPTREE JR.

Illustrated by BLAKELY

There was nothing like Raceworld before the Solterrans. No others had such need to improve the breed.

I

"Keeb'y VAAAAL ya!" The best-known cry in Galactica floated up through Peter Christmas's office window. The big brown man let his eyes stray from the tridi to the scene below.

A gaggle of little dinosaurs were streaking by the stands, their jewelled hides flashing in the light of Raceworld's morning. Raceworld! Christmas's jaw softened briefly. He turned back to his visitor, who was furling and unfurling himself irritably on the courtesy perch.

"But is not flying! On Xemos we do not call this flying!"

"Mr. Porridan," Christmas said, "it's not a question of be-

ing able to fly *well,* of being able to fly over mountains and so on. If you wish to enter your animals in the Non-Flying Avian classes, they must not fly *at all.* No flapping, no gliding even for a few steps. Look at that fellow there!"

He pointed to the tridi where a large ostrich-like fowl was brandishing his pinions and lofting himself easily as he pranced about. Porridan's vaguely human face took on an insulted air, like a dog rejecting inferior biscuits.

"Mr. Porridan, do you realize what would happen if your entry did that during a race? First, it would be disqualified, and you would lose your entry fee and costs, not to mention what Raceworld would lose in compensating the mutuels. Second, you would undoubtedly get a judgment for fouling and damages by some of the other contestants, which would come out of your planetary bond. Thirdly, somebody might get hurt, which means *really* expensive reparations, and of course I, as Chief Steward, would be responsible for an improper ruling. It happened once a long while back when we weren't so careful. An entry with hidden inflatable vanes got into the NFA sulky class and the cursed thing took off over the finish line — with the sulky — and not only injured three other drivers but crashed in the stands. Nearly five million credits to settle that one — Excuse me a moment."

He turned to his chiming intercom.

"Yes, Hal? Fine, I'll lift the quarantine right away. No, for Solsake, Hal, I've told you a jillion times better ten false alarms than one epizootic. You call 'em as you see 'em, I'll back you if I have to isolate every animal on the planet. Wait, Hal, I have a problem with an NFA entry that's going to need belly straps. The planet rep claims it'll upset his birds, they won't run with straps. His birds are coming in on MT today about second period. Can you meet the rep there and work something out? Porridan — no, P as in problem. From Xemos Three, right? Thanks, Hal.

"That was our chief veterinarian, Mr. Porridan — Doctor Lamont. La-mont. He will meet you when your bird comes through, and I know he will find a solution."

His visitor was snuffling through his dewlaps.

"Something which will permit your splendid animals to display their magnificent running ability before the eyes of the whole Galaxy," Christmas added hopefully. "They're great birds, Mr.

Porridan. Believe me, Raceworld wants to show them at their best as much as you do."

"We of the poor backward worlds meet with humiliations from the so-called fair play of the Galactic Imperialists!" Porridan wailed. "Because we are poor you insult our culture!"

He flung his shoulder membranes over his head, dislodging several diamond ear-clips which rolled on the floor. Christmas helped retrieve them.

After Porridan had counted them, Christmas said, "There's one other little matter, Sir. The bursar is rather puzzled over an entry in your cost sheet. Could you give us some clarification on the, ah, auxiliary animals item?"

"But we were guaranteed free transport," Porridan shrilled. "Are we now to be cheated here, too?"

"Not at all, Mr. Porridan, please calm yourself. As you said, Gal Q offers free matter transport and lodging to any planet wishing to send an entry to Raceworld, up to a certain mass. That includes the competing animals, plus trainers, jockeys or drivers, veterinary, and so on, plus food and supplies as appropriate. The auxiliary animals category is intended to cover certain cases where the racers require other animals, such as their young, or biological symbiotes, or even mascots or imprinted animals, for their well-being. But we do require a word of explanation when the shipment runs as high as yours — that is, two hundred auxiliaries. Just what are these extra animals, Mr. Porridan?"

Porridan had furled himself so that only his large aggrieved eyes were visible.

"Female animals," he said coldly.

"Oh, but I see some of your racing birds are female . . . what species are these other females?"

Porridan shrugged. "Just females."

"You mean female Xenosians? Like you?"

"Females are not people!"

"In other words, these females are not for the animals but for the training staff, right? But you have only twenty male personnel. Do these females perform any service in connection with the racing animals?"

"Of course not. What could they do?"

"I see. Mr. Porridan, I deplore having to pry like this, but you must see this is a fantastic expense to Gal Q. Transporting mass from your position at the rim is — "

"Ah! Again you insult us because we are far away and backward!"

"Mr. Porridan, no one is insulting you. It's a question of fair play. What would all the other planetary teams say if we let you bring in ten females for every trainer and driver?"

"Ten females are not for trainers and drivers!" Porridan squealed. Refurling himself furiously, he started for the door. "You insult even our intimate life! Xemosian females are not for discussion! This is too much! The Treaty of Xemos can be reopened! Poor as we are, we can still die for our honor!"

"Mr. Porridan, wait!"

The door slammed. Christmas blew an imaginary fly off his blunt nose, pushed one hand through his reddish wool and stabbed his male secretary's signal.

"I'm here, PC," said a cheerful otterlike being, from the side door.

"Dana, tell the Secretariat that Xemos has blown his wig again, and they better get someone after him to oil him down. Lamont will take care of the entry ruling, but get Brooksie onto the sex situation on Xemos — especially the standard mating ratios and female status. Porridan claims their females aren't people, and he needs a couple of hundred of them, mostly for the team chiefs, I gather. I'm sure it's a phony, but check it out, will you? And what are these?"

"The ruling on the squid propellant situation, PC. We finally got agreement: All contestants will submit to ink-sac removal, but riders must wear masks capable of filtering legitimate metabolic products. We do the chem anal."

"How about the I.Q. business? Are those Deneb squids animals, or do they go over to Galsports as people?"

"Not yet clear, PC. We could get a ruling on the squids, but a mammalian group has injected itself into the question. They claim any contestant capable of using a stop-watch isn't an animal."

"Whose animals are using stopwatches?"

"That Flanigan outfit. Light equinoids."

"Hey, Flange is one of the teams in the class that's been having so many long shot wins. The Stat people from Mutuel put me onto last night. They've had Lamont running covert metabolic tests on the whole field . . . I wonder — "

He punched his intercom savagely, and the mournful face of his security came on.

"Kurtis? Can you put a total snoop on the Flange delegation right away? Light horses. Yes, especially I want the stables, the animals. Sound, pictures, even smells if you have to. FTL prior-

ity, around the clock, too, until we get something. Oh, just a hunch, but it could be nasty — that's right, like the old Pyrrhoxa mess. You know what to look for. Thanks, Kurt."

Christmas sighed. The reputation of Raceworld, Inc. — Inc. for Incorruptible — rested heavy on his shoulders.

"There's another thing," said Dana, thoughtfully flicking a black tongue around his beautiful cream muzzle. "Maybe nothing to it, but that new Ankru team that started yesterday has won two of their first three starts. All in different classes. One herbiamph, a carnii-mammal and an N.F.A. The N.F.A. came in second."

"Dana, your hunches are golden. I'll never forget that alleged herbivorous Capellan thing that would have eaten our starter . . . When's Ankru running next?"

"Just coming up, PC. Giant armored reps on the main track."

"Could I sneak down and take a look?"

Dana's bristles twitched at the big human's cublike eagerness.

"Okay, but remember the Gal Q conference in half a unit — PC, please keep your caller open."

Christmas blew joyfully as he wrestled the commocollar onto his thick neck and stepped out onto the balcony to mount his airsled. Raceworld! His Raceworld. His broad nose wrinkled in the spicy breeze from a thousand racetracks on which ran, hopped, flopped, swam, slithered, humped, darted and thundered the racing beasts of a million planets. Raceworld the perfect planet, turning stately through equal hours of flawless day and balmy floodlit night. Her utterly predictable climate graded smoothly from equator to pole, and offered every oxygen-breather its natural optimum.

Directly in front of Christmas's equatorial headquarters lay the major track for the most spectacular of all races — the giant armored reptiles, general Galaxy favorites. Other hot-climate beasts ran here too; big cats, savannah ungulates, and giant insects and arachnoids. The left horizon was mountains, holding the canyons, pylons and airborne stands of the flighted races. On his right glittered the sea world where aquatic forms competed. Beyond the track in front was a great hotel and recreation complex, and beyond that, stretching around the planet's curve, lay the special-atmosphere domes and exotic courses where indescribable creatures met to dig or spin or spit or display whatever competitive frenzy their home worlds had developed



as sport. All for the honor of those home worlds — and incidentally to the honor and profit of Raceworld and its Solterran staff.

II

Christmas cast an eye up to the commo satellite — "the eyes of the Galaxy are upon you!" — and checked his chronometer. He let his airsled settle into the main track infield, past the vast mutuel boards, which were showing a Myrian entry as favorite. He turned his glasses on the backstretch where the giant reptiles were warming up, making the ground quake. The polished bodies blazed, the riders almost invisible behind fantastically assorted shoulder-plates.

"Great sight, isn't it, Sir?"

Christmas recognized the tall ebony boy as one of Hal Lamont's veterinary internes. They leaned together on the rail to watch a rider trying to control his mount's tendency to thrash a ten-ton tail. The rider, an arthropod type from around Sirius, Christmas guessed, worked feverishly with his string-straps on the creature's hind brain. Christmas' main interest, the Ankru entry, was a low-slung, nondescript red beast whose huge wither-fan concealed his jockey.

The first brush was over, and the field began to fall in behind the tremendous scaffolds of the traveling start-gate.

"The Field is in Motion!" A roar came from the stands. Galaxy-wide betting was always heavy for this one.

The arthopod went by in pole position, still making adjustments. Number Two was the Myrian favorite, a towering green monster with a slobbering trunk of a head thirty feet off the ground. Its rider gleamed white as they passed — apparently a human girl.

Dust hit the rest, and Christmas headed back to the finish-line, circling the boards at ground level since it was illegal to fly during a race. He was grinning at himself for pretending to check up in person when the tridi tapes would show him every detail.

A confused booming filled the air as the field came around the last turn. The green Myrian was in the lead, fighting off the bid of a yellow monster with a ten-foot frill on its jaws. Red Ankru was holding back in mid-field; Christmas could see steam as the rider held coolant on its rump.

The stands were rising and howling — the ground thrummed under the punishment of twenty-ton drumsticks — scales flashed through the dust kicked up by the great splay feet. In the glit-

ter and rush of enormous bodies, Christmas saw the Myrian girl going to her heat-straps. The yellow challenger had faded, and now a long brown neck was lunging up. The green behemoth began to pull ahead, and the field was almost upon him when he caught the boom-boom-boom of an animal coming up fast on the outside. It was red Ankru, levelled out to rocket speed. The stands exploded — the girl worked madly — but the low red monster barrelled first across the line, its rider popping up and down like a ping-pong ball between the thrashing withers. Christmas sledded along for a closer look.

"Sir! Sir! Look out — the girl — stop her!"

The voice of the young interne blasted his collar. Christmas turned, saw the green saurian now riderless, his long neck bent to a figure in the dust. The girl's pale arms were up, and between them was a glint of metal. Christmas lobbed his sled over the rail and tumbled off with a fist around her wrists.

She didn't struggle. Closed eyes in her upturned face opened to stare wildly at him, her mouth ceased whispering and fell open too. Her wrists were like icy twigs. Christmas gently disengaged the three-foot razor-bright sword.

"No, no, no," he told her, urging her up. She rose shakily — eight feet tall, skinny and naked as a fork, except for a crimson sword-belt around her navel. She had no body hair, and one breast had been removed.

"Oy ban s'cred warro vergan f'Myria!" she protested, reaching for the sword.

"Anybody know what she's saying?" Christmas fended her off.

"She says she's a sacred warrior virgin from Myria," the young interne panted. "She has to kill herself because she lost the race."

"Oh, now, she can't do that. Tell her she must ride in other races and win."

"Oy ban s'cred warro vergan f' Myria," the girl repeated.

"Ser Nisrair from Gal Q is on the way in," said Dana's voice in his collar.

"You — Doctor What's-your-name — Joloolulloolah? — get her over to Infirmary, will you?"

As he turned to go the girl screamed like a peahen and grabbed for the sword. Instinctively he raised it overhead. Bystanders goggled and backed from the odd tableau.

"You can have it if you swear not to harm yourself. Tell her, Doc, make her swear, right?"

The girl knelt and began to recite in a high treble.

"Ser Nisrair is here, PC," said his collar. Christmas peeled her arms off his knees, tossed the sword of the interne and took off in a zoom for the balcony. He stepped into his office just as Dana was ushering the Gal Q liaison officer through the king-sized folding doors. Ser Nisrair's steel-blue carapace towered over Christmas.

"Good morning Peter," Nisrair intoned melodiously, retracting his lower limbs so that he rested on his edge at man-height. Like all the Gal Center people he exuded a firm benevolence which made Christmas overact a bit.

"Hi, Ser. How are the Magellans doing? I take it that's what you came to discuss?"

"Very true, Peter," beamed Nisrair, as though he were giving Christmas an A in fractions. "We are, as you know, showing them over Raceworld since they expressed an interest during their recent tour of Galactic Center."

"Primitive of them," Christmas murmured. He knew Gal Center took a slightly patronizing view of Raceworld — "our charming toy" — although they were keenly aware of Raceworld's use in helping cement the million-planet federation.

"What have they seen?"

"We took them to North Pole yesterday for Communications and the Galactic computer." Surprisingly, all four of Nisrair's eyestalks turned on Christmas. "It is a little difficult, Peter . . . Nothing seems to interest them. They are so very different . . . and it is so very important that we establish at least a little rapport."

His antennae were in rigid formal position. *The big bug is really worried,* Christmas thought.

Reassuringly he said, "Something here is bound intwiggle them, Ser, it's worked on every visitor so far. Even if they're from another galaxy, they can't be all that different. So the hardware didn't fascinate them; maybe the economics of the galactic betting system will. Or the Secretariat's display of xenobiology and alien housekeeping. After all, our galaxy is bigger than the Clouds; the sheer size and range of it all is bound to be impressive.

"And if that fails, there's always the psy-math boys down at Pole South, forecasting the results of their own forecasts. Remember, that's what finally lured those dematerialized clots from the Horsehead into the Federation?"

"I hope so, Peter . . . They are very powerful, you know. Their equipment — very advanced."

Big man and bigger coleopteran eyed each other in wordless unity. No one spoke of the possibility of intergalactic war resulting from First Contact.

"I'll do anything I can, Ser, you know that."

"I was going to say . . . if they express some desire, no matter how unorthodox — "

"Anything at all, Ser. They can break all the rules."

"Thank you." Ser hoisted his bulk and paused before the balcony on his way out. "Delightful," he murmured, again avuncularly bland. "Always an idyllic interlude to visit here. You lead an Arcadian life, Peter."

"Kurtis called, PC," said Dana, as usual slipping in before Christmas could signal. "He has the net on the Flange team going, but there's nothing to report yet except that the drivers seem to be playing some game with their toes."

"How Arcadian," Christmas grunted.

"Also, there's a complaint from one of the big cat teams. They claim the target doesn't look human enough, their beast won't chase it."

"Pass that one to Detweiler; that's a Secretariat problem . . . Oh! On your Ankru hunch: Run me the tridis of all their animals, will you? That giant rep win makes them three out of four now — all in two days. I think you've got something."

The Ankru entries came on his screen; the red Tyrannosaur type Christmas had seen, then a burly-legged running bird, and a tufted cheetah-like affair with a build like a rope slung between two stumps, and finally a slimy-looking tub of a thing which apparently navigated on a broad keel, propelled by paddles.

"That's the herbivorous amphibian," Dana said. The herbiamph opened one yawning end at the camera.

"High-gravity builds, I'd say," Christmas mused. "Call Lamont and tell him to run a covert check on their grav compensators for starters. It could be they have found a way to screw up their handicap. Oh — and while you're onto him, get that report on the compound life-swarm geehinkus from the Coalsack, will you? Detwieler's shop should never have put it in the social insect classes; we've had two complaints of fouling — "

III

BOOM! BOO-O-O-O-M-M-M-M-M! ! ! !

The resounding overhead thunder sent them both jumping for the balcony, to be greeted by a sight they had seen only on historitapes — a blazing rocket ex-

haust wavering down to land beyond the hotels. Christmas stared. Behind him the innercom was yammering.

" — unauthorized landing! Repeat, red alert, unidentified alien landing — " It was the voice of the Gal Q security satellite.

"PC! A rocket's coming down on my minirodent tracks!" screamed a soprano.

Christmas vaulted onto his sled. "Get a firescreen over those rats, Dana!" He took off, barely noticing that Dana had pushed something into his hand.

As he cleared the hotel domes, he saw the alien ship squatting in a volcano of smoke. The fireboys howled past, foam jets reaching for the intruder. The blaze was plastered down by the time Christmas skidded to a stop. Kurtis's blue prowler whined in behind him. The security chief was whispering orders into his collar. He raised a finger at Christmas without taking his eyes off the alien ship.

The foam around the ship was wriggling. Minirodents, ludicrously be-foamed, were dashing in all directions, many without jockeys.

"Lily! Lily — are you all right?" Christmas called, and saw his assistant steward rise up from under an overturned stand, wiping gobs of foam off her face. The minirodents rushed for her, formed a solid pile around her feet and scrambled onto her shoulders and head.

The alien's port swung open to a ramp. Three squat figures like blond chimpanzees peered out through the fading smoke. Then one, flamboyantly uniformed, strode onto the ramp, tossed his yellow mop out of his eyes, and gave out a ringing ululation ending in an interrogative note.

"Voder's coming in a minute," Kurtis said. "Look at those side arms — what the holy Galaxy are they, space opera?"

The alien caterwauled again. Christmas, realizing he was the only official there, stepped forward, holding up his hand.

On the alien ramp, the figure stared at him, tossed his head again, and all three of them ducked back inside. Christmas stopped. Gal Q and the Secretary would be there in a minute from the far side of Admin. There was a siren roar from inside the spaceboat, and the three emerged again, wheeling what looked like surrealistic airsleds bigger than themselves and decked with grilles, pipes and streamers. The leader yawped at Christmas, who held up his hand again.

Suddenly all three aliens jammed horned helmets on their heads, sprang onto their machines, and took off in thunder.

They circled their craft at eye-level, making everyone duck, and then began doing aerobatics. At that moment, Secretary Detweiler's sled come over the hotel. The aliens brayed and began looping and crowding him, with ear-splitting blasts from their machines.

Kurtis had taken off in pursuit. Christmas got airborne just in time to see what looked like a laser beam coming from the aliens. Yes! In the name of madness, it was a laser. Detweiler's sled had sagged sideways, and Kurtis was throwing up his screens. Christmas put up his own, becoming vaguely aware that he had a minirodent on his head. He gained altitude and gave chase.

The aliens were now circling a cluster of M/T masts, firing at the rigging, but Kurtis was on top of them. Christmas saw him nail one with come-along spray and then miss another, who darted toward Christmas. The thing Dana had given him had turned out to be a hand stunner. Christmas picked off the alien at low power as he went by, and saw him go into a long glide to the beach. Kurtis, followed docilely by the come-alonged alien, was turning tight circles on the last rider's tail, forcing him down away from his ship.

Christmas got the minirodent's tail out of his eye and started back to the alien boat. Ambulance crews were converging, and Detweiler's sled had limped in.

Suddenly the last alien doubled and streaked for his ship at ground level, his laser beam looping wildly.

"Down! Everybody down!" Christmas bellowed and made for the melee. The alien had almost gained his ramp, when he slumped off his machine and fell into the foam. His sled crashed into the ship wall and fell beyond him.

Lily, Christmas's assistant, emerged from under the ramp, making cooing noises to the minirodents clinging to her. On her head, one of the rodent jockeys was holstering a tiny hand-gun.

"Snedecor got him, PC! Snedecor got him!" Lily yelled.

Kurtis and the now zombie-like alien had landed. The voder crew came up.

"Snedecor got him!" Lily carolled.

"What in creation were they trying?" Christmas asked.

The security chief glowered sadly at his captive, now being hooked up to the voder.

"We'll know shortly," he said. "Some bunch of flipping primitives who heard we had races, is my guess. Who's Snedecor?"

On Lily's head, Snedecor bowed and waved composedly.

"Good shooting. But what's that mouse doing with sidearms?"

"Old ruling — all beings less than nine centims high authorized to carry non-lethal defense," said Christmas. "Hello, Det. Glad you're okay. Well, I guess the rest of this is your job. Let me know the score, Lily, I've got to get back. Oh — here."

He disengaged the minirodent and handed it over. "Did anyone ever tell you you have an idyllic job?"

He zoomed for home, pausing to let another lizard race finish before he crossed the tracks. "Machines . . . racing with *machines* . . . " he muttered, his big shoulders twitching. He floated over the shouts, the flashing scales and silks, the joyous commotion. Dana met him on the balcony with a tray.

"Good, what is it?" he demanded, his nose in a beaker of Infield ale.

"Don't ask. Lamont sent it. His reward for saving something that broke a leg; he has a freezer full."

"I didn't know we had a stunner, Dana."

"You don't. I do. Kurtis gave it to me last year. Remember those Altaireans who wanted to duel to the death in your office? Kurt says you have illusions of invulnerability." Dana's bristles curled in a grin.

"Well, it paid off. Another of your hunches . . . Yes, Hal?" he said to the intercom. "Indeed we did have a little excitement. How're the rats? Ah, too bad. Rotten shame, who could foresee it? Great idea of yours, putting drugs in the firefoam . . . Anything on the Ankru grav check yet?"

"Their gravity compensators are absolutely correct," Lamont told him. "Right on the nose at one point two. Funny thing, they look like really high G types to me, too. And I'll tell you another funny thing — they're exercising some of their animals under double grav *loading*. Of course there's no law against adding more G's, but they're being very quiet about it. I'd say you have got the answer — there's a mistake in the handicapping from Detweiler's shop."

"That could be ugly, Hal. Who made the mistake, and why?"

"I hadn't thought of that," Lamont said slowly. He frowned.

"Well, it's not your screaming baby. How did things go with the Xemos Three birds?"

"Thank you for nothing, PC. No question, those things fly. I suggested nerve blocks or temporary pinions, and he frothed. We settled on a special strap

job after I showed him that other contestants used them. Probably intends to sabotage the straps — better put a watch-note on him. But listen, PC, did you know he had copper spurs on those birds as long as your arm? Slice a leg right off, like a saber. We had another scene when I told him they'd have to go. It seems they have some bosom enemy here they've got to beat, preferably fatally. You better alert the equipment boys. He's out for mayhem."

"Scythes on his chariot wheels, h'mm? Remember that lot from Orion with the acid jets?"

"And those she-minks from Scorpio way who couldn't see why we wouldn't let them dump spikes on the track behind? Sometimes I think Gal Q is using us to civilize half the delinquents in the Galaxy."

Christmas chuckled and rang off. Their intercoms were flashing for the daily staff meeting. Christmas tuned himself in and listened with one ear, while going through a batch of rulings Dana had brought in for signature. Secretary Detweiler was a plump little man with gazelle eyes, very good at a job Christmas would have loathed. At the moment one of his aides was describing plans for celebrating the finish of the giant ice-slug race. The contestants had covered fifty feet in the extraordinary time of six months and were due to cross the finish line tomorrow. Interest in their home system was at fever pitch. The secretariat had arranged tridi FTL coverage from underneath the transparent track, so that viewers could observe the cell-by-cell approach of the slug's feet to the line.

"They don't really locomote," the aide was saying. "They grow in front and slough off behind. Fastest moving thing in their system, but of course outsiders aren't interested. I'd like permission to assemble a small, ah claque, I believe the word is, and perhaps stimulate a little betting. It would help their morale."

Christmas grunted. Detweiler announced plans for making a ceremonial award that evening to the mouse who had shot the alien.

"Quite a little hero, really," the Secretary said. "If that lad had got his ship off, Gal Q would have had a messy chase, messy *and* expensive. You'll come to the presentation, won't you, PC?"

"Don't I get a wound stripe?" Christmas asked. "My ear is full of rat-leavings. Who were they, Det?"

"An officially uncontacted system 'way north of Murillo. Actu-

ally, they've been trading with us for some time, through Murillo. Apparently they got hold of some obsolete stuff and made it all the way here in that old warp boat. Gal Fed has an M/T mission landing there right now."

The bursar spoke up. "Either we or Gal Q are going to have reparations to pay on this. Three valuable animals hurt and all those scent-null tracks to rebuild."

"And we have adjustments on the spoiled races," said the Mutuel chief. "I think Gal Q should be asked to disseminate word that one doesn't just drop in on Raceworld."

"Nor does one race with machines," growled Christmas. There was a moment's silence.

IV

"Yes. Well," said Detweiler. "Now about our main business, the Magellans. You're getting them almost immediately, you know, PC. I don't know when they'll come to Mutuel and you others, if at all. Frankly, the tour is not working out quite as well as we had hoped. They went through the Secretariat this morning, and among everything else we tried a really beautiful viewing of the complete range of Galactic life we service here, with chemico-genetic analyses . . . You just can't tell how they're reacting, but I'm afraid it was negative. They asked to leave Raceworld tonight. Ser Nisrair is troubled."

"Who isn't?" asked Commo from Pole North. "I've seen aliens, but these are *alien*. Two of my secretaries are under sedation. Did you hear that Galtech hasn't been able to unscrew half the junk in that spook-boat they came in? Your viewing may have only whetted their appetites for dinner, Det — or offended their sense of neatness, like finding out your neighbor's house is full of vermin. The Clouds are just too close for comfort."

"Well, we just have to do what we can," Detweiler said, determinedly brisk. "Anything else?"

"Sorry to add to the gloom," Christmas spoke up. "This concerns Mutuel, too. That new Ankru team who have been winning several events are only carrying a one point two G handicap, and Lamont has an idea this isn't enough by half. So do I. Check this out fast, Det, will you? I don't need to go into the implications."

"I'll get right on it." Detweiler looked startled. The Mutuel chief laid his hand over his eyes and groaned.

"Can't you hold up their races, PC? Great Kali — the adjustments, the compensations — "

He leaned offscreen to hiss at an aide.

"Not solid enough," Christmas said.

Detweiler signed off with a sick look in his gazelle eyes. He knew what Christmas meant.

Alone, Christmas rubbed his rusty wool and turned to the window. The announcer's chants rang out, and a dozen rhino-type creatures, their tails like quivering flagpoles over their laboring rumps, padded behind the starter's gate.

Christmas smiled automatically, but somehow the magic had ebbed. He — all of them — knew what the magic was. It wasn't the clamor of the stands, or the rolling coffers of Mutuel, or in the rhinos' horn-down charge across the finish, the silks of planets a thousand light-years apart flying from their tails. The magic invested those things, but it was not of them . . . and it was threatened.

His outercom chimed and cleared to show the bony black face of the young vet.

"Sir, the infirmary wouldn't keep her — that, ah, young lady from Myria, I mean, and she can't go back to her team; they insist that she kill herself or they'll do it for her."

"Oh, for Solsake! We've got our hands full right now. Take charge of her for a while, will you Doctor? Stick with her — show her around. I *know* you're a veterinarian. Refer Lamont to me . . . Well, take the sword away from her. And get some pants on her, will you? She looks horrible. Why shouldn't virgins on Myria wear pants? Oh, never mind — do anything you can, right?"

"Ser Nisrair and the Magellans are on their way up, PC," said Dana's voice.

He stood to greet them as the big folding doors swung wide.

Looming beside Nisrair were two coal-black sinuous shapes as tall as he, topped with dead white triangular heads like bleached horse-skulls.

Christmas bowed and stood watching while Nisrair explained the Steward's functions. The Magellans never moved. Their horse-skulls turned on him, eyeless, expressionless. Christmas, like most of the Galaxy, had seen them on the vast FTL coverage that announced First Contact, but he was not prepared for their unnerving alienness in the flesh, or whatever they were. They seemed to exude a faint disquieting odor . . . or was it a vibration?

The Magellans' voder crackled suddenly, interrupting Nisrair.

"You are the (?) juridical (?) ethical organ," it said tonelessly

Christmas couldn't tell which one was using it.

"That's right," he said to the blank skull-eyes. "It is my job to see that the fairest possible rules are set for all contestants, and to enforce them in detail and in spirit. When some condition affects contestants unequally, we work out new rules by unanimous agreement if possible. If not, my word is final — sorry I didn't get that."

"Query your statement re spirit," repeated the voder.

"Oh! I meant that we do not allow the technical wording of a rule to work against the intent to deal equally fairly with all. We define an equal chance as conditions as close as possible to those on the contestants' home planets; for example, to compensate for different gravities we have a handicapping device—"

"Spirit . . . " the voder muttered unintelligibly. The two horse-skulls glared down at him unmoving.

"You have great power here," the voder went on. "You could affect many contests without (?) detection (?) supervision for your own profit. Query you do not do so. Query your identity."

Christmas glanced at Ser Nisrair. Hadn't he briefed them? He saw a worry-helix in one of the Gal Q officer's tendrils.

"Why, like everyone here — everyone in authority — I'm a Solterran," Christmas said stiffly. "I assume you were informed that Solterrans originated and run Raceworld."

"Peculation (?) speculation (?) . . . " the voder gobbled. Evidently the alien semantics were giving Central Computer a hard time. Then it said clearly, "Query there is no corruption."

Christmas said nothing.

"Corruption, in a system of this sort, can be defined simply as entropy," Ser Nisrair intoned smoothly. "And of course, entropy, or degradation of order, is avoided by all civilized beings, since no local increase in complexity can offset entropic effects in the larger matrix. We see three main entropic potentials in the Raceworld system. First, external parasitism — attempts at a take-over from without. You have viewed the Galactic security force which guards against this. Second, attempts by the contestants to subvert portions of the system from within, for individual or planetary benefit. The Steward here functions to prevent this, with the aid of his own security staff and such outside help as continuous probability monitoring from Mutuel. Thirdly, there is the possibiility of the distortion of the system by its own organizing elements,

that is, by the Solterrans themselves. This is highly unlikely, as I indicated earlier — perhaps too briefly — first because of the fact that we meet all their material desires, secondly because of the high value placed upon honesty and fair play in the Solterrans' own value system, in which they are indoctrinated from infancy as managers of Raceworld, and thirdly because the Solterrans themselves insist upon a program of periodic testing conducted by Galactic experts in combination with a rotating panel of neutral planets."

A pause in which Christmas could hear the voder whispering to the Magellans.

"We will observe," the voder said. "Alone."

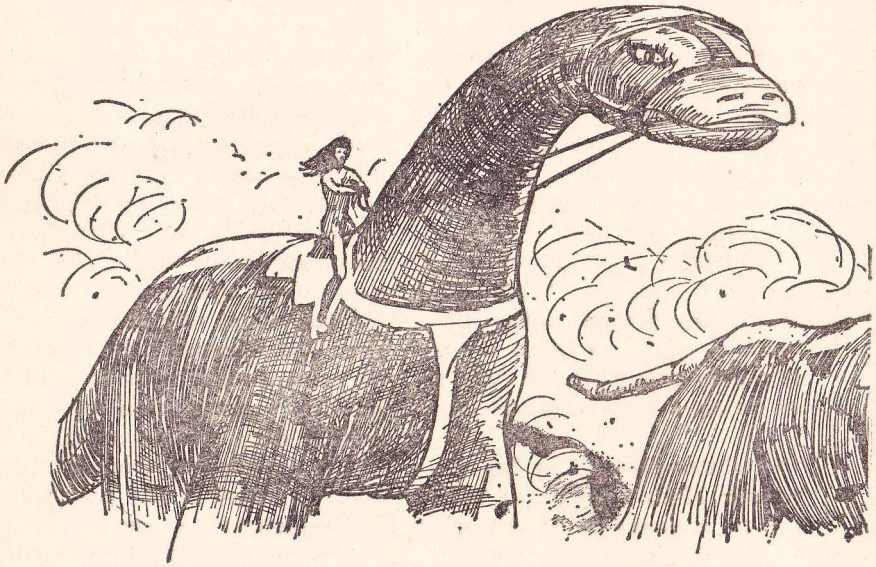
Nisrair's antennae, which had straightened out during his speech, kinked again. "You wish me to leave?" he asked.

"You mean, stay here and watch our normal operations?" asked Christmas.

"Yes."

"Well, certainly. Glad to have you. Make yourselves comfortable. Would you like, ah, chairs? Resting surfaces?" Christmas suggested through clenched teeth.

The Magellans rippled into sudden violent motion and then stopped abruptly. They were now standing behind Christmas's off shoulder.



"Proceed," said the voder.

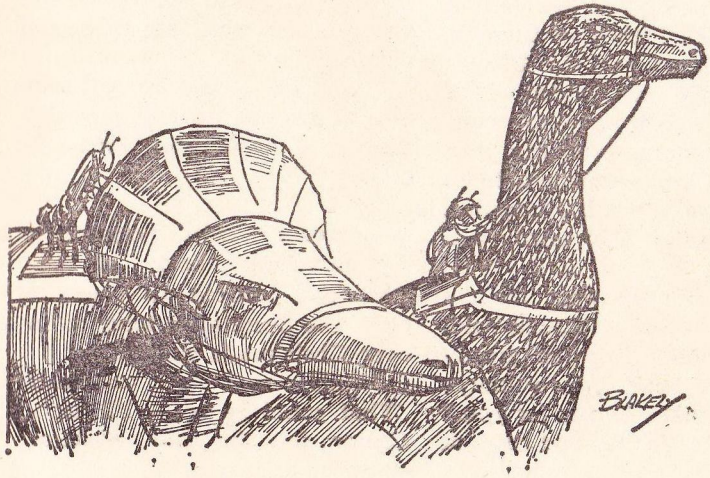
"Right," grated Christmas. He rang for Dana and bowed to Ser Nisrair, who allowed himself to be ushered out, antennae rigid.

"All right, Dana, I'm open for business. Our guests are staying to observe. What's come in?"

"A complaint has been filed by Betelgeuse system." Only a slight starchiness about the whispers betrayed Dana's awarenss of the apparaitions looming behind Christmas. "They have a team of giant bore-worms, and they claim their entry was fouled by striking tunnels left by a previous race."

"Those cursed worms have gnawed up that whole mountain range," Christmas growled. "Allow the claim, notify Mutuel, and tell the Secretariat we need some new mountains. They're going to devastate the planet. Better yet, ask Detweiler if Gal-Q could move in an asteroid for all those excavation contests. There's mining over in the next system; maybe they can shove us a rock or two. Det should have thought of that."

To the presences behind he added. "This is a just claim against Raceworld for improper track conditions and must be allowed. Those who bet on the affected team will be compensated."



"We understand your language," the voder said hollowly.

Kurtis came on the intercom. As the screen lit, Christmas realized that the aliens had chosen to stand where no viewer would pick them up.

"Your Flangians, PC. Its Pyrrhoxa all over again. Their drivers are nothing more than monkeys, the horses were training *them*. We caught the horses cold, laying out a ploy for the next race. They didn't fancy their own odds, so they were fixing to have a long shot from Fitfat win. They actually passed their betting instructions to one of my boys. Usually they do it through their food-handler, but he got delayed by a girl — you know Elva."

"Mutuel will go up the wall on this one, Kurt; they've been in a lot of races." For the Magellans' benefit he added, "Of course they will have to reimburse all bettors, probably with damages. Thank our stars, those light equines aren't too popular. Give Detweiler the word, will you?"

"It's lucky they went for the big odds so openly," Kurtis said. "If they hadn't been so greedy they might have had a longer run. Well, that's horses for you."

Christmas flinched and cut him off.

Dana looked up from his own commocollar.

"Ankru has just won another one, PC."

Holding his fingers on Detweiler's channel, Christmas swung around to the Magellans. "I am now going to query the Secretary on a very serious case," he told them. "A team from a planet called Ankru appears to have been assigned too light a gravity handicap, probably due to an error in the original schedules made up the Secretary's office. The team has of course been winning in several different class events." He swung back.

"Anything on Ankru yet, Det?"

The gravity is absolutely correct at one point two G, PC," Detweiler told his gravely. "According to both our own star synopsis and the Gal Q master directory."

"Can't be — they're still winning. Four out of five now. Besides — have you seen the brutes?"

Detweiler nodded perplexedly. Suddenly both he and Christmas started to speak at once, the Secretary's tenor riding over Christmas's rumble.

"Ambimass!" he exclaimed. "That could be it — I'll signal Center for the full planetary specs!"

"But — " said Christmas to the empty screen. The office door lit up.

"Visitors with an appointment, PC," Dana told him. "He's from somewhere I can't pronounce in Sector 90. Insists on talking to you in person, something about their age-weight handicap."

The caller ambled in, an immense hump of shell with a sad, tapir-like face emerging at knee-height. He began hooting in nearly incomprehensible Galactic, with much ritual courtesy. Christmas waved Dana over to interpret.

"The problem is that their entry is now fifteen hundred Standard years old, and the age handicap's gone asymptotic."

"How long do your animals live?" Christmas asked.

"He's not sure," Dana translated. "This particular animal has been winning races for over a millenium — he races every twenty years — and the home system expects him to go on indefinitely, I gather. They don't have any more, right now, breeding is slow. With no weight handicap differential any more, it's getting tough. They're up against a much younger similar form from a new system, and planetary prestige is at stake."

"He seems a nice old boy. But we can't bugger up the whole system. Even anti-grav wouldn't help him: the animal would lose traction. Ask him if he would be satisfied to switch over to non-competitive exhibition, with choice of pace-setters, and lots of fanfare — oldest living champion, and all that!"

Dana and the alien hooted at length. Behind Christmas the aliens stood moveless, expressionless, exuding their faint aroma of disquiet.

"I think he says yes," Dana reported. "I told him the Secretary will — "

V

The office door burst open and a long white figure leaped in, drew itself up to eight feet of naked girl, rounded the desk and fell prone with a crash at Christmas's feet. Christmas curled up his toes as he felt cold steel sliding under them. Tapir-face hooted in alarm and backed into the Magellans, who did not move. He moaned louder and backed off into Dana. The office door was jammed with secretaries, topped by the interne's dark face.

"What the — you, Doctor Ooloo — this is no place — " Christmas roared.

"She got away from me, Sir, through the ladies' latrine. She kept saying she was your slave since you saved her life and she

had to swear fealty or something."

The girl nodded and patted his instep.

"She says now she must toil for you — she has no home."

"But what can she do? Has she ever seen a computer?"

"She says she is a warrior."

"Yes, I know . . . Hold it a minute, Det!" he said as the intercom flashed. "All right, young lady, you've sworn fealty. Now you go along with Dr. Ooloo and they'll find you something to do. Find something! Anything! Show her how to run the elevator! Now get her out of here!"

He turned to bow deeply to the shaken tapir-faced one as Dana got them out. From the screen, Detweiler's face watched in puzzlement until Christmas gave him the all-clear.

"We were right, PC!" Detweiler burst out. "Ankru's wildly oblate spheroid; they've got nearly three G at the equator. That one-point-two figure was an average. Obviously they've been sending animals from their heavy zone."

"But in that case, shouldn't the specs have the letter 'v' after it for variable?"

"Yes, it should, but it doesn't. Here, look at the Directory readout. Same in our synopsis, of course."

"Recent date on that paragraph," Christmas said thoughtfully. "Just about the time Ankru applied, wasn't it?"

"H'mm yes, it's a change notice. They come out periodically from Gal Comp by FTL and are automatically transcribed here . . . Wait, let me see if we still have the old paragraph." He dived off-screen, to return noticeably pale. "The old directory paragraph has been destroyed, but I found it in my personal synopsis. The 'v' was there, before the change. What could have happened?"

"Seems to me there's three possibilities," said Christmas. "Gal Comp mistransmitted, the FTL garbled, or something went wrong with the transcriber in your office."

"Gal Comp has *never* sent a mis-read, Peter." Detweiler seldom used his given name. "You know the Directory is the Galaxy bible for navigation, administration, everything; they have a fantastic technical control on it. The Directory literally never has had an error . . . The transmission could garble, of course, but they do a triplication with discrepancy signal. For one letter alone to fall out and the warning to fail too would be, well, just about the fifty million monkeys. And the transcriber in our office is automatic too. It would be almost impossi-

ble for it to miss one symbol in an otherwise correct paragraph."

"Unless somebody tampered with it," Christmas finished for him in a dead voice.

"Yes . . . It could be done! the original read-out is duplicated for the Directory and the synopses. If the process were stopped, a technician could alter the original . . . There is a gap in the time too, Peter, I think." The gazelle eyes were sick, and his face showed lines Christmas had never seen.

"The technicians are all our people," said Christmas.

"Yes, every one. Peter, I'm going to signal Gal Comp to check their master program. It'll take some while." He cut off abruptly.

Christmas sat drumming his desk. Then he shook himself.

"Dana, put a hold order on all Ankru races. Either they withdraw or the races are postponed. Handicap error. And tell Kurt to see they don't get off the planet and monitor any signals, but not to alarm them. And notify Mutuel that results on those already run are now officially invalid."

The voder crackled. Christmas started.

"Query correct understanding. You now (?) hypothesize (?) imaginatively postulate a Solterran has engaged in deception for profit."

"That's right," Christmas said. He took a deep breath. "Only a Solterran could have cut out the 'v' that told the planet was irregular. Once it was out, the way was open for Ankru to bring in their heavies and make a killing. The fact that they entered so many items so fast suggests that there was a plan. Ankru may have cooked it up themselves and subverted our staff member, but this is unlikely because only one of our people would perceive the possibility. Of course there is a microscopic possibility that there was some outside leader, maybe even from Gal Center, and that our person was intimidated. No . . . It looks — but it can't be! It *cannot be!*

"Query impossibility. Solterrans do not differ from other life."

Christmas was silent.

"Such (?) plans (?) systems have been known to fail in our Galaxy. The possibility of material gain is very great," the voder probed on.

"What's to gain?" Christmas burst out, aware that he was being driven closer to what he would not say. "We have everything one could wish, homes, luxury, travel — all free."

"Possibility of material gain for your home planet is very great."

"This is our home planet," Christmas responded mechanically. What was wrong with Ser Nisrair? How could he have failed to brief the Magellans? It was unforgivable . . . Christmas felt the never-quite-absent ache rising.

"Query correct understanding," the voder said, like a vulture picking at his vitals. "You are native of planet Terra in system Sol."

He was going to have to say it. He surged up and strode to the window, his back to the aliens.

"There is no living planet of Terra. The Solterrans you have seen here are descendants of small colonies on our moon and a few other places at the time Terra was destroyed. Terra was the only habitable planet in our system."

The ache was hard in his breast now. As a child he had sung *There is a dome That we call home, Green Terra is no more.* Neither he nor his fifteenth grandfather had known Green Terra, and no Terran he knew lived in a dome, but he had the images of grim survivors in asteroid bubbles, under leaky Marsdome . . . watching the big ships of Gal Q come poking in to see what was burning up their scintillographs, and to rescue the orphans.

"In our system those without home planet do not long persist."

"Nor here," said Christmas. It was true. Orphan races somehow died out, no one knew quite why —or why the ache never died. Either you kept hold of the ache and lived or you forgot and after a while you weren't around any more.

"Raceworld is run by the planetless, you see," he said aloud. "There is no one outside to profit. Only Solterrans."

"Your assistant is not Solterran."

"Oh, we take in a few other orphans. Dana's people got one ship out of a planet-busting war. Doesn't often happen."

Were Dana's people going to live with the ache, too? Christmas wondered. He had never pried behind the cheery brown eyes. Dana was fifth generation. There were still some cubs around . . .

"Query your planet was lost by war." The ghoul-voice bored on relentlessly. Christmas studied the horizon. The scene below him, the announcer's call — all phantasms now.

"No. We blew it up ourselves."

The voder gargled. "Such cases especially non-persistent," it said.

This too was true. Those races who had destroyed their own worlds never lived on long. Except one, Christmas thought

grimly. All honor to the suicides, the fratricides, the matricides — the lost Solterrans who had found their immortality as purveyors of a primitive pleasure to the Galaxy.

The voder-vulture was squawking again.

"Query you place value on (?) ethics (?) group conduct of dead planet."

Christmas whirled around.

"Terra is not dead!" he shouted into the white skull-faces. "Every civilized race in the Galaxy knows Terra! The word Solterran is slang for fairness, for incorruptibility, all over the Galaxy! Ask anywhere — ask in the Center, go to the Rim and ask things that hang by their tails — they know us. They joke about it — they don't understand it — but they play our game and they use our name as a symbol! How can Terra be dead when mother fish in the seas teach their young to be like us?"

He paused, breathing hard.

"There was nothing like Race-world before we came," he went on. "We — the Terran survivors — thought of it, planned it, sold it to Gal Center. We're a good piece of their budget now. But with us it is for Terra. How could Terra be dead when birds that fly in freezing ammonia talk about her?"

He ran down and the room was silent.

The voder curdled faintly and hushed again. Christmas went back to his desk. The black dvils had got it out of him.

"Query," announced the voder. Somehow Christmas had the impression a different Magellan was speaking, but he couldn't care less.

"You experience noxious subjective disturbance."

"I experience noxious subjective disturbance, yes," Christmas said bleakly. "If . . . if . . . one of us . . . The whole thing is no good . . . the unique thing . . . But it can't be . . . "

The minutes dragged by. The aliens spoke no more. Dana came in with some papers, not meeting Christmas's eyes he always monitored the office. A planetary rep came on the outercom, breezily intent on getting a special ruling in the hopper classes. The rep looked like a kangaroo. Christmas answered him mechanically. In the middle of a complicated point about tail rests, Detweiler's signal chimed. Christmas spun away from the kangaroo.

" — Definitely, Peter. I've seen the master read-in."

"What's definite!"

"The 'v' was never transmitted from Cal Comp! Some molecule, I don't know — anyway, it's the first mis-read in five Standard

centuries; they're wild. It's theirs, Peter! It's theirs."

"It's not us," Christmas said softly. They broke connection.

VI

Christmas sat stone-still. Then he slapped his desk hard and whirled on the Magellans.

"You see?" he shouted. "You see. Oh, I should have seen it had to be them; a mechanical process can reverse a unit at random, but motivation acts like a field — elements don't change until the field does — "

The kangaroo was spluttering from the screen. Christmas got him mollified. Over his shoulder he heard the Magellans rustling and turned back in time to catch a glimpse of crimson rib-flaps opening and closing along the black sides. The voder made an incomprehensible noise. Christmas stared back, alien, grotesque. Christmas remembered that there were Galaxies, and war.

A grating sound came from outside the big doors. Dana rushed to fling it open, revealing Ser Nisrair standing eyeball to eyeball with the Myrian girl. The point of her sword was at Nisrair's stomach plates. A secretarial hubbub arose from beyond.

"Let him in," Christmas ordered. "And put that knife away. Who in Entropy told you I needed a door-guard? Excuse me, Ser, we've been having problems."

Nisrair stumped in, antennae formal. Three of his eyestalks were trained on the Magellans, one on Christmas. The aliens gave no sign.

"The transportation back to Galactic Center which you requested is now ready," Ser Nisrair told them.

"No," said the voder.

"But — " said Nisrair. "Well, then, you wish to continue the tour here? We have an interesting demonstration of probability extrapolation prepared for the evening."

"No," repeated the voder.

Again there came the crimson rustling.

" . . . Not previously visible," said the voder, and relapsed into unintelligibility. Nisrair swiveled a second eye-stalk around to Christmas. Christmas opened his hands in a shrug.

"My companion (?) co-traveler is . . . untranslatable . . . disturbance. We wish to retire now to consider . . . garble . . . what we have seen."

"I will escort you at once to the hotel," said Nisrair. Still the aliens did not move.

The voder crackled on for a moment and then said clearly,

"Technology, communications, mathematics, economics, chemistry . . . " It went into garble, and quit. The aliens were suddenly in swirling motion to the door.

There they stopped, wheeled, and stamped hard in unison with black whip-like toes, making a report like a pistol-shot. The next second they were receding through the outer office.

Nisrair went after them in massive pursuit, one round eyeball still twisted over his shoulder at Christmas.

Dana silently closed the big doors and leaned with his back to them.

"Who knows," said Christmas. Tragedians, maybe. Romantics. Were they crying? Or laughing? It was something they wanted. Gal Q has been killing them with computers, you know, and everything so sublime . . . "

"The gods do not come to earth to see lightning," Dana said. "An old saying of my people."

"Maybe they weren't gods," Christmas said. "Maybe they were a couple of old aunties out for a joyride . . . or a retired couple who got lost."

He shook off his ghosts.

"All right, let's get that unholy Myrian in here — and that Doctor Oolooloolooloo — "

He went to the window, snuffing luxuriously. The magic was back. Dana herded in the gangling humans.

"Young lady, stay on your feet. I've got something to tell you. You couldn't go home because you lost the race, right? Well, you didn't lose it, you won it. The animal who came in first has been disqualified; it was running under an inadequate gravity handicap. Do you understand? Tell her, Doctor, she won it fair and square. Now she can go back to Myria in triumph and be a sacred warrior virgin again. Okay?"

The girl broke into sobs of unmistakable woe.

"For Solsake — what now?"

"She says she can't go home now, Sir, because — uh — "

"Because what?"

"Sir, you said, do anything—"

"Oy not vergan now!" she wailed and collapsed on the interne's chest.

"She . . . she wants to stay here," said the interne. "I thought she could work out well with the animals — "

"She can't stay here, she's got a home. What's that?"

"She says they'll disembowel her at home for not being a virgin," the interne said miserably.

"Really? Permissive types. Well, Dana, do you think she might qualify as a planetless person? I'll buck a request over to

Det in the morning; he'll have to get cultural certification. All right! You, Doctor, take her to Lamont's transient billet; she can camp there till we get this straightened out. You, young lady, go with him and do whatever he says, right? You can put some pants on now and put that sword away, right? No, stay on your feet — in public, anyway. And you, both of you — get out of here and stay out until I call for you — if I ever do — right? Scat!"

The drifting fragrance of a cheroot told Christmas that his night deputy had come into the office and was quietly checking through Dana's log to see what was pending for the night. Coburg was a stocky white-haired man who had been main track chief until his legs failed.

"Should be a quiet night," Christmas told him. "You might call Lamont's office for quarters for a special case — you heard it. And you're bound to get some noise about the Ankru thing. Other than that — I'll call in later."

He gazed out to where the floodlights were coming on over plain and mountains, pylons, domes and sea. All were folded in the gold and pastel of Raceworld's perfect evening, one in the infinite series.

"Somehow I feel you and I could do with a small idyll," he said to Dana. "How about getting your family to join me at Seaworld? We'll snatch a prime table by the big shark races and your kids can have themselves a swim-ride . . . Great, I'll meet you at freshwater pools. I have to go over to Admin for a minute."

He went out to his sled and floated into the evening. Below him a line of giant wolf-spiders was parading onto the track, prancing daintily on twenty-foot legs. The bugle made sweet sounds.

Arcadia, Nisrair had called it, Arcadia or Arcady was a pastoral dream. No, this was another dream — one that had kept his race alive, of all the orphan races. A bright improbable dream that their ancestors had managed to weave into the Galaxy's life currents so their children need never wake up . . . and die. It even hooked those golems from the Clouds, Christmas chuckled, recalling Ser Nisrair's discomfiture. Maybe the poor spooks had been terrified by Gal Q's briefings!

Grinning, he turned a long lazy circle toward Admin. Then his grin faded. In his mind was the image of Nisrair's round, receding eye. It had been unforgivable to make him bare his

soul that way! How could Nisrair have fallen down so badly in briefing them? He must have been really frantic, Christmas decided; he'd never before failed to explain the set-up here to visitors in advance. In fact, he'd never before failed at much of anything.

The eye came back, brighter, expressively clinical.

"Why, that mealy-mouthed big smart cockroach!" Christmas exploded aloud. "I should have known! He wasn't just asking me to let them press some buttons, or fly over a track. He had them figured — and he was looking for something to get under their hides with — and he decided to try the Tragedy of Terra. Played live. Oh, you soulless big blue bug!"

He kicked the sled to savage speed.

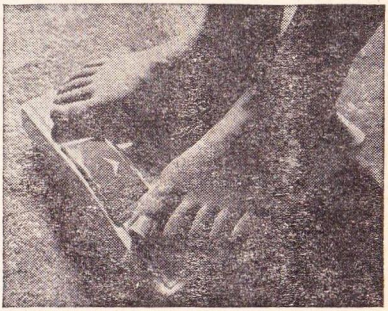
Then, slowly, his jaw came back to normal.

"It's his job to get rapport; he got rapport." Christmas muttered. He grunted. His lips quirked.

Grinning once more, the Steward of Raceworld braked his sled into a gung-ho landing. Below him was the amphitheatre where the Secretary of Raceworld was preparing with all ceremony to award a medal to an intrepid mouse. Christmas started down the ramp while behind him floated up the cry, "Keeb'y VAAAAAl ya!" and the watchers from a million planets rose and clamored.

—JAMES TIPTREE JR.

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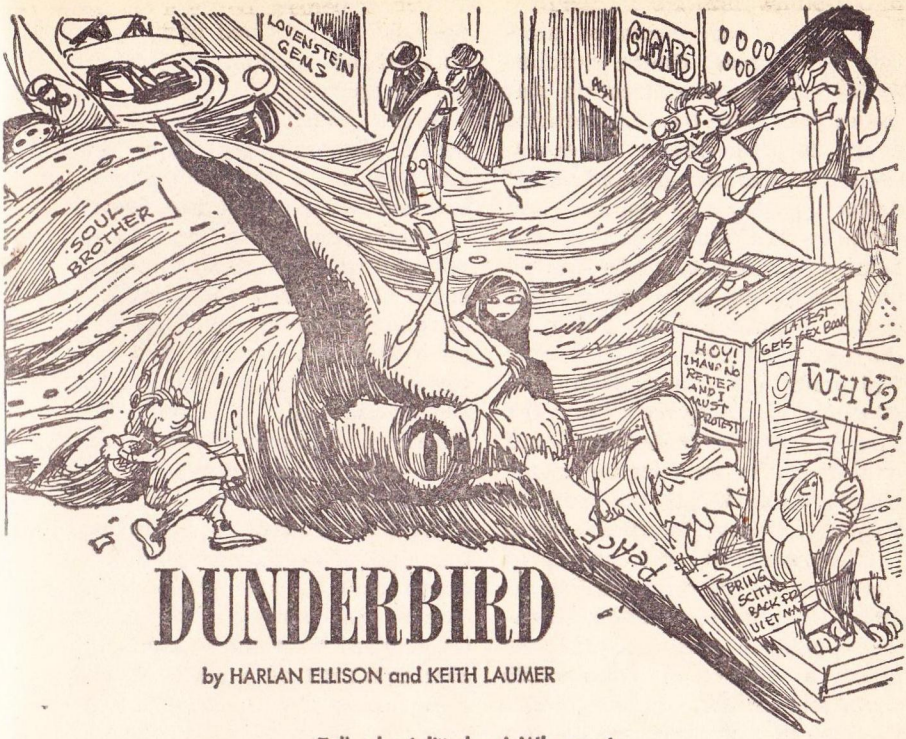
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DUNDERBIRD

by HARLAN ELLISON and KEITH LAUMER

Talk about litterbugs! Who wants a dead pterodactyl near his house?

I

Very much like a dead bird, the pteranodon fell out of the sky at 4:18 of a Wednesday, fell whistling, end-over-end, landing squarely in the middle of Sixth Avenue and 47th Street. It fell flat-out, wings spread, and crushed a Mustang, two Cadillacs, a Buick Riviera, three VW's, the front end of a Peugeot and a Greyline Tours sightseeing bus.

The fall of the beast killed eighty-seven people, but it was not that, precisely, that caught the attention of Will Kiley as he emerged from one of the small smut bookshops dotting Sixth Avenue, his parcel of paperbacks

and photo sets showing Puerto Rican girls with unshaved armpits and spread thighs clutched to his side. Kiley's attention was initially caught by the crashing shape as it shadowed the street, then by the crashing sound as the extinct creature impacted, and then by his recognition of the beast as not merely a pterodactyl, but specifically as a pteranodon, genus *ornithostoma*. Kiley, a third-year student at Columbia University, majoring in Historical Geology, instantly recognized the osseous crest extending the skull to the rear in an effective counterweight, balancing the mass of the huge, bony, toothless, beak.

Kiley observed this aspect of the beast in the dust-settling instant after the pteranodon, crashing, bounced, rose into the air amid a welter of automobile parts and crushed humans, hung there as though observing its own handiwork and then slammed down again very hard on its original ground zero.

One vast wing lay spread like a dusty, olive-gray tarpaulin over the still feebly struggling bodies of victims trapped beneath it. An edge fluttered as pocketed air escaped bearing a pungent reek of reptilian juices. The other extended across 47th Street, sagging, warty leather stretched on thin bones like collapsed aluminum tubing, the fingered tip caressing a tarnished brick front adorned by a clustered trio of brazen spheres.

Sirens began keening everywhere. Screams rose up in the intersection as the half-pinned, maimed survivors of the beast's tumble struggled to free themselves. From his doorway Kiley noted at once that the beast was incredibly heavy, much heavier by a fantastic overage than any pterodactyl had a right to be. Aerodynamically a sport, the creatures had never weighed more than a hundred pounds. Eighty was closer to the average. But this thing had crushed a sightseeing bus and something over a half dozen cars. It was many times longer and had a far greater wingspread than any pterodactyl ever exhumed as a fossil. It was lying almost like an immense crucifix, its shaft of body heading toward the Radio City Music Hall, its wings outspread as though waiting for Pilate's men to come and drive in the spikes, crosstown on 47th.

Kiley was torn between staying to watch what was certainly going to happen, or running back uptown to his mingy little room, to put the contents of his parcel to use.

At that moment, a group of fifteen Chassidic Rabbinical Seminary students, adorned with *pay-*

uss, beards and long black overcoats, so out-of-line for mid-August, and faintly redolent of the scent of Rappaport's *gefilte* fish, emerged from one of the diamond exchange shops. Seeing the dead beast lying in the street, they began a loud and incomprehensible argument as to whether or not pteranodon was kosher.

"It flies . . . it's a chicken," said one.

"That makes it kosher," confirmed a second.

"Snake. It's a reptile," countered a third.

"Then most definitely there should be no argument on this point, it's *trayf!*" concluded a fourth.

A florid, large-boned police officer of the midtown precinct, ran up from 45th Street, blowing his whistle, readying his book of parking tickets and looking around for the owner of the dead beast. Spying an old man lounging against the side of a papaya juice stand, the cop hustled over and pointed an accusing finger.

"That your pterodactyl?"

The old man shook his head.

"You're sure?"

The old man began to tremble. "Honest to God, it ain't mine. Why'd joo always pick on me?"

"'Cause you were the guy owned that big monkey we caught climbin' up the Empire State, that's why!"

"They never proved it!"

"I don't give a damn if they didn't. *I* knew you were the guy. I *knew* that big ape belonged to you!"

"Oh yeah, fuzz. *How'd* you know?"

"You were the only guy on the street with a seventy-five foot tambourine."

The lean, corsetted, hatted, rouge-on-bones young woman standing *au dessus* the soot-flecked, plate-glass display window of the truss and artificial limb shop on the southwest corner of the blocked intersection compared the watch strapped to her narrow wrist with the oversized timepiece dangling over the sidewalk across the street. Her lips compressed into a hard line like a surgery scar. For the tenth time in thirty seconds she had scanned the pavement to left and right, strode a few impatient steps to peer past the upjutting elbow of the pteranodon blocking her view. Still no Melville. Melville wasn't coming. Stood up. Her. Lilya. Stood up. By a creep like Melville, which she was doing him the biggest favor of his life just to go out with him, the slob, and he's got the undiluted crust to not show, and after she skipped lunch just to have room for

a lousy dinner which he probably would've suggested Nedick's anyway —

A large, slow-moving middle-aged man with moist eyes and a mouth like a prune pit was hesitating, looking at her; Lilya had seen a Museum of Modern Art Film Retrospective of Films of Depravity in 1964; the persistent image of Peter Lorre as "M" kept oozing into her mind; this was probably an out-of-town rapist. She'd been staring right at him: *probably in another second he'll make the pass; I can always spot them, yechh; why me? Why always me? If I ride in a car with someone down the Major Deegan Expressway, they always yell, hey looka that, and I always look, and it's always a legless cripple or some drunk lady whose thing is collecting cardboard flats while it is she's puking into a litter basket, or a cat run over across the head by a sanitation truck. Why always me? A flasher, this one is. I can tell.*

Lilya stiffened her face, let her gaze slide past him, turned her back, but not rapidly as to appear really, like rude. She gasped as the old man tottered, wheezed, lunged past her, hand outstretched for the door of the hole-in-corner public house next to the prosthetics display. A gush of beer-laden air; the door closed behind him. Lilya perked as though struck by a wetmop. Her eyes fell on the clock. Twelve minutes late. She'd give him exactly two more minutes, or possibly five, that would make it four-thirty on the nose, and besides you couldn't expect her to climb over that flying crocodile, which somebody ought to call the zoo and tell them a few things about letting the inmates go falling all over the street.

Will Kiley decided he'd had quite enough morphology of flying reptiles for one day. The parcel beneath his arm grew warm even as he thought of it. Within the parcel: *Rolling Sin House,* a novel dealing with six young prostitutes who buy a house trailer and flout the laws of interstate commerce; *Lust Whip Madam,* a stinging tale of cruelty and unbridled passions among the silken-limbed houris of the bondage set in Scarsdale; *Teeny Slut,* an adventure into the sexual psychology of the amoral young. These three, and a seventeen- picture set of maybe a Rosita or Consuelo or Guadalupe (he would settle for a Dolores), were the spurs to his rapidly returning uptown to a student-dingy room.

He started past the head of the beast, when he saw the edge of the artifact hanging from its neck.

It seemed to be a large golden disc, hanging from a thick link chain. Will Kiley's instant thoughts were not of rich rewards from the archeological society. They were of ready cash for old gold in any one of the Second Avenue antique shops. Ready cash that could buy important things like regular meals, more books, possibly even a young woman's affections. (Will Kiley, having emerged from a cocoon of poverty spun about him by his parents in Three Bridges, New Jersey, was inclined to accept the philosophy that money may not be the only thing in life, but the *other* thing won't go out with you if you don't have it.)

He jammed the package into his jacket pocket and began hauling at the golden chain, in an attempt — hearty but hardly surreptitious — to get the disk off the dead pteranodon.

II

From a doorway across Sixth Avenue, a group of youths belonging to a Bronx-based organization titled The Pelham Privateers — what in days of pre-protest picketing would have been called a juvenile delinquent gang, now referred to as "a minority youth group" — observed Will Kiley's struggles and continued their own observations.

"But it don't look like it *got* hubcaps," Angie said.

"Hey, *shtoomie,* if it is lyin' inna street, it is gotta have hubcaps. The question's where?" The gang's leader, George ("The Pot") Lukovitch dealt with matters in a realistic fashion.

"Maybe they're *unnerneat',*" suggested Vimmy.

"Could be," George mused, "could very well be."

He pondered a moment longer, then made up his mind and the gang's collective mind. "We gotta jack it up. Get unnerneat'. Get the hubcaps off. Vimmy, I want you should take t'ree boys and go over to the building they're building onna corner Madison an' 48th. Steal a pneumatic hoist or somethin'."

Vimmy gave a quick one-finger salute and dodged out of the doorway, tapping three of the gang members on their chests as he passed them.

A hook-and-ladder approaching from the direction of Fifth Avenue swerved to avoid the quartet and skidded to a halt in the lee of the dead ornithosaurian. Big Louis Morono, wearing a Texaco hat and black rubber boots and slicker, leaped down, dragging a foot-long brass nozzle trailing a flat gray boa-constrictor of hose. Assessing the situation at a glance, he set off at a heavy-footed trot toward the

stern of the beast, assisted by fellow fire fighters each supporting his half dozen yards of tubing. A second team launched itself with silent efficiency in the opposite direction, toward the giant maloccluded jaws. They rounded the head, continued parallel with the scaly neck, paused only momentarily before trampling ahead across the leather carpet of the wing. They met Big Louis and his crew at a point abaft the fourth thoracic vertebra.

"Anything?"

"Nothing."

"Smoke?"

"Not a wisp."

Big Louis sighed. His hose drooped. "It figures."

"Yeah."

"Okay, boys, reel it in." Muttering, Big Louis headed back for the trembling red truck. Before he had taken more than three steps, however, one of the members of the second team yelled, "Hey, Cap! It's a, uh you know what, a dragon. Maybe it breathes fire. Could be, y'know!"

Big Louis stopped dead and smiled a winsome smile. ""Reel it out again, men!" he shouted.

As Will Kiley struggled manfully with the golden chain and its golden disk, two rumpled figures wearing thick glasses paused beside him, but pointed frequently at the dead beast's head:

"The chief difference in the pterodactyl skull from that of a bird is in the way in which the malar arch is prolonged backward on each side," said the first.

"The nostrils are unusually large. Could it be Dimorphodon?" asked the second.

"Don't be a silly goose, Trenchard," replied the first. "Doesn't even resemble."

Trenchard's eyes flashed anger and his mouth tightened. "Damn's blood, Goilvey! You were the one who said this genus shouldn't be this heavy. You were the one who dragged me out of the Automat, leaving a perfectly good fish cake, just to come down here and argue about this. *I* don't know why it's so big, and *I* don't know why it's so heavy . . . all *I* know is that I don't like you talking to me so snottily. Your seniority in the department doesn't give you that right!"

A civil rights group, attracted by the noise, abandoned their labors integrating a parking lot and, instantly interpreting what was going on there in the intersection, whipped out magic markers and fresh cardboard and rejingoed their slogans. They began parading around and around the dead beast, bearing signs that read HE DIED FOR US! and DON'T LET THIS DEATH GO UNAVENGED! and SOCIETY ASKS: WHY?

"Looks dead to me," murmured a secretary, walking to Sak's with a girl friend.

"Remind me to make an appointment with an orthodontist," her friend replied.

A representative of the sanitation workers union — summoned by enraged members of his local — arrived on the scene and uttered a snarl. "Like hell we will!" he commented to the members of the press. "It'll lay there till hell freezes over! If the corrupt and Commie-Symp government of this city thinks it is going to fatten and batten on the blood and sweat and tears of the members of the United Sanitation Workers of America Local #337, it has another think coming. The name is Fortnoy. F-O-R-T..."

The two CIA men ran out of film.

One's tie-tack camera clicked on empty spools, and the other's mini-corder in his hatband whirred emptily. They met at mid-pteranodon and compared notes:

"Maoist?"

"Doubtful. Castro?"

"Maybe. Been able to reach the office yet?"

"No, something's wonking up the circuits."

"Jamming?"

"Maybe. Maoist?"

"Doubtful. Russkie?""

"Maybe. . . ."

Kiley pulled and strained at the disk, trying to drag it out from under the great head. He was making some small headway when a photographer and three models and the director of fashion for a leading woman's magazine nudged him aside and began posing the girls on the head of the dead beast.

"Look anguished, Maddie," said the photographer, a slim and ascetic man wearing an Australian digger hat in white velour. The model looked anguished. "No, no! *More* anguished. Cry for the entire world, sweetheart!" Maddie anguished harder. She cried. "Now tilt the pelvis just a tiddle forward, darling," the photographer urged. "Let's transmute that anguish into a starchy impudence at the really *tasty* things the season's culottes have to say to the Now Female!"

"Off duty," said a cabbie, streaking down around a wingtip and plunging up the Avenue.

Somewhere children were laughing and the wind was sweet with the scent of imminent summer. But that was somewhere else.

"Jesus, I can't stand the stink!" shouted a woman from the seventh floor window of an employment agency.

Seventeen sailors from a Japanese freighter in New York on three-day leave crouched near

the juncture of wing and torso, and snapped pictures of the dead beast with Leicas, several murmuring words that sounded like, "Rodan." No one paid them any heed.

Several handbills were hastily pasted onto the leathery hide, announcing the candidacy of Roger Scarpennetti for Borough President.

A vendor of socks (seconds) pitched his way from tail to beak, and made almost four dollars with his wares.

Three agile and rolling-gaited Caughnawaga Indians, those noble descendants of the noblest of noble savages, crossed 48th Street heading downtown. They carried lunch pails. They were on their way home by IRT subway (which they could catch at 42nd & Times Square) from the building site construction on Madison and 48th, the selfsame construction site toward which four Pelham Privateers (behind the point scouting of the redoubtable Vimmy) at this moment were streaking. The three redskins, high-steel workers of the most loftily-paid species, paused at the corner of 47th and Sixth, shifted lunch pails and clucked their tongues almost in unison.

"Is that crummy, I ask you!" said Walter Knife-That-Gleams-In-Starlight.

"Yeah, first they zap alla the buffalo, bison, whatever the hell they was that they did in, and now this!" The lament was voiced by Teddy Bearclaw.

"Goddamn white-eyes," added Sidney G. Nine Fires.

"Red man's burden," said Walter.

"Is it not a sad pass what our people has come to, that we must erect for these crummy pony soldiers a edifice of such nobility as we are at this precise moment in time erecting," penultimated Teddy.

"What the hell is a bison?" asked Sidney G. Nine Fires. Mutual shrugs of confusion led to a prompt exit.

III

The Reverend Leroy L. Beal, arriving at the head of the Poke County, Mississippi delegation to the First Annual Congress of the International Evangelical Brotherhood for the Promotion of Christian Love and Low Down-Payments, paused, waving his flock to a halt, shaking his head sadly at the vast obstruction blocking the intersection ahead. His second-in-command moved up beside him. Together they studied the crumpled, strutted, awning-winged apparition.

"Well, Leroy, what do you make of it?" the lieutenant inquired.

Rev. Beal sighed. "The expenditure of funds and ingenuity that went into constructing this hoax and placing it in our line of march could have supported three indigent families in fair comfort for a period of at least two months," he stated.

The two men advanced; Rev. Beal poked at the leathery hide with a finger.

"Plastic," he said. "A transparent fraud."

"As I see it, Leroy, they intended to suspend the thing from wires and have it buzz us. But apparently the wires broke."

"Obviously. Tsk. Sometimes I wonder at the curious picture the opposition seems to entertain of our gullibility. First the whole thing with the sheets over their heads. Now this: rubber pteranosaurs."

"So — what do we do?"

"We make ourselves comfortable," the Reverend said. "And wait."

As the strains of *We Shall Overcome* rose on the afternoon air, a party of lobbyists for the All American Society for the Preservation of Property Values (ASPPV) emerged from the gloom of Reilly's Bar and Grille, summoned by the mingled cries of the wounded, the chatter of the spectators, and the exhortations of the cop, still in search of a recipient for the summons. The group blinked at the scene, noting the size and placement of the reptile with eyes accustomed to lightning assessment.

"By George, Charlie," the head lobbyist said, around a cigar, "you couldn't replace that thing for under twenty-eight-five or I'm a baboon's nephew."

Charlie was staring at the singers grouped by the monster's stern.

"Tell *me* there's no Commie money behind them Nigras," he murmured.

Lilya looked at her watch for the thirty-first time. Ten more minutes and not a second more, and then by God she'd take a cab to Schrafft's and order the expensivist item on the menu and if that skin-disease Melville ever dared to show that collection of acne scars he called a face again—

"Sorry, lady," the man with the leather jacket said, not looking at Lilya as he bellied her aside. He planted his feet and looked the project over, from beak to tail-tip and back to beak.

"Hey, Jake," a wiry man in overalls said. "You want I should get the rig in position?"

"Nix," Jake said succinctly.

"Right," the wiry man said. "This is outta our line — "

Jake whirled and grabbed a handful of the wiry man's overall bib.

"There ain't no wrecking job Ajax Wrecking can't handle and dontcha forget it," he growled. "Hold the headache ball. Tell the boys to break out the chain saws."

"Sure, Jake. Only you got aholt of the hair on my chest — "

"Twenny minutes, that's what the dude said. I don't want to see nothing but hip pockets and elbows until we got this intersection clear, get me?"

A husband and wife team, tourists from Joplin, Missouri, making one of their rare p.a.'s in the apple, stood near the forearm and metacarpus of the dead beast, the husband setting the automatic timer on his camera. Then he strolled nonchalantly to his spouse (indicating his ease and familiarity with matters photographic), struck an attitude, and waited, smiling, till the camera had clicked them off. "Do we have time to make it down to the Village for some shots with hippies, before dinner?" the wife asked. Her husband's answer was lost on the wind as the mayor's helicopter settled in the center of Sixth Avenue, just above 47th Street.

The riot police jog-trotted around the corner of 48th and Sixth and began breaking up into assault teams.

"Careful of that Mace!" Captain Schirmer bellowed through the bullhorn. Snipers in office windows began firing at streetlights. "All right, move it out!" shouted Captain Schirmer. The first wave of riot police lobbed their tear gas grenades, and began spraying high pressure hoses down the Avenue. The rabbinical students fled, still uncertain whether the pteranodon was kosher or *trayf* — but dead certain the eggs were edible if the proper *bruchah* was said over them.

The rescue squads at last pulled the last of the survivors out from under the dead beast and carried them away from the line of combat.

Kiley was trapped at the neck of the creature, still trying to yank loose the golden amulet. He was cut off from escape by the insurrecting Columbia Law students and Black Panther Freedom Party members on the eastern flank, by the riot police using Mace and leadweighted truncheons on the west, by the roughneck warriors of the Ajax Wrecking Corporation (all ex-Seabees) on the North, and by the advancing wave of members of the Amalgamated Butchers and Meat Hackers Local #39 on the South.

He crouched down all the way, hoping to go unseen, and continued yanking at the circle of gold.


GUARUAY PAMA KONG

More police on horseback clogged the scene, trying to aid their beat partner in establishing to whom the corpse in the street belonged. The ticket was written, it merely needed to be served.

Three hookers began working the uptown side of 47th Street, hoping some of the show biz crowd would stick to their fingers, or other portions of their anatomy.

"Oh!" cried Alice, awakening, "apparently it is all a dream!"

"You're under arrest," said the cop with the ticket, to no one in particular. He said it again, softer, but no one paid any attention.

Lilya curse/wished plagues of gnats and nits on the acne-pocked head of Melville and stalked off down the Avenue, passing the hip-girdle of the pteranodon, failing to look down where she would have seen her much cursed Melville, much more crushed than cursed.

Near the hind limbs of the dead beast twelve members of The Pelham Privateers now worked diligently trying to get the beast erect so its hubcaps could be stolen. The pneumatic jacks they had installed merely sank into the flesh of the beast.

Big Louis Morono, seeing the gang at work, whistled up his men and, using the high pressure hoses, drove the juvies from the scene.

Even as they fled, the Pelham Privateers indicated their frustration at having been thwarted. They mugged Trenchard and Goilvey where they stood, leaving the two tottering scientists even more tottered: face-down in the gutter, arguing through split lips and cracked teeth, "It's too big to be a pterodactyl from our past . . . it *has* to be from the past, you twit . . . no, it's from another planet . . . don't be an ass, they don't have pterodactyls on any planet in our solar system . . . so it came from another solar system . . . how did it get here . . . that's not my problem . . . "

Will Kiley struggled with the golden amulet.

And at that precise moment, the parallel worlds, having reached the apogee of their pendulum swings, and having started back toward the point at which they touched originally (for the first time in fifty-six years), met . . . perigee . . . merged . . .

And Will Kiley, tightly attached to the focal point of the two worlds' merging — the golden amulet — found himself poof!

Gone. Vanished.

In the intersection of 47th Street and Sixth Avenue, the mob was cleared away, and the Ajax Wreckers joined with their working-class comrades of the Amalgamated Butchers and Meat Hackers Local #39, to rid the

streets of the unsightly corpse of a flying reptile that had dropped from no one knew where . . . and no one seemed to very much care.

Meanwhile, back at the tangential meeting-place of the parallel worlds. . . .

IV

Very much like a dead ibari, the man fell out of the sky at X.O.+19 of a Bluemorn, fell howling, arms and legs all a-tumble, landing squarely in the moss-and-metal center of the Religious Icon of Nerf, in Avuncular Square.

Two leathery-winged residents flapped over to the gigantic creature and stared at it.

"Did it fly?" said the first, scratching its osseous crest with a wingtip finger. "Or did it merely fall?"

"Big, isn't it?" commented the second. "Much bigger than whatchamacallit, *men,* are supposed to be. And heavier. I wonder, is it edible?"

"Ah-ha, not is it *edible,*" interjected one of the dietary priests of Nerf, "but is it *hazzil!* That's the question!"

The eyes are blue, that means it can't be a *hazzil*!"

"But it has a nose. It *must* be *hazzil!*"

A Proctor descended on the scene and extracted its demerit book from its wingtip-pouch with the fingertip of its other wing. "Okay, who owns this myth?"

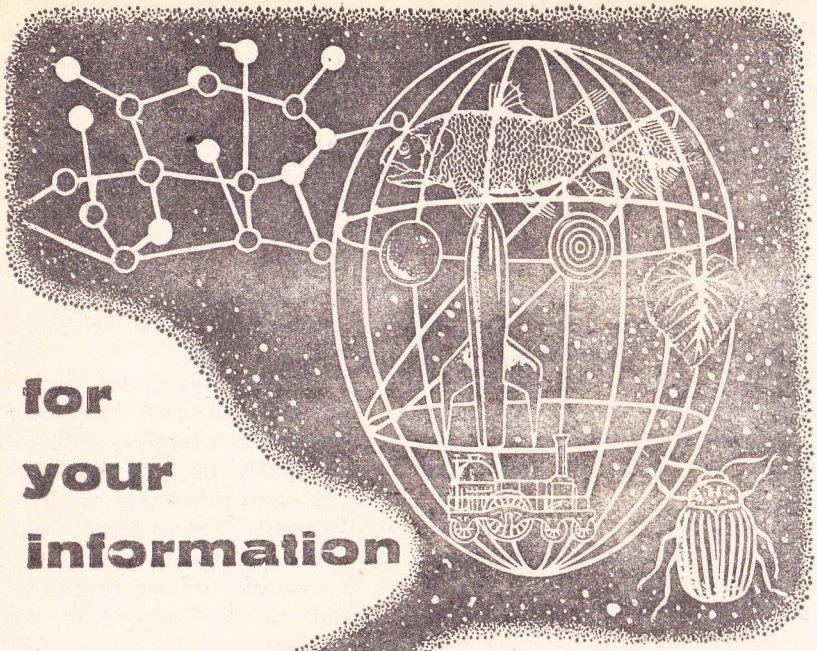
"What's a *Teeny Slut?*" asked the dietary priest of Nerf.

But no one seemed to know.

And no one seemed to very much care.

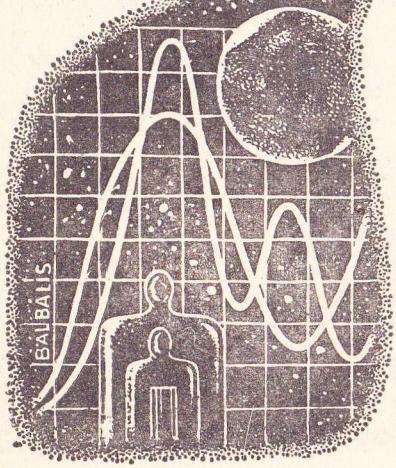
—KEITH LAUMER
and HARLAN ELLISON





for your information

BY WILLY LEY



THE WRITTEN WORD

And David, the King, having heard the reports of the messengers called for his scribe so that he might send a letter to his commander in the field.

The year, in round figures, is 1000 B.C., and we are informed in II Samuel 8:16-17 that the king's recorder was Jehoshaphat, the son of Ahilud, while the scribe was a man named Seraiah.

Unfortunately nothing is said about *how* the letter was written.

We may take it for granted that the scribe wrote down what the king dictated, but it would be nice if we were also told just how he did his job. I do not mean the language; that probably was some early form of Aramaic. Nor do I care what letters he employed, though it can also be taken for granted that it was already alphabetical writing. What I want to know is what he wrote *on* and what he used for writing. We have to guess about this, though the guess has a rather high probability.

If the story of David's letters had been written by Homer, about two centuries later, it would have taken a few more lines but we would know every detail for it would read about as follows:

Quickly Seraiah the scribe (the name of his father is unknown)
Mounted the terrace well screened from Helios's rays that are burning,
Carrying with him a bundle of dried reeds, prepared for writing.
Also he brought with him inkstones, some red as the sky looks at sunset,
Others as black as the night at the time when white Selene fails to
Lighten the darkness. The inkstones were fashioned with skill by Simon,
Weaver by trade is he, yet skillful in dyeing the cloth he has woven.
Also the scribe carried some water for softening inkstones with rags dipp'd
Into the fluid; and sheets of papyrus from Egypt he carried,
Almost as costly as gold, when weighed for trading. . . .

Of course I have put all the available information about the scribe's trade, as carried out in the areas of Egypt, Syria and Palestine into these pseudo-Homeric lines. The inkstones (also called ink cakes) were made of lampblack and some gummy substance for black, or of iron oxides and a similar substance for red. They were then permitted to dry out for easier handling, which is the reason why the scribe had to carry, as clearly shown on some Egyptian monuments, a small water bucket with a few rags for moistening the surface of the inkstone. The pen was a dried reed, cut obliquely at one end. The resulting broad point was then frayed, so that the scribe's pen was about the same as the felt tip marker of our time.

This is the equipment Seraiah must have had with him; but the conclusion that he wrote on pa-

pyrus is mainly based on the reasoning that he was the king's scribe and that papyrus was expensive. In reality he might have written on leather; there is an old wall painting dating back to the eighth century B.C. that shows two Assyrian scribes: one writes on what is obviously a clay tablet while the other holds some flexible material, probably leather. The painting shows the two principles of writing: by impression into the writing surface and by making colored marks on a writing surface that is not altered otherwise.

But before we go into this important distinction of the two possible methods of writing, let us say what can be said about papyrus which has been the main writing surface for several thousands of years. We have only one account of how papyrus was made, written by Pliny the Elder during the first century after Christ. Unfortunately Pliny's account is second hand, he had not observed the process itself. What he said is, therefore, incomplete in various ways, and his words could hardly be used as a guideline for duplicating the feat of the ancient Egyptian craftsmen.



Fig. 1. Portion of a wall painting from Tell Ahmar, early eighth century B.C. The scribe at right obviously is inscribing a clay tablet, but the one at left holds a flexible material, probably leather.

The reed, Pliny informs us, was first cut lengthwise into thin slices. Since the papyrus reed, the *Cyperus papyrus* of the botanists, grows anywhere from three to ten feet tall it must have been chopped into sections before it could be sliced lengthwise. Of course the sections from the center of the reed are the widest, so the papyrus made from center sections was most valuable. The sections were laid side by side on some backing until the area covered had reached a certain width, about one foot. Then a second layer of such sections was placed on top of the first, at a right angle to it. Then the two were somehow pressed together.

Pliny's informant stated that prior to this they are moistened by Nile water: and Pliny concluded that Nile water, when muddy, must act like a glue. We now know that Nile water whether muddy or clear, does no such thing. Very likely the papyrus makers added glue of some kind about which they kept quiet. The squares of papyrus were then joined together to make a "scroll" that, as a rule, was about 30 feet long. Longer rolls grew too bulky and were hard to handle.

This, surprising as it may be to many, is the reason why a number of books of the Old Testament (like Samuel, Kings and Chronicles) are now in two sections. Written in Hebrew which writes consonants only, each of these books just about filled one scroll, but when translated into Greek, which does write the vowels, and has many of them, the books took up two scrolls.

Of course an "ink" consisting of lampblack and a water-soluble glue would not cling to the papyrus very well. Writing could easily be washed off a papyrus scroll — something that was considered desirable because the scroll could then be used over again.

Papyrus, as has been mentioned, was expensive.

It evidently had been invented originally because there was no other convenient writing material available. But what was, or could have been, used before papyrus?

Well — slabs of stone, slabs of wood, the inner side of large pieces of tree bark, possibly the large hard leaves of some subtropical plants. Just the listing of these objects suggests that the writing must have been of the "incised" variety, regardless of whether pictographs or actual letters were used. In each case the picture or the inscription had to be chiseled into the stone, carved into the wood or the bark[1] or scratched into the hard leaf. It is logical, keeping this background in mind, that the Sumerians and Assyrians took this kind of making marks for granted, even though they used prepared writing surfaces, namely clay tablets. The writing instrument was a metal stylus that was pressed into the soft clay. And the marks they made, because of the materials used, assumed the typical shape we call cuneiform.

When in high school I was informed that the use of clay tablets had the additional advantage that they could be made into permanent records by "firing"

1 When it comes to tree bark one is apt to think of burning the inscription into it with a red-hot piece of metal; but in ancient times nobody seems to have had that idea.

them in a potter's kiln. Now we know that this was *not* done. They were simply sundried. The "fired" tablets we have in our museums owe their nature to later and absolutely unwanted conflagrations which they survived.

Another writing material for (incised) writing was sheet metal. Gold, silver, copper and lead are all soft metals which will accept an inscription easily, and it is likely that the earliest such inscriptions were a kind of dedication on a gold or silver vessel given as a present to an important personage. One of the Dead Sea scrolls from Qumran is copper. A copper sheet could be rolled into a scroll with not too much effort. *Unrolling* it thousands of years later is the problem.

Leaden scrolls were quite common, too. They have been found both in Italy and in Greece; a Greek translation of Psalm 80 was found, inscribed on lead, on the Island of Rhodes. There are Punic and Hittite texts on lead, and in the Bible Job (19:23-24) says that he wishes his words were "written with an iron stylus on lead.)

Even in Roman times "incised" writing was still common. If somebody sent a petition to the senate, or wrote for posterity, he used papyrus. But if he just wanted to send a message to a friend he employed what is customarily called a "tablet". These tablets were very shallow wooden troughs holding a layer of beeswax. Writing, hence, was done with a metal stylus by impressing the pointed end of the stylus in the wax. The other end of the stylus was flattened and used to smooth out mistakes. Once the message had become obsolete the tablet was erased simply by heating it until the wax formed a smooth surface again. It very quickly occurred to somebody that the message could be protected by using another tablet as a cover; the two tablets were hinged together, waxed sides inside, by metal rings, the earliest form of a book.

By that time papyrus had found a competitor that was soon to win out because of durability, resistance to water and for several other reasons. It was parchment. For many centuries credit was given to Eumenes II of Pergamum (197-158 B.C.) for having invented parchment; we now know that parchment is older. Eumenes either improved the process or did something else to make parchment more customary. Parchment is animal skin — sheepskin, goat's skin or the skin of newborn calves — treated in a special manner to

make it smooth and white, by repeated washings, scrapings, stretchings and rubbing with pumice and with chalk. The best grade of parchment came from newly born lambs; it was labeled vellum. During the latter years of the Roman Empire it became customary for a time to stain vellum purple for greater elegance, and such stained vellum was used for documents of special significance.

Meanwhile the Chinese had invented paper. As customary, some Chinese writers claimed that paper was invented very early in their history. More cautious European scholars — who are not trying to credit some illustrious ancestor — have settled for the second century B.C. as the probable time of the invention of paper. While the origin of paper in China is somewhat obscure there is no doubt about the introduction of paper in the western countries. In 751 A.D., the Arabs occupying Somarkand were attacked by a Chinese army; Samarkand was such an important trading post that everybody wanted to have his hands on it. The Chinese lost, and two of the prisoners taken by the Arabs were skilled paper makers who willingly taught their craft to Arab and Persian artisans. Many paper manuscripts from the ninth century — usually in Arabic — are still in existence. Beginning with the eleventh century they became common in Greece and very soon afterwards in the other European countries.

With the introduction of paper the writing materials became standardized too. The universal writing instrument was the goose quill. Of course there were people who insisted that quills made from peacock feathers were superior. (One writing master who was questioned about the superiority of peacock quills by a prospective pupil replied cautiously that he was only sure they were more expensive.) Somebody, we do not know who or when or where, had invented ink in our sense; he would no doubt have been horrified as well as nonplussed if somebody could have told him in chemical terminology why and how his ink worked.

It works like this: so-called "green vitriol," or ferrous sulphate, is combined with tannin from the galls on leaves of walnut trees. This compound has a weak color, just enough to see what you have written. But upon drying the ferrous salts oxidize into ferric salts, which are black, and then the writing appears distinct and clear. (At a later date a blue dye was added to the ink so that the written lines would show

up better immediately. Oxidation then changed the blue letters to black letters.) So the equipment of the "scribe" or student of the fourteenth century was simple: paper, an inkwell, a few goose quills and a small sharp knife for re-cutting the nibs of the quills when they needed it. When traveling the inkwell was replaced by the stoppered ink horn, which must have led to many messy accidents. The accidents, in turn, led to attempts to have the ink inside the pen. Early designs of probably unworkable fountain pens go back to about 1500 A.D.

By that time a competitor to pen and ink began to appear: the pencil.

It had been the custom of copying monks and baronial bookkeepers all along to use a thin coin-shaped piece of lead to rule the parchment or paper before writing on it. But if a piece of lead, guided by a ruler, could make visible marks on paper, why not use a lead stylus for writing? The marks made by actual lead were too faint to be easily legible, but something had just been brought on the market that went under the name of "Spanish lead," namely graphite. That substance made strong and visible marks especially on paper (less so on vellum).

An illustration in the last book of the Swiss physician and naturalist Conrad Gesner shows how the early pencils — called *stylus inferius* — looked: the "lead" was fairly thick encased in a wooden holder with a center hole. A screw at the end of the pencil seems to indicate that the "lead" could slide inside the wooden holder and was advanced by the screw as it was used up. The book is dated 1565, and the device seems to have been fairly new then, but it found favor fast. In 1595 Count Johann the Younger of Nassau issued an instruction to the officers of the heavy cavalry saying that "the pens of Spanish lead must not be forgotten, for they are far more useful to riders than ink horn and quills."

While we now use all kinds of devices, from rubber stamps via pencils, fountain pens and ballpoint pens to typewriters and teletype machines for making marks on paper, paper is virtually the only substance used as a writing surface. Ceremonial inscriptions are still chiseled in stone or cast in bronze, but otherwise it is always that fragile and combustible substance called paper. To give a limited immortality to the thoughts put on a fragile paper we have adopted the biological survival principle of large numbers and successive

generations. A book no longer exists in a dozen or so handwritten copies on durable parchment. It exists in thousands of copies on paper. Then there are reprints of the original book, paperback editions (in tens of thousands of copies) and, at a later date, facsimile reprints and microfilms.

Will paper, at some time, be replaced by something else?

Probably, but not by something we already know. Thin metal sheets — for a short time favored in science fiction as printing stock — are always heavier than paper, square inch for square inch and have other disadvantages, too. Maybe a plastic will come along that does not weigh more than paper, or at least not much more, a plastic that will not discolor with time and will not be destroyed by fire. Then the chemistry of writing may be changed, too. Instead of adding something to the paper, graphite or a dye, the process of making marks may be to cause a visible chemical change brought about by the chemical interaction with the material of the stylus.

In saying this I have the everyday forms of writing in mind, like letters, memos, monthly charge statements and related pleasantries. I disregarded such things as information storage in the memory units of a computer.

But this brings up the field of electronics and with it the one occasion where a written message cannot be put on paper for transmission: a message to somewhere in space and to someone who, while his intelligence is assumed to be high, could not read a written message simply because he does not know our letters. Dr. Stillman Drake once sent a message to friends. He did

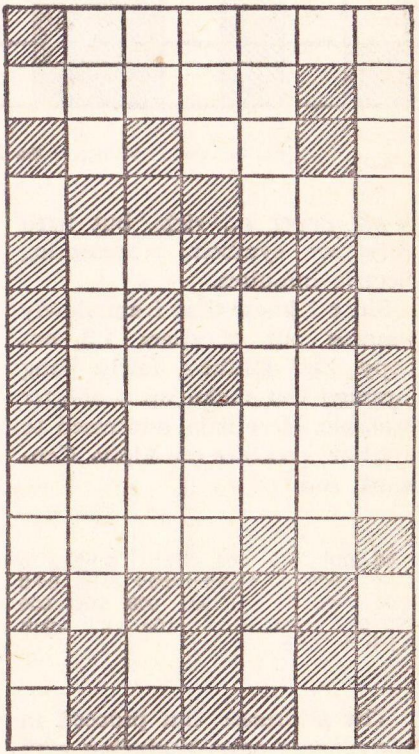


Fig. 2. Mistaken reading of the interstellar message.

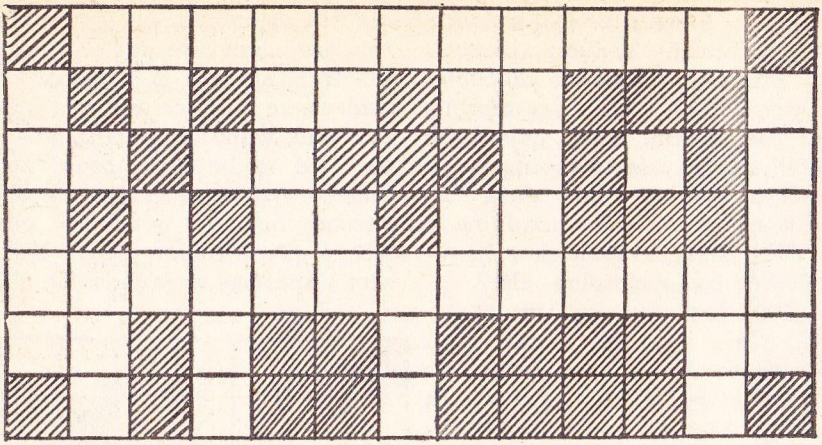


Fig. 3. Correct reading of the interstellar message.

it on paper all right but used only two symbols, representing electric impulses.

Since I know that I am slowly running out of space I'll not copy Dr. Drake's fairly long message but make up a shorter example. Here it is, addressed to a fellow creature on Alpha Centauri A-3.

```
+00  000  000  000  +0+   0+0 0+0
0++  +00  0+0  0+++0+  0+0 0+0
+00  +00  +++  000  000  000  000
000 0+0  ++0  +++  +00  +0+  0++
0++  ++0 +
```

The addressee can proceed in one manner only, beginning with counting the pulses. Their total number is 91; of this there are 55 "o" spaces and 36 "+" signs. The ratio of 55 to 36 carries no meaning nor does the ratio of either of these two figures to the total. However, the total is the product of two primes, namely 7 and 13; it is not the product of any other two figures. So a rectangle 7 units wide and 13 units tall is involved, or else one 7 units tall and 13 units wide.

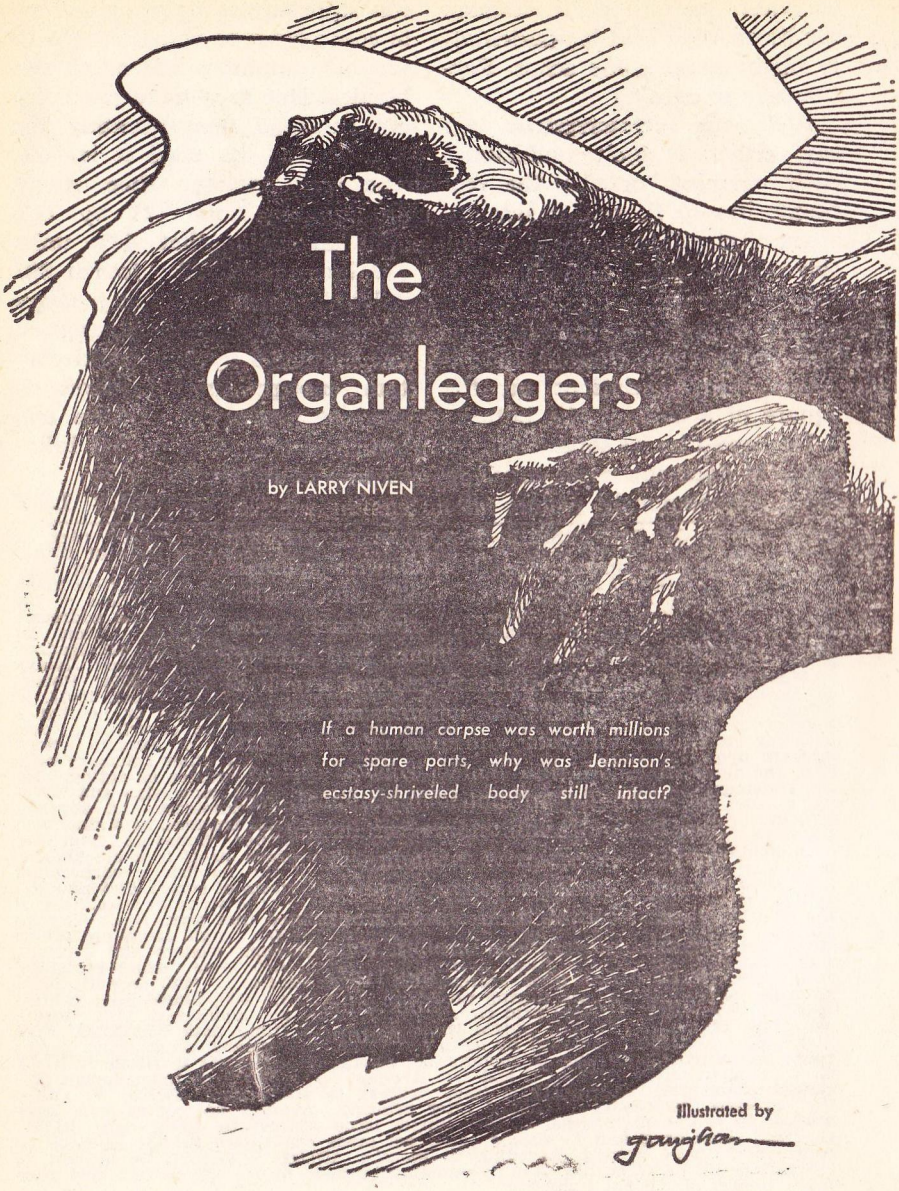
Constructing such a rectangle the addressee decides to blacken each square on which a + sign falls. The message begins with a + sign, meaning that the first corner square must be marked, a logical beginning. But the final result is anything but logical or meaningful — see Fig. 2. (In case anybody wonders: yes, I

was quite worried while drawing the illustration that it accidentally might make some sense. Fortunately it didn't.)

Well, our extraterrestrial will say, either I don't understand their meaning, or else the rectangle has to lie on its side instead of standing upright. Trying this construction he finds the top line empty, except that both its ends are marked, which is logical. And then the pattern becomes clear: three variations on the square of 3 and, at the bottom, a 2 followed by its square and its cube. It does not mean much in itself, for obviously people who can squirt short-wave signals into space must be acquainted with squares and cubes and much else besides. But as a mere preliminary message, demonstrating the principle to be used it is fine. The next message then might contain 187 units (11 by 17), the one after that 247 units (13 by 19) and the fourth 391 units (17 by 23), using larger and larger primes. A message of 551 units (19 by 29) would contain enough small squares to produce reasonable pictures and the transmission of actual information could begin.

—WILLY LEY

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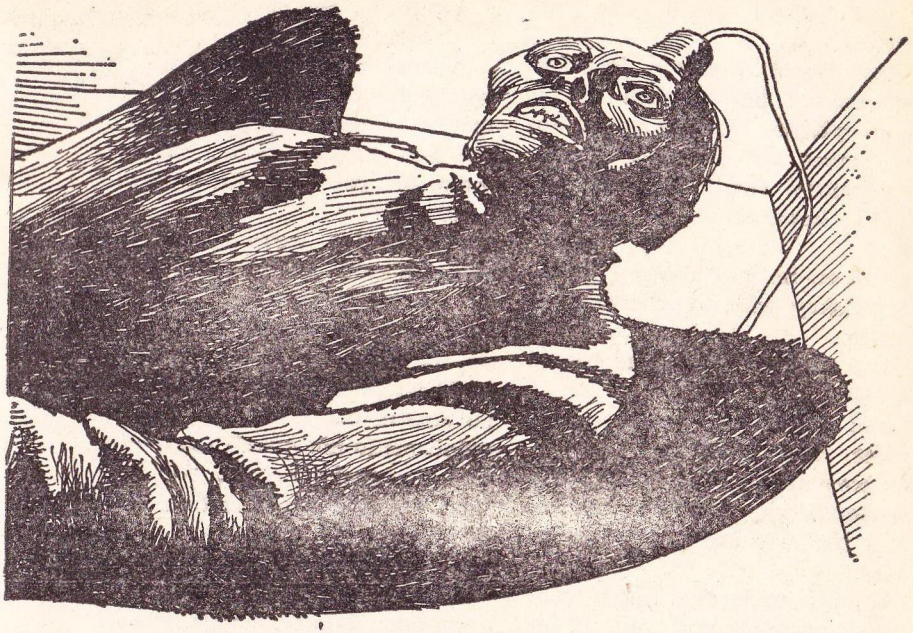


The Organleggers

by LARRY NIVEN

If a human corpse was worth millions for spare parts, why was Jennison's ecstasy-shriveled body still intact?

Illustrated by gaughan



I

First came the routine request for a Breech of Privacy permit. A police officer took down the details and forwarded the request to a clerk, who saw that the tape reached the appropriate civic judge. The judge was reluctant, for privacy is a precious thing in a world of eighteen billion; but in the end he could find no reason to refuse. On November 2nd, 2123, he granted the permit.

The tenant's rent was two

weeks in arrears. If the manager of Monica Apartments had asked for eviction he would have been refused.

But Owen Jennison just did not answer his doorbell or his room phone. Nobody could recall seeing him in many weeks. Apparently the manager wanted to know that he was all right.

And so he was allowed to use his passkey, with an officer standing by.

And so they found the tenant of 1809.

And when they looked in his wallet, they called me.

I was at my desk in ARM's Headquarters, making useless notes and wishing it were lunchtime.

At this stage the Loren case was all correlate-and-wait. It involved an organlegging gang, apparently run by a single man, yet big enough to cover half the North American west coast. We had considerable data on the gang — methods of operation, centers of activity, a few former customers, even a tentative handful of names — but nothing that would give us an excuse to act. So it was a matter of shoving what we had into the computer, watching the few suspected associates of the ganglord Loren, and waiting for a break.

The months of waiting were ruining my sense of involvement.

My phone buzzed.

I put the pen down and said, "Gil Hamilton."

A small dark face regarded me with soft black eyes. "I am Detective-Inspector Julio Ordaz of the Los Angeles Police Department. Are you related to an Owen Jennison?"

"Owen? No, we're not related. Is he in trouble?"

"You do know him, then."

"Sure I know him. Is he here, on Earth?"

"It would seem so." Ordaz had no accent, but the lack of colloquialisms in his speech made him sound vaguely foreign. "We will need positive identification, Mr. Hamilton. Mr. Jennison's ident lists you as next of kin."

"That's funny. I . . . Back in a minute. What's happened? Is Owen dead?"

"Somebody is dead, Mr. Hamilton. He carried Mr. Jennison's ident in his wallet."

"Okay. Now, Owen Jennison was a citizen of the Belt. This may have interworld complications. That makes it ARM's business. Where's the body?"

"We found him in an apartment rented under his own name. Monica Apartments, Lower Los Angeles, room 1809."

"Good. Don't move anything you haven't moved already. I'll be right over."

Monica Apartments was a nearly featureless concrete block, eighty stories tall, a thousand feet across the edges of its square base. Lines of small balconies gave the sides a sculptured look, above a forty-foot inset ledge that would keep tenants from dropping objects on pedestrians. A hundred buildings just like it made Lower Los Angeles look lumpy from the air.

Inside was a lobby done in anonymous modern. Lots of metal and plastic showing; lightweight, comfortable chairs without arms; big ash trays; plenty of indirect lighting; a low ceiling; no wasted space. The whole room might have been stamped out with a die. It wasn't supposed to look small, but it did, and that warned you what the rooms would look like.

I found the manager's office and the manager, a soft-looking man with watery-blue eyes. His conservative paper suit, dark red, seemed chosen to render him invisible, as did the style of his brown hair, worn long and combed straight back without a part. "Nothing like this has ever happened here," he confided as he led me to the elevator banks. "Nothing. It would have been bad enough without his being a Belter, but *now* — " He cringed at the thought. "Newsmen. They'll *smother* us."

The elevator was coffin-sized, but with the handrails on the inside. It went up fast and smooth. I stepped out into a long, narrow hallway.

What would Owen have been doing in a place like this, Machinery lived here, not people.

Maybe it wasn't Owen. Ordaz had been reluctant to commit himself. Besides, there's no law against picking pockets. You couldn't enforce such a law on this crowded planet. Everyone on Earth was a pickpocket.

Sure. Someone had died carrying Owen's wallet.

I walked down the hallway to 1809.

It was Owen who sat grinning in the armchair. I took one good look at him, enough to be sure, and then I looked away and didn't look back. But the rest of it was even more unbelievable.

No Belter could have taken that apartment. I was born in Kansas; but even I felt the awful anonymous chill. It would have driven Owen bats.

"I don't believe it," I said.

"Did you know him well, Mr. Hamilton?"

"About as well as two men can know each other. He and I spent three years mining rocks in the main asteroid belt. You don't keep secrets under those conditions."

"Yet you didn't know he was on Earth."

"That's what I can't understand. Why the blazes didn't he phone me if he was in trouble?"

"You're an ARM," said Ordaz. "An operative in the United Nations Police."

He had a point. Owen was as honorable as any man I knew; but honor isn't the same in the Belt. Belters think flatlanders are all crooks. They don't understand that to a flatlander, picking pockets is a game of skill. Yet a Belter sees smuggling as the same kind of game, with no dishonesty involved. He balances the thirty percent tariff against possible confiscation of his cargo, and if the odds are right he gambles.

Owen could have been doing something sticky," I admitted. "But I can't see him killing himself over it. And... not here. He wouldn't have come here."

1809 was a living room and a bathroom and a closet. I'd glanced into the bathroom, knowing what I would find. It was the size of a comfortable shower stall. An adjustment panel outside the door would cause it to extrude various appurtenances in memory plastic, to become a washroom, a shower stall, a toilet, a dressing room, a steam cabinet. Luxurious in everything but size, if you pushed the right buttons.

The living room was more of the same. A King bed was invisible behind a wall. The kitchen alcove, with basin and oven and grill and toaster, would fold into another wall; the sofa, chairs and tables would vanish into the floor. One tenant and three guests would make a crowded cocktail party, a cosy dinner gathering, a closed poker game. Card table, dinner table, coffee table were all there, surrounded by the appropriate chairs; but only one set at a time would emerge from the floor. There was no refrigerator, no freezer, no bar. If a tenant needed food or drink, he phoned down, and the supermarket on the third floor would send it up.

The tenant of such an apartment had his comfort. But he owned nothing. There was room for him; there was none for his possessions. This was one of the inner apartments. An age ago there would have been an air shaft; but air shafts took up expensive room. The tenant didn't even have a window. He lived in a comfortable box.

Just now the items extruded were the overstuffed reading armchair, two small side tables, a footstool, and the kitchen alcove. Owen Jennison sat grinning in the armchair. Naturally he grinned. Little more than dried skin

covered the natural grin of his skull.

"It's a small room," said Ordaz, "but not too small. Millions of people live this way. In any case, a Belter would hardly be a claustrophobe."

"No. Owen flew a singleship before he joined us. Three months at a stretch, in a cabin so small you couldn't stand up with the airlock closed. Not claustrophobia, but — " I swept my arm about the room. "What do you see that's his?"

Small as it was, the closet was nearly empty. A set of street clothes, a paper shirt, a pair of shoes, a small brown overnight case. All new. The few items in the bathroom medicine chest had been equally new and equally anonymous.

Ordaz said, "Well?"

"Belters are transients. They don't own much, but what they do own, they guard. Small possessions, relics, souvenirs. I can't believe he wouldn't have had *something*."

Ordaz lifted an eyebrow. "His space suit?"

"You think that's unlikely? It's not. The inside of his pressure suit is a Belter's home. Sometimes it's the only home he's got. He spends a fortune decorating it. If he loses his suit, he' not a Belter any more.

"No, I don't insist he'd have brought his suit. But he'd have had *something*. His phial of marsdust. The bit of nickel-iron they took out of his chest. Or, if he left all his souvenirs home, he'd have picked up things on Earth. But in this room — there's *nothing*."

"Perhaps," Ordaz suggested delicately, "he didn't notice his surroundings."

And somehow that brought it all home.

Owen Jennison sat grinning in a water-stained silk dressing gown. His space-darkened face lightened abruptly beneath his chin, giving way to normal suntan. His blond hair, too long, had been cut Earth style; no trace remained of the Belter strip cut he'd worn all his life. A month's growth of untended beard covered half his face. A small black cylinder protruded from the top of his head. An electric cord trailed from the top of the cylinder and ran to a small wall socket.

The cylinder was a droud, a current addict's transformer.

I stepped closer to the corpse and bent to look. The droud was a standard make, but it had been altered. Your standard current addict's droud will pass only a trickle of current into the brain. Owen must have been getting ten times the usual charge, easily

enough to damage his brain in a month's time.

I reached out and touched the droud with my imaginary hand.

Ordaz was standing quietly beside me, letting me make my examination without interruption. Naturally he had no way of knowing about my restricted psi powers.

Restricted was the operative word. I had two psychic powers: telekinesis and esper. With the esper sense I could sense the shapes of objects at a distance; but the distance was the reach of an extra right arm. I could lift small objects, if they were no further away than the fingertips of an imaginary right hand. The restriction was a flaw in my own imagination. Since I could not believe my imaginary hand would reach further than that . . . it wouldn't.

Even so limited a psi power can be useful. With my imaginary fingertips I touched the droud in Owen's head, then ran them down to a tiny hole in his scalp, and further.

It was a standard surgical job. Owen could have had it done anywhere. A hole in his scalp, invisible under the hair, nearly impossible to find even if you knew what you were looking for. Even your best friends wouldn't know, unless they caught you with the droud plugged in. But the tiny hole marked a bigger plug set in the bone of the skull. I touched the ecstasy plug with my imaginary fingertips, then ran them down the hair-fine wire going deep into Owen's brain, down into the pleasure center.

No, the extra current hadn't killed him. What had killed Owen was his lack of will power. He had been unwilling to get up.

He had starved to death sitting in that chair. There were plastic squeezebottles all around his feet and a couple still on the end table. All empty. They must have been full a month ago. Owen hadn't died of thirst. He had died of starvation, and his death had been planned.

Owen my crewmate. Why hadn't he come to me? I'm half a Belter myself. Whatever his trouble, I'd have gotten him out somehow. A little smuggling — what of it? Why had he arranged to tell me only after it was over?

The apartment was so clean; so clean. You had to bend close to smell the death; the air conditioning whisked it all away.

He'd been very methodical. The kitchen was open so that a catheter could lead from Owen to the sink. He'd given himself enough water to last out the month; he'd paid his rent a month in advance. He'd cut the droud cord by hand, and he'd cut it

short, deliberately tethering himself to a wall socket beyond reach of the kitchen.

A complex way to die, but rewarding in its way. A month of ecstasy, a month of the highest physical pleasure man can attain. I could imagine him giggling every time he remembered he was starving to death. With food only a few footsteps away . . . but he'd have to pull out the droud to reach it. Perhaps he postponed the decision, and postponed it again . . .

Owen and I and Homer Chandrasekhar, we had lived for three years in a cramped shell surrounded by vacuum. What was there to know about Owen Jennison that I hadn't known? Where was the weakness we did not share? If Owen had done this, so could I. And I was afraid.

"Very neat," I whispered. "Belter neat."

"Typically Belter, would you say?"

"I would not. Belters don't commit suicide. Certainly not this way. If a Belter had to go, he'd blow his ship's drive and die like a star. The neatness is typical. The result isn't."

"Well," said Ordaz. "Well." He was uncomfortable. The facts spoke for themselves, yet he was reluctant to call me a liar. He fell back on formality.

"Mr. Hamilton, do you identify this man as Owen Jennison?"

"It's him." He'd always been a touch overweight, yet I'd recognized him the moment I saw him. "But let's be sure." I pulled the dirty dressing gown back from Owen's shoulder. A near-perfect circle of scar tissue, eight inches across, spread over the left side of his chest. "See that?"

"We noticed it, yes. An old burn?"

"Owen's the only man I know who could show you a meteor scar on his skin. It blasted him in the shoulder one day while he was outside the ship. Sprayed vaporized pressure-suit steel all over his skin. The doc pulled a tiny grain of nickle-iron from the center of the scar, just below the skin. Owen always carried that grain of nickel-iron. Always," I said, looking at Ordaz.

"We didn't find it."

"Okay."

"I'm sorry to put you through this, Mr. Hamilton. It was you who insisted we leave the body *in situ*."

"Yes. Thank you."

Owen grinned at me from the reading chair. I felt the pain, in my throat and in the pit of my stomach. Once I had lost my right arm. Losing Owen felt the same way.

"I'd like to know more about this," I said. "Will you let me

know the details as soon as you get them?"

"Of course. Through the ARM's office?"

"Yes." This wasn't ARM's business, despite what I'd told Ordaz, but ARM's prestige would help. "I want to know why Owen died. Maybe he just cracked up . . . culture shock or something. But if someone hounded him to death, I'll have his blood."

"Surely the administration of justice is better left to — " Ordaz stopped, confused. Did I speak as an ARM or as a citizen?

I left him wondering.

The lobby held a scattering of tenants entering and leaving elevators or just sitting around. I stood outside the elevator for a moment, searching passing faces for the erosion of personality that must be there.

Mass-produced comfort. Room to sleep and eat and watch tridee, but no room to *be* anyone. Living here, one would own nothing. What kind of people would live like that? They should have looked all alike, moved in unison, like the string of images in a barber's mirrors.

Then I spotted wavy brown hair and a dark red paper suit. The manager? I had to get close before I was sure. His face was the face of a permanent stranger.

He saw me coming and smiled without enthusiasm. "Oh, hello, Mr. . . . uh . . . Did you find . . . " He couldn't think of the right question.

"Yes," I said, answering it anyway. "But I'd like to know some things. Owen Jennison lived here for six weeks, right?"

"Six weeks and two days, before we opened his room."

"Did he ever have visitors?"

The man's eyebrows went up. We'd drifted in the direction of his office, and I was close enough to read the name on the door: JASPER MILLER, *Manager.* "Of course not," he said. "Anyone would have noticed that something was wrong."

"You mean he took the room for the express purpose of dying? You saw him once, and never again?"

"I suppose he might . . . no, wait." The manager thought deeply.

"No. He registered on a Thursday. I noticed the Belter tan, of course. Then on Friday he went out. I happened to see him pass."

"Was that the day he got the droud? No, skip it, you wouldn't know that. Was it the last time you saw him go out?"

"Yes, it was."

"Then he could have had visitors late Thursday or early Friday."

The manager shook his head, very positively.

"Why not?"

"You see, Mr. . . . uh . . . "

"Hamilton."

"We have a holo camera on every floor, Mr. Hamilton. It takes a picture of each tenant the first time he goes to his room, and then never again. Privacy is one of the services a tenant buys with his room." The manager drew himself up a little as he said this. "For the same reason, the holocamera takes a picture of anyone who is *not* a tenant. The tenants are thus protected from unwarranted intrusions."

"And there were no visitors to any of the rooms on Owen's floor?"

"No, sir, there were not."

"Your tenants are a solitary bunch."

"Perhaps they are."

"I suppose a computer in the basement decides who is and is not a tenant."

"Of course."

"So for six weeks Owen Jennison sat alone in his room. In all that time he was totally ignored."

Miller tried to turn his voice cold, but he was too nervous. "We try to give our guests privacy. If Mr. Jennison had wanted help of any kind he had only to pick up the house phone. He could have called me, or the pharmacy, or the supermarket downstairs."

"Well, thank you, Mr. Miller. That's all I wanted to know. I wanted to know how Owen Jennison could wait six weeks to die while nobody noticed."

Miller swallowed. "He was dying all that time?"

"Yah."

"We had no way of knowing. How could we? I don't see how you can blame us."

"I don't either," I said, and brushed by. Miller had been close enough, so I had lashed out at him. Now I was ashamed. The man was perfectly right. Owen could have had help if he'd wanted it.

I stood outside, looking up at the jagged blue line of sky that showed between the tops of the buildings. A taxi floated into view, and I beeped my clicker at it, and it dropped.

I went back to ARM headquarters. Not to work — I could not have done any work, not under the circumstances — but to talk to Julie.

Julie. A tall girl, pushing thirty, with green eyes and long hair streaked red and gold. And two wide brown forceps marks above her right knee; but they weren't showing now. I looked into her office, through the one-way glass, and watched her at work.

She sat in a contour couch, smoking. Her eyes were closed.

Sometimes her brow would furrow as she concentrated. Sometimes she would snatch a glance at the clock, then close her eyes again.

I didn't interrupt her. I knew the importance of what she was doing.

Julie. She wasn't beautiful. Her eyes were a little too far apart, her chin too square, her mouth too wide. It didn't matter. Because Julie could read minds.

She was the ideal date. She was everything a man needed. A year ago, the day after the night I killed my first man, I had been in a terribly destructive mood. Somehow Julie had turned it into a mood of manic exhileration. We'd run wild through a supervised anarchy park, running up an enormous bill. We'd hiked five miles without going anywhere, facing backward on a downtown slidewalk. At the end we'd been utterly fatigued, too tired to think . . . But two weeks ago it had been a warm, cuddly, comfortable night. Two people happy with each other; no more than that. Julie was what you needed, anytime, anywhere.

Her male harem must have been the largest in history. To pick up on the thoughts of a male ARM, Julie had to be in love with him. Luckily there was room in her for a lot of love. She didn't demand that we be faithful. A good half of us were married. But there had to be love for each of Julie's men, or Julie couldn't protect him.

She was protecting us now. Each fifteen minutes, Julie was making contact with a specific ARM agent. Psi powers are notoriously undependable, but Julie was an exception. If we got in a hole, Julie was always there to get us out . . . provided some idiot didn't interrupt her at work.

So I stood outside, waiting, with a cigarette in my imaginary hand.

The cigarette was for practice, to stretch the mental muscles. In its way my "hand" was as dependable as Julie's mind-touch, possibly because of its very limitations. Doubt your psi powers and they're gone. A rigidly defined third arm was more reasonable than some warlock ability to make objects move by wishing at them. I knew how an arm felt, and what it would do.

Why do I spend so much time lifting cogarettes? Well, it's the biggest weight I can lift without strain. And there's another reason . . . something taught me by Owen.

At ten minutes to fifteen, Julie opened her eyes, rolled out of the contour couch and came to the door. "Hi, Gil," she said sleepily. "Trouble?"

"Yah. A friend of mine just died. I thought you'd better know." I handed her a cup of coffee.

She nodded. We had a date tonight, and this would change its character. Knowing that, she probed lightly.

"My God!" she said, recoiling. "How . . . how horrible. I'm terribly sorry, Gil. Date's off, right?"

"Unless you want to join the ceremonial drunk."

She shook her head vigorously. "I didn't know him. It wouldn't be proper. Besides, you'll be wallowing in your own memories, Gil. A lot of them will be private. I'd cramp your style if you knew I was there to probe. Now if Phil Chandrasekhar were here, it'd be different."

"I wish he were. He'll have to throw his own drunk. Maybe with some of Owen's girls, if they're around."

"You know what I feel," she said.

"Just what I do."

"I wish I could help."

"You always help." I glanced at the clock. "Your coffee break's about over."

"Slave driver." Julie took my earlobe between thumb and forefinger. "Do him proud," she said, and went back to her soundproof room.

She always helps. She doesn't even have to speak. Just knowing that Julie has read my thoughts, that someone understands . . . that's enough.

All alone at three in the afternoon, I started my ceremonial drunk.

The ceremonial drunk is a young custom, not yet tied down by formality. There is no set duration. No specific toasts must be given. Those who participate must be close friends of the deceased, but there is no set number of participants.

I started at the Luau, a place of cool blue light and running water. Outside it was fifteen-thirty in the afternoon, but inside it was evening in the Hawaiian Islands of centuries ago. Already the place was half full. I picked a corner table with considerable elbow room and dialed for a Luau Grog. It came, cold, brown and alcoholic, its straw tucked into a cone of ice.

There had been three of us at Cubes Forsythe's ceremonial drunk, one black Ceres night four years ago. A sorry group we were, too; Owen and me and the widow of our third crewman. Gwen Forsythe blamed us for her husband's death. I was just out of the hospital with a right arm that ended at the shoulder, and I blamed Cubes and Owen and myself, all at once. Even Owen had turned dour and introspective. We couldn't have picked a worse

trio, or a worse night for it if we'd tried.

But custom called, and we were there. Then as now, I found myself probing my own personality for the wound that was missing crewman, a missing friend. Introspecting.

Gilbert Hamilton. Born of flatlander parents, in April, 2093, in Topeka, Kansas. Born with two arms and no sign of wild talents.

Flatlander: a Belter term referring to Earthmen, and particularly to Earthmen who had never seen space. I'm not sure my parents ever looked at the stars. They managed the third largest farm in Kansas, ten square miles of arable land between two wide strips of city paralleling two strips of turnpike. We were city people, like all flatlanders, but when the crowds got to be too much for my brothers and me, we had vast stretches of land to be alone in. Ten square miles of playground, with nothing to hamper us but the crops and automachinery.

We looked at the stars, my brothers and I. You couldn't see stars from the city; the lights hide them. Even in the fields you couldn't see them around the lighted horizon. But straight overhead, they were there: black sky scattered with bright dots, and sometimes a flat white moon.

At twenty I gave up my UN citizenship to become a Belter. I wanted stars, and the Belt government holds title to most of the solar system. There are fabulous riches in the rocks, riches belonging to a scattered civilization of a few hundred thousand Belters; and I wanted my share of that, too.

It wasn't easy. I wouldn't be eligible for a singleship license for ten years. Meanwhile I would be working for others and learning to avoid mistakes before they killed me. Half the flatlanders who join the Belt die in space bebore they can earn their licenses.

I mined tin on Mercury and exotic chemicals from Jupiter's atmosphere. I hauled ice from Saturn's rings and quicksilver from Europa. One year our pilot made a mistake pulling up to a new rock, and we damn near had to walk home. Cubes Forsythe was with us then. He managed to fix the com laser and aim it at Icarus to bring us help. Another time the mechanic who did the maintenance job on our ship forgot to replace an absorber, and we all got roaring drunk on the alcohol that built up in our breathing-air. The three of us caught the mechanic six months later. I hear he lived.

Most of the time I was part of a three-man crew. The members changed constantly. When

Owen Jennison joined us he replaced a man who had finally earned his singleship license and couldn't wait to start hunting rocks on his own. He was too eager. I learned later that he'd made one round trip and half of another.

Owen was my age, but more experienced, a Belter born and bred. His blue eyes and blond cockatoo's crest were startling against the dark of his Belter tan, the tan that ended so abruptly where his neck ring cut off the space-intense sunlight his helmet let through. He was permanently chubby, but in free fall it was as if he'd been born with wings. I took to copying his way of moving, much to Cubes' amusement.

I didn't make my own mistake until I was twenty-six.

We were using bombs to put a rock in a new orbit. A contract job. The technique is older than fusion drives, as old as early Belt colonization, and it's still cheaper and faster than using a ship's drive to tow the rock. You use industrial fusion bombs small and clean, and you get them so that each explosion deepens the crater to channel the force of later blasts.

We'd set four blasts already, four white fireballs that swelled and faded as they rose. When the fifth blast went off we were hovering nearby on the other side of the rock.

The fifth blast shattered the rock.

Cubes had set the bomb. My own mistake was a shared one, because any of the three of us should have had the sense to take off right then. Instead, we watched, cursing, as valuable oxygen-bearing rock became near-valueless shards. We watched the shards spread slowly into a cloud . . . and while we watched, one fast-moving shard reached us. Moving too slowly to vaporize when it hit, it nonetheless sheered through a triple crystal-iron hull, slashed through my upper arm, and pinned Cubes Forsythe to a wall by his own heart.

IV

A couple of nudists came in. They stood blinking among the booths while their eyes adjusted to the blue twilight, then converged with glad cries on the group two tables over. I watched and listened with an eye and an ear, thinking how different flatlander nudists were from Belter nudists. These all looked alike. They all had muscles, they had no interesting scars, they carried their credit cards in identical shoulder pouches, and they all shaved the same areas.

. . . We always went nudist in

the big bases. Most people did. It was a natural reaction to the pressure suits we wore day and night while out in the rocks. Get him into a shortsleeve environment, and your normal Belter sneers at a shirt. But it's only for comfort. Give him a good reason, and your Belter will don shirt and pants as quickly as the next guy.

But not Owen. After he got that meteor scar, I never saw him wear a shirt. Not just in the Ceres domes, but anywhere there was air to breath. He just had to show that scar.

A cool blue mood settled on me, and I remembered . . .

. . . Owen Jennison lounging on a corner of my hospital bed, telling me of the trip back. I could not remember anything after that rock sheered through my arm.

I should have bled to death in seconds. Owen hadn't given me the chance. The wound was ragged; Owen had sliced it clean to the shoulder with one swipe of a com laser. Then he'd tied a length of fiberglass curtain over the flat surface and knotted it tight under my remaining armpit. He told me about putting me under two atmospheres of pure oxygen as a substitute for replacing the blood I'd lost. He told me how he'd reset the fusion drive for four gees to get me back in time. By rights we should have gone up in a cloud of starfire and glory.

"So there goes my reputation. The whole Belt knows how I rewired our drive. A lot of 'em figure if I'm stupid enough to risk my own life like that, I'd risk theirs too."

"So you're not safe to travel with."

"Just so. They're starting to call me Four Gee Jennison."

"You think you've got problems? I can just see how it'll be when I get back to this bed. 'You do something stupid, Gil?' The hell of it is, it *was* stupid."

"So lie a little."

"Uh huh. Can we sell the ship?"

"Nope. Gwen inherited a third interest in it from Cubes. She won't sell."

"Then we're effectively broke."

"Except for the ship. We need another crewman."

"Correction. *You* need *two* crewmen. Unless you want to fly with a one-armed man. I can't afford a transplant."

Owen hadn't tried to offer me a loan. That would have been insulting, even if he'd had the money. "What's wrong with a prosthetic?"

"An iron arm? Sorry, no."

Owen had looked at me strangely, but all he'd said was, "Well, we'll wait a bit. Maybe you'll change your mind."

He hadn't pressured me. Not then, and not later, after I'd left the hospital and taken an apartment while I waited to get used to a missing arm. If he thought I would eventually settle for a prosthetic, he was mistaken.

Why? It's not a question I can answer. Others obviously feel differently; there are millions of people walking around with metal and plastic and silicone parts. Part man, part machine, and how do they themselves know which is the real person?

I'd rather be dead than part metal. Call it a quirk. Call it, even, the same quirk that makes my skin crawl when I find a place like Monica Apartments. A human being should be all human. He should have habits and possessions peculiarly his own, he should not try to look like or to behave like anyone but himself.

So there I was, Gil the Arm, learning to eat with my left hand.

An amputee never entirely loses what he's lost. My missing fingers itched. I moved to keep from barking my missing elbow on sharp corners. I reached for things, then swore when they did not come.

Owen had hung around, though his own emergency funds must have been running low. I hadn't offered to sell my third of the ship, and he hadn't asked.

There had been a girl. Now I'd forgotten her name. One night I was at her place waiting for her to get dressed — a dinner date — and I'd happened to see a nail file she'd left on a table. I'd picked it up. I'd almost tried to file my nails, but remembered in time. Irritated, I had tossed the file back on the table — and missed.

Like an idiot I'd tried to catch it with my right hand.

And I'd caught it.

I'd never suspected myself of having psychic powers. You have to be in the right frame of mind to use a psi power. But who had ever had a better opportunity than I did that night, with a whole section of brain tuned to the nerves and muscles of my right arm, and no right arm?

I'd held the nail file in my imaginary hand. I'd felt it, just as I'd felt my missing fingernails getting too long. I had run my thumb along the rough steel surface; I had turned the file in my fingers. Telekinesis for lift, esper for touch.

"That's it," Owen had said the next day. "That's all we need. One crewman, and you with your eldrich powers. You practice, see how strong you can get that lift. I'll go find a sucker."

"He'll have to settle for a sixth of net. Cubes' widow will want her share."

"Don't worry. I'll swing it."

"Don't worry!" I'd waved a pencil stub at him. Even in Ceres' gentle gravity, it was as much as I could lift — then. "You don't think TK and esper can make do for a real arm, do you?"

"It's better than a real arm. You'll see. You'll be able to reach through your suit with it without losing pressure. What Belter can do that?"

"Sure."

"What the hell do you want, Gil? Someone should give you your arm back? You can't have that. You lost it fair and square, through stupidity. Now it's your choice. Do you fly with an imaginary arm, or do you go back to Earth?"

"I can't go back. I don't have the fare."

"Well?"

"Okay, okay. Go find us a crewman. Someone I can impress with my imaginary arm."

I sucked meditatively on a second Luau grog. By now all the booths were full, and a second layer was forming around the bar. The voices made a continuous hypnotic uproar. Cocktail hour had arrived.

. . . He'd swung it, all right. On the strength of my imaginary arm, Owen had talked a kid named Homer Crandrasekhar into joining our crew.

He'd been right about my arm, too.

Others with similar senses can reach further, up to halfway around the world. My unfortunately literal imagination had restricted me to a physic hand. But my esper fingertips were more sensitive, more dependable. I could lift more weight. Today, in Earth's gravity, I can lift a full shot glass.

I found I could reach through a cabin wall to feel for breaks in the circuits behind it. In vacuum I could brush dust from the outside of my faceplate. In port I did magic tricks.

I'd almost ceased to feel like a cripple. It was all due to Owen. In six months of mining I had paid off my hospital bills and earned my fare back to Earth, with a comfortable stake left over.

"Finagle's Black Humor!" Owen had exploded when I told him. "Of all places, why Earth?"

"Because if I can get my UN citizenship back, Earth will replace my arm. Free."

"Oh. That's true," he'd said dubiously.

The belt had organ banks too, but they were always undersupplied. Belters didn't give things away. Neither did the Belt government. They kept the prices on transplants as high as they would go. Thus they dropped the demand to meet the supply, and

that kept taxes down, to boot.

In the Belt I'd have had to buy my own arm. And I didn't have the money. On Earth there was social security and a vast supply of transplant material.

What Owen had said couldn't be done, I'd done. I'd found someone to hand me my arm back.

Sometimes I'd wondered if Owen held the choice against me. He'd never said anything, but Homer Chandrasekhar had spoken at length. A Belter would have earned his arm or done without. Never would he have accepted charity.

Was that why Owen hadn't tried to call me?

I shook my head. I didn't believe it.

The room continued to lurch after my head stopped shaking. I'd had enough for the moment. I finished my third grog and ordered dinner.

Dinner sobered me for the next lap. It was something of a shock to realize that I'd run through the entire lifespan of my friendship with Owen Jennison. I'd known him for three years, though it had seemed like half a lifetime. And it was. Half my six-year lifespan as a Belter.

I ordered coffee grog and watched the man pour it: hot, milky coffee laced with cinnamon and other spices, and high-proof rum poured in a stream of blue fire. This was one of the special drinks served by a human headwaiter, and it was the reason they kept him around. Phase two of the ceremonial drunk: blow half your fortune, in the grand manner.

But I called Ordaz before I touched the drink.

"I won't keep you long. Have you found out anything new?"

Ordaz took a closer look at my phone image. His disapproval was plain. "I see that you have been drinking. Perhaps you should go home now, and call me tomorrow."

I was shocked. "Don't you know *anything* about Belt customs?"

"I do not understand."

I explained the ceremonial drunk. "Look, Ordaz, if you know that little about the way a Belter thinks, then we'd better have a talk. Soon. Otherwise you're likely to miss something."

"You may be right. I can see you at noon, over lunch."

"Good. What have you got?"

"Considerable, but none of it is very helpful. Your friend landed on Earth two months ago, arriving on the *Pillar of Fire*, operating out of Outback Field, Australia. He was wearing a haircut in the style of Earth. From there — "

"That's funny. He'd have had to wait two months for his hair to grow out."

"That occurred even to me. I understand that a Belter commonly shaves his entire scalp, except for a strip two inches wide running from the nape of his neck forward."

"The strip cut, yah. It probably started when someone decided he's live longer if his hair couldn't fall in his eyes during a tricky landing. But Owen could have let his hair grow out during a singleship mining trip. There'd be nobody to see."

Still, it seems odd. Did you know that Mr. Jennison had a cousin on Earth? One Harvey Peele, who manages a chain of supermarkets."

"So I wasn't his next of kin, even on Earth."

"Mr. Jennison made no attempt to contact him."

"Anything else?

"I've spoken to the man who sold Mr. Jennison his droud and plug. Kenneth Graham owns an office and operating room on Gayley in Near West Los Angeles. Graham claims that the droud was a standard type, that your friend must have altered it himself."

"Do you believe him?"

"For the present. His permits and his records are all in order. The droud was altered with a soldering iron, just an amateur's tool."

"Uh huh."

"As far as the police are concerned, the case will probably be closed when we locate the tools Mr. Jennison used."

"Tell you what. I'll wire Homer Chandrasekhar tomorrow. Maybe he can find out things — why Owen landed without a strip haircut, why he came to Earth at all."

Ordaz shrugged with his eyebrows. He thanked me for my trouble and hung up.

The coffee grog was still hot. I gulped at it, savoring the sugary, bittery sting of it, trying to forget Owen dead and remember him in life. He was always slightly chubby, I remembered, but he never gained a pound and he never lost a pound. He could move like a whippet when he had to.

And now he was terribly thin, and his death-grin was ripe with obscene joy.

I ordered another coffee grog. The waiter, a showman, made sure he had my attention before he lit the heated rum, then poured from a foot above the glass. You can't drink that drink slowly. It slides down too easily, and there's the added spur that if you wait too long it might get cold. Rum and strong coffee. Two of these and I'd be drunkenly alert for hours.



V

Midnight found me in the Mars bar, running on Scotch and soda. In between I'd been bar-hopping Irish coffee at Bergin's, cold and smoking concoctions at the Moon Pool, Scotch and wild music at Beyond. I couldn't get drunk, and I couldn't find the right mood. There was a barrier to the picture I was trying to rebuild.

It was the memory of the last Owen, grinning in an armchair with a wire leading down into his brain.

I didn't know that Owen. I had never met the man, and never would have wanted to. From bar to night club to restaurant I had run from the image, waiting for the alcohol to break the barrier between present and past.

So I sat at a corner table, surrounded by 3D panoramic views of an impossible Mars. Crystal towers and long, straight blue canals, six-legged beasts and beautiful, impossibly slender men and women, looked out at me across never-never land. Would Owen have found it sad or funny? He'd seen the real Mars, and had not been impressed.

I had reached that stage where time becomes discontinuous, where gaps of seconds or minutes appear between the events you can remember. Somewhere in that period I found myself staring at a cigarette. I must have just lighted it, because it was near its original two - hundred - millimeter length. Maybe a waiter had snuck up behind me. There it was, at, any rate, burning between my middle and index fingers.

I stared at the coal as the mood settled on me. I was calm, I was drifting, I was lost in time . . .

We'd been two months in the rocks, our first trip out since the accident. Back we came to Ceres with a holdful of gold, fifty percent pure, guaranteed suitable for rustproof wiring and conductor plates. At nightfall we were ready to celebrate.

We walked along the city limits, with neon blinking and beckoning on the right, a melted rock cliff to the left, and stars blazing through the dome overhead. Homer Chandrasekhar was practically snorting. On this night his first trip out culminated in his first homecoming; and homecoming is the best part.

"We'll want to split up about midnight," he said. He didn't need to enlarge on that. Three men in company might conceivably be three singleship pilots, but chances are they're a ship's crew. They don't have their singleship licenses yet; they're too stupid or too inexperienced. If we wanted companions —

"You haven't thought this through," Owen answered. I saw Homer's double-take, then his quick look at where my shoulder ended, and I was ashamed. I did not need my crewmates to hold my hand, and in this state I'd only slow them down.

Before I could open my mouth to protest, Owen went on. "Think it through. We've got a draw here that we'd be idiots to throw away. Gil, pick up a cigarette. No, not with your left hand.

I was drunk gloriously drunk and feeling immortal. The attenuated Martians seemed to move in the walls, the walls that seemed to be picture windows on a Mars that never was. For the first time that night, I raised my glass in toast.

"To Owen, from Gil the Arm. Thanks."

I transferred the cigarette to my imaginary hand.

By now you've got the idea I was holding it in my imaginary fingers. Most people have the same impression, but it isn't so. I held it clutched ignominiously in my fist. The coal couldn't burn me, of course, but it still felt like a lead ingot.

I rested my imaginary elbow on the table, and that seemed to make it easier — which is ridiculous, but it works. Truly, I'd expected my imaginary arm to disappear after I got the transplant. But I'd found I could dissociate from the new arm, to hold small objects in my invisible hand, to feel tactile sensations in my invisible fingertips.

I'd earned the title Gil the Arm that night in Ceres. It had started with a floating cigarette. Owen had been right. Everyone in the place eventually wound up staring at the floating cigarette smoked by the one-armed man. All I had to do was find the prettiest girl in the room with my peripheral vision, then catch her eye.

That night we had been the center of the biggest impromptu party ever thrown in Ceres Base. It wasn't planned that way at all. I'd used the cigarette trick three times, so that each of us would have a date. But the third girl already had an escort, and he was celebrating something; he'd sold some kind of patent to an Earth-based industrial firm. He was throwing money around like confetti. So we let him stay. I did tricks, reaching esper fingers into a closed box to tell what was inside; and by the time I finished, all the tables had been pushed together and I was in the center, with Homer and Owen and three girls. Then we got to singing old songs, and the bartenders joined us, and suddenly everything was on the house.

Eventually about twenty of us wound up in the orbiting mansion of the First Speaker for the Belt Government. The goldskin cops had tried to bust us up earlier, and the First Speaker had behaved very rudely indeed, then compensated by inviting them to join us . . .

And that was why I used TK on so many cigarettes.

Across the width of the Mars Bar, a girl in a peach colored dress sat studying me with her chin on her fist. I got up and went over.

My head felt fine. It was the first thing I checked when I woke up. Apparently I'd remembered to take a hangover pill.

A leg was hooked over my knee. It felt good, though the pressure had put my foot to sleep. Fragrant dark hair spilled beneath my nose. I didn't move. I didn't want her to know I was awake.

It's damned embarrassing when you wake up with a girl and can't remember her name.

Well, let's see. A peach dress neatly hung from a doorknob . . . I remembered a whole lot of traveling last night. The girl at the Mars Bar. A puppet show. Music of all kinds. I'd talked about Owen, and she'd steered me away from that because it depressed her. Then —

Hah! Taffy. Last name forgotten.

"Morning," I said.

"Morning," she said. "Don't try to move, we're hooked together . . . " In the sober morning light she was lovely. Long black hair, brown eyes, creamy untanned skin. To be lovely this early was a neat trick, and I told her so,, and she smiled.

My lower leg was dead meat until it started to buzz with renewed circulation, and then I made faces until it calmed down. Taffy kept up a running chatter as we dressed. "That third hand is strange. I remember you holding me with two strong arms and stroking the back of my neck with the third. *Very* nice. It reminded me of a Fritz Leiber story."

"*The Wanderer.* The panther girl."

"Mm hmm. How many girls have you caught with that cigarette trick?"

"None as pretty as you."

"And how many girls have you told that to?"

"Can't remember. It always worked before. Maybe this time it's for real."

We exchanged grins. A minute later I caught her frowning thoughtfully at the back of my neck. "Something wrong?"

"I was just thinking. You really crashed and burned last night.

I hope you don't drink that much all the time."

"Why? You worried about me?"

She blushed, then nodded.

"I should have told you. In fact, I think I did, last night. I was on a ceremonial drunk. When a good friend dies it's obligatory to get smashed."

Taffy looked relieved. "I didn't mean to get — "

"Personal? Why not. You've the right. Anyway, I like — " I meant *maternal types* but *I* couldn't say that. "People who worry about me."

Taffy touched her hair with some kind of complex comb. A few strokes snapped her hair instantly into place. Static electricity?

"It was a good drunk," I said. "Owen would have been proud. And that's all the mourning I'll do. One drunk and — " I spread my hands. "Out."

"It's not a bad way to go," Taffy mused reflectively. "Current stimulus, I mean. I mean, if you've got to bow out — "

"Now drop that!" I don't know how I got so angry so fast. Ghoulthin and grinning in a reading chair, Owen's corpse was suddenly vivid before me. I'd fought that image for too many hours. "Walking off a bridge is enough of a cop-out," I snarled. "Dying for a month while current burns out your brain is nothing less than sickening."

Taffy was hurt and bewildered. "But your friend did it, didn't he? You didn't make him sound like a weakling."

"Nuts," I heard myself say. "He didn't do it. He was — "

Just like that, I was sure. I I must have realized it while I was drunk or sleeping. Of *course* he hadn't killed himself. *That* wasn't Owen. And current addiction wasn't Owen either. I made a dive for the phone.

"Good morning, Mr. Hamilton." Detective-Inspector Ordaz looked very fresh and neat this morning. I was suddenly aware that I hadn't shaved. "I see you remembered to take your hangover pills."

"Right. Ordaz, has it occurred to you that Owen might have been murdered?"

"Naturally. But it isn't possible."

"I think it might be. Suppose he — "

"Mr. Hamilton."

"Yah?"

"We have an appointment for lunch. Shall we discuss it then? Meet me at Headquarters at twelve hundred."

"Okay. One thing you might take care of this morning. See if Owen registered for a nudist's license."

"Do you think he might have?"

"Yah. I'll tell you why at lunch."

"Very well."

"Don't hang up. You said you had found the man who sold Owen his droud-and-plug. What was his name again?"

"Kenneth Graham."

"That's what I thought." I hung up. "Sure," I said to myself. "Somebody killed him. And that means — yah. Yah." I turned around to get my shirt and found myself face to face with Taffy. I'd forgotten about her completely.

She said, "Killed?" as if she'd never heard the word.

"Yah. See, the whole setup depended on his not being able to — "

"No. Wait. I don't really want to know about it."

She really didn't. The very subject of a stranger's death was making her sick to her stomach.

"Okay. Look, I'm a ratfink not to at least offer you breakfast, but I've got to get on this right away. Can I call you a cab?"

When the cab came I dropped a ten-mark coin in the slot and helped her in. I got her address before it took off.

VI

ARM Headquarters hummed with early morning activity. Hellos came my way, and I answered them without stopping to talk. Anything important would filter down to me eventually.

As I passed Julie's cubical I glanced in. She was hard at work, limply settled in her contour couch, jotting notes with her eyes closed.

Kenneth Graham.

A hookup to the basement computer formed the greater part of my desk. Learning how to use it had taken me several months. I typed an order for coffee and doughnuts then: INFORMATION RETRIEVAL. KENNETH GRAHAM. LIMITED LICENSE SURGERY. GENERAL LICENSE: DIRECT CURRENT STIMULUS EQUIPMENT SALES. ADDRESS NEAR WEST LOS ANGELES.

Tape chattered out of the slot an instant response, loop after loop of it curling on my desk. I didn't need to read it to know I was right.

New technologies create new customs, new laws, new ethics, new crimes. About half the activity of the United Nations Police, the ARM's dealt with control of a crime that hadn't existed a century ago. The crime of organlegging was the result of thousands of years of medical progress, of millions of lives selflessly dedicated to the ideals of healing the sick. Progress had

brought these ideals to reality, and, as usual, had created new problems.

1900 A.D. was the year Carl Landsteiner classified human blood into four types, giving patients their first real chance to survive a transfusion. The technology of transplants had grown with the growing of the twentieth century. Whole blood, dry bone, skin, live kidneys, live hearts could all be transferred from one body to another. Donors had saved tens of thousands of lives in that hundred years, by willing their bodies to medicine.

But the number of donors was limited, and not many died in such a way that anything of value could be saved.

The deluge had come something less than a hundred years ago. One healthy donor (but of course there was no such animal) could save a dozen lives. Why, then, should a condemned ax murderer die to no purpose? First a few states, then most of the nations of the world had passed new laws. Criminals condemned to death must be executed in a hospital, with surgeons to save as much as could be saved for the organ banks.

The world's billions wanted to live, and the organ banks were life itself. A man could live forever as long as the doctors could shove spare parts into him faster than his own parts wore out. But they could do that only as long as the world's organ banks were stocked.

A hundred scattered movements to abolish the death penalty died silent, unpublicized deaths. Everybody gets sick sometime.

And still there were shortages in the organ banks. Still patients died for the lack of parts to save them. The world's legislators had responded to steady pressure from the world's people. Death penalties were established for first, second and third degree murder. For assault with a deadly weapon. Then for a multitude of crimes: rape, fraud, embezzlement, having children without a license, four or more counts of false advertising. For nearly a century the trend had been growing, as the world's voting citizens acted to protect their right to live forever.

Even now there weren't enough transplants. A woman with kidney trouble might wait a year for a transplant: one healthy kidney to last the rest of her life. A thirty-five-year-old heart patient must live with a sound but forty-year-old heart. One lung, part of a liver, prosthetics that wore out too fast or weighed too much or did too little . . . there weren't enough criminals. Not surprising-

ly, the death penalty *was* a deterrent. People stopped committing crimes rather than face the donor room of a hospital.

For instant replacement of your ruined digestive system, for a *young* healthy heart, for a whole liver when you'd ruined yours with alcohol . . . you had to go to an organlegger.

There are three aspects to the business of organlegging.

One is the business of kidnap-murder. It's risky. You can't fill an organ bank by waiting for volunteers. Executing condemned criminals is a government monopoly. So you go out and *get* your donors: on a crowded city slidewalk, in an air terminal, stranded on a freeway by a car with a busted capacitor . . . anywhere.

The selling end of the business is just as dangerous, because even a deperately sick man sometimes has a conscience. He'll buy his transplant, then go straight to the ARM's, curing his sickness and his conscience by turning in the whole gang. Thus the sales end is somewhat anonymous; but as there are few repeat sales, that hardly matters.

Third is the technical, medical aspect. Probably this is the safest part of the business. Your hospital is big, but you can put it anywhere. You wait for the donors, who arrive still alive; you ship out livers and glands and square feet of live skin, correctly labeled for rejection reactions.

It's not as easy as it sounds. You need doctors. Good ones.

That was where Loren came in. He had a monopoly.

Where did he get them? We were still trying to find out. Somehow, one man had discovered a foolproof way to recruit talented but dishonest doctors practically en masse. Was it really one man? All our sources said it was. And he had half the North American west coast in the palm of his hand.

Loren. No holographs, no fingerprints or retina prints, not even a description. All we had was that one name, and a few possible contacts.

One of these was Kenneth Graham.

The holograph was a good one. Probably it had been posed in a portrait shop. Kenneth Graham had a long Scottish face with a lantern jaw and a small, dour mouth. In the holo he was trying to smile and look dignified simultaneously. He only looked uncomfortable. His hair was sandy and close cut. Above his light gray eyes his eyebrows were so light as to be nearly invisible.

My breakfast arrived. I dunked a doughnut and bit it, and

found out I was hungrier than I'd thought.

A string of holos had been reproduced on the computer tape. I ran through the others fairly quickly, eating with one hand and flipping the key with the other. Some were fuzzy, they had been taken by spy beams through the windows of Graham's shop. None of the prints were in any way incriminating. Not one showed Graham smiling.

He had been selling electrical joy for twelve years now.

A current addict has an advantage over his supplier. Electricity is cheap. With a drug, your supplier can always raise the price on you; but not with electricity. You see the ecstasy merchant once, when he sells you your operation and your droud, and never again. Nobody gets hooked by accident. There's an honesty to current addiction. The customer always knows just what he's getting into, and what it will do for him — and to him.

Still, you'd need a certain lack of empathy to make a living the way Kenneth Graham did. Else he'd have had to turn away his customers. Nobody becomes a current addict gradually. He decides all at once, and he buys the operation before he has ever tasted its joy.

Each one of Kenneth Graham's customers had reached his shop after deciding to drop out of the human race.

What a stream of the hopeless and the desperate must have passed through Graham's shop! How could they help but haunt his dreams? And if Kenneth Graham slept well at night, then —

Then, small wonder if he had turned organlegger.

He was in a good position for it. Despair is characteristic of the would-be current addict. The unknown, the unloved, the people nobody knew and nobody needed and nobody missed, these passed in a steady stream through Kenneth Graham's shop.

So a few didn't come out. Who would notice?

I flipped quickly through the tape to find out who was in charge of watching Graham. Jackson Bera. I called down through the desk phone.

"Sure," said Bera, "we've had a spy beam on him about three weeks now. It's a waste of good salaried ARM agents. Maybe he is clean. Maybe he's been tipped."

"Then why not stop watching him?"

Bera looked disgusted. "Because we've only been watching for three weeks. How many donors do you think he needs a year? Two. Read the reports. Gross profit on a single donor is over a million UN marks. Gra-

ham can afford to be careful who he picks."

"Yah."

"At that, he wasn't careful enough. At least two of his customers disappeared last year. Customers with families. That's what put us on him."

"So you could watch him for the next six months without a guarantee. He could be just waiting for the right guy to walk in."

"Sure. He has to write up a report on every customer. That gives him the right to ask personal questions. If the guy has relatives, Graham lets him walk out. Most people do have relatives, you know. Then again," Bera said disconsolately, "he could be clean. Sometimes a current addict disappears without help."

"How come I didn't see any holos of Graham at home? You can't be watching just his shop."

Jackson Bera scratched his hair. He had hair like black steel wool, worn long like a bushman's mop. "Sure we're watching his place, but we can't get a spy beam in there. It's an inside apartment. No windows. You know anything about spy beams?"

"Not much. I know they've been around a while."

"They're as old as lasers. Oldest trick in the book is to put a mirror in the room you want to bug. Then you run a laser beam through a window, or even through heavy drapes, and bounce it off the mirror. When you pick it up it's been distorted by the vibrations in the glass. That gives you a perfect recording of anything that's been said in that room. But for pictures you need something a little more sophisticated."

"How sophisticated can we get?"

"We can put a spy beam in any room with a window. We can send one through some kinds of wall. Give us an optically flat surface and we can send one around corners."

"But you need an outside wall."

"Yup."

"What's Graham doing now?"

"Just a sec." Bera disappeared from view. "Someone just came in. Bera's talking to him. Want the picture?"

"Sure. Leave it on. I'll turn it off from here when I'm through with it."

VII

The picture of Bera went dark. A moment later I was looking into a doctor's office. If I'd seen it cold I'd have thought it was run by a podiatrist. There was the comfortable, tilt-back chair with the headrest and the footrest;

the cabinet next to it with instruments lying on top, on a clean white cloth; the desk over in one corner. Kenneth Graham was talking to a homely, washed-out-looking girl.

I listened to Graham's would-be-fatherly reassurances and his glowing description of the magic of current addiction. When I couldn't take it any longer, I turned the sound down. The girl took her place in the chair, and Graham placed something over her head.

The girl's homely face turned suddenly beautiful.

Happiness is beautiful, all by itself. A happy person is beautiful, per se. Suddenly and totally, the girl was full of joy — and I realized that I hadn't known everything about droud sales. Apparently Graham had an inductor to put the current where he wanted it, without wires. He *could* show a customer what current addiction felt like, without first implanting the wires.

What a powerful argument!

Graham turned off the machine. It was as if he'd turned off the girl. She sat stunned for a moment, then reached frantically for her purse and started scrabbling inside.

I couldn't take any more. I turned it off.

Small wonder if Graham had turned organlegger. He had to be totally without empathy just to sell his merchandise.

Even there, I thought, he'd had a head start.

So he was a little more callous than the rest of the world's billions. But not much. Every voter had a bit of the organlegger in him. In voting the death penalty for so many crimes, the lawmakers had only bent to pressure from the voters. There was a spreading lack of respect for life, the evil side of transplant technology. The good side was no longer life for everyone. One condemned criminal could save a dozen deserving lives. Who could complain about that?

We hadn't thought that way in the Belt. In the Belt survival was a virtue in itself, and life was a precious thing, spread so thin among the sterile rocks, hurtling in single units through all that killing emptiness between the worlds.

So I'd had to come to Earth for my transplant.

My request had been accepted two months after I landed. So quickly? Later I'd learned that the banks always have a surplus of certain items. Few people lose their arms these days. I had also learned, a year after the transplant had taken, that I was using an arm from a captured organlegger's storage tank.

That had been a shock. I'd hoped my arm had come from a depraved murderer, someone who'd shot fourteen nurses from a rooftop. Not at all. Some faceless, nameless victim had had the bad luck to encounter a ghoul, and I had benefitted thereby.

Did I turn in my new arm in a fit of revulsion? No, surprising to say, I did not. But I had joined the ARM's, once the Amalgamation of Regional Militia, now the United Nations Police. Though I had stolen a dead man's arm, I would hunt the kin of those who had killed him.

The noble urgency of that resolve had been drowned in paperwork these last few years. Perhaps I was becoming callous, like the flatlanders — the *other* flatlanders around me, voting new death penalties year after year. *Income tax evasion. Operating a flying vehicle on manual controls, over a city.*

Was Kenneth Graham so much worse than they?

Sure he was. The bastard had put a wire in Owen Jennison's head.

I waited twenty minutes for Julie to come out. I could have sent her a memorandum, but there was plenty of time before noon, and too little time to get anything accomplished, and . . . I wanted to talk to her.

"Hi," she said, taking the coffee. "Thanks. How went the ceremonial drunk? Oh, I see. Mmm. Very good. Almost poetic." Conversation with Julie has a way of taking short cuts.

Poetic, right. I remembered how inspiration had struck like lightning through a mild high glow. Owen's floating cigarette lure. What better way to honor his memory than to use it to pick up a girl?

"Right," Julie agreed. "But there's something you may have missed. What's Taffy's last name?"

"I can't remember. She wrote it down on — "

"What does she do for a living?"

"How should I know?"

"What religion is she? Is she a pro or an anti? Where did she grow up?"

"Damnit — "

"Half an hour ago you were very complacently musing on how depersonalized all us flatlanders are except you. What's Taffy, a person or a fold-out?" Julie stood with her hands on her hips looking like a schoolteacher.

How many people is Julie? Some of us have never seen this Guardian aspect. She's frightening, the Guardian. If it ever appeared on a date, the man she was with would be struck impotent forever.

It never does. When a reprimand is deserved, Julie delivers it in broad daylight. This serves to separate her functions, but it doesn't make it easier to take.

No use pretending it wasn't her business, either.

I'd come here to ask for Julie's protection. Let me turn unlovable to Julie, even a little bit unlovable, and as far as Julie was concerned I would have an unreadable mind. How, then, would she know when I was in trouble? How could she send help to rescue me from whatever? My private life *was* her business, her single, vastly important job.

"I *like* Taffy," I protested. "I didn't care who she was when we met. Now I like her, and I think she likes me. What do you want from a first date?"

"You know better. You can remember other dates when two of you talked all night on a couch, just from the joy of learning about each other." She mentioned three names, and I flushed. Julie knows the words that will turn you inside out in an instant. "Taffy is a person, not an episode, not a symbol of anything, not just a pleasant night. What's your judgment of her?"

I thought about it, standing there in the corridor. Funny, I've faced the Guardian Julie on other occasions, and it has never occurred to me to just walk out of the unpleasant situation. Later I think of that. At the time I just stand there, facing the Guardian/Judge/Teacher. I thought about Taffy . . .

"She's nice," I said. "*Not* depersonalized. Squeamish, even. She wouldn't make a good nurse. She'd want to help too much, and it would tear her apart when she couldn't. I'd say she was one of the vulnerable ones."

"Go on."

"I want to see her again, but I won't dare talk shop with her. In fact . . . I'd better not see her till this business of Owen is over. Loren might take an interest in her. Or . . . she might take an interest in me, and I might get hurt . . . have I missed anything?"

"I think so. You owe her a phone call. If you won't be dating her for a few days, call her and tell her so."

"Check." I spun on my heel, spun back. "Finagle's Jest! I almost forgot. The reason I came here — "

"I know, you want a time slot. Suppose I check on you at oh nine forty-five every morning?"

"That's a little early. When I get in deadly danger it's usually at night."

"I'm off at night. Oh nine forty-five is all I've got. I'm sorry, Gil, but it is."

"Sold. Nine forty-five."

"Good. Let me know if you get real proof Owen was murdered. I'll give you two slots. You'll be in a little more concrete danger then."

"Good."

"I love you. Yeep, I'm late." And she dodged back into her office, while I went to call Taffy.

Taffy wasn't home, of course, and I didn't know where she worked, or even what she did. Her phone offered to take a message. I gave my name and said I'd call back.

And then I sat there sweating for five minutes.

It was half an hour to noon. Here I was at my desk phone. I couldn't decently see any way to argue myself out of sending a message to Homer Chandrasekhar.

I didn't want to talk to him, then or ever. He'd chewed me out but good, last time I'd seen him. My free arm had cost me my Belter life, and it had cost me Homer's respect. I didn't want to talk to him, even on a one-way message, and I most particularly didn't want to have to tell him Owen was dead.

But someone had to tell him.

And maybe he could find out something.

And I'd put it off nearly a full day.

For five minutes I sweated, and then I called Long Distance and recorded a message and sent it off to Ceres. More accurately, I recorded six messages before I was satisfied. I don't want to talk about it.

I tried Taffy again; she might come home for lunch. Wrong.

I hung up wondering if Julie had been fair. What had we bargained for, Taffy and I, beyond a pleasant night? And we'd had that and would have others, with luck.

But Julie would find it hard not to be fair. If she thought Taffy was the vulnerable type, she'd taken her information from my own mind.

Mixed feelings. You're a kid, and your mother has just laid down the law. But it *is* a law, something you can count on . . . and she *is paying* attention to you . . . and she *does* care . . . when, for so many of those outside, nobody cares at all.

VIII

"Naturally I thought of murder," said Ordaz. "I always consider murder. When my sainted mother passed away after three years of the most tender care by my sister Maria Angela, I actually considered searching for evidence of needle holes about the head."

"Find anything unusual?"

Ordaz's face froze. He put down his beer and started to get up.

"Cool it," I said hurriedly. "No offense intended." He glared a moment, then sat down, half mollified.

We'd picked an outdoor restaurant on the pedestrian level. On the other side of a hedge (a real live hedge, green and growing and everything) the shoppers were carried past in a steady, one-way stream. Beyond them, a slidewalk carried a similar stream in the opposite direction. I had the dizzy feeling that it was we who were moving.

A waiter like a bell-bottomed chess pawn produced steaming dishes of chili from its torso, put them precisely in front of us and slid away on a cushion of air.

"Naturally I considered murder. Believe me, Mr. Hamilton, it does not hold up."

"I think I could make a pretty good case."

"You may try, of course. Better, I will start you on your way. First, we must assume that Kenneth Graham the happiness peddler,did not sell a droud-and-plug to Owen Jennison. Rather, Owen Jennison was forced to undergo the operation. Graham's records, including the written permission to operate, were forged. All this we must assume, is it not so?"

"Right. And before you tell me Graham's escutcheon is unblemished, let me tell you that it isn't."

"Oh?"

"He's connected with an organlegging gang. That's classified information. We're watching him, and we don't want him tipped."

"That is news." Ordaz rubbed his jaw. "Organlegging. Well. What would Owen Jennison have to do with organlegging?"

"Owen's a Belter. The Belt's always drastically short of transplant materials."

"Yes, they import quantities of medical supplies from Earth. Not only organs in storage, but also drugs and prosthetics. So?"

"Owen ran a good many cargoes past the goldskins in his day. He got caught a few times, but he's still way ahead of the government. He's on the records as a successful smuggler. If a big organlegger wanted to expand his market, he might very well send a feeler out to a Belter with a successful smuggling record."

"You never mentioned that Mr. Jennison was a smuggler."

"What for? All Belters are smugglers, if they think they can get away with it. To a Belter, smuggling isn't immoral. But an organlegger wouldn't know that. He'd think Owen was already a criminal."

"Do you think your friend —" Ordaz hesitated delicately.

"No, Owen wouldn't turn organlegger. But he might, he just *might* try to turn one in. The rewards for information leading to the capture and conviction of, et cetera, are substantial. If someone contacted Owen, Owen might very well have tried to trace the contact by himself.

"Now, the gang we're after covers half the west coast of this continent. That's big. It's the Loren gang, the one Graham may be working for. Suppose Owen had a chance to meet Loren himself?"

"You think he might take it, do you?"

"I think he did. I think he let his hair grow out so he'd look like an Earthman, to convince Loren he wanted to look inconspicuous. I think he collected as much information as he could, then tried to get out with a whole skin. But he didn't make it.

"Did you find his application for a nudist license?"

"No. I saw your point there," said Ordaz. He leaned back, ignoring the food in front of him. "Mr. Jennison's tan was uniform except for the characteristic darkening of the face. I presume he was a practicing nudist in the Belt."

"Yah. We don't need licenses there. He'd have been one here, too, unless he was hiding something. Remember that scar. He never missed a chance to show it off."

"Could he really have thought to pass for a — " Ordaz hesitated. "A flatlander?"

"With that Belter tan? No! He was overdoing it a little with the haircut. Maybe he thought Loren would underestimate him. But he wasn't advertising his presence, or he wouldn't have left his most personal possessions home."

"So he was dealing with organleggers, and they found him out before he could reach you. Yes, Mr. Hamilton, this is well thought out. But it won't work."

"Why not? I'm not trying to prove it's murder. Not yet. I'm just trying to show you that murder is at least as likely as suicide."

"But it's not, Mr. Hamilton."

I looked at the question.

"Consider the details of the hypothetical murder. Owen Jennison is drugged, no doubt, and taken to the office of Kenneth Graham. There, an ecstasy plug is attached. A standard droud is fitted and is then amateurishly altered with soldering tools. Already we see, on the part of the killer, a minute attention to details. We see it again in Kenneth Graham's forged papers of permission to operate. They were impeccable.

"Owen Jennison is then taken back to his apartment. It would be his own, would it not? There would be little point in moving him to another. The cord from his droud is shortened, again in amateurish fashion. Mr. Jennison is tied up — "

"I wondered if you'd see that."

"But why should he not be tied up? He is tied up and allowed to waken. Perhaps the arrangement is explained to him, perhaps not. That would be up to the killer. The killer then plugs Mr. Jennison into a wall. A current trickles through his brain, and Owen Jennison knows pure pleasure for the first time in his life.

"He is left tied up for, let us say, three hours. In the first few minutes he would be a hopeless addict, I think — "

"You must have known more current addicts than I have."

"Even I would not want to be pinned down. Your normal current addict is an addict after a few minutes. But then, your normal current addict asked to be made an addict, knowing what it would do to his life. Current addiction is symptomatic of despair. Your friend might have been able to fight free of a few minutes' exposure."

"So they kept him tied up for three hours. Then they cut the ropes." I felt sickened. Ordaz's ugly, ugly picture matched mine in every detail.

"No more than three hours, by our hypothesis. They would not dare stay longer than a few hours. They would cut the ropes and leave Owen Jennison to starve to death. In the space of a month the evidence of his drugging would vanish, as would any abrasions left by ropes, lumps on his head, mercy needle punctures, and the like. A carefully detailed, well thought out plan, don't you agree?"

I told myself that Ordaz was not being ghoulish. He was just doing his job. Still, it was difficult to answer objectively.

"It fits our picture of Loren. He's been very careful with us. He'd love carefully detailed, well thought out plans."

Ordaz leaned forward. "But don't you see? A carefully detailed plan is all wrong. There is a crucial flaw in it. Suppose Mr. Jennison pulls out the droud?"

"Could he do that? Would he?"

"Could he? Certainly. A simple tug of the fingers. The current wouldn't interfere with motor coordination. Would he?" Ordaz pulled meditatively at his beer. "I know a good deal about current addiction, but I don't know what it *feels* like, Mr. Hamilton. Your normal addict pulls his

droud out as often as he inserts it, but your friend was getting ten times normal current. He might have pulled the droud out a dozen times and instantly plugged it back each time. Yet Belters are supposed to be strong-willed men, very individualistic. Who knows whether, even after a week of addiction, your friend might not have pulled the droud loose, coiled the cord, slipped it in his pocket, and walked away scot free?

"There is an individual risk that someone might walk in on him — an automachinery service man, for instance. Or someone might notice that he had not bought any food in a month. A suicide would take that risk. Suicides routinely leave themselves a chance to change their minds. But a murderer?

"No. Even if the chance were one in a thousand, the man who created such a detailed plan would never have taken such a chance."

The sun burned hotly down on our shoulders. Ordaz suddenly remembered his lunch and began to eat.

I watched the world ride by beyond the hedge. Pedestrians stood in little conversational bunches; others peered into shop windows on the pedestrian strip, or glanced over the hedge to watch us eat. There were the few who pushed through the crowd with set expressions, impatient with the ten-mile-per-hour speed of the slidewalk.

"Maybe they *were* watching him. Maybe the room was bugged."

"We searched the room thoroughly," said Ordaz. "If there had been observational equipment, we would have found it."

"It could have been removed."

Ordaz shrugged.

I remembered the spy-eyes in Monica Apartments. Someone would have had to physically enter the room to carry a bug out. He could ruin it with the right signal, maybe, but it would surely leave traces.

And Owen had had an inside room. No spy-eyes.

"There's one thing you've left out," I said presently.

"And what would that be?"

"My name in Owen's wallet, listed as next of kin. He was directing my attention to the thing I was working on. The Loren gang."

"That is possible."

"You can't have it both ways."

Ordaz lowered his fork. "I *can* have it both ways, Mr. Hamilton. But you won't like it."

"I'm sure I won't."

"Let us incorporate your assumption. Mr. Jennison was contacted by an agent of Loren, the

organlegger, who intended to sell transplant material to Belters. He accepted. The promise of riches was too much for him.

"A month later, something made him realize what a terrible thing he had done. He decided to die. He went to an ecstasy peddler and he had a wire put in his head. Later, before he plugged in the droud, he made one attempt to atone for his crime. He listed you as his next of kin, so that you might guess why he had died, and perhaps so that you could use that knowledge against Loren."

Ordaz looked at me across the table. "I see that you will never agree. I cannot help that. I can only read the evidence."

"Me too. But I knew Owen. He'd never have worked for an organlegger, he'd never have killed himself, and if he had, he'd never have done it that way."

Ordaz didn't answer.

"What about fingerprints?"

"In the apartment? None."

"None but Owen's?"

"Even his were found only on the chair and end tables. I curse the man who invented the cleaning robot. Every smooth surface in that apartment was cleaned exactly forty-four times during Mr. Jennison's tenancy." Ordaz went back to his chili.

"Then try this. Assume for the moment that I'm right. Assume Owen was after Loren, and Loren got him. Owen knew he was doing something dangerous. He wouldn't have wanted me to get onto Loren before he was ready. He wanted the reward for himself. But he might have left me something, just in case.

"Something in a locker somewhere, an airport or spaceport locker. Evidence. Not under his own name, or mine either, because I'm a known ARM. But—"

"Some name you both know."

"Right. Like Homer Chandrasekhar. Or — we got it. Cubes Forsythe. Owen would have thought that was apt. Cubes is dead."

"We will look. You must understand that it will not prove your case."

"Sure. Anything you find, Owen could have arranged in a fit of conscience. Screw that. Let me know what you get," I said, and stood up and left.

IX

I rode the slidewalk, not caring where it was taking me. It would give me a chance to cool off.

Could Ordaz be right? Could he?

But the more I dug into Owen's death, the worse it made Owen look.

Therefore Ordaz was wrong.

Owen work for an organlegger? He'd rather have been a donor.

Owen getting his kicks from a wall socket? He never even watched tridee!

Owen kill himself? No. If so, not that way.

But even if I could have swallowed all that . . .

Owen Jennison, letting me know he'd worked with organleggers? Me, Gil the Arm Hamilton? Let *me* know *that*?

The slidewalk rolled along, past restaurants and shopping centers and churches and banks. Ten stories below, the hum of cars and scooters drifted faintly up from the vehicular level. The sky was a narrow, vivid slash of blue between shadows of skyscrapers.

Let *me* know *that?* Never.

"But Ordaz's strangely inconsistent murderer was no better.

I thought of something even Ordaz had missed. Why would Loren dispose of Owen so elaborately? Owen need only disappear into the organ banks, never to bother Loren again.

The shops were thinning out now, and so were the crowds. The slidewalk narrowed, entered a residential area, and not a very good one. I'd let it carry me a long way. I looked around, trying to decide where I was.

And I was four blocks from Graham's place.

My subconscious had done me dirty. I wanted a look at Kenneth Graham, face to face. The temptation to go on was nearly irresistible, but I fought it off and changed direction at the next disc.

A slidewalk intersection is a rotating disc, its rim tangent to four slidewalks and moving with the same speed. From the center you ride up an escalator and over the slidewalks to reach stationary walks along the buildings. I could have caught a cab at the center of the disc, but I still wanted to think, so I just rode halfway around the rim.

I could have walked into Graham's shop and gotten away with it. Maybe. I'd have looked hopeless and bored and hesitant, told Graham I wanted an ecstasy plug, worried loudly about what my wife and friends would say, then changed my mind at the last moment. He'd have let me walk out, knowing I'd be missed. Maybe.

But Loren had to know more about the ARM's then we knew about him. Some time or other, had Graham been shown a holo of yours truly? Let a known ARM walk into his shop, and Graham would panic. It wasn't worth the risk.

Then, damnit, what *could* I do?

Ordaz's inconsistent killer. If we assumed Owen was murdered, we couldn't get away from the assumptions. The case, the nitpicking detail — and then Owen left alone to pull out the plug and walk away, or to be discovered by a persistent salesman or a burglar, or —

No. Ordaz's hypothetical killer, and mine, would have watched Owen like a hawk. For a month.

That did it. I stepped off at the next disc and got a taxi.

The taxi dropped me on the roof of Monica Apartments. I took an elevator to the lobby.

If the manager was surprised to see me, he didn't show it as he gestured me into his office. The office seemed much roomier than the lobby had, possibly because there were things to break the anonymous modern decor: paintings on the wall, a small black worm-track in the rug that must have been caused by a visitor's cigarette, a holo of Miller and his wife on the wide, nearly empty desk. He waited until I was settled, then leaned forward expectantly.

"I'm here on ARM's business," I said, and passed him my ident.

He passed it back without checking it. "I presume it's the same business," he said.

"Yah. I'm convinced Owen Jennison must have had visitors while he was here."

The manager smiled. "That's ridic — impossible."

"Nope, it's not. Your holo cameras take pictures of visitors, but they don't snap the tenants, do they?"

"Of course not."

"Then Owen could have been visited by any tenant in the building."

The manager looked shocked. "No, certainly not. Really, I don't see why you pursure this, Mr. Hamilton. If Mr. Jennison had been found in such a condition, it would have been reported!"

"I don't think so. Could he have been visited by any tenant in the building?"

"No. No. The cameras would have taken a picture of anyone from another floor."

"How about someone from the same floor?"

Reluctantly the manager bobbed his head. "Ye-es. As far as the holo cameras are concerned, that's possible. But — "

"Then I'd like to ask for pictures of any tenant who lived on the eighteenth floor during the last six weeks. Send them to the ARM's Building, Central LA, Can do?"

"Of course. You'll have them within an hour."

"Good. Now, something else occurred to me. Suppose a man

got out on the nineteenth floor and walked down to the eighteenth,. He'd be holoed on the nineteenth, but not on the eighteenth, right?"

The manager smiled indulgently. "Mr. Hamilton, there are no stairs in this building."

"Just the elevators? Isn't that dangerous?"

"Not at all. There is a separate self-contained emergency power source for each of the elevators. It's common practice. After all, who would want to walk up eighty stories if the elevator failed?"

"Okay, fine. One last point. Could someone tamper with the computer? Could someone make it decide not to take a certain picture, for instance?"

"I . . . am not an expert on how to tamper with computers, Mr. Hamilton. Why don't you go straight to the company? Caulfield Brains, Inc."

"Okay. What's your model?"

"Just a moment." He got up and leafed through a drawer in a filing cabinet. "EQ 144."

"Okay."

That was all I could do here, and I knew it . . . and still I didn't have the will to get up. There ought to be *something*...

Finally Miller cleared his throat. "Will that be all, sir?"

"Yes," I said. "No. Can I get into 1809?"

"I'll see if we've rented it yet."

"The police are through with it?"

"Certainly." He went back to the filing cabinet. "No. It's still available. I'll take you up. How long will you be?"

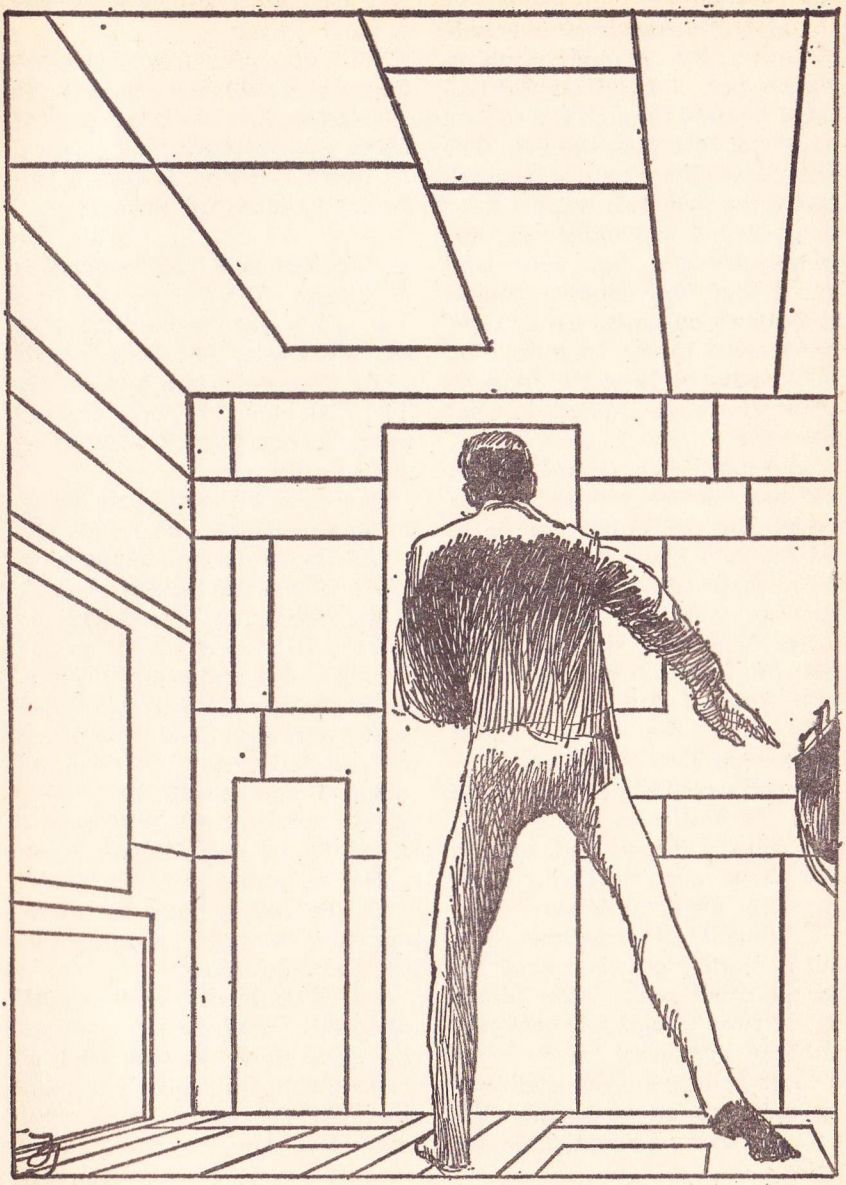
"I don't know. No more than half an hour. No need to come up."

"Very well." He handed me the key and waited for me to leave.

The merest flicker of blue light caught my eye as I left the elevator. I would have thought it was my optic nerve, not in the real world, if I hadn't known about the holo cameras. Maybe it was. You don't need laser light to make a holograph, but it does get you clearer pictures.

Owen's room was a box. Everything was retracted. There was nothing but the bare walls. I had never seen anything so desolate, unless it was some asteroidal rock, too poor to mine, too badly placed to be worth a base.

The control panel was just beside the door. I turned on the lights, then touched the master button. Lines appeared, outlined in red and green and blue. A great square on one wall for the bed, most of another wall for the kitchen, various outlines across the floor. Very handy. You would not want a guest to be standing on the table when you expanded it.



I'd come here to get the feel of the place, to encourage a hunch, to see if I'd missed anything. Translation: I was playing. Playing, I reached through the control panel to find the circuits. The printed circuitry was too small and too detailed to tell me anything, but I ran imaginary fingertips along a few wires and found that they looped straight to their action points, no detours. No sensors to the outside. You would have to be in the room to know what was expanded, what retracted.

So a supposedly occupied room had had its bed retracted for six weeks. But you'd have to be in the room to know it.

I pushed buttons to expand the kitchen nook and the reading chair. The wall slid out eight feet; the floor humped itself and took form. I sat down in the chair, and the kitchen nook blocked my view of the door.

Nobody could have seen Owen from the hall.

If only someone had noticed that Owen wasn't ordering food. . . . That might have saved him.

I thought of something else, and it made me look around for the air conditioner. There was a grill at floor level. I felt behind it with my imaginary hand. Some of these apartment air-conditioning units go on when the CO^2 level hits half a percent. This one was geared to temperature and manual control.

With the other kind, our careful killer could have tapped the air conditioner to find out if Owen was still alive and present. As it was, 1809 had behaved like an empty room for six weeks.

I flopped back in the reading chair.

If my hypothetical killer had watched Owen, he'd done it with a bug. Unless he actually lived on this floor for the four or five weeks it took Owen to die, there was no other way.

Okay, think about a bug. Make it small enough and nobody would find it except the cleaning robot, who would send it straight to the incinerator. You'd have to make it big, so the robot would not get it. No worry about Owen finding it! And then, when you knew Owen was dead, you'd use the self-destruct.

But if you burned it to slag, you'd leave a burn hole somewhere. Ordaz would have found it. So. An asbestos pad? You'd want the self-destruct to leave something that the cleaning robot would sweep up.

And if you'll believe that you will believe anything. It was too chancy. *Nobody* knows what a cleaning robot will decide is garbage. They're made stupid because it's cheaper. So they're

programmed to leave large objects alone.

There had to be someone on this floor, either to watch Owen himself or to pick up the bug that did the watching. I was betting everything I had on a human watcher.

I'd come here mainly to give my intuition a chance. It wasn't working. Owen had spent six weeks in this chair, and for at least the last week he'd been dead. Yet I couldn't feel it with him. It was just a chair with two end tables. He had left nothing in the room, not even a restless ghost.

The call caught me halfway back to Headquarters.

"You were right," Ordaz told me over the wristphone. "We have found a locker at Death Valley Port registered to Cubes Forsythe. I am on my way there now. Will you join me?"

"I'll meet you there."

"Good. I am as eager as you to see what Owen Jennison left us."

I doubted that.

The Port was something more than two hundred and thirty miles away, an hour at taxi speeds. It would be a big fare. I typed out a new address on the destination board, then called in at Headquarters. An ARM agent is fairly free; he doesn't have to justify every little move. There was no question of getting permission to go. At worst they might disallow the fare on my expense account.

"Oh, and there'll be a set of holos coming in from Monica Apartments," I told the man. "Have the computer check them against known organleggers and associates of Loren."

The taxi rose smoothly into the sky and headed east. I watched tridee and drank coffee until I ran out of coins for the dispenser.

X

If you go between November and May, when the climate is ideal, Death Valley can be a tourist's paradise. There is the Devil's Golf Course, with its fantastic ridges and pinnacles of salt; Zabriskie Point and its weird badlands topography; the old borax mining sites; and all kinds of strange, rare plants, adapted to the heat and the death-dry climate. Yes, Death Valley has many points of interest, and someday I was going to go see them. So far all I'd seen was the spaceport. But the Port was impressive in its own way.

The landing field used to be part of a sizeable inland sea. It is now a sea of salt. Alternating red and blue concentric circles mark the field for ships dropping

from space, and a century's developments in chemical, fission, and fusion reaction motors have left blast pits striped like rainbows by esoteric, often radio-active salts. But mostly the field retains its ancient glare white.

And out across the salt are ships of many sizes and many shapes. Vehicles and machinery dance attendance, and if you're willing to wait, you may see a ship land. It's worth the wait.

The Port building, at the edge of the major salt flat, is a pastel green tower set in a wide patch of fluorescent orange concrete. No ship has ever landed on it — yet. The taxi dropped me at the entrance and moved away to join others of its kind. And I stood inhaling the dry, balmy air.

Four months of the year, Death Valley's climate is ideal. One August the Furnace Creek Ranch recorded 134° F. shade temperature.

A man behind the desk told me that Ordaz had arrived before me. I found him and another officer in a labyrinth of pay lockers, each big enough to hold two or three suitcases. The locker Ordaz had opened held only a lightweight plastic briefcase.

"He may have taken other lockers," he said.

"Probably not. Belters travel light. Have you tried to open it?"

"Not yet. It is a combination lock. I thought perhaps . . . "

"Maybe." I squatted to look at it.

Funny. I felt no surprise at all. It was as if I'd known all along that Owen's suitcase would be here. And why not? He was bound to try to protect himself somehow. Through me, because I was already involved in the UN side of organlegging. By leaving something in a spaceport locker, because Loren couldn't find the right locker or get into it if he did, and because I would naturally connect Owen with spaceports. Under Cubes's name, because I'd be looking for that, and Loren wouldn't.

Hindsight is wonderful.

The lock had five digits. He must have meant me to open it. Let's see . . . " and I moved the tumblers to 42217. April 22, 2117, the day Cubes died, stapled suddenly to a plastic partition.

The lock clicked open.

Ordaz went instantly for the manila folder. More slowly, I picked up two glass phials. One was tightly sealed against Earth's air and half full of an incredibly fine dust. So fine was it that it slid like oil inside the glass. The other phial held a blackened grain of nickel-iron, barely big enough to see.

Other things were in that case, but the prize was that folder.

The story was in there . . . at least up to a point. Owen must have planned to add to it.

A message had been waiting for him in the Ceres mail dump when he returned from his last trip out. Owen must have laughed over parts of that message. Loren had taken the trouble to assemble a complete dossier of Owen's smuggling activities over the past eight years. Did he think he could ensure Owen's silence by threatening to turn the dossier over to the goldskins?

Maybe the dossier had given Owen the wrong idea. In any case, he'd decided to contact Loren and see what developed. Ordinarily he'd have sent me the entire message and let me try to track it down. I was the expert, after all. But Owen's last trip out had been a disaster.

His fusion drive had blown somewhere beyond Jupiter's orbit. No explanation. The safeties had blown his lifesystem capsule free of the explosion, barely. A rescue ship had returned him to Ceres. The fee had nearly broken him. He needed money. Loren may have known that and counted on it.

The reward for information leading to Loren's capture would have bought him a new ship.

He'd landed at Outback Field, following Loren's instructions. From there, Loren's men had moved him about a good deal: to London, to Bombay, to Amberg, Germany. Owen's personal, written story ended in Amberg. How had he reached California? He had not had a chance to say.

But in between, he had learned a good deal. There were snatches of detail on Loren's organization. There was Loren's full plan for shipping illicit transplant materials to the Belt, and for finding and contacting customers. Owen had made suggestions there. Most of them sounded reasonable and would be workable in practice. Typically Owen. I could find no sign that he'd overplayed his hand.

But of course he hadn't known it when he did.

And there were holos, twenty-three of them, each a member of Loren's gang. Some of the pictures had markings on the back; others were blank. Owen had been unable to find out where each of them stood in the organization.

I leafed through them twice, wondering if one of them could be Loren himself. Owen had never known.

"It would seem you were right," said Ordaz. "He could not have collected such detail by accident. He must have planned from the beginning to betray the Loren gang."

"Just as I told you. And he was murdered for it."

"It seems he must have been. What motive could he have had for suicide?" Ordaz's round, calm face was doing its best to show anger. "I find I cannot believe in our inconsistent murderer either. You have ruined my digestion, Mr. Hamilton."

I told him my idea about other tenants on Owen's floor. He smiled and nodded. "Possibly, possibly. This is your department now. Organlegging is the business of the ARM's."

"Right." I closed the briefcase and hefted it. "Let's see what the computer can do with these. I'll send you photocopies of everything in here."

"You'll let me know about the other tenants?"

"Of course."

I walked into ARM Headquarters swinging that precious briefcase, feeling on top of the world. Owen had been murdered. He had died with honor, if not—oh, definitely not — with dignity. Even Ordaz knew it now.

Then Jackson Bera, snarling and panting, went by at a dead run.

"What's up?" I called after him. Maybe I wanted a chance to brag. I had twenty-three faces, twenty-three organleggers, in my briefcase.

Bera slid to a stop beside me. "Where in hell have you been?"

"Working. Honest. What's the hurry?"

"Remember that pleasure peddler we were watching?"

"Graham? Kenneth Graham?"

"That's the one. He's dead. We blew it." And Bera took off.

He'd reached the lab by the time I caught up with him. Kenneth Graham's corpse was face up on the operating table. His long, lantern-jawed face was pale and slack, without expression, empty. Machinery was in place above and below his head.

"How you doing?" Bera demanded.

"Not good," the doctor answered. "Not your fault. You got him into the deepfreeze fast enough. It's just that the current — " he shrugged.

I shook Bera's shoulder. "What happened?"

Bera was panting a little from his run. "Something must have leaked. Graham tried to make a run for it. We got him at the airport."

"You could have waited. Put someone on the plane with him. Flooded the plane with TY-4.

"Remember the stink the last time we used TY-4 on civilians? Damn newscasters." Bera was shivering. I don't blame him.

ARM's and organleggers play a funny kind of game. The organ-

leggers have to turn their donors in alive, so they're always armed with hypo guns, firing slivers of crystaline anaesthetic that melt instantly in the blood. We use the same weapon, for somewhat the same reason; a criminal has to be saved for trial, and then for the government hospitals. So no ARM ever expects to kill a man.

There was a day I learned the truth. A small-time organlegger named Raphael Haine was trying to reach a call button in his own home. If he'd reached it all kinds of hell would have broken loose, Haine's men would have hypoed me, and I would have regained consciousness a piece at a time, in Haine's organ storage tanks. So I strangled him.

The report was in the computer, but only three human beings knew about it. One was my immediate superior, Lucas Garner. The other was Julie. So far, he was the only man I'd ever killed.

And Graham was Bera's first killing.

"We got him at the airport," said Bera. "He was wearing a hat. I wish I'd noticed that, we might have moved faster. We started to close in on him with hypo guns. He turned and saw us. He reached under his hat, and then he fell."

"Killed himself?"

"Uh huh."

"How?"

"Just look at his head."

I edged closer to the table, trying to stay out of the doctor's way. The doctor was going through the routine of trying to pull information from a dead brain by induction. It wasn't going well.

There was a flat oblong box on top of Graham's head. Black plastic, about half the size of a pack of cards. I touched it and knew at once that it was attached to Graham's skull.

"A droud. Not a standard type. Too big."

"Uh. huh."

Liquid helium ran up my nerves. "There's a battery in it."

"Right."

"Right."

"I often wonder what the vintners buy, *et cetera*. A cordless droud. Man, that what *I* want for Christmas."

Bera twitched all over. "Don't say that."

"Did you know he was a current addict?"

"No. We were afraid to bug his home. He might have found it and be tipped. Take another look at that thing."

The shape was wrong, I thought. The black plastic case had been half melted.

"Heat," I mused. "Oh!"

"Uh huh. He blew the whole battery at once. Sent the whole

killing charge right through his brain, right through the pleasure center of his brain. And Jesus, Gil, the thing I keep wondering is, what did it feel like? Gil, what could it possible have *felt* like?"

I thumped him across the shoulders in lieu of giving him an intelligent answer. He'd be a long time wondering. And so would I.

Here was the man who had put the wire in Owen's head. Had his death been momentary hell, or all the delights of paradise in one singing jolt? Hell, I hoped, but I didn't believe it.

At least Kenneth Graham wasn't somewhere else in the world, getting a new face and new retinae and new fingertips from Loren's illicit organ banks.

"Nothing," said the doctor. "His brain's too badly burned. There's just nothing there that isn't too scrambled to make sense."

"Keep trying," said Bera.

I left quietly. Maybe later I'd buy Bera a drink. He seemed to need it. Bera was one of those with empathy. I knew that he could almost feel that awful surge of ecstasy and defeat as Kenneth Graham left the world behind.

The holos from Monica Apartments had arrived hours ago. Miller had picked not only the tenants who had occupied the eighteenth floor during the past six weeks, but tenants from the nineteenth and seventeenth floors too.

It seemed an embarrassment of riches. I toyed with the idea of someone from the nineteenth floor dropping over his balcony to the eighteenth, every day for five weeks. But 1809 hadn't had an outside wall, let alone a window, not to mention anything resembling a balcony.

Had Miller played with the same idea? Nonsense. He didn't even know the problem. He'd just overkilled with the holos to show how cooperative he was.

None of the tenants during the period in question matched known or suspected Loren men.

I said a few appropriate words and went for coffee. Then I remembered the twenty-three possible Loren men in Owen's briefcase.

I'd left them with a programmer, since I wasn't quite sure how to get them into the computer myself. He ought to be finished by now.

I called down. He was.

I persuaded the computer to compare them with the holos of the tenants from Monica Apartments.

Nothing. Nobody matched anybody.

XI

I spent the next two hours writing up the Owen Jennison case. A programmer would have to translate it for the machine. I wasn't that good yet.

We were back with Ordaz's inconsistent killer.

That, and a tangle of dead ends. Owen's death had bought us a handful of new pictures, pictures which might even be obsolete by now. Organleggers changed their faces at the drop of a hat. I finished the case outline, sent it down to a programmer, and called Julie. I wouldn't need her protection now.

Julie had left for home.

I started to call Taffy, stopped with her number half dialed. There are times not to make a phone call. I needed to sulk; I needed a cave to be alone in. My expression would probably have broken a phone screen. Why inflict it on an innocent girl?

I left for home.

It was dark when I reached the street. I rode the pedestrian bridge across the slidewalks, waited for a taxi at the intersection disc. Presently one dropped, the white FREE sign blinking on its belly. I stepped in and deposited my credit card.

Owen had collected his holos from all over the Eurasian continent. Most of them, if not all, had been Loren's foreign agents. Why had I expected to find them in Los Angeles?

The taxi rose into the white night sky. City lights turned the cloud cover into a flat white dome. We penetrated the clouds, and stayed there. The taxi autopilot didn't care if I had a view or not.

. . . So what did I have now? Someone among dozens of tenants was a Loren man. That, or Ordaz's inconsistent killer, the careful one, had left Owen to die for five weeks, alone and unsupervised.

. . . Was the inconsistent killer so unbelievable?

He was, after all, my own hypothetical Loren. And Loren had committed murder, the ultimate crime. He'd murdered routinely, over and over, with fabulous profits. The ARM's hadn't been able to touch him. Wasn't it about time he started getting careless?

Like Graham. How long had Graham been selecting donors among his customers, choosing a few nonentities a year? And then, twice within a few months, he took clients who were missed. Careless.

Most criminals are not too bright. Loren had brains enough; but the men on his payroll would be about average. Loren would deal with the stupid

ones, the ones who turned to crime because they didn't have enough sense to make it in real life.

If a man like Loren got careless, this is how it would happen. Unconsciously he would judge ARM intelligence by his own men. Seduced by an ingenious plan for murder, he might ignore the single loophole and go through with it. With Graham to advise him, he knew more about current addiction than we did; perhaps enough to trust the effects of current addiction on Owen.

Then Owen's killers had delivered him to his apartment and never seen him again. It was a small gamble Loren had taken, and it had paid off, this time.

Next time he'd grow more careless. One day we'd get him.

But not today.

The taxi settled out of the traffic pattern, touched down on the roof of my apartment building in Hollywood Hills. I got out and moved toward the elevators.

An elevator opened. Someone stepped out.

Something warned me. Something about the way he moved. I turned, quick-drawing from the shoulder. The taxi might have made good cover — if it hadn't been already rising. Other figures had stepped from the shadows.

I think I got a couple before something stung my cheek. Mercy-bullets, slivers of crystaline anaesthetic melting in my bloodstream. My head spun, and the roof spun, and the centrifugal force dropped me limply to the room. Shadows loomed above me, then receded to infinity.

Fingers on my scalp shocked me awake.

I woke standing upright, bound like a mummy in soft, swaddling bandages. I couldn't so much as twitch a muscle below my neck. By the time I knew that much it was too late. The man behind me had finished removing the electrodes from my head and stepped into view, out of reach of my imaginary arm.

There was something of the bird about him. He was tall and slender, small-boned, and his triangular face reached a point at the chin. His wild, silken blond hair had withdrawn from his temples, leaving a sharp widow's peak. He wore impeccably tailored wool street shorts in orange and brown stripes. Smiling brightly, with his arms folded and his head cocked to one side, he stood waiting for me to speak.

And I recognized him. Owen had taken a holo of him.

"Where am I?" I groaned, trying to sound groggy. "What time is it?"

"Time? It's already morning," said my captor. "As for where you are, I'll let you wonder."

Something about his manner. . . . I took a guess and said, "Loren?"

Loren bowed, not overdoing it. "And you are Gilbert Hamilton of the United Nations Police. Gil the Arm."

Had he said Arm or ARM? I let it pass. "I seem to have slipped."

"You underestimated the reach of my own arm. You also underestimated my interest.

I had. It isn't much harder to capture an ARM than any other citizen, if you catch him off guard, and if you're willing to risk the men. In this case his risk had cost him nothing. Cops use hypo guns for the same reason organleggers do. The men I'd shot, if I'd hit anyone in those few seconds of battle, would have come around long ago. Loren must have set me up in these bandages, then left me under "Russian sleep" until he was ready to talk to me.

The electrodes were the "Russian sleep". One goes on each eyelid, one on the nape of the neck. A small current goes through the brain, putting you right to sleep. You get a full night's sleep in an hour. If it's not turned off you can sleep forever.

So this was Loren. At long last.

He stood watching me with his head cocked to one side, birdlike, with his arms folded. One hand held a hypo gun, rather negligently, I thought.

What time was it? I didn't dare ask again, because Loren might guess something. But if I could stall him until 0945, Julie could send help . . .

She could send help where?

Finagle in hysterics! Where was I? If I didn't know that, Julie wouldn't know either!

And Loren intended me for the organ banks. One crystaline sliver would knock me out without harming any of the delicate, infinitely various parts that made me Gil Hamilton. That Loren's doctors would take me apart.

In government operating rooms they flash-burn the criminal's brain for later urn burial. God knows what Loren would do with my own brain. But the rest of me was young and healthy. Even considering Loren's overhead, I was worth more than a million UN marks on the hoof.

"Why me?" I asked. "It was me you wanted, not just any ARM. Why the interest in me?"

"It was you who were investigating the case of Owen Jennison. *Much* too thoroughly."

"Not thoroughly enough, damnit!"

Loren looked puzzled. "You really don't understand?"

"I really don't."

"I find that highly interesting," Loren mused. "Highly."

"All right, why am I still alive?"

"I was curious, Mr. Hamilton. I hoped you'd tell me about your imaginary arm."

So he'd said Arm, not ARM. I bluffed anyway. "My *what?*"

"No need for games, Mr. Hamilton. If I think I'm losing, I'll use this." He wiggled the hypo gun. "You'll never wake up."

Damn! He knew. The only things I could move were my ears and my imaginary arm, and Loren knew all about it! I'd never be able to lure him into reach.

Provided he knew *all* about it.

I had to draw him out.

"Okay," I said, "but I'd like to know how you found out about it. A plant in the ARM's?"

Loren chuckled. "I wish it were so. No. We captured one of your men some months ago, quite by accident. When I realized what he was, I induced him to talk shop with me. He was able to tell me something about your remarkable arm. I hope you'll tell me more."

"Who was it?"

"Really, Mr. Hamil — "

"*Who was it?*"

"Do you really expect me to remember the name of every donor?"

Who had gone into Loren's organ banks? Stranger, acquaintance, friend? Does the manager of a slaughterhouse remember every slaughtered steer?

"So-called psychic powers interest me," said Loren. "I remembered you. And then, when I was on the verge of concluding an agreement with your Belter friend Jennison, I remembered something unusual about a crewman he had shipped with. They called you Gil the Arm didn't they? Prophetic. In port your drinks came free if you could use your imaginary arm to drink them?"

"Then damn you. You thought Owen was a plant, did you? Because of me! Me!"

"Breast beating, will earn you nothing, Mr. Hamilton." Loren put steel in his voice. "Entertain me, Mr. Hamilton."

I'd been feeling around for anything that might release me from my upright prison. No such luck. I was wrapped like a mummy in bandages too strong to break. All I could feel with my imaginary hand were cloth bandages up to my neck, and a bracing rod along my back to hold me upright. Beneath the swathing I was naked.

"I'll show you my eldrich pow-

ers," I told Loren, "If you'll loan me a cigarette." Maybe that would draw him close enough...

He knew something about my arm. He knew it's reach. He put one single cigarette on the edge of a small table-on-wheels and slid it up to me. I picked it up and stuck it in my mouth and waited hopefully for him to come light it. "My mistake," he murmured; and he pulled the table back and repeated the whole thing with a lighted cigarette.

No luck. At least I'd gotten my smoke. I pitched the dead one as far as it would go: about two feet. I had to move slowly with my imaginary hand. Otherwise what I'm holding simply slips through my fingers.

Loren watched in fascination. A floating, disembodied cigarette, obeying my will! His eyes held traces of awe and horror. That was bad. Maybe the cigarette had been a mistake.

Some people see psi powers as akin to witchcraft, and psychic people as servants of Satan. If Loren feared me, then I was dead.

"Interesting," said Loren. "How far will it reach?"

He knew that. "As far as my real arm, of course."

"But why? Others can reach much further. Why not you?"

He was clear across the room, a good ten yards away, sprawled in an armchair. One hand held a drink, the other held the hypo gun. He was superbly relaxed. I wondered if I'd ever see him move from that comfortable chair, much less come within reach.

The room was small and bare, with the look of a basement. Loren's chair and a small portable bar were the only furnishings, unless there were others behind me.

A basement could be anywhere. Anywhere in Los Angeles, or out of it. If it was really morning, I could be anywhere on Earth by now.

"Sure," I said, "others can reach farther than me. But they don't have my strength. It's an imaginary arm, sure enough, and my imagination won't make it ten feet long. Maybe someone could convince me it was, if he tried hard enough. But maybe he'd ruin what belief I have. Then I'd have two arms, just like everyone else. I'm better off . . . " I let it trail away because Loren was going to take all my damn arms anyway.

My cigarette was finished. I pitched it away.

"Want a drink?"

"Sure, if you've got a jigger glass. Otherwise I can't lift it."

He found me a shot glass and sent it to me on the edge of the rolling table. I was barely strong

enough to pick it up. Loren's eyes never left me as I sipped and put it down.

The old cigarette lure. Last night I'd used it to pick up a girl. Now it was keeping me alive.

Did I really want to leave the world with something gripped tightly in my imaginary fist? Entertaining Loren. Holding his interest until —

XII

Where was I? Where?

And suddenly I knew. "We are at Monica Apartments," I said. "Nowhere else."

"I knew you'd guess that eventually." Loren smiled. "But it's too late. I got to you in time."

"Don't be so damn complacent. It was stupidity, not your luck. I should have *smelled* it. Owen would never have come here of his own choice. You ordered him here."

"And so I did. By then I already knew he was a traitor."

"So you sent him here to die. Who was it that checked on him every day to see he'd stay put? Was it Miller, the manager? He has been working for you. He's the one who took the holographs of you and your men out of the computer."

"He was the one," said Loren. "But it wasn't every day. I had a man watching Jennison every second, through a portable camera. We took it out after he was dead."

"And then waited a week. Nice touch," The wonder was that it had taken me so long. The atmosphere of the place . . . what kind of people would live in Monica Apartments? The faceless ones, the ones with no identity, the ones who would surely be missed by nobody. They would stay put in their apartments while Loren checked on them, to see that they really did have nobody to miss them. Those who qualified would disappear, and their papers and possessions with them, and their holo would vanish from the computer.

Loren said, "I tried to sell organs to the Belters, through your friend Jennison. I know he betrayed me, Hamilton. I want to know how badly."

"Badly enough." He'd guess that. "We've got detailed plans for getting up an organ bank dispensary in the Belt. It would not have worked anyway, Loren. Belters don't think that way."

"No pictures."

"No." I didn't want him changing his face.

"I was sure he'd left something," said Loren. "Otherwise we would have made him a donor. Much simpler. More profitable. too. I needed the money, Hamilton. Do you know what it costs

the organization to let a donor go?"

"A million or so. Why'd you do it?"

"He'd left something. There was no way to get at it. All we could do was try to keep the ARM's from looking for it."

"Ah." I had it then. "When anyone disappears without a trace, the first thing an idiot thinks of is organleggers."

"Naturally. So he couldn't just disappear, could he? The police would go to the ARM's, the file would go to you, and you'd start looking."

"For a spaceport locker."

"Oh?"

"Under the name of Cubes Forsythe."

"I knew that name," Loren said between teeth. "I should have tried that. You know, after we had him hooked on current, we tried pulling the plug on him to get him to talk. It didn't work. He couldn't concentrate on anything but getting the droud back in his head. We looked high and low — "

"I'm going to kill you," I said, and meant every word.

Loren cocked his head, frowning. "On the contrary, Mr. Hamilton. Another cigarette?"

"Yah."

He sent it to me, lighted, on the rolling table. I picked it up, holding it a trifle ostentatiously. Maybe I could focus his attention on it — on his only way to find my imaginary hand.

Because if he kept his eyes on the cigarette, and I put it in my mouth at a crucial moment — I'd leave my hand free without his noticing.

What crucial moment? He was still in the armchair. I had to fight the urge to coax him closer. Any move in that direction would make him suspicious.

What time was it? And what was Julie doing? I thought of a night two weeks past. Remembered dinner on the balcony of the highest restaurant in Los Angeles, just a fraction less than a mile up. A carpet of neon that spread below us to touch the horizon in all directions. Maybe she'd pick it up . . .

She'd be checking on me at 0945.

"You must have made a remarkable spaceman," said Loren. "Think of being the only man in the solar system who can adjust a hull antenna without leaving the cabin."

"Antennae take a little more muscle than I've got." So he knew I could reach through things. If he'd seen that far — "I should have stayed," I told Loren. "I wish I were on a mining ship, right this minute. All I

wanted at the time was two good arms."

"Pity. Now you have three. Did it occur to you that using psi powers against men was a form of cheating?"

"What?"

"Remember Raphael Haine?" Loren's voice had become uneven. He was angry, and holding it down with difficulty.

"Sure. Small time organlegger in Australia."

"Raphael Haine was a friend of mine. I know he had you tied up at one point. Tell me Mr. Hamilton: if your imaginary hand is as weak as you say, how did you untie the ropes?"

"I didn't. I couldn't have. Haine used handcuffs. I picked his pocket for the key . . . with my imaginary hand, of course."

"You used psi powers against him. You had no right!"

Magic. Anyone who's not psychic himself feels the same way, just a little. A touch of dread, a touch of envy. Loren thought he could handle ARM's; he'd killed at least one of us. But to send warlocks against him was grossly unfair.

That was why he'd let me wake up. Loren wanted to gloat. How many men have captured a warlock?

"Don't be an idiot," I said. "I didn't volunteer to play your silly game, or Haine's either. *My* rules make you a wholesale murderer."

Loren got to his feet (what time was it?), and I suddenly realized my time was up. He was in a white rage. His silky blond hair seemed to stand on end.

I looked into the tiny needle hole in the hypo gun. There was nothing I could do. The reach of my TK was the reach of my fingers. I felt all the things I would never feel: the quart of Trastine in my blood to keep the water from freezing in my cells, the cold bath of half-frozen alcohol, the scalpels and the tiny, accurate surgical lasers. Most of all, the scalpels.

And my knowledge would die when they threw away my brain. I knew what Loren looked like. I knew about Monica Apartments and who knew how many others of the same kind? I knew where to go to find all the loveliness in Death Valley, and someday I was going to go. What time was it? What time?

Loren had raised the hypo gun and was sighting down the stiff length of his arm. Obviously he though he was at target practice. "It really is a pity," he said, and there was only the slightest tremor in his voice. "You should have stayed a spaceman."

What was he waiting for? "I can't cringe unless you loosen these bandages," I snapped, and

I jabbed what was left of my cigarette at him for emphasis. It jerked out of my grip, and I reached and caught it —

And stuck it in my left eye.

At another time I'd have examined the idea a little more closely, But I'd still have done it. Loren already thought of me as his property. As live skin and healthy kidneys and lengths of artery, as parts in Loren's organ banks, I was property worth a million UN marks. And I was destroying my eye! Organleggers are always hurting for eyes; anyone who wears glasses could use a new pair, and the organleggers themselves are constantly wanting to change retina prints.

What I hadn't anticipated was the pain. I'd read somewhere that there are no sensory nerves in the eyeball. Then it was my lids that hurt. Terribly!

But I only had to hold on.

Loren swore and came for me at a dead run. He knew how terribly weak was my imaginary arm. What could I do with it? He didn't know; he'd never known, though it stared him in the face. He ran at me and slapped at the cigarette, a full swing that half knocked my head off my neck and sent the now dead butt ricocheting off a wall. Panting, snarling, speechless with rage, he stood — within reach.

My eye closed like a small tormented fist.

I reached past Loren's gun, through his chest wall, and found his heart. And squeezed.

His eyes became very round, his mouth gaped wide, his larynx bobbed convulsively. There was time to fire the gun. Instead he clawed at his chest with a half-paralyzed arm. Twice he raked his fingernails across his chest, gaping upward for air that would not come. He thought he was having a heart attack. Then his rolling eyes found my face.

My face. I was a one-eyed carnivore, snarling with the will to murder. I would have his life if I had to tear the heart out of his chest! How could he help but know?

He knew!

He fired at the floor and fell.

I was sweating and shaking with reaction and disgust. The scars! He was all scars; I'd felt them going in. His heart was a transplant. And the rest of him— he'd looked about thirty from a distance, but this close it was impossible to tell. Parts were younger, parts older. How much of Loren was Loren? What parts had he taken from others? And none of the parts quite matched.

He must have been chronically ill, I thought. And the Board wouldn't give him the transplants he needed. And one day he'd seen

the answer to all his problems...

Loren wasn't moving. He wasn't breathing. I remembered the way his heart had jumped and wriggled in my imaginary hand, and then suddenly given up.

He was lying on his left arm, hiding his watch. I was all alone in an empty room, and I still did not know what time it was.

I never found out. It was hours before Miller finally dared to interrupt his boss. He stuck his round, blank face around the door jamb, saw Loren sprawled at my feet, and darted back with a squeak. A minute later a hypo gun came around the jamb, followed by a watery blue eye. I felt the sting in my cheek.

"I checked you early," said Julie. She settled herself uncomfortably at the foot of the hospital bed. "Rather, you called me. When I came to work you weren't there, and I wondered why, and *wham*. It was bad, wasn't it?"

"Pretty bad," I said.

"I'd never sensed anyone so scared."

"Well, don't tell anyone about it." I hit the switch to raise the bed to sitting position. "I've got an image to maintain."

My eye and the socket around it were bandaged and numb. There was no pain, but the numbness was obtrusive, a reminder of two dead men who had become part of me. One arm, one eye.

If Julie was feeling that with me, then small wonder if she was nervous. She was. She kept shifting and twisting on the bed.

"I kept wondering what time it was. What time was it?"

"About nine ten." Julie shivered. "I thought I'd faint when that — that vague little man pointed his hypo gun around the corner. Oh, don't! Don't, Gil. It's *over*."

That close? Was it *that* close? "Look," I said, "you go back to work. I appreciate the sick call, but this isn't doing either of us any good. If we keep it up we'll both wind up in a state of permanent terror.

She nodded jerkily and got up.

"Thanks for coming. Thanks for saving my life, too."

Julie smiled from the doorway. "Thanks for the orchids."

I hadn't ordered them yet. I flagged down a nurse and got her to tell me that I could leave tonight, after dinner, provided I went straight home to bed. She brought me a phone, and I used it to order the orchids.

Afterward I dropped the bed back and lay there a while. It was nice being alive. I began to remember promises I had made, promises I might never have kept. Perhaps it was time to keep a few.

I called down to Surveillance and got Jackson Bera. After letting him drag from me the story of my heroism, I invited him up to the infirmary for a drink. His bottle, but I'd pay. He didn't like that part, but I bullied him into it.

I had dialed half of Taffy's number before, as I had last night, I changed my mind. My wristphone was on the bedside table. No pictures.

" 'Lo."

"Taffy? This is Gil. Can you get a weekend free?"

"Sure. Starting Friday?"

"Good."

"Come for me at ten. Did you ever find out about your friend?"

"Yah. I was right. Organleggers killed him. It's over now, we got the guy in charge." I didn't mention the eye. By Friday the bandages would be off. "About that weekend. How would you like to see Death Valley?"

"You're kidding, right?"

"I'm kidding, wrong. Listen—"

"But it's hot! It's dry! It's as dead as the Moon! You did say Death Valley, didn't you?"

"It's not hot this month. Listen . . . " And she did listen. She listened long enough to be convinced.

"I've been thinking," she said then. "If we're going to see a lot of each other, we'd better make a — a bargain. No shop talk. All right?"

"A good idea."

"The point is, I work in a hospital," said Taffy. "Surgery. To me, organic transplant material is just the tools of my trade, tools to use in healing. It took me a long time to get that way. I don't want to know where the stuff comes from, and I don't want to know anything about organleggers."

"Okay, we've got a covenant. See you at ten hundred Friday."

A doctor, I thought afterward. Well. The weekend was going to be a good one. Surprising people are always the ones most worth knowing.

Bera came in with a pint of J&B. "My treat," he said. "No use arguing, 'cause you can't reach your wallet anyway." And the fight was on.

—LARRY NIVEN

REMEMBER New subscriptions and changes of address require 5 weeks to process!

WELCOME, CENTAURIANS

by TED THOMAS

Sometimes people have more in common than they think.

Colonel Lee Musser looked at the tracery on the giant screen in front of him and said, "Someone seems to be attacking Russia. I'm glad it isn't us." He picked up the phone and said, "Captain, this is Colonel Musser at Central. Listen carefully, time is important. We have a large bogie at a high altitude — three hundred miles — on a southeasterly course that will cut across the Russian heartland, destination unknown. We didn't put it there, but the Russians may think we did and retaliate. I'm recommending that both the Joint Chiefs and the hot line be used right now to tell the Russians we don't know anything about it. I'll stand by here for any confirmation you might need. Over and out."

He hung up and turned to supervise the swelling bustle of activity around him. Other phones were busy as other men called lesser officials. After making certain that the information was being passed around as fast as possible he urged the tracking groups to fix a course and target for the bogie. The computers ceased gathering data and swung to computation. Musser watched the trace on the screen until his phone rang, a long, continuous ring. He knew the origin of that

ring. He picked up the phone and said, "Colonel Musser, Sir." He listened a moment and then swung around to the computer technicians and waved them over. He said, "Our data so far show it is not falling. It seems to be in orbit now, passing right over the center of the continent. It's larger than anything we could put up, and you might point out that fact to them at the outset, Sir. They ought to know we couldn't put anything that big up. Neither could they, so it might be appropriate to ask them what the hell they . . . that is, what they are doing." He listened, and then, "Good luck, Sir." and hung up.

"Follow it," he said to the computer technicians, "and let me know of any departure from its existing course."

Linton stepped up, a wiry, dapper army colonel who always leaned forward a bit when he walked. He kept his eye on the tracery on the screen as he talked to Musser. "Well, Lee, a bit of action at last. Where'd that thing come from if not the Russians? British, French, Chinese? None of them has the capability."

"You make the answer easy, if what you say is true. It comes from off-planet."

"Oh come on, Lee. Not you."

"That bogie's real. We've been triangulating it for six minutes from eighteen or more observers. What's your answer?"

Musser's phone rang, the Pentagon ring this time. He picked it up and said, "Colonel Musser." He listened. "Good," he said. "It makes sense that they would know we didn't do it. All pressure off, then? We'll keep watching it. Me? I think it is from off-planet. No, I'm not. Where else? Okay. So long, Charlie."

Linton winced. No one of such comparative youth as Musser called General Charles S. Arlington "Charlie." Linton said, "You must be bucking for a promotion, or out. You a UFO nut?" He pronounced it you-foh.

Musser said, "As of now I'm converted." Linton wandered off, shaking his head.

Activity settled into routine for an hour. The bogie changed orbit, dropping to one hundred miles and levelling, following a line above the parallel of forty degrees north latitude. The phones rang again, and for fifteen minutes things were busy. For six hours thereafter there was no change, and by that time half the world had monitors of one kind or another on the bogie. Several of the giant telescopes had photographed it as it swept through their field of view, and nations were comparing pictures.

Musser said, "I never thought

I'd see the day when we'd be swapping photographs with the Soviet Union on such a chummy basis. What's become of all our good old nastiness?"

The Pentagon ring came again, and it was the General. "Lee, it looks like your first guess was right. I want you to head up our effort in coping with it. Come on over here."

In his new office Musser felt uncomfortable for a few hours with no activity around him. Then the answers to some of his questions began to come in and the phones began to ring. He received approximate answers from half a dozen universities and research centers around the country before anyone else even thought to ask the questions. What was that slightly flattened sphere made of? Did it leave a trail of any kind? What was its mass? What gravitational forces acted on it when it changed course? On and on he went, often putting the same question to different groups to compare answers. It wasn't until the next day, however, that he thought to call in an etymologist and a linguist. "How do we communicate with them up there?" He waved his hand at the sky.

They looked surprised and did not answer, so he said, "Can either of you think of anything better than flashing a light at them in a sequence of one, two, three flashes, over and over, or perhaps up to ten?"

The etymologist agreed, but thought that seven would be right. The linquist thought five would be better. While they mounted an argument with each other Musser had his men start up the great heliograph he had rigged to emit short flashes in bursts of one, two and three. They used the aiming mechanism on an antiaircraft rifle as the bogie swept overhead, and they maintained their flashes for four minutes. Musser said to his two experts, "Give some thought to what we'll do when we make a little headway here. I want a reasonable plan, not a lot of arguments. Bye."

He turned to the task of setting up radio communication in conjunction with the flashes, and two passes later his men emitted blasts of static of mixed frequencies timed with the flashes. On the third orbit, a flash came back from the bogie and at the same time they received a pulse on the high end of their scatter band. By the sixth orbit the bogie was counting with him, and Musser was using his voice. He ordered his men to raise the frequency slowly to the TV broadcast ranges, and on the tenth orbit a master sergeant was giving the

bogie a lesson in the alphabet and simple English sentences. Musser got his first response on the twelfth orbit. It was an aspirated word that sounded like the whispered word "Hhugg." That was when the etymologist and the linguist showed up with a plan. Musser thanked them and asked them if they minded leaving so he could take a nap. General Arlington woke him up.

"Lee, I'm putting you in overall charge of that thing, to the extent you can take charge of it." General Arlington was known for a sense of humor. "It seems to be talking to your men at a pretty steady rate. One thing, though. Other countries have followed your lead. I understand the bogie now speaks pretty fair French, Russian, German and Japanese. What are you going to do?"

Musser said, "Rub my eyes and yawn." General Arlington frowned a little, and Musser said, "Okay, Charlie. The thing to do is to talk it down to the United Nations Plaza. Let's see what I can do." He stepped up to the battery of TV cameras and microphones while the master sergeant briefed him on everything that had been happening.

"It knows who you are," the sergeant said. "It wanted to know who thought of signalling so fast. So go and talk to it."

"What do they look like, sergeant?"

"Well, they won't show us. Or can't. They say they can't. But they can see us."

"They use names?"

"No."

Musser walked out in front of the cameras and said, "All right up there. Lee Musser down here. You see and hear me all right?"

An immediate sibilant "yesss" came back.

"What do you have in mind up there?"

A pause, and then, "You come right to the point, Lee Musser We have nothing particular in mind. We'd like to come down for a few days, but we don't know what we would be getting into. Will it be safe for us?"

"I think so. I'll check with all the other countries to make sure nobody takes a shot at you. I would like to have you come down here, but other countries might not like that. We have a place where all countries meet, and it is not far from here. You ought to come down there."

"Damn good idea."

Musser glared at the sergeant. "Who taught it 'damn?' "

The sibilant voice said, "Oh we learned a lot from your television and radio once you taught us the language. Don't blame the

sergeant. We'll ask the other countries whose language we speak if we can land safely at the U.N. Okay with you, Lee?"

Musser shrugged and said, "Sure, man."

"We're not men. Wait until you see us. Be back to you in a few minutes."

Musser nodded and walked out of camera view and started his people calling to clear with the New York City police, the New York City fire department, the mayor, the governor, the U.N. Secretary General, regional F.B.I. Early Warning Commander, Air Force Commander, Harbor Police, and the U.S. Coast Guard. He had just got the phone calls going when he heard the sibilant voice say, "Lee Musser, you there?"

He stepped back into camera view and said, "I'm here, man. How'd you make out?"

"Pretty good. Can we rely on their assurances not to shoot us down?"

"I think so. Let it sit for an hour while they chew on it. I have a lot of phone calls going now so that you won't be wounding any feelings when you land. Let them gel, too. By the way. Where you fellows from?"

"Yesss. Well, we haven't got your name for the place yet. It's about four light-years from here. and as soon as we identify it in your language we'll name it for you."

"Been here before?"

"Yesss, but not lately. We got here, oh let's see, about eighty million years ago."

Musser shook his head. "Boy, you fellows live a lot longer than we do."

"Hold it. When I say 'we,' I mean my race was here. We don't live much longer than you do. I guess we average out to something like ninety or one hundred of your years. Damn shame, isn't it?"

"Yeah. How come somebody as smart as you hasn't figured out a way to live forever?"

"We're not smart, at least not that smart. Hell, we're not much smarter than you. That's why we want to make sure your people won't take a shot at us when we land. We don't have any weapons aboard. We can't hurt you here on your planet. Fact is, we can help you. We can teach you to build the engines that power this ship, and maybe a couple of other things. But we can't teach you much. You won't want to go space traveling any more than we do. Speed of light is tops. If it weren't for the clock paradox we couldn't get here at all. When we get back home everybody we knew will be long dead. That's a pretty high price

to pay for the privilege of going for a space jaunt. We do it every once in a while, but not often.

"We made this trip because we wanted to see what happened after our last visit. We didn't really expect to find this kind of an advanced civilization. When we were here last time, things were in a mess. Swampy, hot, wet everywhere, and huge damn animals with big teeth — yes we've got the word. Dinosaurs. The place was all over dinosaurs."

"Yeah, well, some people think things must have been better in those days anyway."

"You have that kind, too, huh? Believe me, they weren't. Our people couldn't safely leave the ship. We had no weapons. We managed to get some studying done anyway. Boy, let me tell you. This planet is a legend back home. We scare our youngsters with stories and pictures about it. Wait until you see the pictures."

"Hey, great. Our scientific community will go off its rocker to see actual pictures of Earth eighty million years ago. And some of the live stock, too, you say?"

"Most of it. Wait until you see the animals. When we left we seeded the place with a blood-sucking grub we use to make food for us, the way you use a cow. Left them all over the place — figured they might kill off the dinosaurs. We had a bad few minutes when we first got here this time. That grub was a parasite, and somewhat adaptable, and we thought *you* might be the evolutionary product of the grub. But you're not — nothing like the way it could possibly turn out. It might still be around, though. That's one of the things we'd like to check into, if you'll let us."

"Sure, far as I'm concerned. Say, you're talking a lot better. You learn fast."

"Yes, we do that. We communicate by squeezing air through many narrow tubes that whistle. To make your kind of sounds I squeeze my air into a voice box that I control with my . . . call them hands. It takes some practice."

"Like I said, you're pretty smart."

"Not much. You could run films for us. We have eyes something like yours, and we can make records. We can read books.

We can give you wires with our information on them. You can play them back. But we have only got a week here before we have to head home; we have a schedule that we ought to stick to."

"Yeah," said Musser. "Wait a minute while I see how our clearances are coming along down here." Musser was by now surrounded by a huge mob kept off the platform only by a ring of police. He called out, "Sergeant, how're things coming!"

"Pretty good, Sir. The New York police are already clearing out the U.N. grounds to make sure no nut gets at them. Most of the others are all set. Another few minutes.

Musser started to speak, but the voice said, "We heard him, Lee. Sounds promising."

Musser nodded. "I think you will be all right. How are your checks coming?"

"All in order, those that have answered."

"How do you manage to get along so well in all those languages?"

"We pick them up fast. Can you get to the U.N. in an hour?"

"Yep. You ready to come down?"

"Yep. Meet you there then." The hum of static stopped, and Musser stepped off the platform.

A platoon formed around him and led him to a copter nearby. There was a delay of a few minutes while the troops moved the crowd back, and then the copter took off and headed swiftly for New York City. They were there in forty minutes. The New York police had cleared the U.N. Plaza, so the copter put down there to drop off Musser and his crew, and then it left. Musser found himself in the midst of a group of very important people, all of whom wanted to talk to him and make suggestions. Musser listened and smiled pleasantly and nodded, and started them talking among themselves.

"There it is." The cry went up from the crowd, and they all looked up to see the silver dot in the sky grow quickly larger as it dropped toward them. It did not seem to slow down as it neared the surface and assumed surprisingly large dimensions. A few women began screaming, and the crowd out on the street surged with panic and then scattered as the great globe plummeted to within a hundred yards of the ground and then stopped. It blotted out the sun, but the panicky crowd grew quiet, and then the great sphere settled slowly to the ground, crushing a few trees as it landed. As it made its final move, Musser, unnoticed, left the group he was with and walked alone to a point near where its base would touch the ground. When it hit he craned his neck looking for a door or hatch. Seeing none, he began to circle. Halfway around he found it and waved his radioman over. He picked up the microphone

and said, "Well, so far so good. Everything all right in there?"

"Great in here Lee Musser. All right out there?"

"Yeah. You scared a few people when you came down, but nothing serious. Come on out."

"Well, I want to make sure you are ready for us. I want to remind you again that we are not exactly supermen in appearance. I doubt you have anything here on Earth that looks quite like us."

Musser said, "All right. You apologized. Come on out."

"We note you've got TV cameras hooked up all over hell and gone. I think a lot of your people are likely to faint. Is that all right?"

"Sure is. Come on out."

"Are there any kooks out there that might start shooting when they got a look at us?"

Musser sighed. "You know? For the first meeting in the history of mankind with extraterrestrials, you certainly are kicking up a lot of fuss about showing yourself." He glanced at the nearest police captain, who nodded to him. "Everything's hunky dory out here, the police tell me. We're not expecting a Robert Taylor. Come on out."

"Okay, if you say so."

The hatch swung outward and a ramp slid down to the ground. There was a moment's pause and out came an object, down the ramp, alive, all right; but only obviously so because it moved. It was brown in color, about three feet long, two feet wide, and five inches thick, roughly rectangular in shape, and around its perimeter was a fringe of appendages, finger-thick and five inches long, spaced an inch or so apart. The rectangle moved in ripples that traveled down its length, and in the front eight appendages it carried a black box four inches on a side. It flowed up to Musser's feet and stopped, and out of the box came the words, "Well, what do you think?"

Musser said, "You look like a damn bath mat."

"Yes. Well, where I come from you'd look like the rack we dry food on."

Musser nodded and said, "Figures." He walked around the creature, noticing a row of eyes all around the perimeter. Musser said, "Where's your brain?"

"Brain? Oh, thinking tissue. Strung out inside the muscle sheaths. Where else?"

"Yeah. It seems to me you're pretty well built for moving, working and all like that. How come you were so shy about coming out? I think you're a pretty good looking guy. You are a guy, aren't you?"

"That's a little hard to say."

"Well, if it isn't important to you, it isn't to me. Welcome to Earth, Mat. Mind if I call you Mat?"

"Not at all. Let me get the rest of us out here. Why don't you bring your people over and we can talk and get the formalities over and get to know one another."

Most of the important people joined them, although a few were afraid to come too close. At first the Earth people were afraid of stepping on the extra-terrestrials. But then Mat asked Musser to step up on him while he carefully carried Musser around in a small circle to show that they were strong and not easily hurt. Out of the spaceship came the unearthly equivalent of chairs — half cylinders — over which the visitors draped themselves. There a dozen of them, and soon the plaza buzzed with conversation as scientists and TV interviewers began pumping the visitors.

Several hours passed, and Musser said to Mat, "Maybe we ought to organize. Let's get our communication people over here to set up with you a system for swapping information. Also, set your own schedule for eating, sleeping, and whatever else you do."

"You've got a good logical mind, Lee Musser. Let's do it."

It took two hours to set up a smooth running schedule of information exchange. Off to one side the TV news services were happily interviewing one of the visitors for the benefit of the world-wide audience. A team of Earthside scientists agreed on the needed equipment and located most of it at Columbia, N.Y.U. and Brooklyn Polytechnic. An orderly hubbub settled in. Streams of Earthpeople poured past in controlled lines, looking at the activities: congressmen, senators, governors, presidents of corporations, scholars, renowned sports figures, actors.

The next day Musser said, "Everything all right from your end, Mat?"

"Yes, Lee. We're into your astronomy, and your name for our home is Proxima Centauri."

"Nice to know. Welcome, Centaurians. You know, you've already stopped looking like bath mats to most of us."

"Nice to know. We can look at you without thinking about food, too. Funny, we're pretty much alike in mental outlook. I wonder if our scientists will be able to explain that. We've given them some of our tissue, and you've given us some of yours. Maybe they can make something out of it. And your people

are sure wild about those pictures my people made eighty million years ago. They emphasized how much *we* had changed in eighty million years. We used to be a lot thicker and shorter than we are now. So it goes, all things change. We're looking at your paleontology texts. Those damn parasites we left behind must have killed off your dinosauers, but there ought to be some fossils, at least. How are your people doing with the theory of our space drive?"

Musser said, "They think they have it mastered. We'll have a couple of ships built in a few years. That's a big thing you've done for us Mat. I don't know how long it would have taken us to get it on our own. That space drive theory is subtle.

"What are friends for? This way we'll see you out in the Centauri neighborhood before long. No reason why we can't continue the exchange. We've got to crack out of here in another two days to meet our schedule."

"Yeah. Things won't be the same around here after you go."

Two days later they gathered for the farewell.

Musser said, "If I knew how to shake hands with a guy like you I would."

"I know how you feel. When I put my voice box down in a minute. I want you to have it."

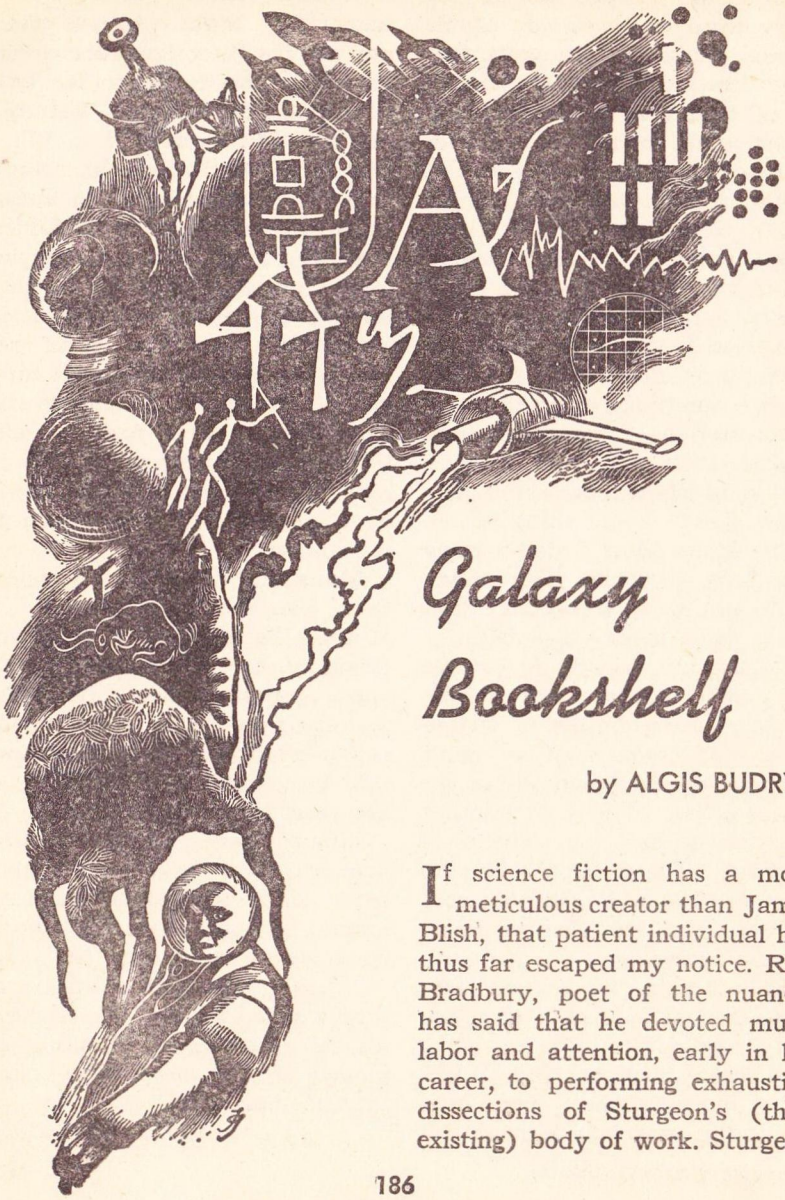
"Thanks, Mat. I want you to take this." Musser leaned over and slid his West Point class ring on one of Mat's finger-like appendages. They stood quietly, and then Musser said, "Say, Mat. Our biologists found out something they wanted you to know from me. You're more of Earth than you think. That change in form you went through in the last eighty million years? It was caused by your visit here; we can trace the chromosomal origin of the tissue to mycelium from Earth. You have it all through you. Yessir, while he was here, one of your ancestors must have inadvertently mated with a mushroom."

Mat said, "We suspected something like that. We have a bit of news I'm supposed to give you privately, too. We finally found those parasites were the first mammals on Earth. We seem to have seeded your planet with the first mammals. I'm afraid they are your remote ancestors."

Musser shrugged his shoulders and said, "Figures. It's just too bad they're afraid to announce it, both ways. Look how close we turned out to be."

"Yeah," said Mat. "What are they worried about?" He flipped his voice box up at Musser and moved up the ramp. The takeoff was uneventful.

—TED THOMAS



Galaxy Bookshelf

by ALGIS BUDRYS

If science fiction has a more meticulous creator than James Blish, that patient individual has thus far escaped my notice. Ray Bradbury, poet of the nuance, has said that he devoted much labor and attention, early in his career, to performing exhaustive dissections of Sturgeon's (then existing) body of work. Sturgeon

himself can tell you the why of every word in every one of his stories (most writers can't, and many take pride in that). And a lot of writers can go on and on about their motives, messages, moods and meditations. But I mean what I said — Blish is not merely introspective, and he is long, long past any apprenticeships. He is meticulously creative, and a lot of the time his creations have the inexhaustibility of real things. They reward re-reading not by repeating a familiar and pleasant flow of words but by presenting further aspects of what prove to be complex ideas.

For this reason, *Black Easter* (Doubleday, $3.95) not only left me curiously dissatisfied — I'm going to explain why this may be due to a whopping blind spot I happen to have — but seriously worried that if I were to re-read it enough, I might pluck out of it something vital that has escaped me.

However, let's get at it from one end to the other.

At the opening end, there is a very brief and hazardous author's statement that this book is actually the third volume in a trilogy, that the overall title of the trilogy is *After Such Knowledge,* and that the other two books are *Doctor Mirabilis,* a historical novel about Roger Bacon, and *A Case of Conscience* — a science-fiction novel (and a magnificent one, in case you haven't read it). *Black Easter* is that classic of fantasy, the deal-with-the-devil story.

Doctor Mirabilis, a book well and seriously received in England, has never been published in the U.S.A., you will have to trust me, I guess, in my possibly incorrect statement that the only overt link among the parts of the trilogy is that the principal characters of all three books are vitally concerned with intense questions of theology. The author says the books are independent of each other except for subject matter, and if you're sure you know what he's referring to, then you can act on his word.

Black Easter is subtitled "Faust Aleph-Null," the title of the magazine version. "Why, this is Hell; nor am I out of it," says Christopher Marlowe on the title page, and a little farther on, Albertus Magnus says it is not reasonable to suppose that Aristotle knew the number of the Elect. The author, having caused all this to appear in the book, which he dedicates to C. S. Lewis, also includes an introduction in which he vouches for the care he took in researching the rituals described in the book. And then we are off, under this freight of clues, signs, preparations and sig-

ils, into a story that begins with a sentence designed to remind you of "Who Goes There?" or the scene in which young Roger's room explodes in the light of a torch, or some other reference I'm not privy to, but which is pretty clearly intended to refer to something beyond the narrative, for it's instantly qualified for the purposes of the actual scene to be set. (When Blish waters down a preceding sentence, it's because he's just gotten done hitting you with a quotation, not because he's too lazy to rewrite).

What now follows is a story in which a ruthless munitions millionaire — one hardly needs the first modifier, does one? — approaches a black magician for the purpose of intensifying the amount of chaos in the world. The magician, a dedicated, hard-working, learned craftsman, first performs two preliminary jobs, for the purpose of demonstrating his ability, we are told, and then opens the lid of Pandora's box. He performs everything needful to keep the lid open only a crack, and only for a specified time. He does not blow his cool, and his assistants do falter but do not fail. Yet the world is destroyed, and he is dragged off into the Pit. Why has he failed to maintain control of the demons, when everything he did was in accordance with the previously well established relationship between himself and the ruler of Heaven and Hell? Because, the Devil says, God is dead.

All right. Up to a point, what we had was a story much like the regrettably scarce *Unknown* novellas of years ago, with the addition of priests and other features dealt with in ways John Campbell never published. But by those standards, I'm not even doing something reprehensible by giving away the punchline, because by those standards this novel is an unreasonably inflated short story, not deserving of much care as an entity, for all that individual scenes and characterizations are handled with Blish's accustomed virtuosity in such matters.

I can't believe those are the standards Blish intended, because of the great care he has taken to put so many markers on this story. One does not lightly offer any companion to *Mirabilis* and *A Case of Conscience*, particularly when one is their author, and especially when that author is genuinely concerned with religion, not with trick endings.

I would be more at ease — a great deal more at ease — if I did not have this blind spot I mentioned in Paragraph 2, said blind spot being that I cannot accept any fictional situation in which the God of the Bible ap-

pears as an operative character. I would in fact have disqualified myself from reviewing this book, except that I strongly suspect I'm not alone, by far, in experiencing this failure of the suspension of disbelief, belief, or unbelief, take your choice. And I more than suspect that Blish knows perfectly well his last line will not play the way he appears to expect it to play. You pay your money and you take your choice — Lewis, in *Perelandra,* obviously did expect his readers to go along with a literal wrestle with the Devil (and a most unconvincing one, at that). Blish quotes Marlowe, harking back to *Unknown*'s *None But Lucifer* (by H. L. Gold and L. Sprague deCamp)" yet assuredly (?) Earth and Hell in *Black Easter* are not the same place . . . to begin with, anyway.

I don't know. I would disqualify myself on those grounds, too, except that think I'm accurately portraying the potential reaction of many readers. I could resolve my difficulties by re-reading the book until I felt I understood it. But would you be patient for long? Have you read it several times already, by the time this review appears in print? Or I could pick up a phone, and ask Jim some of these questions. But would you?

Strange. Strange. So opaque a book from so pellucid a writer...

Let's go to a pellucid book by a man who sprays words in a dazzle of light.

Samuel R. Delany is the best science-fiction writer in the world. As partial evidence, I offer you *Nova* (Doubleday, $4.95 —pay the hardcover price and place the volume in your library).

If he lives long enough, Delany will get the full treatment from the slick magazine blurb writers, from the literary editors, and from critics more polished and prestigious than your humble servant. He will be interviewed, quoted, discussed, photographed standing alone on a beach at dawn, photographed sharing an apple with a child, and be offered a role in an underground movie. I just want to say it while it's true. Samuel R. Delany, right now, as of this book, *Nova,* not as of some future book or some accumulated body of work, is the best science-fiction writer in the world, at a time when competition for that status is intense.

I don't see how a science-fiction writer can do more than wring your heart while explaining how it works. No writer can. The special thing that science fiction does is to first credibly place the heart in an unconventional environment. A particular thing that recent science fiction has been doing is to make that unconven-

tional environment a technological one. Another has been to make it a romantic one, sometimes calling it an intensely humanistic one, or a psychedelic one. All of these things are accomplished in *Nova* by Samuel R. Delany, the world's best science-fiction writer.

But let's go about this in some systematic way. What makes this book, among all books, offer me the conviction that its author stands at some pinnacle?

Well, for one thing it successfully combines a number of strong, well handled story elements. It is highly entertaining to read, and it involves the reader in the unfolding of events. It does so on a number of levels, and it does so while using classical science-fiction elements

For example, the story of interstellar politico-economics is a well established and thoroughly explored vehicle in science fiction Having chosen to set his story in this framework, Delany is obligated to make it believable — to make it develop meaningfully to give it a history and to promise it a future The generations-long galaxy-wide power struggle between the contending factions in *Nova* meets all of these criteria. The human events in the book are all valid parts of the one central politico-economic event they interact with. They are influenced by and influence it, believably and directly.

Delany's technical accomplishment in bringing off this portion of the story, in the necessarily restricted space he allows himself, is impressive. People who specialize in this kind of story have often taken much lengthier paths to getting it told. Delany tackles it like an old master. Which he is not; he simply seems like one.

But within the story of what quarter — or, more accurately, third — of the human galaxy will come out on top is the story of who will reach the Illyrion first. And this, too, is a classical science-fiction story in its aspect of explaining that Illyrion is a physical element — albeit a most unconventional one — whose properties make it the basic universal power source (and hence make its possession a potent politico-economic factor) and whose properties furthermore are crucial to the plot climax. That is, this is a useful, good, effective thing to have in an sf story provided you can make it scientifically believable and then make it it artistically believable. There are a lot of places where a science-fiction writer can fall down right here — in his science, and in his fiction, as well as in his writing — and Delany dances through them. Up to now, I thought only

Larry Niven could make stellar mechanics as functionally understandable as this.

The story of where the Illyrion is to be reached is, again, an example of virtuosity in these several places; it is also the working out of the classically posed scientific puzzle. All the clues are given in the beginning of the story, and the ending satisfactorily explains their relevance. At the same time, all these many other things are going on, and Delany is plausibly telling us how a man might pilot a vessel through a nova.

And we haven't even touched yet on the story of Lorq Von Ray and his blood-struggle against the psychopathic Prince and Prince's sister, Ruby Red, whom Lorq loves, but it's in the telling of that story that Delany will assuredly reach you where you live; I really don't see how some aspect of that story can fail to seem very true and poignant to you.

But leave that. We have many good storytellers in the field, especially lately, who can involve you in interpersonal drama. They are all Ted Sturgeon's children, if you want to oversimplify. What about taking the cyborg idea, and painting a picture of a civilization where everyone plugs directly into his tools? What about then making you realize that a socketed man plugged into a factory literally puts the raw materials in with his bare hands and nudges and pushes the product along the processing line.

His brain, after all, cannot then tell the difference between telling his hand to scoop and telling an automated train of ore cars to roll into the unloading dock. All right? Then Delany makes you realize that if this is true — which is a little past where Cordwainer Smith left it, already — then such a factory worker has a sense of accomplishment and identity with his product that is now lost to the 20th century and has in fact been lost to us all since the disappearance of the artisan. And that this becomes a major social fact in the world of the future . . . a redeeming fact of technology, with all its intense humanistic implications arrived at via the route of playing on the sensorium. And what of the hero who scoops up seven tons of Illyrion in his bare hands and tips the balance of interstellar power, of history and of human yearning?

I haven't even told you about the Mouse. Or Dan. Or the syrinx, or Istanbul, or the puns. I'll give a clue about Delany the writer this year as distinct from Delany the writer last year. In *The Einstein Intersection,* Looby has a musical machete. In *Nova,*

Mouse has a syrinx and calls it an ax almost right away — it's later that you get the jest.

There are a couple of things that might have been done better. I'll list a couple to save time —Brian was a good idea, but shouldn't have been just let go if he was going to be a character in the book at all. Since a function like Brian is necessary to the story, it probably should have been a piece of prose rather than a person. And we should have seen some Illyrion at the end; we need a flash of the Grail, for credibility. Okay? Satisfied?

But I never said this was the world's best science-fiction *book*. It's so far the best book of the year, not coincidentally because it's a book, this year, by the world's best science-fiction writer. *That's* what I said.

—ALGIS BUDRYS

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GALAXY'S STARS

Ben Bova, whose *Foeman, Where Do You Flee?* leads off this issue, marks his tenth year as a science-fiction writer in 1969. His first appearance was with a juvenile novel, *The Star Conquerors,* since which he has published ten books, plus a number of articles and stories.

The articles, he says, began when "Isaac Asimov was approached by Cele Goldsmith to do a series on 'Life on Other Worlds'. He was busy and didn't want to do it, but he told Cele that Ben Bova, who knew just as much about it as he did, would be glad to do the series. Then he called me and told me what he had told Cele. After reviving me he said, 'Now, here's what I mean. You'll know just as much as I do, because if you get stuck I'll help you.' I frequently got stuck. Isaac was a big help."

Bova's basic career is as Coordinator of Marketing for Avco-Everett Research Laboratory in Massachusetts, which principally does research in high-temperature gas physics, which includes everything from re-entry physics to gas lasers. Among other interesting projects is a means of protecting a spacecraft from lethal doses of radiation, such as solar-flare occurrences. "It turns out," Bova says, "that you may be able to predict solar flares well enough so that on a three- or four-day mission to the moon you can time your mission so that there won't be a flare. But when you start traveling out toward Mars you're going to be in deep space so long that there's bound to be a flare of serious enough intensity so that you're going to need radiation shielding. You can shield with a cement wall, but that's kind of bulky. One of the things we're trying to do is shield with a magnetic field to keep these high-energy protons away from the spacecraft by deflecting them. This calls for real good knowledge of the interplay of magnetic energy and plasmas, in the field of study called magnetohydrodynamics."

Bova, a regular at the annual Milford Science-fiction Writers' Conference, says that the Conference reminds him of some of the things that happen at the lab. "In the laboratory a research man reports periodically on his work in front of a sort of jury of peers, who will offer generally friendly, sometimes pretty barbed, criticism of what he's doing. The guy goes away sometimes bloody, but usually wiser. At Milford the same thing is done to manuscripts

that all of the writers submit."

John Brunner, whose *Thing-of-the-Month-Club* japes are a *Galaxy* feature, is a Londoner who has functioned as editor, poet and critic as well as writer. His views on writing are worth listening to: "We ought to get back to the old idea of a 'masterpiece' — that is to say, a task one sets oneself in order to demonstrate that one has fully mastered the basics of the writing craft. Picasso, to my mind, could never have become the seminal influence on modern art that he is had he not been one of the great portrait painters of his generation. I have a feeling that perhaps I've been fortunate in coming up the slow way in science fiction; none of my early books achieved immediate wide acclaim; they just sold and brought me in a steady living. And now, finally, after ten years of freelancing, I think I've done a book which will stand up head and shoulders above everything else I've ever written. This is *Stand on Zanzibar,* from Doubleday."

James Tiptree, Jr., one of our more peripatetic writers, is just back from a fishing sojourn amid the primeval rocky lochs of Northern Scotland. Saw no Loch Ness monsters, he reports; also no fish.

Larry Niven (*The Organleggers*) won a Hugo for *Neutron Star,* published a year or two ago in *If.* Around the *Galaxy* office there is a feeling that he may be about due for another one for *The Organleggers* . . .

TRICKS OR TREATS

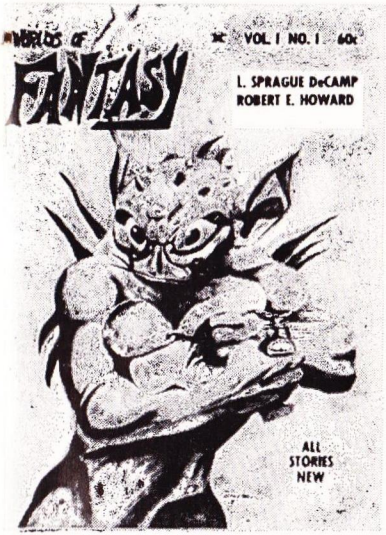
The trick is to write the number of possible results of flipping *n* coins, even when *n* is unknown because you've hidden some of the coins. The solution is to draw the row of coins, or have someone else do it, and then merely write the number 1 in front of it. The answer is the number of possible results *in binary notation.*

Assume you've drawn 8 coins: OOOOOOOO. There are 256 possible results. Writing the number 1 before them gives you the binary number 1OOOOOOOO, equivalent to decimal 256, which is the right answer. This is so regardless of how many zeroes ("coins") you have drawn, and this regardless of whether you can count them or not.

"Oh, I didn't know you meant to give the answer as a *binary* number!"

(If you don't know what binary numbers are, ask any twelve-year-old; as a last resort, you might even look up a copy of *Digits and Dastards,* published by Ballantine Books, written by your editor.)

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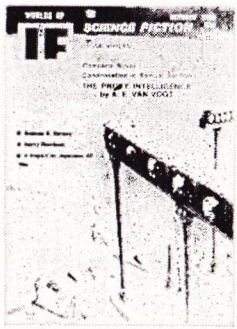
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The author and the contributors.

R. D. Heitchue, the editor, has been associated with Douglas Aircraft Missile and Space System Division since 1957. For four years he had the responsibility of directing advanced studies of space launch vehicles, unmanned spacecraft, and manned planetary systems. All the contributors are senior members of the technical staff at Douglas, and have an average of 19 years of professional experience.

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