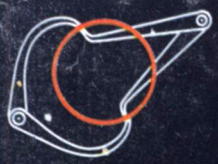

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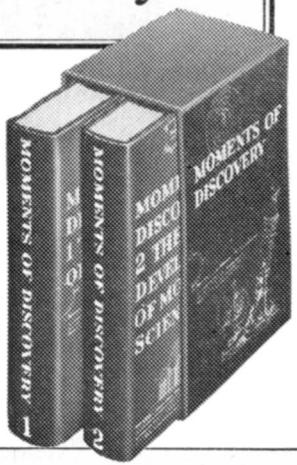

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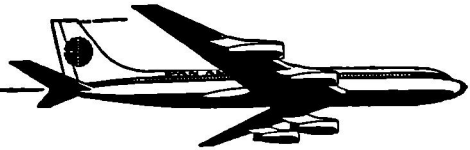

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SUBJECTIVE COLOR

HE I.E.S., which we started in these pages about a year ago, is making slow progress; trouble seems to be the difficulty of accumulating members, building local groups, et cetera.

But I want to point out another Society, a Society which has the characteristic that membership is always involuntary, undesired, and painful, but which grows by leaps and bounds nonetheless.

This is the Society For Monkey's Uncles. Membership is involuntarily conferred on one by the achievement of someone else; it's unnecessary to *say* "Well I'll be a monkey's uncle!" to achieve that status. The fundamental requirement for election to membership—the absolutely necessary pre-existing condition—is that you be absolutely certain that you know for sure some "fact" which someone else proves to be a misguided theory.

Dr. Edwin Land, of the Polaroid-Land outfit, most widely known for his Polaroid sixty-second-pictures camera, has very recently conferred full membership in the Society For Monkey's Uncles on a major segment of a number of learned societies and groups. The Medical profession, the psychologists, many physicists, electronics engineers, photo-chemists—a very large and outstanding group indeed.

Dr. Land has achieved a major breakthrough. As an off-hand estimate, I'd say that the electronics industry in the United States just had the plug pulled out on a 200 megabuck investment—their entire color TV program just went down the drain. Finished—*kaput*—wiped out.

The medical profession has been

blundering around trying to understand color blindness for centuries. More recently, the psychologists have been making a terrific effort on the study of perception. Of course, Eastman Kodak, Agfa, Gaevert, Ilford—the great film companies of the world—have been investing major research programs toward improved color films and color reproduction.

One of the most fascinating aspects of all this to-do, now clarified by the little demonstration Dr. Land put on, is that all the hundreds of millions of dollars, and the years of research by battalions of highly trained scientists . . . has been based one hundred per cent on a piece of pure superstition! A bit of ancient folklore! They wouldn't spend a nickel investigating such superstitious nonsense as dowsing rods, but millions and millions went into the prehistoric superstition that human beings have three-color vision!

We don't. We actually see only one color . . . as Dr. Land has beautifully demonstrated. We do NOT see the other colors—*we deduce them!*

When artists first originated the idea of three-primary-colors I don't know, but the scientists have gone happily down the same line, without once—despite flagrantly obvious clues!—stopping to consider that an artist wasn't interested in light, but in objects. The artist's job is to produce a colored *object;* the only time an artist works with colored *light* is when he's working with stained glass windows. And, as everyone knows, reflection color follows entirely different laws than radiant color. In reflected color, red plus green equals black; in radiant color, red light plus green light equals white.

Oh, well . . . Dr. Land seems to be more of an Edison-type empiricist than an orthodox theory-and-crucial-experiment scientist. Land wanted color prints for his sixty-second camera—the one area in which the Polaroid camera wouldn't match conventional cameras. Land seems to have done some genuine, thoroughly original I.E.S. type research.

In Cambridge recently, he demonstrated a new technique.

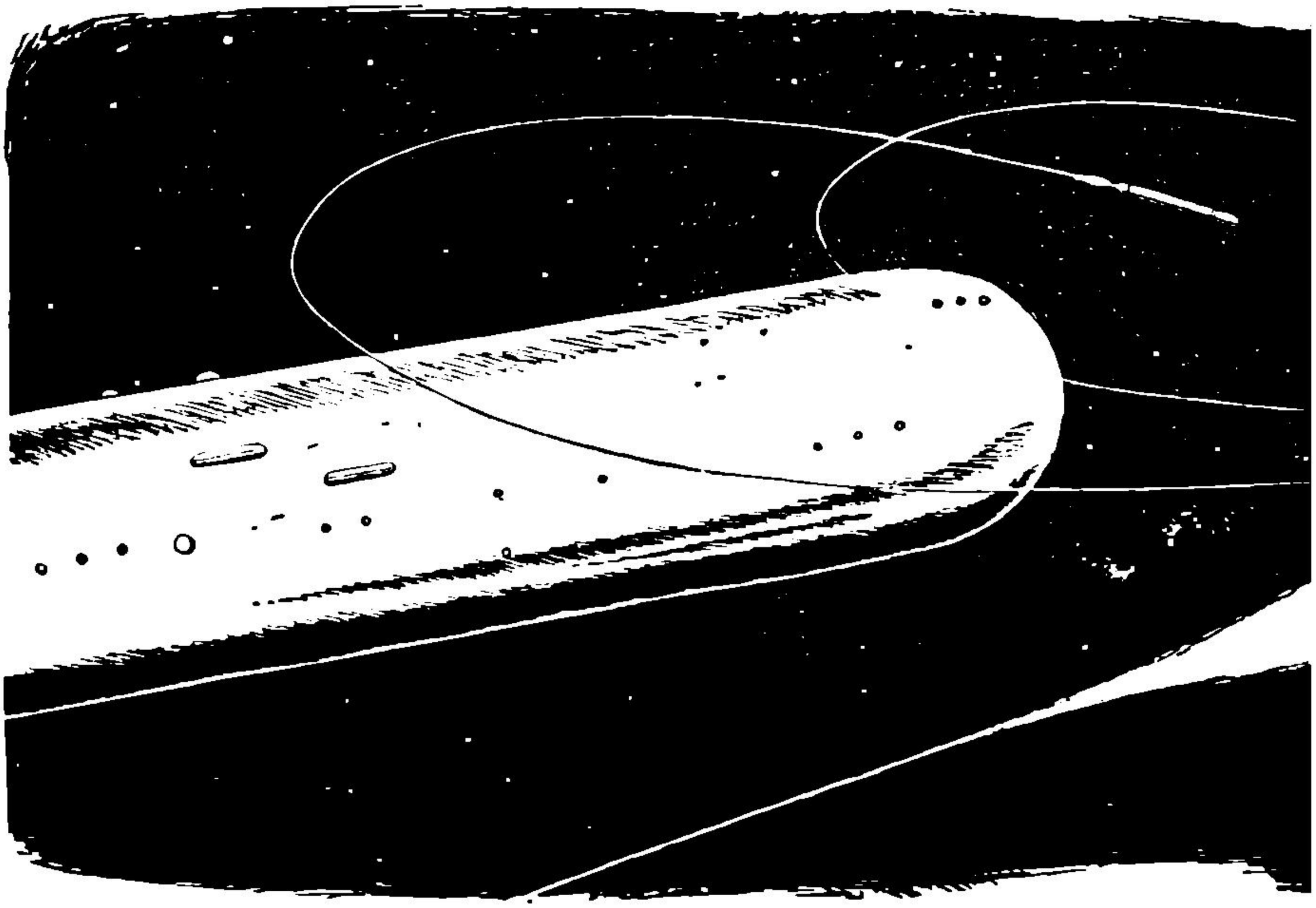
He takes one shot on standard panchromatic black-white film through a green filter, and another shot on similar film through a red filter. An article by Edwin Land in the May, 1959 *Scientific American* gives considerable technical data; the filter-curves published correspond to those Eastman gives for the Wratten #25 (tri-color red), #58 (tri-color green) and #61 (a photometric green filter.)

The two shots are processed to standard black-white transparencies. The red-filtered shot is projected on a normal screen through a red filter; the green-filtered shot can be projected either through a green filter, or simply in white light.

If the red-white light combination is used, it is self-evident that there can only be present on the screen, various tones ranging from

(*Continued on page* 156)

THE...

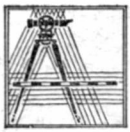


BY MURRAY LEINSTER

Illustrated by van Dongen

..ALIENS

The human race was expanding through the galaxy . . . and so, they knew, were the Aliens. When two expanding empires meet . . . war is inevitable. Or is it . . .?



AT 04 HOURS 10 minutes, ship time, the *Niccola* was well inside the Theta Gisol solar system. She had previously secured excellent evidence that this was not the home of the Plumie civilization. There was no tuned radiation. There was no evidence of interplanetary travel—rockets would be more than obvious, and a magnetronic drive had a highly characteristic radiation-pattern—so the real purpose of the *Niccola's* voyage would not be accomplished here. She wouldn't find out where Plumies came from.

There might, though, be one or more of those singular, conical, hollow-topped cairns sheltering silicon-bronze plates, which constituted the evidence that Plumies existed. The *Niccola* went sunward toward the inner planets to see. Such cairns had been found on conspicuous landmarks on oxygen-type planets over a range of some twelve hundred light-years. By the vegetation about them, some were a century old. On the same evidence, others had been erected only months or weeks or even days before a human Space Survey ship arrived to discover them. And the situation was unpromising. It wasn't likely that the galaxy was big enough to hold two races of rational beings capable of space travel. Back on ancient Earth, a planet had been too small to hold two races with tools and fire. Historically, that problem was settled when *Homo sapiens* exterminated *Homo neanderthalis*. It appeared that the same situation had arisen in space. There were humans, and there were Plumies. Both had interstellar ships. To humans, the fact was alarming. The need for knowledge, and the danger that Plumies might know more first, and thereby be able to exterminate humanity, was appalling.

Therefore the *Niccola*. She drove on sunward. She had left one frozen outer planet far behind. She had crossed the orbits of three others. The last of these was a gas giant with innumerable moonlets revolving about it. It was now some thirty millions of miles back and twenty to one side. The sun, ahead, flared and flamed in emptiness against that expanse of tinted stars.

Jon Baird worked steadily in the *Niccola's* radar room. He was one of those who hoped that the Plumies would not prove to be the natural enemies of mankind. Now, it looked like this ship wouldn't find out in this solar system. There were plenty of other ships on the hunt. From here on, it looked like routine to the next unvisited family of planets. But meanwhile he worked. Opposite him, Diane Holt worked as steadily, her dark head bent intently over a radar graph in formation. The immediate job was the completion of a map of the meteor swarms following cometary orbits about this sun. They interlaced emptiness with hazards to navigation, and nobody would try to drive through a solar system without such a map.

Elsewhere in the ship, everything was normal. The engine room was a place of stillness and peace, save for

the almost inaudible hum of the drive, running at half a million Gauss flux-density. The skipper did whatever skippers do when they are invisible to their subordinates. The weapons officer, Taine, thought appropriate thoughts. In the navigation room the second officer conscientiously glanced at each separate instrument at least once in each five minutes, and then carefully surveyed all the screens showing space outside the ship. The stewards disposed of the debris of the last meal, and began to get ready for the next. In the crew's quarters, those off duty read or worked at scrimshaw, or simply and contentedly loafed.

Diane handed over the transparent radar graph, to be fitted into the three-dimensional map in the making.

"There's a lump of stuff here," she said interestedly. "It could be the comet that once followed this orbit, now so old it's lost all its gases and isn't a comet any longer."

At this instant, which was 04 hours 25 minutes ship time, the alarm-bell rang. It clanged stridently over Baird's head, repeater-gongs sounded all through the ship, and there was a scurrying and a closing of doors. The alarm gong could mean only one thing. It made one's breath come faster or one's hair stand on end, according to temperament.

The skipper's face appeared on the direct-line screen from the navigation room.

"Plumies?" he demanded harshly. *"Mr. Baird! Plumies?"*

Baird's hands were already flipping switches and plugging the radar room apparatus into a new setup.

"There's a contact, sir," he said curtly. "No. There was a contact. It's broken now. Something detected us. We picked up a radar pulse. One."

The word "one" meant much. A radar system that could get adequate information from a single pulse was not the work of amateurs. It was the product of a very highly developed technology. Setting all equipment to full-globular scanning, Baird felt a certain crawling sensation at the back of his neck. He'd been mapping within a narrow range above and below the line of this system's ecliptic. A lot could have happened outside the area he'd had under long-distance scanning.

But seconds passed. They seemed like years. The all-globe scanning covered every direction out from the *Niccola*. Nothing appeared which had not been reported before. The gas-giant planet far behind, and the only inner one on this side of the sun, would return their pulses only after minutes. Meanwhile the radars reported very faintfully, but they only repeated previous reports.

"No new object within half a million miles," said Baird, after a suitable interval. Presently he added: "Nothing new within three-quarter million miles." Then: "Nothing new within a million miles . . ."

The skipper said bitingly:

"Then you'd better check on objects that are not new!" He turned aside, and his voice came more faintly as he spoke into another microphone. *"Mr.*

Taine! Arm all rockets and have your tube crews stand by in combat readiness! Engine room! Prepare drive for emergency maneuvers! Damage-control parties, put on pressure suits and take combat posts with equipment!" His voice rose again in volume. *"Mr. Baird! How about observed objects?"*

Diane murmured. Baird said briefly:

"Only one suspicious object, sir—and that shouldn't be suspicious. We are sending an information-beam at something we'd classed as a burned-out comet. Pulse going out now, sir."

Diane had the distant-information transmitter aimed at what she'd said might be a dead comet. Baird pressed the button. An extraordinary complex of information-seeking frequencies and forms sprang into being and leaped across emptiness. There were microwaves of strictly standard amplitude, for measurement-standards. There were frequencies of other values, which would be selectively absorbed by this material and that. There were laterally and circularly polarized beams. When they bounced back, they would bring a surprising amount of information.

They returned. They did bring back news. The thing that had registered as a larger lump in a meteor-swarm was not a meteor at all. It returned four different frequencies with a relative-intensity pattern which said that they'd been reflected by bronze—probably silicon bronze. The polarized beams came back depolarized, of course, but with phase-changes which said the reflector had a rounded, regular form. There was a smooth hull of silicon bronze out yonder. There was other data.

"It will be a Plumie ship, sir," said Baird very steadily. "At a guess, they picked up our mapping beam and shot a single pulse at us to find out who and what we were. For another guess, by now they've picked up and analyzed our information-beam and know what we've found out about them."

The skipper scowled.

"How many of them?" he demanded. *"Have we run into a fleet?"*

"I'll check, sir," said Baird. "We picked up no tuned radiation from outer space, sir, but it could be that they picked us up when we came out of overdrive and stopped all their transmissions until they had us in a trap."

"Find out how many there are!" barked the skipper. *"Make it quick! Report additional data instantly!"*

His screen clicked off. Diane, more than a little pale, worked swiftly to plug the radar-room equipment into a highly specialized pattern. The *Niccola* was very well equipped, radar-wise. She'd been a type G8 Survey ship, and on her last stay in port she'd been rebuilt especially to hunt for and make contact with Plumies. Since the discovery of their existence, that was the most urgent business of the Space Survey. It might well be the most important business of the human race—on which its survival or destruction would depend. Other remodeled ships had gone out before the *Niccola,* and others would follow until the problem was solved. Meanwhile the *Niccola's* twenty-four rocket

tubes and stepped-up drive and computer-type radar system equipped her for Plumie-hunting as well as any human ship could be. Still, if she'd been lured deep into the home system of the Plumies, the prospects were not good.

The new setup began its operation, instantly the last contact closed. The three-dimensional map served as a matrix to control it. The information-beam projector swung and flung out its bundle of oscillations. It swung and flashed, and swung and flashed. It had to examine every relatively nearby object for a constitution of silicon bronze and a rounded shape. The nearest objects had to be examined first. Speed was essential. But three-dimensional scanning takes time, even at some hundreds of pulses per minute.

Nevertheless, the information came in. No other silicon-bronze object within a quarter-million miles. Within half a million. A million. A million and a half. Two million . . .

Baird called the navigation room.

"Looks like a single Plumie ship, sir," he reported. "At least there's one ship which is nearest by a very long way."

"Hah!" grunted the skipper. *"Then we'll pay him a visit. Keep an open line, Mr. Baird!"* His voice changed. *"Mr. Taine! Report here at once to plan tactics!"*

Baird shook his head, to himself. The *Niccola's* orders were to make contact without discovery, if such a thing were possible. The ideal would be a Plumie ship or the Plumie civilization itself, located and subject to complete and overwhelming envelopment by human ships—before the Plumies knew they'd been discovered. And this would be the human ideal because humans have always had to consider that a stranger might be hostile, until he'd proven otherwise.

Such a viewpoint would not be optimism, but caution. Yet caution was necessary. It was because the Survey brass felt the need to prepare for every unfavorable eventuality that Taine had been chosen as weapons officer of the *Niccola.* His choice had been deliberate, because he was a xenophobe. He had been a problem personality all his life. He had a seemingly congenial fear and hatred of strangers—which in mild cases is common enough, but Taine could not be cured without a complete breakdown of personality. He could not serve on a ship with a multiracial crew, because he was invincibly suspicious of and hostile to all but his own small breed. Yet he seemed ideal for weapons officer on the *Niccola,* provided he never commanded the ship. Because *if* the Plumies were hostile, a well-adjusted, normal man would never think as much like them as a Taine. He was capable of the kind of thinking Plumies might practice, if they were xenophobes themselves.

But to Baird, so extreme a precaution as a known psychopathic condition in an officer was less than wholly justified. It was by no means certain that the Plumies would instinctively be hostile. Suspicious, yes. Cautious,

certainly. But the only fact known about the Plumie civilization came from the cairns and silicon-bronze inscribed tablets they'd left on oxygen-type worlds over a twelve-hundred-light-year range in space, and the only thing to be deduced about the Plumies themselves came from the decorative, formalized symbols like feathery plumes which were found on all their bronze tablets. The name "Plumies" came from that symbol.

Now, though, Taine was called to the navigation room to confer on tactics. The *Niccola* swerved and drove toward the object Baird identified as a Plumie ship. This was at 05 hours 10 minutes ship time. The human ship had a definite velocity sunward, of course. The Plumie ship had been concealed by the meteor swarm of a totally unknown comet. It was an excellent way to avoid observation. On the other hand, the *Niccola* had been mapping, which was bound to attract attention. Now each ship knew of the other's existence. Since the *Niccola* had been detected, she had to carry out orders and attempt a contact to gather information.

Baird verified that the *Niccola's* course was exact for interception at her full-drive speed. He said in a flat voice:

"I wonder how the Plumies will interpret this change of course? They know we're aware they're not a meteorite. But charging at them without even trying to communicate could look ominous. We could be stupid, or too arrogant to think of anything but a fight." He pressed the skipper's call and said evenly: "Sir, I request permission to attempt to communicate with the Plumie ship. We're ordered to try to make friends if we know we've been spotted."

Taine had evidently just reached the navigation room. His voice snapped from the speaker:

"I advise against that, sir! No use letting them guess our level of technology!"

Baird said coldly:

"They've a good idea already. We beamed them for data."

There was silence, with only the very faint humming sound which was natural in the ship in motion. It would be deadly to the nerves if there were absolute silence. The skipper grumbled:

"Requests and advice! Dammit! Mr. Baird, you might wait for orders! But I was about to ask you to try to make contact through signals. Do so."

His speaker clicked off. Baird said:

"It's in our laps. Diane. And yet we have to follow orders. Send the first roll."

Diane had a tape threaded into a transmitter. It began to unroll through a pickup head. She put on headphones. The tape began to transmit toward the Plumie. Back at base it had been reasoned that a pattern of clickings, plainly artificial and plainly stating facts known to both races, would be the most reasonable way to attempt to open contact. The tape sent a series of cardinal numbers—one to five. Then an addition table, from one plus

one to five plus five. Then a multiplication table up to five times five. It was not startlingly intellectual information to be sent out in tiny clicks ranging up and down the radio spectrum. But it was orders.

Baird sat with compressed lips. Diane listened for a repetition of any of the transmitted signals, sent back by the Plumie. The speakers about the radar room murmured the orders given through all the ship. Radar had to be informed of all orders and activity, so it could check their results outside the ship. So Baird heard the orders for the engine room to be sealed up and the duty-force to get into pressure suits, in case the *Niccola* fought and was hulled. Damage-control parties reported themselves on post, in suits, with equipment ready. Then Taine's voice snapped: *"Rocket crews, arm even-numbered rockets with chemical explosive warheads. Leave odd-numbered rockets armed with atomics. Report back!"*

Diane strained her ears for possible re-transmission of the *Niccola's* signals, which would indicate the Plumie's willingness to try conversation. But she suddenly raised her hand and pointed to the radar-graph instrument. It repeated the positioning of dots which were stray meteoric matter in the space between worlds in this system. What had been a spot—the Plumie ship—was now a line of dots. Baird pressed the button.

"Radar reporting!" he said curtly. "The Plumie ship is heading for us. I'll have relative velocity in ten seconds."

He heard the skipper swear. Ten seconds later the Doppler measurement became possible. It said the Plumie plunged toward the *Niccola* at miles per second. In half a minute it was tens of miles per second. There was no re-transmission of signals. The Plumie ship had found itself discovered. Apparently it considered itself attacked. It flung itself into a headlong dash for the *Niccola.*

Time passed—interminable time. The sun flared and flamed and writhed in emptiness. The great gas-giant planet rolled through space in splendid state, its moonlets spinning gracefully about its bulk. The oxygen-atmosphere planet to sunward was visible only as a crescent, but the mottlings on its lighted part changed as it revolved—seas and islands and continents receiving the sunlight as it turned. Meteor swarms, so dense in appearance on a radar screen, yet so tenuous in reality, floated in their appointed orbits with a seeming vast leisure.

The feel of slowness was actually the result of distance. Men have always acted upon things close by. Battles have always been fought within eye-range, anyhow. But it was actually 06 hours 35 minutes ship time before the two spacecraft sighted each other—more than two hours after they plunged toward a rendezvous.

The Plumie ship was a bright golden dot, at first. It decelerated swiftly. In minutes it was a rounded, end-on disk. Then it swerved lightly and

presented an elliptical broadside to the *Niccola*. The *Niccola* was in full deceleration too, by then. The two ships came very nearly to a stop with relation to each other when they were hardly twenty miles apart—which meant great daring on both sides.

Baird heard the skipper grumbling: *"Damned cocky!"* He roared suddenly: *"Mr. Baird! How've you made out in communicating with them?"*

"Not at all, sir," said Baird grimly. "They don't reply."

He knew from Diane's expression that there was no sound in the headphones except the frying noise all main-sequence stars give out, and the infrequent thumping noises that come from gas-giant planets' lower atmospheres, and the Jansky-radiation hiss which comes from everywhere.

The skipper swore. The Plumie ship lay broadside to, less than a score of miles away. It shone in the sunlight. It acted with extraordinary confidence. It was as if it dared the *Niccola* to open fire.

Taine's voice came out of a speaker, harsh and angry:

"Even-numbered tubes prepare to fire on command."

Nothing happened. The two ships floated sunward together, neither approaching nor retreating. But with every second, the need for action of some sort increased.

"Mr. Baird!" barked the skipper. *"This is ridiculous! There must be some way to communicate! We can't sit here glaring at each other forever! Raise them! Get some sort of acknowledgment!"*

"I'm trying," said Baird bitterly, "according to orders!"

But he disagreed with those orders. It was official theory that arithmetic values, repeated in proper order, would be the way to open conversation. The assumption was that any rational creature would grasp the idea that orderly signals were rational attempts to open communication.

But it had occurred to Baird that a Plumie might not see this point. Perception of order is not necessarily perception of information—in fact, quite the contrary. A message is a disturbance of order. A microphone does not transmit a message when it sends an unvarying tone. A message has to be unpredictable or it conveys no message. Orderly clicks, even if overheard, might seem to Plumies the result of methodically operating machinery. A race capable of interstellar flight was not likely to be interested or thrilled by exercises a human child goes through in kindergarten. They simply wouldn't seem meaningful at all.

But before he could ask permission to attempt to make talk in a more sophisticated fashion, voices exclaimed all over the ship. They came blurringly to the loud-speakers. *"Look at that!" "What's he do—" "Spinning like—"* From every place where there was a vision-plate on the *Niccola*, men watched the Plumie ship and babbled.

This was at 06 hours 50 minutes ship time.

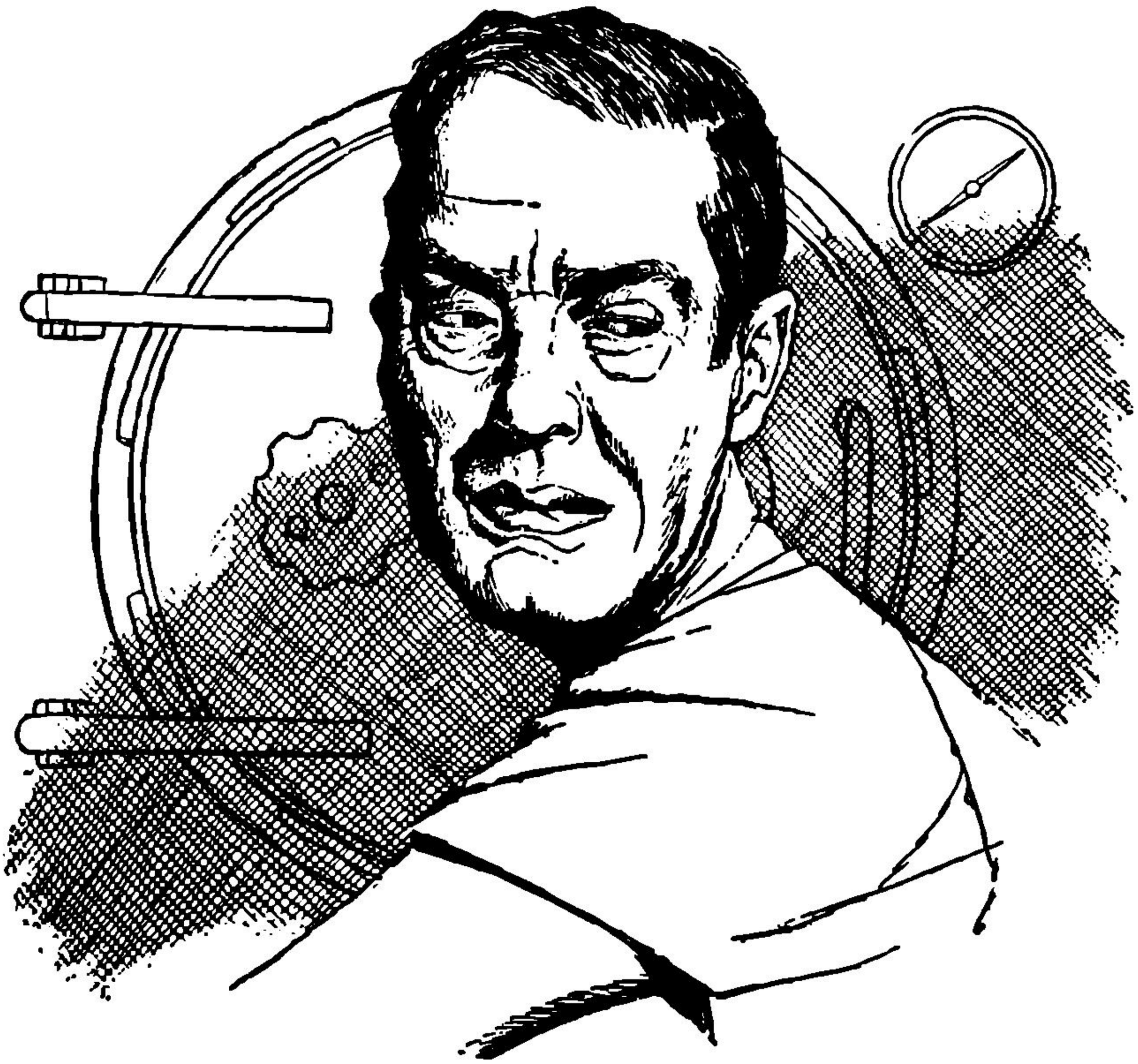
The elliptical golden object darted

into swift and eccentric motion. Lacking an object of known size for comparison, there was no scale. The golden ship might have been the size of an autumn leaf, and in fact its maneuvers suggested the heedless tumblings and scurrying of falling foliage. It fluttered in swift turns and somersaults and spinnings. There were weavings like the purposeful feints of boxers not yet come to battle. There were indescribably graceful swoops and loops and curving dashes like some preposterous dance in emptiness.

Taine's voice crashed out of a speaker:

"All even-number rockets," he barked. *"Fire!"*

The skipper roared a countermand, but too late. The crunching, grunting sound of rockets leaving their launching tubes came before his first syllable was complete. Then there was silence



while the skipper gathered breath for a masterpiece of profanity. But Taine snapped:

"That dance was a sneak-up! The Plumie came four miles nearer while we watched!"

Baird jerked his eyes from watching the Plumie. He looked at the master radar. It was faintly blurred with the fading lines of past gyrations, but the golden ship was much nearer the *Niccola* than it had been.

"Radar reporting," said Baird sickishly. "Mr. Taine is correct. The Plumie ship did approach us while it danced."

Taine's voice snarled:

"Reload even numbers with chemical-explosive war heads. Then remove atomics from odd numbers and replace with chemicals. The range is too short for atomics."

Baird felt curiously divided in his own mind. He disliked Taine very much. Taine was arrogant and suspicious and intolerant even on the *Niccola*. But Taine had been right twice, now. The Plumie ship had crept closer by pure trickery. And it was right to remove atomic war heads from the rockets. They had a pure-blast radius of ten miles. To destroy the Plumie ship within twice that would endanger the *Niccola*—and leave nothing of the Plumie to examine afterward.

The Plumie ship must have seen the rocket flares, but it continued to dance, coming nearer and ever nearer in seemingly heedless and purposeless plungings and spinnings in star-speckled space. But suddenly there were racing, rushing trails of swirling vapor. Half the *Niccola's* port broadside plunged toward the golden ship. The fraction of a second later, the starboard half-dozen chemical-explosive rockets swung furiously around the ship's hull and streaked after their brothers. They moved in utterly silent, straight-lined, ravening ferocity toward their target. Baird thought irrelevantly of the vapor trails of an atmosphere-liner in the planet's upper air.

The ruled-line straightness of the first six rockets' course abruptly broke. One of them veered crazily out of control. It shifted to an almost right-angled course. A second swung wildly to the left. A third and fourth and fifth— The sixth of the first line of rockets made a great, sweeping turn and came hurtling back toward the *Niccola*. It was like a nightmare. Lunatic, erratic lines of sunlit vapor eeled before the background of all the stars in creation.

Then the second half-dozen rockets broke ranks, as insanely and irremediably as the first.

Taine's voice screamed out of a speaker, hysterical with fury:

"Detonate! Detonate! They've taken over the rockets and are throwing 'em back at us! Detonate all rockets!"

The heavens seemed streaked and laced with lines of expanding smoke. But now one plunging line erupted at its tip. A swelling globe of smoke marked its end. Another blew up. And another—

The *Niccola's* rockets faithfully blew themselves to bits on command

from the *Niccola's* own weapons control. There was nothing else to be done with them. They'd been taken over in flight. They'd been turned and headed back toward their source. They'd have blasted the *Niccola* to bits but for their premature explosions.

There was a peculiar, stunned hush all through the *Niccola.* The only sound that came out of any speaker in the radar room was Taine's voice, high-pitched and raging, mouthing unspeakable hatred of the Plumies, whom no human being had yet seen.

Baird sat tense in the frustrated and desperate composure of the man who can only be of use while he is sitting still and keeping his head. The vision screen was now a blur of writhing mist, lighted by the sun and torn at by emptiness. There was luminosity where the ships had encountered each other. It was sunshine upon thin smoke. It was like the insanely enlarging head of a newborn comet, whose tail would be formed presently by light-pressure. The Plumie ship was almost invisible behind the unsubstantial stuff.

But Baird regarded his radar screens. Mircowaves penetrated the mist of rapidly ionizing gases.

"Radar to navigation!" he said sharply. "The Plumie ship is still approaching, dancing as before!"

The skipper said with enormous calm:

"Any other Plumie ships, Mr. Baird?"

Diane interposed.

"No sign anywhere. I've been watching. This seems to be the only ship within radar range."

"We've time to settle with it, then," said the skipper. *"Mr. Taine, the Plumie ship is still approaching."*

Baird found himself hating the Plumies. It was not only that humankind was showing up rather badly, at the moment. It was that the Plumie ship had refused contact and forced a fight. It was that if the *Niccola* were destroyed the Plumie would carry news of the existence of humanity and of the tactics which worked to defeat them. The Plumies could prepare an irresistible fleet. Humanity could be doomed.

But he overheard himself saying bitterly:

"I wish I'd known this was coming, Diane. I . . . wouldn't have resolved to be strictly official, only, until we got back to base."

Her eyes widened. She looked startled. Then she softened.

"If . . . you mean that . . . I wish so too."

"It looks like they've got us," he admitted unhappily. "If they can take our rockets away from us—" Then his voice stopped. He said, "Hold everything!" and pressed the navigation-room button. He snapped: "Radar to navigation. It appears to take the Plumies several seconds to take over a rocket. They have to aim something—a pressor or tractor beam, most likely—and pick off each rocket separately. Nearly forty seconds was consumed in taking over all twelve of our rockets. At shorter range, with

less time available, a rocket might get through!"

The skipper swore briefly. Then: *"Mr. Taine! When the Plumies are near enough, our rockets may strike before they can be taken over! You follow?"*

Baird heard Taine's shrill-voiced acknowledgment—in the form of practically chattered orders to his rocket-tube crews. Baird listened, checking the orders against what the situation was as the radars saw it. Taine's voice was almost unhuman; so filled with frantic rage that it cracked as he spoke. But the problem at hand was the fulfillment of all his psychopathic urges. He commanded the starboard-side rocket-battery to await special orders. Meanwhile the port-side battery would fire two rockets on widely divergent courses, curving to join at the Plumie ship. They'd be seized. They were to be detonated and another port-side rocket fired instantly, followed by a second hidden in the rocket-trail the first would leave behind. Then the starboard side—

"I'm afraid Taine's our only chance," said Baird reluctantly. "If he wins, we'll have time to . . . talk as people do who like each other. If it doesn't work—"

Diane said quietly:

"Anyhow . . . I'm glad you . . . wanted me to know. I . . . wanted you to know, too."

She smiled at him, yearningly.

There was the crump-crump of two rockets going out together. Then the radar told what happened. The Plumie ship was no more than six miles away, dancing somehow deftly in the light of a yellow sun, with all the cosmos spread out as shining pin points of colored light behind it. The radar reported the dash and the death of the two rockets, after their struggle with invisible things that gripped them. They died when they headed reluctantly back to the *Niccola*—and detonated two miles from their parent ship. The skipper's voice came:

"Mr. Taine! After your next salvo I shall head for the Plumie at full drive, to cut down the distance and the time they have to work in. Be ready!"

The rocket tubes went *crump-crump* again, with a fifth of a second interval. The radar showed two tiny specks speeding through space toward the weaving, shifting speck which was the Plumie.

Outside, in emptiness, there was a filmy haze. It was the rocket-fumes and explosive gases spreading with incredible speed. It was thin as gossamer. The Plumie ship undoubtedly spotted the rockets, but it did not try to turn them. It somehow seized them and deflected them, and darted past them toward the *Niccola.*

"They see the trick," said Diane, dry-throated. "If they can get in close enough, they can turn it against us!"

There were noises inside the *Niccola,* now. Taine fairly howled an order. There were yells of defiance and excitement. There were more of those inadequate noises as rockets

went out—every tube on the starboard side emptied itself in a series of savage grunts—and the *Niccola's* magnetronic drive roared at full flux density.

The two ships were less than a mile apart when the *Niccola* let go her full double broadside of missiles. And then it seemed that the Plumie ship was doomed. There were simply too many rockets to be seized and handled before at least one struck. But there was a new condition. The Plumie ship weaved and dodged its way through them. The new condition was that the rockets were just beginning their run. They had not achieved the terrific velocity they would accumulate in ten miles of no-gravity. They were new-launched; logy: clumsy: not the streaking, flashing death-and-destruction they would become with thirty more seconds of acceleration.

So the Plumie ship dodged them with a skill and daring past belief. With an incredible agility it got inside them, nearer to the *Niccola* than they. And then it hurled itself at the human ship as if bent upon a suicidal crash which would destroy both ships together. But Baird, in the radar room, and the skipper in navigation, knew that it would plunge brilliantly past at the last instant—

And then they knew that it would not. Because, very suddenly and very abruptly, there was something the matter with the Plumie ship. The life went out of it. It ceased to accelerate or decelerate. It ceased to steer. It began to turn slowly on an axis somewhere amidships. Its nose swung to one side, with no change in the direction of its motion. It floated onward. It was broadside to its line of travel. It continued to turn. It hurtled stern-first toward the *Niccola*. It did not swerve. It did not dance. It was a lifeless hulk: a derelict in space.

And it would hit the *Niccola* amidships with no possible result but destruction for both vessels.

The *Niccola's* skipper bellowed orders, as if shouting would somehow give them more effect. The magnetronic drive roared. He'd demanded a miracle of it, and he almost got one. The drive strained its thrust-members. It hopelessly overloaded its coils. The *Niccola's* cobalt-steel hull became more than saturated with the drive-field, and it leaped madly upon an evasion course—

And it very nearly got away. It was swinging clear when the Plumie ship drifted within fathoms. It was turning aside when the Plumie ship was within yards. And it was almost safe when the golden hull of the Plumie—shadowed now by the *Niccola* itself—barely scraped a side-keel.

There was a touch, seemingly deliberate and gentle. But the *Niccola* shuddered horribly. Then the vision screens flared from such a light as might herald the crack of doom. There was a brightness greater than the brilliance of the sun. And then there was a wrenching, heaving shock. Then there was blackness. Baird was flung across the radar room, and Diane cried out, and he careened

against a wall and heard glass shatter. He called:

"Diane!"

He clutched crazily at anything, and called her name again. The *Niccola's* internal gravity was cut off, and his head spun, and he heard collision-doors closing everywhere, but before they closed completely he heard the rasping sound of giant arcs leaping in the engine room. Then there was silence.

"Diane!" cried Baird fiercely. "Diane!"

"I'm . . . here," she panted. "I'm dizzy, but I . . . think I'm all right—"

The battery-powered emergency light came on. It was faint, but he saw her clinging to a bank of instruments where she'd been thrown by the collision. He moved to go to her, and found himself floating in midair. But he drifted to a side wall and worked his way to her.

She clung to him, shivering.

"I . . . think," she said unsteadily, "that we're going to die. Aren't we?"

"We'll see," he told her. "Hold on to me."

Guided by the emergency light, he scrambled to the bank of communicator-buttons. What had been the floor was now a side wall. He climbed it and thumbed the navigation-room switch.

"Radar room reporting," he said curtly. "Power out, gravity off, no reports from outside from power failure. No great physical damage."

He began to hear other voices. There had never been an actual space-collision in the memory of man, but reports came crisply, and the cut-in speakers in the radar room repeated them. Ship-gravity was out all over the ship. Emergency lights were functioning, and were all the lights there were. There was a slight, unexplained gravity-drift toward what had been the ship's port side. But damage-control reported no loss of pressure in the *Niccola's* inner hull, though four areas between inner and outer hulls had lost air pressure to space.

"Mr. Baird," rasped the skipper. *"We're blind! Forget everything else and give us eyes to see with!"*

"We'll try battery power to the vision plates," Baird told Diane. "No full resolution, but better than nothing—"

They worked together, feverishly. They were dizzy. Something close to nausea came upon them from pure giddiness. What had been the floor was now a wall, and they had to climb to reach the instruments that had been on a wall and now were on the ceiling. But their weight was ounces only. Baird said abruptly:

"I know what's the matter! We're spinning! The whole ship's spinning! That's why we're giddy and why we have even a trace of weight. Centrifugal force! Ready for the current?"

There was a tiny click, and the battery light dimmed. But a vision screen lighted faintly. The stars it showed were moving specks of light. The sun passed deliberately across the screen. Baird switched to other outside scanners. There was power for only one screen at a time. But he saw

the starkly impossible. He pressed the navigation-room button.

"Radar room reporting," he said urgently. "The Plumie ship is fast to us, in contact with our hull! Both ships are spinning together!" He was trying yet other scanners as he spoke, and now he said: "Got it! There are no lines connecting us to the Plumie, but it looks . . . yes! That flash when the ships came together was a flash-over of high potential. We're welded to them along twenty feet of our hull!"

The skipper:

"Damnation! Any sign of intention to board us?"

"Not yet, sir—"

Taine burst in, his voice high-pitched and thick with hatred:

"Damage-control parties attention! Arm yourselves and assemble at starboard air lock! Rocket crews get into suits and prepare to board this Plumie—"

"Countermand!" bellowed the skipper from the speaker beside Baird's ear. *"Those orders are canceled! Dammit, if we were successfully boarded we'd blow ourselves to bits! Those are our orders! D'you think the Plumies will let their ship be taken? And wouldn't we blow up with them? Mr. Taine, you will take no offensive action without specific orders! Defensive action is another matter. Mr. Baird! I consider this welding business pure accident. No one would be mad enough to plan it. You watch the Plumies and keep me informed!"*

His voice ceased. And Baird had again the frustrating duty of remaining still and keeping his head while other men engaged in physical activity. He helped Diane to a chair—which was fastened to the floor-which-was-now-a-wall—and she wedged herself fast and began a review of what each of the outside scanners reported. Baird called for more batteries. Power for the radar and visions was more important than anything else, just then. If there were more Plumie ships . . .

Electricians half-floated, half-dragged extra batteries to the radar room. Baird hooked them in. The universe outside the ship again appeared filled with brilliantly colored dots of light which were stars. More satisfying, the globe-scanners again reported no new objects anywhere. Nothing new within a quarter million miles. A half-million. Later Baird reported:

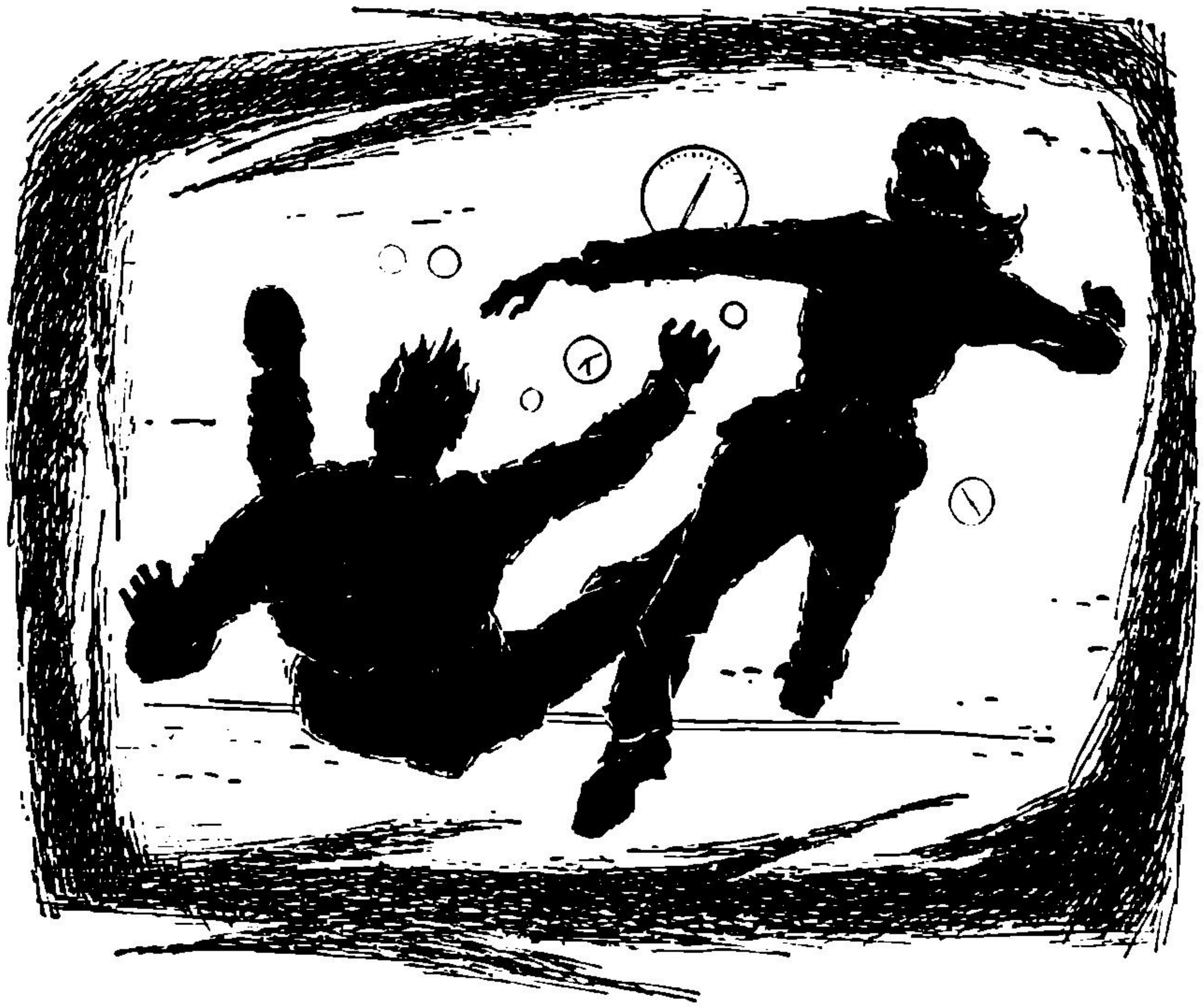
"Radars report no strange objects within a million miles of the *Niccola*, sir."

"Except the ship we're welded to! But you are doing very well. However, microphones say there is movement inside the Plumie."

Diane beckoned for Baird's attention to a screen, which Baird had examined before. Now he stiffened and motioned for her to report.

"We've a scanner, sir," said Diane, "which faces what looks like a port in the Plumie ship. There's a figure at the port. I can't make out details, but it is making motions, facing us."

"Give me the picture!" snapped the skipper.



Diane obeyed. It was the merest flip of a switch. Then her eyes went back to the spherical-sweep scanners which reported the bearing and distance of every solid object within their range. She set up two instruments which would measure the angle, bearing, and distance of the two planets now on this side of the sun—the gas-giant and the oxygen-world to sunward. Their orbital speeds and distances were known. The position, course, and speed of the *Niccola* could be computed from any two observations on them.

Diane had returned to the utterly necessary routine of the radar room which was the nerve-center of the ship, gathering all information needed for navigation in space. The fact that there had been a collision, that the *Niccola's* engines were melted to unlovely scrap, that the Plumie ship was now welded irremovably to a side-keel, and that a Plumie was signaling to humans while both ships went spinning through space toward an unknown destination—these things did not affect the obligations of the radar room.

Baird got other images of the Plumie ship into sharp focus. So near, the scanners required adjustment for precision.

"Take a look at this!" he said wryly.

She looked. The view was of the Plumie as welded fast to the *Niccola.* The welding was itself an extraordinary result of the Plumie's battle-tactics. Tractor and pressor beams were known to men, of course, but human beings used them only under very special conditions. Their operation involved the building-up of terrific static charges. Unless a tractor-beam generator could be grounded to the object it was to pull, it tended to emit lightning-bolts at unpredictable intervals and in entirely random directions. So men didn't use them. Obviously, the Plumies did.

They'd handled the *Niccola's* rockets with beams which charged the golden ship to billions of volts. And when the silicon-bronze Plumie ship touched the cobalt-steel *Niccola*—why—that charge had to be shared. It must have been the most spectacular of all artificial electric flames. Part of the *Niccola's* hull was vaporized, and undoubtedly part of the Plumie. But the unvaporized surfaces were molten and in contact—and they stuck.

For a good twenty feet the two ships were united by the most perfect of vacuum-welds. The wholly dissimilar hulls formed a space-catamaran, with a sort of valley between their bulks. Spinning deliberately, as the united ships did, sometimes the sun shone brightly into that valley, and sometimes it was filled with the blackness of the pit.

While Diane looked, a round door revolved in the side of the Plumie ship. As Diane caught her breath, Baird reported crisply. At his first words Taine burst into raging commands for men to follow him through the *Niccola's* air lock and fight a boarding party of Plumies in empty space. The skipper very savagely ordered him to be quiet.

"Only one figure has come out," reported Baird. The skipper watched on a vision plate, but Baird reported so all the *Niccola's* company would know. "It's small—less than five feet . . . I'll see better in a moment." Sunlight smote down into the valley between the ships. "It's wearing a pressure suit. It seems to be the same material as the ship. It walks on two legs, as we do . . . It has two arms, or something very similar . . . The helmet of the suit is very high . . . It looks like the armor knights used to fight in . . . It's making its way to our air lock . . . It does not use magnetic-soled shoes. It's holding onto lines threaded along the other ship's hull . . ."

The skipper said curtly:

"Mr. Baird! I hadn't noticed the absence of magnetic shoes. You seem to have an eye for important items. Report to the air lock in person. Leave Lieutenant Holt to keep an eye on outside objects. Quickly, Mr. Baird!"

Baird laid his hand on Diane's shoulder. She smiled at him.

"I'll watch!" she promised.

He went out of the radar room, walking on what had been a side wall. The giddiness and dizziness of contin-

ued rotation was growing less, now. He was getting used to it. But the *Niccola* seemed strange indeed, with the standard up and down and Earth-gravity replaced by a vertical which was all askew and a weight of ounces instead of a hundred and seventy pounds.

He reached the air lock just as the skipper arrived. There were others there—armed and in pressure suits. The skipper glared about him.

"I am in command here," he said very grimly indeed. "Mr. Taine has a special function, but I am in command! We and the creatures on the Plumie ship are in a very serious fix. One of them apparently means to come on board. There will be no hostility, no sneering, no threatening gestures! This is a parley! You will be careful. But you will not be trigger-happy!"

He glared around again, just as a metallic rapping came upon the *Niccola's* air-lock door. The skipper nodded:

"Let him in the lock, Mr. Baird."

Baird obeyed. The humming of the unlocking-system sounded. There were clankings. The outer air lock closed. There was a faint whistling as air went in. The skipper nodded again.

Baird opened the inner door. It was 08 hours 10 minutes ship time.

The Plumie stepped confidently out into the topsy-turvy corridors of the *Niccola*. He was about the size of a ten-year-old human boy, and features which were definitely not grotesque showed through the clear plastic of his helmet. His pressure suit was, engineering-wise, a very clean job. His whole appearance was prepossessing. When he spoke, very clear and quite high sounds—soprano sounds—came from a small speaker-unit at his shoulder.

"For us to talk," said the skipper heavily, "is pure nonsense. But I take it you've something to say."

The Plumie gazed about with an air of lively curiosity. Then he drew out a flat pad with a white surface and sketched swiftly. He offered it to the *Niccola's* skipper.

"We want this on record," he growled, staring about.

Diane's voice said capably from a speaker somewhere nearby:

"Sir, there's a scanner for inspection of objects brought aboard. Hold the plate flat and I'll have a photograph—right!"

The skipper said curtly to the Plumie:

"You've drawn our two ships linked as they are. What have you to say about it?"

He handed back the plate. The Plumie pressed a stud and it was blank again. He sketched and offered it once more.

"Hm-m-m," said the skipper. "You can't use your drive while we're glued together, eh? Well?"

The Plumie reached up and added lines to the drawing.

"So!" rumbled the skipper, inspecting the additions. "You say it's up to us to use our drive for both ships." He growled approvingly: "You consider there's a truce. You

must, because we're both in the same fix, and not a nice one, either. True enough! We can't fight each other without committing suicide, now. But we haven't any drive left! We're a derelict! How am I going to say that —if I decide to?"

Baird could see the lines on the plate, from the angle at which the skipper held it. He said:

"Sir, we've been mapping, up in the radar room. Those last lines are map-co-ordinates—a separate sketch, sir. I think he's saying that the two ships, together, are on a falling course toward the sun. That we have to do something or both vessels will fall into it. We should be able to check this, sir."

"Hah!" growled the skipper. "That's all we need! Absolutely all we need! To come here, get into a crazy fight, have our drive melt to scrap, get crazily welded to a Plumie ship, and then for both of us to fry together! We don't need anything more than that!"

Diane's voice came on the speaker: *"Sir, the last radar fixes on the planets in range give us a course directly toward the sun. I'll repeat the observations."*

The skipper growled. Taine thrust himself forward. He snarled:

"Why doesn't this Plumie take off its helmet? It lands on oxygen planets! Does it think it's too good to breathe our air?"

Baird caught the Plumie's eye. He made a gesture suggesting the removal of the space helmet. The Plumie gestured, in return, to a tiny vent in the suit. He opened something and gas whistled out. He cut it off. The question of why he did not open or remove his helmet was answered. The atmosphere he breathed would not do men any good, nor would theirs do him any good, either. Taine said suspiciously:

"How do we know he's breathing the stuff he let out then? This creature isn't human! It's got no right to attack humans! Now it's trying to trick us!" His voice changed to a snarl. "We'd better wring its neck! Teach its kind a lesson—"

The skipper roared at him.

"Be quiet! Our ship is a wreck! We have to consider the facts! We and these Plumies are in a fix together, and we have to get out of it before we start to teach anybody anything!" He glared at Taine. Then he said heavily: "Mr. Baird, you seem to notice things. Take this Plumie over the ship. Show him our drive melted down, so he'll realize we can't possibly tow his ship into an orbit. He knows that we're armed, and that we can't handle our war heads at this range! So we can't fool each other. We might as well be frank. But you will take full note of his reactions, Mr. Baird!"

Baird advanced, and the skipper made a gesture. The Plumie regarded Baird with interested eyes. And Baird led the way for a tour of the *Niccola*. It was confusing even to him, with right hand converted to up and left hand to down, and sidewise now almost vertical. On the way the Plumie

made more clear, flutelike sounds, and more gestures. Baird answered.

"Our gravity pull was that way," he explained, "and things fell so fast."

He grasped a handrail and demonstrated the speed with which things fell in normal ship-gravity. He used a pocket communicator for the falling weight. It was singularly easy to say some things, even highly technical ones, because they'd be what the Plumie would want to know. But quite commonplace things would be very difficulty to convey.

Diane's voice came out of the communicator.

"There are no novelties outside," she said quietly. *"It looks like this is the only Plumie ship anywhere around. It could have been exploring, like us. Maybe it was looking for the people who put up Space-Survey markers."*

"Maybe," agreed Baird, using the communicator. "Is that stuff about falling into the sun correct?"

"It seems so," said Diane composedly. *"I'm checking again. So far, the best course I can get means we graze the sun's photosphere in fourteen days six hours, allowing for acceleration by the sun's gravity."*

"And you and I," said Baird wryly, "have been acting as professional associates only, when—"

"Don't say it!" said Diane shakily. *"It's terrible!"*

He put the communicator back in his pocket. The Plumie had watched him. He had a peculiarly gallant air, this small figure in golden space armor with its high-crested helmet.

They reached the engine room. And there was the giant drive shaft of the *Niccola,* once wrapped with yard-thick coils which could induce an incredible density of magnetic flux in the metal. Even the return magnetic field, through the ship's cobalt-steel hull, was many times higher than saturation. Now the coils were sagging: mostly melted. There were places where re-solidified metal smoked noisesomely against nonmetallic floor or wall-covering. Engineers labored doggedly in the trivial gravity to clean up the mess.

"It's past repair," said Baird, to the ship's first engineer.

"It's junk," said that individual dourly. "Give us six months and a place to set up a wire-drawing mill and an insulator synthesizer, and we could rebuild it. But nothing less will be any good."

The Plumie stared at the drive. He examined the shaft from every angle. He inspected the melted, and partly-melted, and merely burned-out sections of the drive coils. He was plainly unable to understand in any fashion the principle of the magnetronic drive. Baird was tempted to try to explain, because there was surely no secret about a ship drive, but he could imagine no diagrams or gestures which would convey the theory of what happened in cobalt-steel when it was magnetized beyond one hundred thousand Gauss' flux-density. And without that theory one simply couldn't explain a magnetronic drive.

They left the engine room. They visited the rocket batteries. The gen-

erator room was burned out, like the drive, by the inconceivable lightning bolt which had passed between the ships on contact. The Plumie was again puzzled. Baird made it clear that the generator-room supplied electric current for the ship's normal lighting-system and services. The Plumie could grasp that idea. They examined the crew's quarters, and the mess room, and the Plumie walked confidently among the members of the human crew, who a little while since had tried so painstakingly to destroy his vessel. He made a good impression.

"These little guys," said a crewman to Baird, admiringly, "they got something. They can handle a ship! I bet they could almost make that ship of theirs play checkers!"

"Close to it," agreed Baird. He realized something. He pulled the communicator from his pocket. "Diane! Contact the skipper. He wanted observations. Here's one. This Plumie acts like soldiers used to act in ancient days—when they wore armor. And we have the same reaction! They will fight like the devil, but during a truce they'll be friendly, admiring each other as scrappers, but ready to fight as hard as ever when the truce is over. We have the same reaction! Tell the skipper I've an idea that it's a part of their civilization—maybe it's a necessary part of any civilization! Tell him I guess that there may be necessarily parallel evolution of attitudes, among rational races, as there are parallel evolutions of eyes and legs and wings and fins among all animals everywhere! If I'm right, somebody from this ship will be invited to tour the Plumie! It's only a guess, but tell him!"

"Immediately," said Diane.

The Plumie followed gallantly as Baird made a steep climb up what once was the floor of a corridor. Then Taine stepped out before them. His eyes burned.

"Giving him a clear picture, eh?" he rasped. "Letting him spy out everything?"

Baird pressed the communicator call for the radar room and said coldly:

"I'm obeying orders. Look, Taine! You were picked for your job because you were a xenophobe. It helps in your proper functioning. But this Plumie is here under a flag of truce—"

"Flag of truce!" snarled Taine. "It's vermin! It's not human! I'll—"

"If you move one inch nearer him," said Baird gently, "just one inch—"

The skipper's voice bellowed through the general call speakers all over the ship:

"Mr. Taine! You will go to your quarters, under arrest! Mr. Baird, burn him down if he hesitates!"

Then there was a rushing, and scrambling figures appeared and were all about. They were members of the *Niccola's* crew, sent by the skipper. They regarded the Plumie with detachment, but Taine with a wary expectancy. Taine turned purple with fury. He shouted. He raged. He called Baird and the others Plumie-lovers and vermin-worshipers. He shouted

foulnesses at them. But he did not attack.

When, still shouting, he went away, Baird said apologetically to the Plumie:

"He's a xenophobe. He has a pathological hatred of strangers—even of strangeness. We have him on board because—"

Then he stopped. The Plumie wouldn't understand, of course. But his eyes took on a curious look. It was almost as if, looking at Baird, they twinkled.

Baird took him back to the skipper.

"He's got the picture, sir," he reported.

The Plumie pulled out his sketch plate. He drew on it. He offered it. The skipper said heavily:

"You guessed right, Mr. Baird. He suggests that someone from this ship go on board the Plumie vessel. He's drawn two pressure-suited figures going in their air lock. One's larger than the other. Will you go?"

"Naturally!" said Baird. Then he added thoughtfully: "But I'd better carry a portable scanner, sir. It should work perfectly well through a bronze hull, sir."

The skipper nodded and began to sketch a diagram which would amount to an acceptance of the Plumie's invitation.

This was at 07 hours 40 minutes ship time. Outside the sedately rotating metal hulls—the one a polished blue-silver and the other a glittering golden bronze—the cosmos continued to be as always. The haze from explosive fumes and rocket-fuel was, perhaps, a little thinner. The brighter stars shone through it. The gas-giant planet outward from the sun was a perceptible disk instead of a diffuse glow. The oxygen-planet to sunward showed again as a lighted crescent.

Presently Baird, in a human spacesuit, accompanied the Plumie into the *Niccola's* air lock and out to emptiness. His magnetic-soled shoes clung to the *Niccola's* cobalt-steel skin. Fastened to his shoulder there was a tiny scanner and microphone, which would relay everything he saw and heard back to the radar room and to Diane.

She watched tensely as he went inside the Plumie ship. Other screens relayed the image and his voice to other places on the *Niccola*.

He was gone a long time. From the beginning, of course, there were surprises. When the Plumie escort removed his helmet, on his own ship, the reason for the helmet's high crest was apparent. He had a high crest of what looked remarkably like feathers —and it was not artificial. It grew there. The reason for conventionalized plumes on bronze survey plates was clear. It was exactly like the reason for human features or figures as decorative additions to the inscriptions on Space Survey marker plates. Even the Plumie's hands had odd crestlets which stood out when he bent his fingers. The other Plumies were no less graceful and no less colorful. They had equally clear soprano voices. They were equally miniature and so devoid of apparent menace.

But there were also technical surprises. Baird was taken immediately to the Plumie ship's engine room, and Diane heard the sharp intake of breath with which he appeared to recognize its working principle. There were Plumie engineers working feverishly at it, attempting to discover something to repair. But they found nothing. The Plumie drive simply would not work.

They took Baird through the ship's entire fabric. And their purpose, when it became clear, was startling. The Plumie ship had no rocket tubes. It had no beam-projectors except small-sized objects which were—which must be—their projectors of tractor and pressor beams. They were elaborately grounded to the ship's substance. But they were not originally designed for ultra-heavy service. They hadn't and couldn't have the enormous capacity Baird had expected. He was astounded.

When he returned to the *Niccola,* he went instantly to the radar room to make sure that pictures taken through his scanner had turned out well. And there was Diane.

But the skipper's voice boomed at him from the wall.

"Mr. Baird! What have you to add to the information you sent back?"

"Three items, sir," said Baird. He drew a deep breath. "For the first, sir, the Plumie ship is unarmed. They've tractor and pressor beams for handling material. They probably use them to build their cairns. But they weren't meant for weapons. The Plumies, sir, hadn't a thing to fight with when they drove for us after we detected them."

The skipper blinked hard.

"Are you sure of that, Mr. Baird?"

"Yes, sir," said Baird uncomfortably. "The Plumie ship is an exploring ship—a survey ship, sir. You saw their mapping equipment. But when they spotted us, and we spotted them—they bluffed! When we fired rockets at them, they turned them back with tractor and pressor beams. They drove for us, sir, to try to destroy us with our own bombs, because they didn't have any of their own."

The skipper's mouth opened and closed.

"Another item, sir," said Baird more uncomfortably still. "They don't use iron or steel. Every metal object I saw was either a bronze or a light metal. I suspect some of their equipment's made of potassium, and I'm fairly sure they use sodium in the place of aluminum. Their atmosphere's quite different from ours—obviously! They'd use bronze for their ship's hull because they can venture into an oxygen atmosphere in a bronze ship. A sodium-hulled ship would be lighter, but it would burn in oxygen. Where there was moisture—"

The skipper blinked.

"But they couldn't drive in a non-magnetic hull!" he protested. *"A ship has to be magnetic to drive!"*

"Sir," said Baird, his voice still shaken, "they don't use a magnetronic drive. I once saw a picture of the drive they use, in a stereo on the history of space travel. The principle's very old. We've practically forgotten it.

It's a Dirac pusher-drive, sir. Among us humans, it came right after rockets. The planets of Sol were first reached by ships using Dirac pushers. But—" He paused. "They won't operate in a magnetic field above seventy Gauss, sir. It's a static-charge reaction, sir, and in a magnetic field it simply stops working."

The skipper regarded Baird unwinkingly for a long time.

"I think you are telling me," he said at long last, *"that the Plumies' drive would work if they were cut free of the* Niccola."

"Yes, sir," said Baird. "Their engineers were opening up the drive-elements and checking them, and then closing them up again. They couldn't seem to find anything wrong. I don't think they know what the trouble is. It's the *Niccola's* magnetic field. I think it was our field that caused the collision by stopping their drive and killing all their controls when they came close enough."

"Did you tell them?" demanded the skipper.

"There was no easy way to tell them by diagrams, sir."

Taine's voice cut in. It was feverish. It was strident. It was triumphant.

"Sir! The Niccola *is effectively a wreck and unrepairable. But the Plumie ship is operable if cut loose. As weapons officer, I intend to take the Plumie ship, let out its air, fill its tanks with our air, start up its drive, and turn it over to you for navigation back to base!"*

Baird raged. But he said coldly:

"We're a long way from home, Mr. Taine, and the Dirac pusher drive is slow. If we headed back to base in the Plumie ship with its Dirac pusher, we'd all be dead of old age before we'd gone halfway."

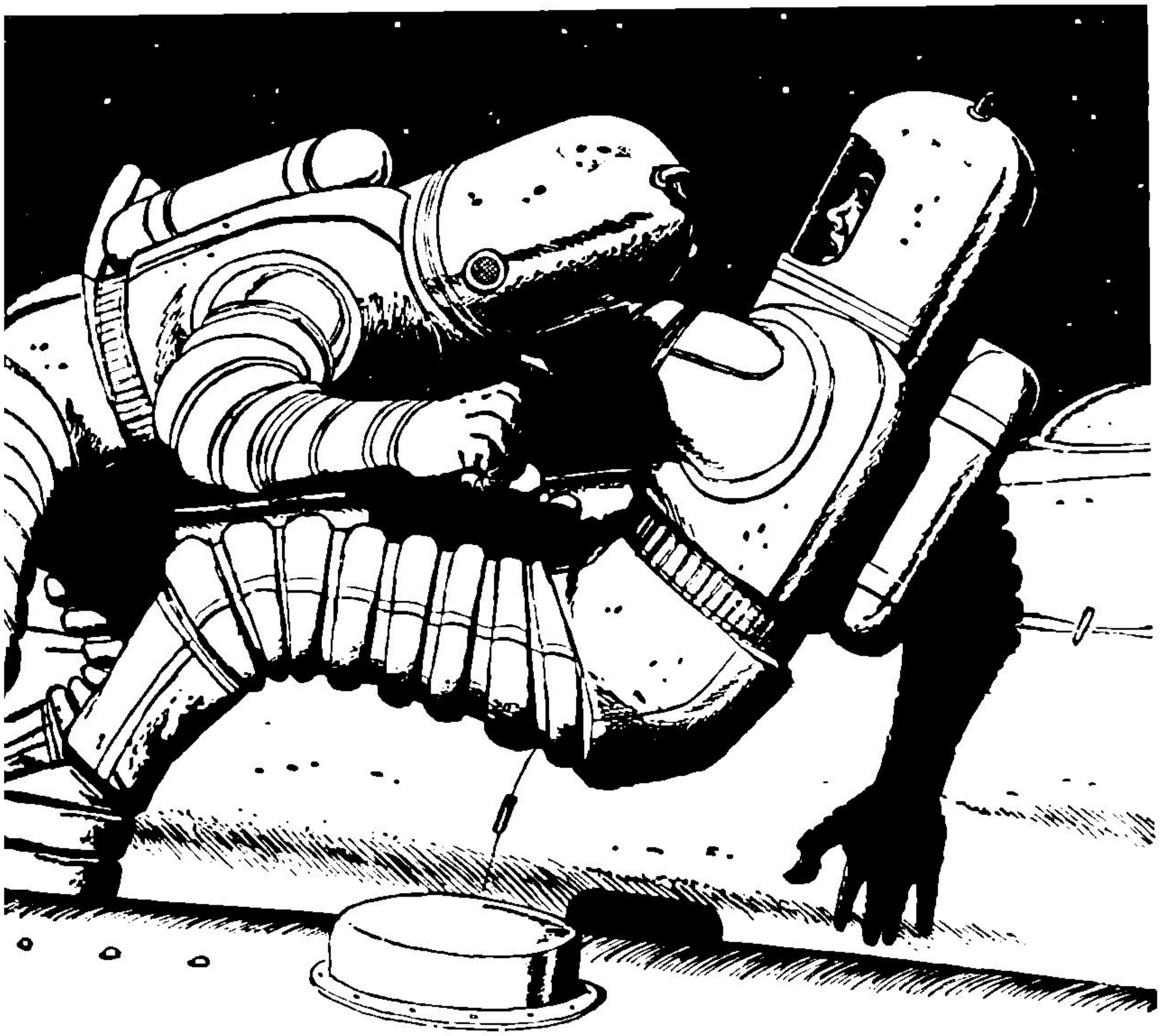
"But unless we take it," raged Taine, *"we hit this sun in fourteen days! We don't have to die now! We can land on the oxygen plant up ahead! We've only to kill these vermin and take their ship, and we'll live!"*

Diane's voice said dispassionately:

"Report. A Plumie in a pressure suit just came out of their air lock. It's carrying a parcel toward our air lock."

Taine snarled instantly:

"They'll sneak something in the



Niccola *to blast it, and then cut free and go away!"*

The skipper said very grimly:

"Mr. Taine, credit me with minimum brains! There is no way the Plumies can take this ship without an atomic bomb exploding to destroy both ships. You should know it!" Then he snapped: *"Air lock area, listen for a knock, and let in the Plumie or the parcel he leaves."*

There was silence. Baird said very quietly:

"I doubt they think it possible to cut the ships apart. A torch is no good on thick silicon bronze. It conducts heat too well! And they don't use steel. They probably haven't a cutting-torch at all."

From the radar room he watched the Plumie place an object in the air lock and withdraw. He watched from a scanner inside the ship as someone brought in what the Plumie had left. An electronics man bustled forward. He looked it over quickly. It was complex, but his examination suddenly seemed satisfying to him. But a grayish vapor developed and he sniffed

and wrinkled his nose. He picked up a communicator.

"Sir, they've sent us a power-generator. Some of its parts are going bad in our atmosphere, sir, but this looks to me like a hell of a good idea for a generator! I never saw anything like it, but it's good! You can set it for any voltage and it'll turn out plenty juice!"

"Put it in helium," snapped the skipper. *"It won't break down in that! Then see how it serves!"*

In the radar room, Baird drew a deep breath. He went carefully to each of the screens and every radar. Diane saw what he was about, and checked with him. They met at the middle of the radar room.

"Everything's checked out," said Baird gravely. "There's nothing else around. There's nothing we can be called on to do before something happens. So . . . we can . . . act like people."

Diane smiled very faintly.

"Not like people. Just like us." She said wistfully: "Don't you want to tell me something? Something you intended to tell me only after we got back to base?"

He did. He told it to her. And there was also something she had not intended to tell him at all—unless he told her first. She said it now. They felt that such sayings were of the greatest possible importance. They clung together, saying them again. And it seemed wholly monstrous that two people who cared so desperately had wasted so much time acting like professional associates—explorer-ship officers—when things like this were to be said . . .

As they talked incoherently, or were even more eloquently silent, the ship's ordinary lights came on. The battery-lamp went on.

"We've got to switch back to ship's circuit," said Baird reluctantly. They separated, and restored the operating circuits to normal. "We've got fourteen days," he added, "and so much time to be on duty, and we've a lost lifetime to live in fourteen days! Diane—"

She flushed vividly. So Baird said very politely into the microphone to the navigation room:

"Sir, Lieutenant Hold and myself would like to speak directly to you in the navigation room. May we?"

"Why not?" growled the skipper. *"You've noticed that the Plumie generator is giving the whole ship lights and services?"*

"Yes, sir," said Baird. "We'll be there right away."

They heard the skipper's grunt as they hurried through the door. A moment later the ship's normal gravity returned—also through the Plumie generator. Up was up again, and down was down, and the corridors and cabins of the *Niccola* were brightly illuminated. Had the ship been other than an engineless wreck, falling through a hundred and fifty million miles of emptiness into the flaming photosphere of a sun, everything would have seemd quite normal, including the errand Baird and Diane were upon, and the fact that they

held hands self-consciously as they went about it.

They skirted the bulkhead of the main air tank. They headed along the broader corridor which went past the indented inner door of the air lock. They had reached that indentation when Baird saw that the inner air-lock door was closing. He saw a human pressure suit past its edge. He saw the corner of some object that had been put down on the air-lock floor.

Baird shouted, and rushed toward the lock. He seized the inner handle and tried to force open the door again, so that no one inside it could emerge into the emptiness without. He failed. He wrenched frantically at the control of the outer door. It suddenly swung freely. The outer door had been put on manual. It could be and was being opened from inside.

"Tell the skipper," raged Baird. "Taine's taking something out!" He tore open a pressure-suit cupboard in the wall beside the lock door. "He'll make the Plumies think it's a return-gift for the generator!" He eeled into the pressure suit and zipped it up to his neck. "The man's crazy! He thinks we can take their ship and stay alive for a while! Dammit, our air would ruin half their equipment! Tell the skipper to send help!"

He wrenched at the door again, jamming down his helmet with one hand. And this time the control worked. Taine, most probably, had forgotten that the inner control was disengaged only when the manual was actively in use. Diane raced away, panting. Baird swore bitterly at the slowness of the outer door's closing. He was tearing at the inner door long before it could be opened. He flung himself in and dragged it shut, and struck the emergency air-release which bled the air lock into space for speed of operation. He thrust out the outer door and plunged through.

His momentum carried him almost too far. He fell, and only the magnetic soles of his shoes enabled him to check himself. He was in that singular valley between the two ships, where their hulls were impregnably welded fast. Round-hulled Plumie ship, and ganoid-shaped *Niccola,* they stuck immovably together as if they had been that way since time began. Where the sky appeared above Baird's head, the stars moved in stately procession across the valley roof.

He heard a metallic rapping through the fabric of his space armor. Then sunlight glittered, and the valley filled with a fierce glare, and a man in a human spacesuit stood on the *Niccola's* plating, opposite the Plumie air lock. He held a bulky object under his arm. With his other gauntlet he rapped again.

"You fool!" shouted Baird. "Stop that! We couldn't use their ship, anyhow!"

His space phone had turned on with the air supply. Taine's voice snarled:

"We'll try! You keep back! They are not human!"

But Baird ran toward him. The sensation of running upon magnetic-soled shoes was unearthly: it was like

trying to run on fly-paper or bird-lime. But in addition there was no gravity here, and no sense of balance, and there was the feeling of perpetual fall.

There could be no science nor any skill in an encounter under such conditions. Baird partly ran and partly staggered and partly skated to where Taine faced him, snarling. He threw himself at the other man—and then the sun vanished behind the bronze ship's hull, and only stars moved visibly in all the universe.

But the sound of his impact was loud in Baird's ears inside the suit. There was a slightly different sound when his armor struck Taine's, and when it struck the heavier metal of the two ships. He fought. But the suits were intended to be defense against greater stresses than human blows could offer. In the darkness, it was like two blindfolded men fighting each other while encased in pillows.

Then the sun returned, floating sedately above the valley, and Baird could see his enemy. He saw, too, that the Plumie air lock was now open and that a small, erect, and somehow jaunty figure in golden space armor stood in the opening and watched gravely as the two men fought.

Taine cursed, panting with hysterical hate. He flung himself at Baird, and Baird toppled because he'd put one foot past the welded boundary between the *Niccola's* cobalt steel and the Plumie ship's bronze. One foot held to nothing. And that was a ghastly sensation, because if Taine only tugged his other foot free and heaved —why—then Baird would go floating away from the rotating, now-twinned ships, floating farther and farther away forever.

But darkness fell, and he scrambled back to the *Niccola's* hull as a disorderly parade of stars went by above him. He pantingly waited fresh attack. He felt something—and it was the object Taine had meant to offer as a return present to the Plumies. It was unquestionably explosive, either booby-trapped or timed to explode inside the Plumie ship. Now it rocked gently, gripped by the magnetism of the steel.

The sun appeared again, and Taine was yards away, crawling and fumbling for Baird. Then he saw him, and rose and rushed, and the clankings of his shoe-soles were loud. Baird flung himself at Taine in a savage tackle.

He struck Taine's legs a glancing blow, and the cobalt steel held his armor fast, but Taine careened and bounced against the round bronze wall of the Plumie, and bounced again. Then he screamed, because he went floating slowly out to emptiness, his arms and legs jerking spasmodically, while he shrieked . . .

The Plumie in the air lock stepped out. He trailed a cord behind him. He leaped briskly toward nothingness.

There came quick darkness once more, and Baird struggled erect despite the adhesiveness of the *Niccola's* hull. When he was fully upright, sick with horror at what had come about, there was sunlight yet again, and men

were coming out of the *Niccola's* air lock, and the Plumie who'd leaped for space was pulling himself back to his own ship again. He had a loop of the cord twisted around Taine's leg. But Taine screamed and screamed inside his spacesuit.

It was odd that one could recognize the skipper even inside space armor. But Baird felt sick. He saw Taine received, still screaming, and carried into the lock. The skipper growled an infuriated demand for details. His space phone had come on, too, when its air supply began. Baird explained, his teeth chattering.

"Hah!" grunted the skipper. *"Taine was a mistake. He shouldn't ever have left ground. When a man's potty in one fashion, there'll be cracks in him all over. What's this?"*

The Plumie in the golden armor very soberly offered the skipper the object Taine had meant to introduce into the Plumie's ship. Baird said desperately that he'd fought against it, because he believed it a booby trap to kill the Plumies so men could take their ship and fill it with air and cut it free, and then make a landing somewhere.

"Damned foolishness!" rumbled the skipper. *"Their ship'd begin to crumble with our air in it! If it held to a landing—"*

Then he considered the object he'd accepted from the Plumie. It could have been a rocket war head, enclosed in some container that would detonate it if opened. Or there might be a timing device. The skipper grunted. He heaved it skyward.

The misshapen object went floating away toward emptiness. Sunlight smote harshly upon it.

"Don't want it back in the Niccola," growled the skipper, *"but just to make sure—"*

He fumbled a hand weapon out of his belt. He raised it, and it spurted flame—very tiny blue-white sparks, each one indicating a pellet of metal flung away at high velocity.

One of them struck the shining, retreating container. It exploded with a monstrous, soundless, violence. It had been a rocket's war head. There could have been only one reason for it to be introduced into a Plumie ship. Baird ceased to be shaky. Instead, he was ashamed.

The skipper growled inarticulately. He looked at the Plumie, again standing in the golden ship's air lock.

"We'll go back, Mr. Baird. What you've done won't save our lives, and nobody will ever know you did it. But I think well of you. Come along!"

This was at 11 hours 5 minutes ship time.

A good half hour later the skipper's voice bellowed from the speakers all over the *Niccola.* His heavy-jowled features stared doggedly out of screens wherever men were on duty or at ease.

"Hear this!" he said forbiddingly. *"We have checked our course and speed. We have verified that there is no possible jury-rig for our engines that could get us into any sort of orbit, let alone land us on the only planet in this system with air we could*

breathe. It is officially certain that in thirteen days nine hours from now, the Niccola *will be so close to the sun that her hull will melt down. Which will be no loss to us because we'll be dead then, still going on into the sun to be vaporized with the ship. There is nothing to be done about it. We can do nothing to save our own lives!"*

He glared out of each and every one of the screens, wherever there were men to see him.

"But," he rumbled, *"the Plumies can get away if we help them. They have no cutting torches. We have. We can cut their ship free. They can repair their drive—but it's most likely that it'll operate perfectly when they're a mile from the* Niccola's *magnetic field. They can't help us. But we can help them. And sooner or later some Plumie ship is going to encounter some other human ship. If we cut these Plumies loose, they'll report what we did. When they meet other men, they'll be cagey because they'll remember Taine. But they'll know they can make friends, because we did them a favor when we'd nothing to gain by it. I can offer no reward. But I ask for volunteers to go outside and cut the Plumie ship loose, so the Plumies can go home in safety instead of on into the sun with us!"*

He glared, and cut off the image.

Diane held tightly to Baird's hand, in the radar room. He said evenly:

"There'll be volunteers. The Plumies are pretty sporting characters—putting up a fight with an unarmed ship, and so on. If there aren't enough other volunteers, the skipper and I will cut them free by ourselves."

Diane said, dry-throated:

"I'll help. So I can be with you. We've got—so little time."

"I'll ask the skipper as soon as the Plumie ship's free."

"Y-yes," said Diane. And she pressed her face against his shoulder, and wept.

This was at 01 hours, 20 minutes ship time. At 03 hours even, there was peculiar activity in the valley between the welded ships. There were men in space armor working cutting-torches where for twenty feet the two ships were solidly attached. Blue-white flames bored savagely into solid metal, and melted copper gave off strangely colored clouds of vapor—which emptiness whisked away to nothing—and molten iron and cobalt made equally lurid clouds of other colors.

There were Plumies in the air lock, watching.

At 03 hours 40 minutes ship time, all the men but one drew back. They went inside the *Niccola*. Only one man remained, cutting at the last sliver of metal that held the two ships together.

It parted. The Plumie ship swept swiftly away, moved by the centrifugal force of the rotary motion the joined vessels had possessed. It dwindled and dwindled. It was a half mile away. A mile. The last man on the outside of the *Niccola's* hull thriftily

brought his torch to the air lock and came in.

Suddenly, the distant golden hull came to life. It steadied. It ceased to spin, however slowly. It darted ahead. It checked. It swung to the right and left and up and down. It was alive again.

In the radar room, Diane walked into Baird's arms and said shakily:

"Now we . . . we have almost fourteen days."

"Wait," he commanded. "When the Plumies understood what we were doing, and why, they drew diagrams. They hadn't thought of cutting free, out in space, without the spinning saws they use to cut bronze with. But they asked for a scanner and a screen. They checked on its use. I want to see—"

He flipped on the screen. And there was instantly a Plumie looking eagerly out of it, for some sign of communication established. There were soprano sounds, and he waved a hand for attention. Then he zestfully held up one diagram after another.

Baird drew a deep breath. A very deep breath. He pressed the navigation-room call. The skipper looked dourly at him.

"Well?" said the skipper forbiddingly.

"Sir," said Baird, very quietly indeed, "the Plumies are talking by diagram over the communicator set we gave them. Their drive works. They're as well off as they ever were. And they've been modifying their tractor beams—stepping them up to higher power."

"What of it?" demanded the skipper, rumbling.

"They believe," said Baird, "that they can handle the *Niccola* with their beefed-up tractor beams." He wetted his lips. "They're going to tow us to the oxygen planet ahead, sir. They're going to set us down on it. They'll help us find the metals we need to build the tools to repair the *Niccola,* sir. You see the reasoning, sir. We turned them loose to improve the chance of friendly contact when another human ship runs into them. They want us to carry back—to be proof that Plumies and men can be friends. It seems that—they like us, sir."

He stopped for a moment. Then he went on reasonably;

"And besides that, it'll be one hell of a fine business proposition. We never bother with hydrogen-methane planets. They've minerals and chemicals we haven't got, but even the stones of a methane-hydrogen planet are ready to combine with the oxygen we need to breathe! We can't carry or keep enough oxygen for real work. The same thing's true with them on an oxygen planet. We can't work on each other's planets, but we can do fine business in each other's minerals and chemicals from those planets. I've got a feeling, sir, that the Plumie cairns are location-notices; markers set up over ore deposits they can find but can't hope to work, yet they claim against the day when their scientists find a way to make them worth own-

ing. I'd be willing to bet, sir, that if we explored hydrogen planets as thoroughly as oxygen ones, we'd find cairns on their-type planets that they haven't colonized yet."

The skipper stared. His mouth dropped open.

"And I think, sir," said Baird, "that until they detected us they thought they were the only intelligent race in the galaxy. They were upset to discover suddenly that they were not, and at first they'd no idea what we'd be like. But I'm guessing now, sir, that they're figuring on what chemicals and ores to start swapping with us." Then he added, "When you think of it, sir, probably the first metal they ever used was aluminum—where our ancestors used copper—and they had a beryllium age next, instead of iron. And right now, sir it's probably as expensive for them to refine iron as it is for us to handle titanium and beryllium and osmium —which are duck soup for them! Our two cultures ought to thrive as long as we're friends, sir. They know it already—and we'll find it out in a hurry!"

The skipper's mouth moved. It closed, and then dropped open again. The search for the Plumies had been made because it looked like they had to be fought. But Baird had just pointed out some extremely commonsense items which changed the situation entirely. And there was evidence that the Plumies saw the situation the new way. The skipper felt such enormous relief that his manner changed. He displayed what was almost effusive cordiality—for the skipper. He cleared his throat.

"Hm-m-m. Hah! Very good, Mr. Baird," he said formidably. *"And of course with time and air and metals we can rebuild our drive. For that matter, we could rebuild the* Niccola*! I'll notify the ship's company, Mr. Baird. Very good!"* He moved to use another microphone. Then he checked himself. *"Your expression is odd, Mr. Baird. Did you wish to say something more?"*

"Y-yes, sir," said Baird. He held Diane's hand fast. "It'll be months before we get back to port, sir. And it's normally against regulations, but under the circumstances . . . would you mind . . . as skipper . . . marrying Lieutenant Holt and me?"

The skipper snorted. Then he said almost—almost—amiably;

"Hm-m-m. You've both done very well, Mr. Baird. Yes. Come to the navigation room and we'll get it over with. Say—ten minutes from now."

Baird grinned at Diane. Her eyes shone a little.

This was at 04 hours 10 minutes ship time. It was exactly twelve hours since the alarm-bell rang.

THE END

DEAD

GIVEAWAY

BY RANDALL GARRETT

Illustrated by Martinez

Logic's a wonderful thing; by logical analysis, one can determine the necessary reason for the existence of a dead city of a very high order on an utterly useless planet. Obviously a shipping transfer point! Necessarily. . . .

ENDEZ?" said the young man in the blue-and-green tartan jacket. "Why, yes . . . sure I've heard of it. Why?"

The clerk behind the desk looked again at the information screen. "That's the destination we have on file for Scholar Duckworth, Mr. Turnbull. That was six months ago." He looked up from the screen, waiting to see if Turnbull had any more questions.

Turnbull tapped his teeth with a thumbnail for a couple of seconds, then shrugged slightly. "Any address given for him?"

"Yes, sir. The Hotel Byron, Landing City, Mendez."

Turnbull nodded. "How much is the fare to Mendez?"

The clerk thumbed a button which wiped the information screen clean, then replaced it with another list, which flowed upward for a few seconds, then stopped. "Seven hundred and eighty-five fifty, sir," said the clerk. "Shall I make you out a ticket?"

Turnbull hesitated. "What's the route?"

The clerk touched another control, and again the information on the screen changed. "You'll take the regular shuttle from here to Luna, then take either the *Stellar Queen* or the *Oriona* to Sirius VI. From there, you will have to pick up a ship to the Central Worlds—either to Vanderlin or BenAbram—and take a ship from there to Mendez. Not complicated, really. The whole trip won't take you more than three weeks, including stopovers."

"I see," said Turnbull. "I haven't made up my mind yet. I'll let you know."

"Very well, sir. The *Stellar Queen* leaves on Wednesdays and the *Oriona* on Saturdays. We'll need three days' notice."

Turnbull thanked the clerk and headed toward the big doors that led out of Long Island Terminal, threading his way through the little clumps of people that milled around inside the big waiting room.

He hadn't learned a hell of a lot, he thought. He'd known that Duckworth had gone to Mendez, and he already had the Hotel Byron address. There was, however, some negative information there. The last address they had was on Mendez, and yet Scholar Duckworth couldn't be found on Mendez. Obviously, he had not

filed a change of address there; just as obviously, he had managed to leave the planet without a trace. There was always the possibility that he'd been killed, of course. On a thinly populated world like Mendez, murder could still be committed with little chance of being caught. Even here on Earth, a murderer with the right combination of skill and luck could remain unsuspected.

But who would want to kill Scholar Duckworth?

And why?

Turnbull pushed the thought out of his mind. It was possible that Duckworth was dead, but it was highly unlikely. It was vastly more probable that the old scholar had skipped off for reasons of his own and that something had happened to prevent him from contacting Turnbull.

After all, almost the same thing had happened in reverse a year ago.

Outside the Terminal Building, Turnbull walked over to a hackstand and pressed the signal button on the top of the control column. An empty cab slid out of the traffic pattern and pulled up beside the barrier which separated the vehicular traffic from the pedestrian walkway. The gate in the barrier slid open at the same time the cab door did, and Turnbull stepped inside and sat down. He dialed his own number, dropped in the indicated number of coins, and then relaxed as the cab pulled out and sped down the freeway towards Manhattan.

He'd been back on Earth now for three days, and the problem of Scholar James Duckworth was still bothering him. He hadn't known anything about it until he'd arrived at his apartment after a year's absence.

The apartment door sighed a little as Dave Turnbull broke the electronic seal with the double key. Half the key had been in his possession for a year, jealousy guarded against loss during all the time he had been on Lobon; the other half had been kept by the manager of the Excelsior Apartments.

As the door opened, Turnbull noticed the faint musty odor that told of long-unused and poorly circulated air. The conditioners had been turned down to low power for a year now.

He went inside and allowed the door to close silently behind him. The apartment was just the same—the broad expanse of pale blue rug, the matching furniture, including the long, comfortable couch and the fat overstuffed chair—all just as he'd left them.

He ran a finger experimentally over the top of the table near the door. There was a faint patina of dust covering the glossy surface, but it was very faint, indeed. He grinned to himself. In spite of the excitement of the explorations on Lobon, it was great to be home again.

He went into the small kitchen, slid open the wall panel that concealed the apartment's power controls, and flipped the switch from "maintenance" to "normal." The lights came on, and there was a faint sigh

from the air conditioners as they began to move the air at a more normal rate through the rooms.

Then he walked over to the liquor cabinet, opened it, and surveyed the contents. There, in all their glory, sat the half dozen bottles of English sherry that he'd been dreaming about for twelve solid months. He took one out and broke the seal almost reverently.

Not that there had been nothing to drink for the men on Lobon; the University had not been so blue-nosed as all that. But the choice had been limited to bourbon and Scotch. Turnbull, who was not a whisky drinker by choice, had longed for the mellow smoothness of Bristol Cream Sherry instead of the smokiness of Scotch or the heavy-bodied strength of the bourbon.

He was just pouring his first glass when the announcer chimed. Frowning, Turnbull walked over to the viewscreen that was connected to the little eye in the door. It showed the face of—what was his name? Samson? Sanders. That was it, Sanders, the building superintendent.

Turnbull punched the opener and said: "Come in. I'll be right with you, Mr. Sanders."

Sanders was a round, pleasant-faced, soft-voiced man, a good ten years older than Turnbull himself. He was standing just inside the door as Turnbull entered the living room; there was a small brief case in his hand. He extended the other hand as Turnbull approached.

"Welcome home again, Dr. Turnbull," he said warmly. "We've missed you here at the Excelsior."

Turnbull took the hand and smiled as he shook it. "Glad to be back, Mr. Sanders; the place looks good after a year of roughing it."

The superintendent lifted the brief case. "I brought up the mail that accumulated while you were gone. There's not much, since we sent cards to each return address, notifying them that you were not available and that your mail was being held until your return."

He opened the brief case and took out seven standard pneumatic mailing tubes and handed them to Turnbull.

Turnbull glanced at them. Three of them were from various friends of his scattered over Earth; one was from Standard Recording Company; the remaining three carried the return address of James M. Duckworth, Ph. Sch., U.C.L.A., Great Los Angeles, California.

"Thanks, Mr. Sanders," said Turnbull. He was wondering why the man had brought them up so promptly after his own arrival. Surely, having waited a year, they would have waited until they were called for.

Sanders blinked apologetically. "Uh . . . Dr. Turnbull, I wonder if . . . if any of those contain money . . . checks, cash, anything like that?"

"I don't know. Why?" Turnbull asked in surprise.

Sanders looked even more apologetic. "Well, there was an attempted robbery here about six months ago. Someone broke into your mailbox downstairs. There was nothing in it,

of course; we've been putting everything into the vault as it came in. But the police thought it might be someone who knew you were getting money by mail. None of the other boxes were opened, you see, and—" He let his voice trail off as Turnbull began opening the tubes.

None of them contained anything but correspondence. There was no sign of anything valuable.

"Maybe they picked my box at random," Turnbull said. "They may have been frightened off after opening the one box."

"That's very likely it," said Sanders. "The police said it seemed to be a rather amateurish job, although whoever did it certainly succeeded in neutralizing the alarms."

Satisfied, the building superintendent exchanged a few more pleasantries with Turnbull and departed. Turnbull headed back toward the kitchen, picked up his glass of sherry, and sat down in the breakfast nook to read the letters.

The one from Standard Recording had come just a few days after he'd left, thanking him for notifying them that he wanted to suspend his membership for a year. The three letters from Cairo, London, and Luna City were simply chatty little social notes, nothing more.

The three from Scholar Duckworth were from a different breed of cat.

The first was postmarked 21 August 2187, three months after Turnbull had left for Lobon. It was neatly addressed to Dave F. Turnbull, Ph. D.

Dear Dave (it read):

I know I haven't been as consistent in keeping up with my old pupils as I ought to have been. For this, I can only beat my breast violently and mutter *mea culpa, mea culpa, mea maxima culpa.* I can't even plead that I was so immersed in my own work that I hadn't the time to write, because I'm busier right now than I've been for years, and I've had to *make* time for this letter.

Of course, in another way, this is strictly a business letter, and it does pertain to my work, so the time isn't as hard to find as it might be.

But don't think I haven't been watching your work. I've read every one of your articles in the various journals, and I have copies of all four of your books nestled securely in my library. Columbia should be—and apparently is—proud to have a man of your ability on its staff. At the rate you've been going, it won't be long before you get an invitation from the Advanced Study Board to study for your Scholar's degree.

As a matter of fact, I'd like to make you an offer right now to do some original research with me. I may not be a top-flight genius like Metternick or Dahl, but my reputation does carry some weight with the Board. *(That, Turnbull thought, was a bit of needless modesty; Duckworth wasn't the showman that Metternick was, or the prolific writer that Dahl was, but he had more intelligence and downright wisdom than either.)* So if you could manage to get a few months leave from Columbia, I'd be honored

to have your assistance. *(More modesty, thought Turnbull. The honor would be just the other way round.)*

The problem, in case you're wondering, has to do with the Centaurus Mystery; I think I've uncovered a new approach that will literally kick the supports right out from under every theory that's been evolved for the existence of that city. Sound interesting?

I'm mailing this early, so it should reach you in the late afternoon mail. If you'll be at home between 1900 and 2000, I'll call you and give you the details. If you've got a pressing appointment, leave details with the operator.

All the best,
Jim Duckworth

Turnbull slid the letter back into its tube and picked up the second letter, dated 22 August 2187, one day later.

Dear Dave,

I called last night, and the operator said your phone has been temporarily disconnected. I presume these letters will be forwarded, so please let me know where you are. I'm usually at home between 1800 and 2300, so call me collect within the next three or four days.

All the best,
Jim

The third letter was dated 10 November 2187. Turnbull wondered why it had been sent. Obviously, the manager of the Excelsior had sent Duckworth a notice that Dr. Turnbull was off-planet and could not be reached. He must have received the notice on the afternoon of 22 August. That would account for his having sent a second letter before he got the notice. Then why the third letter?

Dear Dave,

I know you won't be reading this letter for six months or so, but at least it will tell you where I am. I guess I wasn't keeping as close tabs on your work as I thought; otherwise I would have known about the expedition to Lobon. You ought to be able to make enough credit on that trip to bring you to the attention of the Board.

And don't feel too bad about missing my first letters or the call. I was off on a wild goose chase that just didn't pan out, so you really didn't miss a devil of a lot.

As a matter of fact, it was rather disappointing to me, so I've decided to take a long-needed sabbatical leave and combine it with a little research on the half-intelligent natives of Mendez. I'll see you in a year or so.

As ever,
Jim Duckworth

Well, that was that, Turnbull thought. It galled him a little to think that he'd been offered a chance to do research with Scholar Duckworth and hadn't been able to take it, but if the research hadn't panned out . . . He frowned and turned back to the first letter.

A theory that would "literally kick

the supports right out from under every theory that's been evolved for the existence of that city," he'd said. Odd. It was unlike Duckworth to be so positive about anything until he could support his own theory without much fear of having it pulled to pieces.

Turnbull poured himself a second glass of sherry, took a sip, and rolled it carefully over his tongue.

The Centaurus Mystery. That's what the explorers had called it back in 2041, nearly a century and a half before, when they'd found the great city on one of the planets of the Alpha Centaurus system. Man's first interstellar trip had taken nearly five years at sublight velocities, and *bing!* —right off the bat, they'd found something that made interstellar travel worthwhile, even though they'd found no planet in the Alpha Centaurus system that was really habitable for man.

They'd seen it from space—a huge domed city gleaming like a great gem from the center of the huge desert that covered most of the planet. The planet itself was Marslike—flat and arid over most of its surface, with a thin atmosphere high in CO_2 and very short on oxygen. The city showed up very well through the cloudless air.

From the very beginning, it had been obvious that whoever or whatever had built that city had not evolved on the planet where it had been built. Nothing more complex than the lichens had ever evolved there, as thousands of drillings into the crust of the planet had shown.

Certainly nothing of near-humanoid construction could ever have come into being on that planet without leaving some trace of themselves or their genetic forebears except for that single huge city.

How long the city had been there was anyone's guess. A thousand years? A million? There was no way of telling. It had been sealed tightly, so none of the sand that blew across the planet's surface could get in. It had been set on a high plateau of rock, far enough above the desert level to keep it from being buried, and the transparent dome was made of an aluminum oxide glass that was hard enough to resist the slight erosion of its surface that might have been caused by the gentle, thin winds dashing microscopic particles of sand against its smooth surface.

Inside, the dry air had preserved nearly every artifact, leaving them as they had been when the city was deserted by its inhabitants at an unknown time in the past.

That's right—deserted. There were no signs of any remains of living things. They'd all simply packed up and left, leaving everything behind.

Dating by the radiocarbon method was useless. Some of the carbon compounds in the various artifacts showed a faint trace of radiocarbon, others showed none. But since the method depends on a knowledge of the amount of nitrogen in the atmosphere of the planet of origin, the rate of bombardment of that atmosphere by high-velocity particles, and several

other factors, the information on the radioactivity of the specimens meant nothing. There was also the likelihood that the carbon in the various polymer resins came from oil or coal, and fossil carbon is useless for radiodating.

Nor did any of the more modern methods show any greater success.

It had taken Man centuries of careful comparison and cross-checking to read the evolutionary history written in the depths of his own planet's crust—to try to date the city was impossible. It was like trying to guess the time by looking at a faceless clock with no hands.

There the city stood—a hundred miles across, ten thousand square miles of complex enigma.

It had given Man his first step into the ever-widening field of Cultural Xenology.

Dave Turnbull finished his sherry, got up from the breakfast nook, and walked into the living room, where his reference books were shelved. The copy of Kleistmeistenoppolous' "City of Centaurus" hadn't been opened in years, but he took it down and flipped it open to within three pages of the section he was looking for.

"It is obvious, therefore, that every one of the indicators points in the same direction. The City was not—*could not have been*—self-supporting. There is no source of organic material on the planet great enough to support such a city; therefore, foodstuffs must have been imported. On the other hand, it is necessary to postulate *some* reason for establishing a city on an otherwise barren planet and populating it with an estimated six hundred thousand individuals.

"There can be only one answer: The race that built the City did so for the same reason that human beings built such megalopolises as New York, Los Angeles, Tokyo, and London—because it was a focal point for important trade routes. Only such trade routes could support such a city; only such trade routes give reason for the City's very existence.

"And when those trade routes changed or were supplanted by others in the course of time, the reason for the City's existence vanished."

Turnbull closed the book and shoved it back into place. Certainly the theory made sense, and had for a century. Had Duckworth come across information that would seem to smash that theory?

The planet itself seemed to be perfectly constructed for a gigantic landing field for interstellar ships. It was almost flat, and if the transhipping between the interstellar vessels had been done by air, there would be no need to build a hard surface for the field. And there were other indications. Every fact that had come to light in the ensuing century had been in support of the Greek-German xenologist's theory.

Had Duckworth come up with something new?

If so, why had he decided to discard it and forget his new theory?

If not, why had he formulated the new theory, and on what grounds?

Turnbull lit a cigarette and looked

sourly at the smoke that drifted up from its tip. What the devil was eating him? He'd spent too much time away from Earth, that was the trouble. He'd been too deeply immersed in his study of Lobon for the past year. Now all he had to do was get a little hint of something connected with cultural xenology, and his mind went off on dizzy tizzies.

Forget it. Duckworth had thought he was on to something, found out that he wasn't, and discarded the whole idea. And if someone like Scholar James Duckworth had decided it wasn't worth fooling with, then why was a common Ph. D. like Turnbull worrying about it? Especially when he had no idea what had started Duckworth off in the first place.

And his thoughts came back around to that again. If Duckworth had thought enough of the idea to get excited over it, what had set him off? Even if it had later proved to be a bad lead, Turnbull felt he'd like to know what had made Duckworth

think—even for a short time—that there was some other explanation for the City.

Ah, hell! He'd ask Duckworth some day. There was plenty of time.

He went over to the phone, dialed a number, and sat down comfortably in his fat blue overstuffed chair. It buzzed for half a minute, then the telltale lit up, but the screen remained dark.

"Dave!" said a feminine voice. "Are you back? Where on Earth have you been?"

"I haven't," said Turnbull. "How come no vision?"

"I was in the hammam, silly. And what do you mean 'I haven't'? You haven't what?"

"You asked me where on Earth I'd been, and I said I haven't."

"Oh! Lucky man! Gallivanting around the starways while us poor humans have to stay home."

"Yeah, great fun. Now look, Dee, get some clothes on and turn on your pickup. I don't like talking to gray screens."

"Half a sec." There was a minute's pause, then the screen came on, showing the girl's face. "Now, what do you have on your purported mind?"

"Simple. I've been off Earth for a year, staring at bearded faces and listening to baritone voices. If it isn't too short notice, I'd like to take you to dinner and a show and whatever else suggests itself afterward."

"Done!" she said. "What time?"

"Twenty hundred? At your place?"

"I'll be waiting."

Dave Turnbull cut the circuit, grinning. The Duckworth problem had almost faded from his mind. But it flared back up again when he glanced at the mail tubes on his desk.

"Damn!" he said.

He turned back to the phone, jammed a finger into the dial and spun it angrily. After a moment, the screen came to life with the features of a beautifully smiling but obviously efficient blond girl.

"Interstellar Communications. May I serve you, sir?"

"How long will it take to get a message to Mendez? And what will it cost?"

"One moment, sir." Her right hand moved off-screen, and her eyes shifted to look at a screen that Turnbull couldn't see. "Mendez," she said shortly. "The message will reach there in five hours and thirty-six minutes total transmission time. Allow an hour's delay for getting the message on the tapes for beaming.

"The cost is one seventy-five per symbol. Spaces and punctuation marks are considered symbols. *A, an, and,* and *the* are symbols."

Turnbull thought a moment. It was high—damned high. But then a man with a bona fide Ph. D. was not exactly a poor man if he worked at his specialty or taught.

"I'll call you back as soon as I've composed the message," he said.

"Very well, sir."

He cut the circuit, grabbed a pencil and started scribbling. When he'd finished reducing the thing to its bare minimum, he started to dial the num-

ber again. Then he scowled and dialed another number.

This time, a mild-faced young man in his middle twenties appeared.

"University of California in Los Angeles, Personnel Office. May I serve you?"

"This is Dr. Dave Turnbull, in New York. I understand that Scholar Duckworth is on leave. I'd like his present address."

The young man looked politely firm. "I'm sorry, doctor; we can not give out that information."

"Oh, yap! Look here; I know where he is; just give me—" He stopped. "Never mind. Let me talk to Thornwald."

Thornwald was easier to deal with, since he knew both Duckworth and Turnbull. Turnbull showed him Duckworth's letter on the screen. "I know he's on Mendez; I just don't want to have to look all over the planet for him."

"I know, Dave. I'm sure it's all right. The address is Landing City, Hotel Byron, Mendez."

"Thanks, Thorn; I'll do you a favor some day."

"Sure. See you."

Turnbull cut off, dialed Interstellar Communications, sent his message, and relaxed. He was ready to make a night of it. He was going to make his first night back on Earth a night to remember.

He did.

The next morning, he was feeling almost flighty. He buzzed and flitted around his apartment as though he'd hit a high point on a manic cycle, happily burbling utter nonsense in the form of a perfectly ridiculous popular song.

My dear, the merest touch of you
Has opened up my eyes;
And if I get too much of you,
You really paralyze!
Donna, Donna, bella Donna,
Clad in crimson bright,
Though I'm near you, I don't wanna
See the falling shades of night!

Even when the phone chimed in its urgent message, it didn't disturb his frothy mood. But three minutes later he had dropped down to earth with a heavy *clunk*.

His message to Mendez had not been delivered. There was not now, and never had been a Scholar James Duckworth registered at the Hotel Byron in Landing City. Neither was his name on the incoming passenger lists at the spaceport at Landing City.

He forced himself to forget about it; he had a date with Dee again that night, and he was not going to let something silly like this bother him. But bother him it did. Unlike the night before, the date was an utter fiasco, a complete flop. Dee sensed his mood, misinterpreted it, complained of a headache, and went home early. Turnbull slept badly that night.

Next morning, he had an appointment with one of the executives of U.C.L.I.—University of Columbia in Long Island—and, on the way back he stopped at the spaceport to see what he could find out. But all he

got was purely negative information.

On his way back to Manhattan, he sat in the autocab and fumed.

When he reached home, he stalked around the apartment for an hour, smoking half a dozen cigarettes, chain fashion, and polishing off three glasses of Bristol Cream without even tasting it.

Dave Turnbull, like any really top-flight investigator, had developed intuitive thinking to a fine art. Ever since the Lancaster Method had shown the natural laws applying to intuitive reasoning, no scientist worthy of the name failed to apply it consistently in making his investigations. Only when exact measurement became both possible and necessary was there any need to apply logic to a given problem.

A logician adds two and two and gets four; an intuitionist mutliplies them and gets the same answer. But a logician, faced with three twos, gets six—an intuitionist gets eight. Intuition will get higher orders of answers from a given set of facts than logic will.

Turnbull applied intuition to the facts he knew and came up with an answer. Then he phoned the New York Public Library, had his phone connected with the stacks, and spent an hour checking for data that would either prove or disprove his theory. He found plenty of the former and none of the latter.

Then he called his superiors at Columbia.

He had to write up his report on the Lobon explorations. Would it be possible for him to take a six-month leave of absence for the purpose?

It would.

The following Saturday, Dr. Dave F. Turnbull was on the interstellar liner *Oriona,* bound for Sirius.

If ever there was a Gold Mine In The Sky, it was Centaurus City. To the cultural xenologists who worked on its mysterious riches, it seemed to present an almost inexhaustible supply of new data. The former inhabitants had left everything behind, as though it were no longer of any value whatever. No other trace of them had as yet been found anywhere in the known galaxy, but they had left enough material in Centaurus City to satisfy the curiosity of Mankind for years to come, and enough mystery and complexity to whet that curiosity to an even sharper degree.

It's difficult for the average person to grasp just how much information can be packed into a city covering ten thousand square miles with a population density equal to that of Manhattan. How long would it take the hypothetical Man From Mars to investigate New York or London if he had only the City to work with, if he found them just as they stand except that the inhabitants had vanished?

The technological level of the aliens could not be said to be either "above" or "below" that of Man; it could only be said to be "different." It was as if the two cultures complemented each other; the areas of knowledge which the aliens had explored seemed to be those which Man-

kind had not yet touched, while, at the same time, there appeared to be many levels of common human knowledge which the aliens had never approached.

From the combination of the two, whole new fields of human thought and endeavor had been opened.

No trace of the alien spaceships had been uncovered, but the anti-gravitational devices in their aircraft, plus the basic principles of Man's own near-light-velocity drive had given Man the ultralight drive.

Their knowledge of social organization and function far exceeded that of Man, and the hints taken from the deciphered writings of the aliens had radically changed Man's notions of government. Now humanity could build a Galactic Civilization—a unity that was neither a pure democracy nor an absolute dictatorship, but resulted in optimum governmental control combined with optimum individual freedom. It was *e pluribus unum* plus. Their technological writings were few, insofar as physics and chemistry were concerned. What there were turned out to be elementary texts rather than advanced studies —which was fortunate, because it had been through these that the cultural xenologists had been able to decipher the language of the aliens, a language that was no more alien to the modern mind than, say, ancient Egyptian or Cretan.

But without any advanced texts, deciphering the workings of the thousands of devices that the aliens had left behind was a tedious job. The elementary textbooks seemed to deal with the same sort of science that human beings were used to, but, at some point beyond, the aliens had taken a slightly different course, and, at first, only the very simplest of their mechanisms could be analyzed. But the investigators learned from the simpler mechanisms, and found themselves able to take the next step forward to more complex ones. However, it still remained a fact that the majority of the devices were as incomprehensible to the investigators as would the function of a transistor have been to James Clerk Maxwell.

In the areas of the social sciences, data was deciphered at a fairly rapid rate; the aliens seemed to have concentrated all their efforts on that. Psionics, on the other hand, seemed never to have occurred to them, much less to have been investigated. And yet, there were devices in Centaurus City that bore queer generic resemblances to common Terrestrial psionic machines. But there was no hint of such things in the alien literature.

And the physical sciences were deciphered only slowly, by a process of cut-and-try and cut-and-try again.

The investigations would take time. There were only a relatively small handful of men working on the problems that the City posed. Not because there weren't plenty of men who would have sacrificed their time and efforts to further the work, but because the planet, being hostile to Man, simply would not support very many investigators. It was not economically feasible to pour more men

and material into the project after the point of diminishing returns had been reached. Theoretically, it would have been possible to re-seal the City's dome and pump in an atmosphere that human beings could live with, but, aside from every other consideration, it was likely that such an atmosphere would ruin many of the artifacts within the City.

Besides, the work in the City was heady stuff. Investigation of the City took a particular type of high-level mind, and that kind of mind did not occur in vast numbers.

It was not, Turnbull thought, his particular dish of tea. The physical sciences were not his realm, and the work of translating the alien writings could be done on Earth, from 'stat copies, if he'd cared to do that kind of work.

Sirius VI was a busy planet—a planet that was as Earthlike as a planet could be without being Earth itself. It had a single moon, smaller than Earth's and somewhat nearer to the planet itself. The *Oriona* landed there, and Dave Turnbull took a shuttle ship to Sirius VI, dropping down at the spaceport near Noiberlin, the capital.

It took less than an hour to find that Scholar Duckworth had gone no farther on his journey to Mendez than Sirius VI. He hadn't cashed in his ticket; if he had, they'd have known about it on Earth. But he certainly hadn't taken a ship toward the Central Stars, either.

Turnbull got himself a hotel room and began checking through the Noiberlin city directory. There it was, big as life and fifteen times as significant. Rawlings Scientific Corporation.

Turnbull decided he might as well tackle them right off the bat; there was nothing to be gained by pussyfooting around.

He used the phone, and, after browbeating several of the employees and pulling his position on a couple of executives, he managed to get an appointment with the Assistant Director, Lawrence Drawford. The Director, Scholar Jason Rawlings, was not on Sirius VI at the time.

The appointment was scheduled for oh nine hundred the following morning, and Turnbull showed up promptly. He entered through the big main door and walked to the reception desk.

"Yes?" said the girl at the desk.

"How do you do," Turnbull said. "My name is Turnbull; I think I'm expected."

"Just a moment." She checked with the information panel on her desk, then said: "Go right on up, Dr. Turnbull. Take Number Four Lift Chute to the eighteenth floor and turn left. Dr. Drawford's office is at the end of the hall."

Turnbull followed directions.

Drawford was a heavy-set, florid-faced man with an easy smile and a rather too hearty voice.

"Come in, Dr. Turnbull; it's a pleasure to meet you. What can I do for you?" He waved Turnbull to a chair and sat down behind his desk.

Turnbull said carefully: "I'd just like to get a little information, Dr. Drawford."

Drawford selected a cigar from the humidor on his desk and offered one to Turnbull. "Cigar? No? Well, if I can be of any help to you, I'll certainly do the best I can." But there was a puzzled look on his face as he lit his cigar.

"First," said Turnbull, "am I correct in saying that Rawlings Scientific is in charge of the research program at Centaurus City?"

Drawford exhaled a cloud of blue-gray smoke. "Not precisely. We work as a liaison between the Advanced Study Board and the Centaurus group, and we supply the equipment that's needed for the work there. We build instruments to order—that sort of thing. Scholar Rawlings is a member of the Board, of course, which admits of a somewhat closer liaison than might otherwise be possible.

"But I'd hardly say we were in charge of the research. That's handled entirely by the Group leaders at the City itself."

Turnbull lit a cigarette. "What happened to Scholar Duckworth?" he said suddenly.

Drawford blinked. "I beg your pardon?"

Again Turnbull's intuitive reasoning leaped far ahead of logic; he knew that Drawford was honestly innocent of any knowledge of the whereabouts of Scholar James Duckworth.

"I was under the impression," Turnbull said easily, "that Scholar Duckworth was engaged in some sort of work with Scholar Rawlings."

Drawford smiled and spread his hands. "Well, now, that may be, Dr. Turnbull. If so, then they're engaged in something that's above my level."

"Oh?"

Drawford pursed his lips for a moment, frowning. Then he said: "I must admit that I'm not a good intuitive thinker, Dr. Turnbull. I have not the capacity for it, I suppose. That's why I'm an engineer instead of a basic research man; that's why I'll never get a Scholar's degree." Again he paused before continuing. "For that reason, Scholar Rawlings leaves the logic to me and doesn't burden me with his own business. Nominally, he is the head of the Corporation; actually, we operate in different areas—areas which, naturally, overlap in places, but which are not congruent by any means."

"In other words," said Turnbull, "if Duckworth and Rawlings were working together, you wouldn't be told about it."

"Not unless Scholar Rawlings thought it was necessary to tell me," Drawford said. He put his cigar carefully in the ashdrop. "Of course, if I *asked* him, I'm sure he'd give me the information, but it's hardly any of *my* business."

Turnbull nodded and switched his tack. "Scholar Rawlings is off-planet, I believe?"

"That's right. I'm not at liberty to disclose his whereabouts, however," Drawford said.

"I realize that. But I'd like to get a message to him, if possible."

Drawford picked up his cigar again and puffed at it a moment before saying anything. Then, "Dr. Turnbull, please don't think I'm being stuffy, but may I ask the purpose of this inquiry?"

"A fair question," said Turnbull, smiling. "I really shouldn't have come barging in here like this without explaining myself first." He had his lie already formulated in his mind. "I'm engaged in writing up a report on the cultural significance of the artifacts on the planet Lobon—you may have heard something of it?"

"I've heard the name," Drawford admitted. "That's in the Sagittarius Sector somewhere, as I recall."

"That's right. Well, as you know, the theory for the existence of Centaurus City assumes that it was, at one time, the focal point of a complex of trade routes through the galaxy, established by a race that has passed from the galactic scene."

Drawford was nodding slowly, waiting to hear what Turnbull had to say.

"I trust that you'll keep this to yourself, doctor," Turnbull said, extinguishing his cigarette. "But I am of the opinion that the artifacts on Lobon bear a distinct resemblance to those of the City." It was a bald, out-and-out lie, but he knew Drawford would have no way of knowing that it was. "I think that Lobon was actually one of the colonies of that race—one of their food-growing planets. If so, there is certainly a necessity for correlation between the data uncovered on Lobon and those which have been found in the City."

Drawford's face betrayed his excitement. "Why . . . why, that's amazing! I can see why you wanted to get in touch with Scholar Rawlings, certainly! Do you really think there's something in this idea?"

"I do," said Turnbull firmly. "Will it be possible for me to send a message to him?"

"Certainly," Drawford said quickly. "I'll see that he gets it as soon as possible. What did you wish to say?"

Turnbull reached into his belt pouch, pulled out a pad and stylus, and began to write.

I have reason to believe that I have solved the connection between the two sources of data concerned in the Centaurus City problem. I would also like to discuss the Duckworth theory with you.

When he had finished, he signed his name at the bottom and handed it to Drawford.

Drawford looked at it, frowned, and looked up at Turnbull questioningly.

"He'll know what I mean," Turnbull said. "Scholar Duckworth had an idea that Lobon was a data source on the problem even before we did our digging there. Frankly, that's why I thought Duckworth might be working with Scholar Rawlings."

Drawford's face cleared. "Very well. I'll put this on the company transmitters immediately, Dr. Turnbull. And—don't worry, I won't say

anything about this to anyone until Scholar Rawlings or you, yourself, give me the go-ahead."

"I'd certainly appreciate that," Turnbull said, rising from his seat. "I'll leave you to your work now, Dr. Drawford. I can be reached at the Mayfair Hotel."

The two men shook hands, and Turnbull left quickly.

Turnbull felt intuitively that he knew where Rawlings was. On the Centaurus planet—the planet of the City. But where was Duckworth? Reason said that he, too, was at the City, but under what circumstances? Was he a prisoner? Had he been killed outright?

Surely not. That didn't jibe with his leaving Earth the way he had. If someone had wanted him killed, they'd have done it on Earth; they wouldn't have left a trail to Sirius IV that anyone who was interested could have followed.

On the other hand, how could they account for Duckworth's disappearance, since the trail *was* so broad? If the police—

No. He was wrong. The trouble with intuitive thinking is that it tends to leave out whole sections of what, to a logical thinker, are pieces of absolutely necessary data.

Duckworth actually had no connection with Rawlings—no *logical* connection. The only thing the police would have to work with was the fact that Scholar Duckworth had started on a trip to Mendez and never made it any farther than Sirius IV. There,

he had vanished. Why? How could they prove anything?

On the other hand, Turnbull was safe. The letters from Duckworth, plus his visit to Drawford, plus his acknowledged destination of Sirius IV, would be enough to connect up both cases if Turnbull vanished. Rawlings should know he couldn't afford to do anything to Turnbull.

Dave Turnbull felt perfectly safe.

He was in his hotel room at the Mayfair when the announcer chimed, five hours later. He glanced up from his book to look at the screen. It showed a young man in an ordinary business jumper, looking rather boredly at the screen.

"What is it?" Turnbull asked.

"Message for Dr. Turnbull from Rawlings Scientific Corporation," said the young man, in a voice that sounded even more bored than his face looked.

Turnbull sighed and got up to open the door. When it sectioned, he had only a fraction of a second to see what the message was.

It was a stungun in the hand of the young man.

It went off, and Turnbull's mind spiraled into blankness before he could react.

Out of a confused blur of color, a face sprang suddenly into focus, swam away again, and came back. The lips of the face moved.

"How do you feel, son?"

Turnbull looked at the face. It was that of a fairly old man who still retained the vitality of youth. It was lined, but still firm.

It took him a moment to recognize the face—then he recalled stereos he'd seen.

It was Scholar Jason Rawlings.

Turnbull tried to lift himself up and found he couldn't.

The scholar smiled. "Sorry we had to strap you down," he said, "but I'm not nearly as strong as you are, and I didn't have any desire to be jumped before I got a chance to talk to you."

Turnbull relaxed. There was no immediate danger here.

"Know where you are?" Rawlings asked.

"Centaurus City," Turnbull said calmly. "It's a three-day trip, so obviously you couldn't have made it in the five hours after I sent you the message. You had me kidnaped and brought here."

The old man frowned slightly. "I suppose, technically, it *was* kidnaping, but we had to get you out of circulation before you said anything that might . . . ah . . . give the whole show away."

Turnbull smiled slightly. "Aren't you afraid that the police will trace this to you?"

"Oh, I'm sure they would eventually," said Rawlings, "but you'll be free to make any explanations long before that time."

"I see," Turnbull said flatly. "Mind operation. Is that what you did to Scholar Duckworth?"

The expression on Scholar Rawling's face was so utterly different from what Turnbull had expected

that he found himself suddenly correcting his thinking in a kaleidoscopic readjustment of his mind.

"What did you think you were on to, Dr. Turnbull?" the old man asked slowly.

Turnbull started to answer, but, at that moment the door opened.

The round, pleasant-faced gentleman who came in needed no introduction to Turnbull.

Scholar Duckworth said: "Hello, Dave. Sorry I wasn't here when you woke up, but I got—" He stopped. "What's the matter?"

"I'm just cursing myself for being a fool," Turnbull said sheepishly. "I was using your disappearance as a datum in a problem that didn't require it."

Scholar Rawlings laughed abruptly. "Then you thought—"

Duckworth chuckled and raised a hand to interrupt Rawlings. "Just a moment, Jason; let him logic it out to us."

"First take these straps off," said Turnbull. "I'm stiff enough as it is, after being out cold for three days."

Rawlings touched a button on the wall, and the restraining straps vanished. Turnbull sat up creakily, rubbing his arms.

"Well?" said Duckworth.

Turnbull looked up at the older man. "It was those first two letters of yours that started me off."

"I was afraid of that," Duckworth said wryly. "I . . . ah . . . tried to get them back before I left Earth, but, failing that, I sent you a letter to try to throw you off the track."

"Did you think it would?" Turnbull asked.

"I wasn't sure," Duckworth admitted. "I decided that if you had what it takes to see through it, you'd deserve to know the truth."

"I think I know it already."

"I dare say you do," Duckworth admitted. "But tell us first why you jumped to the wrong conclusion."

Turnbull nodded. "As I said, your letters got me worrying. I knew you must be on to something or you wouldn't have been so positive. So I started checking on all the data about the City—especially that which had come in just previous to the time you sent the letters.

"I found that several new artifacts had been discovered in Sector Nine of the City—in the part they call the Bank Buildings. That struck a chord in my memory, so I looked back over the previous records. That Sector was supposed to have been cleaned out nearly ninety years ago.

"The error I made was in thinking that you had been forcibly abducted somehow—that you had been forced to write that third letter. It certainly looked like it, since I couldn't see any reason for you to hide anything from me.

"I didn't think you'd be in on anything as underhanded as this looked, so I assumed that you were acting against your will."

Scholar Rawlings smiled. "But you thought I was capable of underhanded tactics? That's not very flattering, young man."

Turnbull grinned. "I thought you

were capable of kidnaping a man. Was I wrong?"

Rawlings laughed heartily. "*Touché.* Go on."

"Since artifacts had been found in a part of the City from which they had previously been removed, I thought that Jim, here, had found a . . . well, a cover-up. It looked as though some of the alien machines were being moved around in order to conceal the fact that someone was keeping something hidden. Like, for instance, a new weapon, or a device that would give a man more power than he should rightfully have."

"Such as?" Duckworth asked.

"Such as invisibility, or a cheap method of transmutation, or even a new and faster space drive. I wasn't sure, but it certainly looked like it might be something of that sort."

Rawlings nodded thoughtfully. "A very good intuition, considering the fact that you had a bit of erroneous data."

"Exactly. I thought that Rawlings Scientific Corporation—or else you, personally—were concealing something from the rest of us and from the Advisory Board. I thought that Scholar Duckworth had found out about it and that he'd been kidnaped to hush him up. It certainly looked that way."

"I must admit it did, at that," Duckworth said. "But tell me—how does it look now?"

Turnbull frowned. "The picture's all switched around now. You came here for a purpose—to check up on your own data. Tell me, is everything here on the level?"

Duckworth paused before he answered. "Everything *human*," he said slowly.

"That's what I thought," said Turnbull. "If the human factor is eliminated—at least partially—from the data, the intuition comes through quite clearly. We're being fed information."

Duckworth nodded silently.

Rawlings said: "That's it. Someone or something is adding new material to the City. It's like some sort of cosmic bird-feeding station that has to be refilled every so often."

Turnbull looked down at his big hands. "It never was a trade route focus," he said. "It isn't even a city, in our sense of the term, no more than a birdhouse is a nest." He looked up. "That city was built for only one purpose—to give human beings certain data. And it's evidently data that we need in a hurry, for our own good."

"How so?" Rawlings asked, a look of faint surprise on his face.

"Same analogy. Why does anyone feed birds? Two reasons—either to study and watch them, or to be kind to them. You feed birds in the winter because they might die if they didn't get enough food."

"Maybe we're being studied and watched, then," said Duckworth, probingly.

"Possibly. But we won't know for a long time—if ever."

Duckworth grinned. "Right. I've seen this City. I've looked it over

carefully in the past few months. Whatever entities built it are so far ahead of us that we can't even imagine what it will take to find out anything about them. We are as incapable of understanding them as a bird is incapable of understanding us."

"Who knows about this?" Turnbull asked suddenly.

"The entire Advanced Study Board, at least," said Rawlings. "We don't know how many others. But so far as we know everyone who has been able to recognize what is really going on at the City has also been able to realize that it is something that the human race *en masse* is not yet ready to accept."

"What about the technicians who are actually working there?" asked Turnbull.

Rawlings smiled. "The artifacts are very carefully replaced. The technicians—again, as far as we know—have accepted the evidence of their eyes."

Turnbull looked a little dissatisfied. "Look, there are plenty of people in the galaxy who would literally hate the idea that there is anything in the universe superior to Man. Can you imagine the storm of reaction that would hit if this got out? Whole groups would refuse to have anything to do with anything connected with the City. The Government would collapse, since the whole theory of our present government comes from City data. And the whole work of teaching intuitive reasoning would be dropped like a hot potato by just those very people who need to learn to use it.

"And it seems to me that some precautions—" He stopped, then grinned rather sheepishly. "Oh," he said, "I see."

Rawlings grinned back. "There's never any need to distort the truth. Anyone who is psychologically incapable of allowing the existence of beings more powerful than Man is also psychologically incapable of piecing together the clues which would indicate the existence of such beings."

Scholar Duckworth said: "It takes a great deal of humility—a real feeling of honest humility—to admit that one is actually inferior to someone—or something—else. Most people don't have it—they rebel because they can't admit their inferiority."

"Like the examples of the North American Amerindian tribes," Turnbull said. "They hadn't reached the state of civilization that the Aztecs or Incas had. They were incapable of allowing themselves to be beaten and enslaved—they refused to allow themselves to learn. They fought the white man to the last ditch—and look where they ended up."

"Precisely," said Duckworth. "While the Mexicans and Peruvians today are a functioning part of civilization—because they *could* and *did* learn."

"I'd just as soon the human race didn't go the way of the Amerindians," Turnbull said.

"I have a hunch it won't," Scholar Rawlings said. "The builders of the

City, whoever they are, are edging us very carefully into the next level of civilization—whatever it may be. At that level, perhaps we'll be able to accept their teaching more directly."

Duckworth chuckled. "Before we can become gentlemen, we have to realize that we are *not* gentlemen."

Turnbull recognized the allusion. There is an old truism to the effect that a barbarian can never learn what a gentleman is because a barbarian cannot recognize that he isn't a gentleman. As soon as he recognizes that fact, he ceases to be a barbarian. He is *not* automatically a gentleman, but at least he has become capable of learning how to be one.

"The City itself," said Rawlings, "acts as a pretty efficient screening device for separating the humble from the merely servile. The servile man resents his position so much that he will fight anything which tries to force recognition of his position on him. The servile slave is convinced that he is equal to or superior to his masters, and that he is being held down by brute force. So he opposes them with brute force and is eventually destroyed."

Turnbull blinked. "A screening device?" Then, like a burst of sunlight, the full intuition came over him.

Duckworth's round face was positively beaming. "You're the first one ever to do it," he said. "In order to become a member of the Advanced Study Board, a scholar must solve that much of the City's secret by himself. I'm a much older man than you, and I just solved it in the past few months.

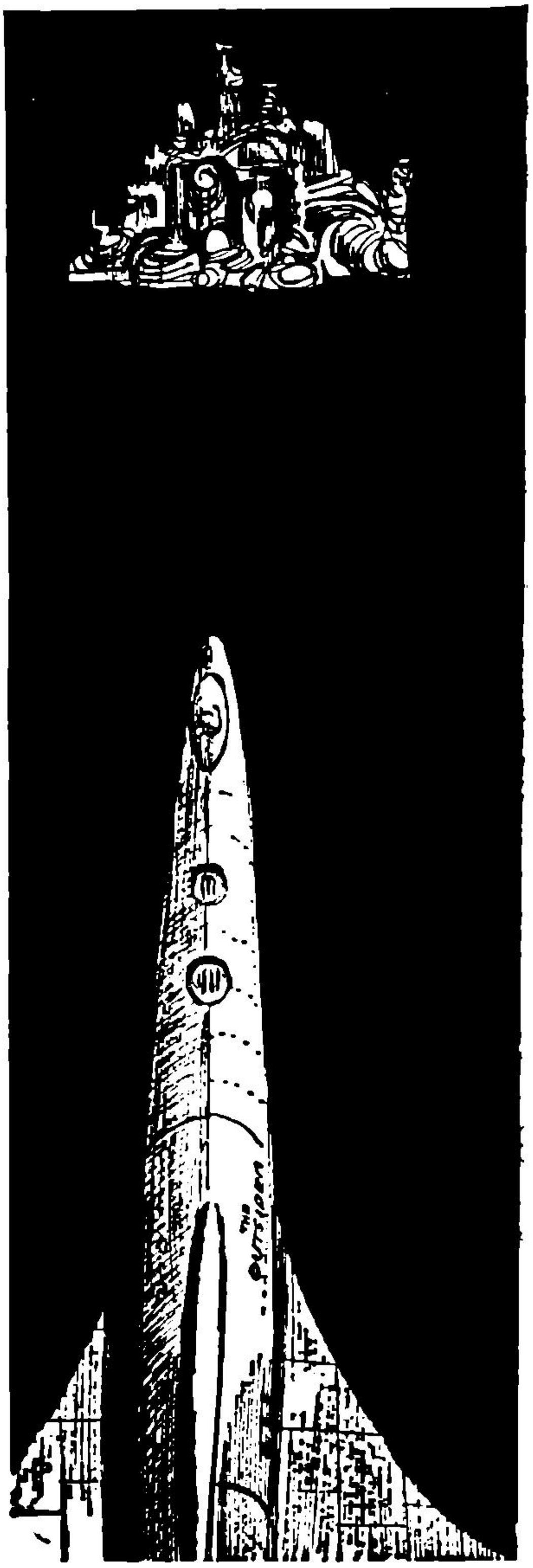
"You will be the first Ph.D. to be admitted to the Board while you're working on your scholar's degree. Congratulations."

Turnbull looked down at his big hands, a pleased look on his face. Then he looked up at Scholar Duckworth. "Got a cigarette, Jim? Thanks. You know, we've still got plenty of work ahead of us, trying to find out just what it is that the City builders want us to learn."

Duckworth smiled as he held a flame to the tip of Turnbull's cigarette.

"Who knows?" he said quietly. "Hell, maybe they want us to learn about *them*!"

THE OUTSIDERS



There's always a backwater area—the sticks—a place that isn't a frontier because it isn't on the way to anywhere, and isn't anything itself. And always some people who live there. In the galaxy—it was The Rim. It wasn't anywhere, and there wasn't any place to go....

Illustrated by Summers

BY A. BERTRAM CHANDLER

'WAS on Stree that star tramp *Rimfire*, received the news. He was in his day cabin at Calver, master of the the time and he and Jane Calver, who was both his wife and his catering officer, were trying to entertain the large, not unhandsome saurian who acted as Rim Runners' local agent. It had been heavy going; the lizard people of Stree are avid for new knowledge and delight in long winded philosophical discussions. Both Calver and Jane tried hard not to show their relief when there was a sharp rapping at the cabin door.

"Excuse me, Treeth," said Calver.

"Most certainly, captain," replied the agent. "Doubtless one of your officers has news of great import."

"I doubt it," said Jane Calver. "It'll be merely some minor problem of stowage."

"Come in!" called Calver.

The lizard, who had been sitting on the deck, rose gracefully to his feet, his long tail skimming the afternoon tea crockery on the low coffee table with a scant millimeter of clearance. Jane, when the expected crash failed to eventuate, gave an audible sigh of relief. Treeth looked at Calver and grinned, showing all his needle teeth. Calver wished that a childish sense of humor did not, as it too often does, go hand in hand with super intelligence.

Levine, the little Psionic Radio Officer, came into the cabin. He was obviously excited.

"Captain," he said, "I've picked up a message. An important one. Really important. .Donaldson, the P.R.O. at Port Faraway, must have hooked up every telepath and every dog's brain on the whole planet to punch it through at this range!"

"And what is the news?" asked Calver.

"The *Thermopylae* salvage case. It's been settled at last."

"So Rim Runners get their new ship," said Calver.

"To hell with Rim Runners," replied Levine. "We get our whack—all of us who were in the poor old *Lorn Lady* at the time."

Treeth sat down again. He did not repeat the infantile joke with his tail and the tea things, which was unlike him. He said, in the well modulated voice that had only the suggestion of a croak, "I trust you will forgive my curiosity, captain. But we, as you know, were entirely ignorant of commercial matters until your Commodore Grimes made his landing on our world. What *is* salvage?"

"Putting it briefly," said Calver, "it's this. If you come across another ship in distress, you do your best to save life and property. The life-saving part is taken for granted. It's when property—the other vessel, or her cargo—is saved that the legal complications creep in. When you save property, the Courts decide what payment you shall receive for so doing. And a spaceship is a very expensive hunk of property."

"And the *Thermopylae?*" asked Treeth. "We heard something about it from Captain Vickery of the *Sun-*

downer. It happened shortly after the last time that you were here in *Lorn Lady,* didn't it? I shall be obliged if you will tell me all about it."

"All right," said Calver. "*Thermopylae* was—and, as far as I know, still is—one of the Trans-Galactic Clippers, a large passenger liner. She was making a cruising voyage out along the Rim. She got into trouble off Eblis—"

"A *most* unpleasant world," said Treeth. "I have seen pictures of it."

"As you say, a most unpleasant world. Anyhow, *Thermopylae* was putting herself into orbit around Eblis when she blew her tube linings, as a result of which she was doomed to make a series of grazing ellipses until such time as she crashed to the surface. We came along in *Lorn Lady* and tried to tow her into a stable orbit. We succeeded—but wrecked *Lorn Lady* in the process. Then *Thermopylae* used our tube linings to make temporary repairs. As you can see, it was the sort of case that brings joy to the hearts of the lawyers and money into their pockets—in addition to the straightforward salvage there was the sacrifice of one ship to save the other."

"And you have been rewarded by the owners of *Thermopylae?*" asked Treeth.

"So it would appear," agreed Calver.

"And how!" cried Levine, who had been waiting with ever increasing impatience. "Three-quarters of a million to *Lorn Lady*'s crew! I haven't got the individual figures yet, but—"

"This," said Jane, "calls for a celebration. Luckily we're well stocked with liquor."

The agent got to his feet again.

"Now I must leave," he said. "For me, a stranger, to be present at your celebration would not be meet. But there is one thing about you beings that always mystifies me, the need that you feel to deaden the exhilaration that comes with good news by the ingestion of alcohol . . .

"Good afternoon to you, captain and captain's lady, and to you, Mr. Levine. I am familiar enough with your vessel to find my own way ashore.

"Good afternoon—and my sincere congratulations."

There was Calver, and there was Jane Calver who, as Jane Arlen, had been catering officer of *Lorn Lady.* Calver sat at the head of the table in *Rimfire*'s saloon and Jane, tall and slim and with the silver streak in her glossy dark hair gleaming like a coronet, sat at his right. Very much the captain and the captain's lady they had been when the other officers had been there, the officers who had not served in the *Lorn Lady.* But now the others were gone to their cabins, and the party was one for *Lorn Lady*'s people only.

There was the gangling Bendix, with the few strands of black hair brushed carefully over his shining scalp, who had been Interstellar

Drive Engineer in the T. G. Clippers before coming out to the Rim for reasons known only to himself. There was Renault, the Rocket King, swarthy, always in need of depilation, Reaction Drive Engineer; he, like Jane and Calver, was out of the Interstellar Transport Commission's ships. There was little Brentano, in charge of Radio Communications, highly competent and capable of standing a watch in the control room or either of the two engine rooms should the need arise. There was Levine, another small man but competent—extremely so—only in his own field. There was old Doc Malone, looking like a monk who had, somehow, put on a uniform in mistake for his habit.

The decanter passed round the table.

"A toast," said Bendix harshly. "A toast. We want to drink to you, Calver. It was you who made this good fortune come our way."

"No," demurred Calver. "We'll drink to us. To all of us. We were all in it together." He raised his glass. "To us," he said quietly.

"And to hell with the Rim!" almost shouted Brentano. "To hell with Lorn and Faraway, Ultimo and Thule and the whole Eastern Circuit!"

"And are you going home?" asked Doc Malone. "And are you going home, Brentano? To the warm Cluster Worlds, to the swarming stars and planets? Won't you feel confined, shut in? Won't you miss that empty sky, the call of it, the mystery of it? Won't you miss this freemasonry of ours?"

"What about you, Doc?" asked Brentano. "Aren't you going home?"

The old man was silent for what could only have been seconds, but seemed longer. He said, at last, very softly, ". . . And home there's no returning—"

"I'm afraid he's right," muttered Bendix.

"He is right," said Renault.

Calver remembered how he and Jane had stood in the captain's cabin aboard *Thermopylae,* and how her hand had found his, and how he had said, "We belong on the Rim." He said it again.

"So we belong on the Rim," said Jane practically. "We seem to be in agreement on that point, with the exception of Brentano—"

"Why make an exception of me?" asked the radio officer plaintively. "I'm as much a Rim Runner as any of you."

"But you said—"

"What I say isn't always what I think, or feel." His face clouded. "Old Doc put it in a nutshell. *And home there's no returning.* All the same, there must be more in life than running the Eastern Circuit."

"What if we ran it for ourselves?" asked Calver.

"You mean—?" queried Renault.

"What I said. With what we've got we can buy an obsolete *Epsilon* Class tramp and have enough left over for the refit. We know the trade, and there's quite a deal of goodwill on the Eastern Circuit planets that's

ours rather than the company's—"

"The Sundown Line didn't last long," said Levine.

"Perhaps not," said Bendix, "but they didn't lose any money when Rim Runners bought them out."

"I never thought," said old Doc Malone, "that I should finish my days as a shipowner."

"You aren't one yet," remarked Brentano.

"Perhaps not. But the idea has its charm. Now, just supposing we do buy this ship, what do we call ourselves?"

"The Outsiders," said Calver.

Calver was rather relieved that it was not necessary to make the voyage all the way to Terra to pick up the ship. The return to his home planet would have brought back too many memories—for Jane as well as for himself. When he had come out to the Rim he had said good-by to Earth, and he liked his good-byes to be permanent.

It was Levine who, spending his watches gossiping with his opposite numbers in all the ships within telepathic range, learned that *Epsilon Aurigae* had been delivered to Nova Caledon for sale to a small local company, and that the sale had broken down. It was Levine who succeeded in getting in touch with the P.R.O. of Port Caledon and persuading him to pass word to the commission's local agent that buyers would shortly be on the way.

The stickiest part of the whole business, of course, was the mass resignation of all of *Rimfire*'s senior officers when she set down at Port Faraway. Commodore Grimes—back in harness as Astronautical Superintendent after his exploratory jaunts—stormed and blustered, threatened to sue Calver and the others for breach of contract. Then, when he saw it was hopeless, he softened.

"You're all good men," he said. "Yes—and one good woman. I don't like to see you go. But, with all that money coming to you, you'd be fools to stay on the Rim."

"But we are staying on the Rim, sir," said Calver.

"What? If you intend to live on the interest of your salvage money, captain, there are far better places to do it."

"Commodore," said Calver, "you're an astronaut, not a businessman. I'm talking to you now as one spaceman to another, and I'd like you to respect the confidence. We—the officers who were in *Lorn Lady* at the time of the salvage—are going to set up as shipowners. You've often said yourself that there's a grave shortage of tonnage on the Eastern Circuit."

Grimes laughed. "I think that if I were in your shoes, Calver, I'd be doing the same myself. But I'll warn you—there won't always be the scarcity of ships, of Rim Runner ships, out here."

"But there is now," said Calver.

"There is now. We may be willing to charter you. But when there's no longer a shortage—"

"You'll run us out of Space," finished Calver.

"We will. Meanwhile, captain, the best of luck. Let me know when you're back on the Rim and I'll see what I can do for you—as long as it doesn't conflict with Rim Runners' interests, of course."

"Thank you, sir," said Calver, shaking hands.

So they booked passage for Nova Caledon, all of them, making the lengthy, roundabout voyage that was inevitable in this poorly served sector of the galaxy. At last *Delta Sagittarius,* in which vessel they had made the last leg of the journey, dropped down through the inevitable misty drizzle to Port Caledon. Calver, as a shipmaster, could have had the freedom of *Delia Archer*'s control room, but he preferred to stay in the observation lounge with his own officers and, of course, with Jane.

There was only one other ship in port—obviously an *Epsilon* Class vessel.

"Ours," Jane murmured.

"Ours," repeated Bendix.

"She looks a mess," said Brentano.

"No more a mess than the poor old *Lorn Lady* was," declared Bendix.

"She's a ship," said Calver. "She'll do."

Customs formalities dragged, and then there was the problem of the disposal of their not inconsiderable baggage. The master of *Delta Sagittarius* was helpful, and put them in touch with the deputy port captain, who arranged temporary storage at the spaceport and also put through a call to the Commission's agent.

When the agent arrived they were already aboard the ship, were already checking the condition of her instruments and machinery. She was a good ship, decided Calver. She was overage and obsolescent, but the Commission looks after its ships well. He, like the others, however, was disappointed to find that it would be impossible to sleep aboard her that night. There was so much to be done before she would be habitable, even though there was little doubt as to her spaceworthiness.

Later, he stood with Jane and the agent in the control room.

"You're getting a good ship here, captain," said the agent.

"I know," said Calver.

"There's one thing I don't like about her," said Jane.

"And what's that, Mrs. Calver?"

"Her name. As you know, most ships have fancy names and their crews are able to twist them around into something affectionate and amusing. But *Epsilon Aurigae . . .*"

"Don't listen to her," said Calver. "In any case, we're changing the name."

"Of course," said the agent. "And what are you calling her?"

"The Outsider," said Jane.

"And how in the galaxy can you twist *that* into anything affectionate or amusing?" asked the puzzled agent.

So *The Outsider* she was.

When the shining, new golden letters of her new name had been welded to the sharp prow Jane went up in the cage to the top of the scaffolding and, with all the others watching from below, smashed a bottle of what had been sold to them as genuine champagne over the gleaming characters. With the symbolic action performed, *The Outsider* was ready for Space. She was fueled and provisioned. Hydroponic tanks and tissue culture vats were functioning perfectly. She had, even, already begun to pay for herself, her cargo compartments being full of casks of whisky and bales of tweed for Faraway.

Manning had been the biggest problem. There is no shortage of spacemen at the Center—neither, oddly enough, is there at the Rim. It is on halfway worlds such as Nova Caledon that it is hard to find qualified officers. In the end, however, Calver found a chief officer of sorts, a drunken derelict who had missed his ship on Nova Caledon. He found a second officer—he was a Nova Caledonian who, tired of Space, had come ashore to raise sheep and now, tired of sheep, was willing to make the voyage out to the Rim provided that repatriation was guaranteed. Then there were two professors—one of physics and the other of mathematics—from the University of Nova Caledon who wanted to see something of the galaxy and who were willing to sign on as junior engineers. There were no pursers available—but Jane and the two communications officers would be able to cope quite easily.

After the brief remaining ceremony the scaffolding was wheeled away and *The Outsider*'s crew marched up the ramp to the air lock, Calver leading, and, once inside the ship, dispersed to their stations. Spaceport Control gave the final clearance, the conventional good wishes. Renault's rockets sighed gently, and then gave tongue to the familiar screaming roar. *The Outsider* lifted, slowly at first, delicately balanced a-top the lengthening column of her incandescent exhaust. Faster and faster she climbed through the misty skies of Nova Caledon until the pearly overcast was beneath her and ahead of her was the black of Space.

Once she was well clear of the atmosphere Calver put her through her paces. She was a good ship, and responded sweetly to her controls. The ship was good and, with one exception, the crew was good. The two scientists made up in intelligence and enthusiasm for what they lacked in practical engineering experience. The ex-cattleman demonstrated that he had forgotten very little about ships in his years ashore. Of the capabilities of the old crew of *Lorn Lady* there was, of course, no doubt. The mate was the weak link in the chain; his reactions were painfully slow and he seemed to have no interest whatsoever in his duties. Calver decided to have Brentano fix up duplicate, telltale instruments in his own cabin at the first opportunity. There is little risk of mishap to a

well found, well organized ship in Deep Space—but on the rare occasions that mishaps do occur they are liable to be disastrous unless the officer of the watch is alert. Calver also made up his mind to tell Jane to keep Maudsley's liquor ration to the bare minimum and to impress upon old Doc Malone not to give the mate any of his home-made Irish whisky. Furthermore, he would have to read the Riot Act to the mate as soon as possible.

The first thing to be done, however, was to set course for the Rim. Rockets silent, *The Outsider* turned around her humming gyroscopes to the correct heading, checked and steadied. For the last time the rockets flared and she pushed off into the black infinity, the pale-gleaming ball that was Nova Caledon dwindling astern of her. There was free fall again as the Reaction Drive was cut, there was the familiar, yet never familiar, gut-wrenching twist, the uncanny feeling of *deja vu* as the Mannschen Drive built up its temporal precession fields.

And then, outside the control room ports, the hard, brilliant stars flickered and faded, were replaced by the hypnotically coiling whorls of luminosity, the shifting colors, known only to those who have made the Long Drop, who have ridden to the stars on a crazy contraption of precessing gyroscopes through the warped fabric of Space and Time.

Time—subjective time—passed.

Time passed fast and pleasantly for most of *The Outsider*'s people. There was so much to do, so many little things that were not quite right, that could be—and were—tinkered with until they were brought to the stage of perfection that gladdens the heart of an efficient Officer who is also an Owner. Cappell, the second mate, and Lloyd and Ritter, the two junior engineers, had no shares in the ship but were infected by the general enthusiasm. Maudsley was the odd man out, the malcontent. He kept his watch, and that was all. He refused to mix with the others, bolting his meals in silence and then retiring immediately to his cabin.

Calver discussed him with Jane.

He said, "I'm sorry we had to ship that one. Unluckily Cappell has only a second pilot's ticket, and Maudsley's a master astronaut. Even so—"

"We were stuck on Nova Caledon until we could find two certificated officers," said Jane. "We had to take what we could get. In any case—Maudsley's improving."

"Is he? I can't say I noticed it. He's as much mournful bloodhound walking on two legs as he was when we signed him on. More so, in fact. Then the liquor he had on board did give him a little sparkle."

"But he is improving," insisted Jane. "He's looking healthier. He's putting on weight."

"All right, all right. We all know that you're a good cook. It's his manner I don't like."

"I didn't like yours when I first met you. Remember? There you were, an ex-chief officer out of the

Commission's big ships, joining a scruffy little Rim Runners ramp as second mate . . . And, after all, Maudsley has been master, himself . . ."

"And he lost his ship, and was very lucky not to lose his ticket."

"You lost yours."

"In rather different circumstances, my dear. And nobody—neither Rim Runners nor ourselves—lost on the deal."

"What about Lloyds and Trans-Galactic Clippers?"

"They can afford it." He filled and lit his pipe. "Anyhow, I'm afraid that we shall be getting rid of our Mr. Maudsley as soon as we reach Port Faraway."

"Even though you are master and part owner," she flared, "there's no need to be so hard. With the exception of Cappell and Lloyd and Ritter—and, I suppose, Levine—we're all of us outsiders here; throwouts from the Center and the big ships, outsiders on the Rim. Maudsley's like us—or like we used to be. He's had his troubles and he's running away from them and he's just about hit rock bottom. This is his chance of rehabilitation. Would you deny it to him?"

"This," said Calver evenly, "happens to be a shipping company, even though it is only a one-ship company, not a charitable organization. When and if Mr. Maudsley stops behaving like a first-trip cadet with a bad fit of the sulks and starts behaving like a chief officer I'll consider keeping him on. Until then—"

"I still think you're being harsh," she said stubbornly.

"And I still think," he replied, "that I have the best interests of the ship *and* her owners at heart."

That was all that was said on that occasion, but more, much more, was said later. This was when Maudsley, who must have possessed other attributes of the bloodhound beside the appearance, discovered old Doc Malone's secret cache of whisky and drank himself into insensibility. Calver's first reaction was annoyance, his second was disgust. He did not begin to get worried until Malone came to see him in the control room where, with the chief officer incapacitated, he was keeping a watch.

"Captain," said Malone, "we've got a very sick man on our hands."

"Doctor," said Calver, "we have a drunken, irresponsible wastrel on our hands, and I'll see to it that he's first out of the air lock when we reach port."

"He'll be first out of the air lock all right—but it'll be long before we reach port."

"What do you mean?"

"I mean that he's dying. He was as weak as a kitten when he joined us, and this last bout, coming as it did after a period of enforced abstinence, has been too much for his system."

"In this day and age?" scoffed Calver.

"Yes, in this day and age. In any day and age all that the doctor has ever done has been to help his patients to recover. When there's no will to recovery . . . Jane's with him now, but I think you'd better come along yourself."

"Wait until I call Brentano up here," said Calver, reaching for the telephone. Then, with the indispensable little radio officer in charge of the watch, he followed Malone to the Officers' flat.

Maudsley's cabin reeked of sickness and vomit and stale liquor. Maudsley was strapped in his bunk while Jane, quiet and efficient as always, cleared the air of the disgusting globules of fluid that floated in it with an absorbent cloth. She looked around as her husband and the doctor entered. She said, "He's unconscious again. And surely there can't be anything left in his stomach."

Calver looked at Maudsley. The man no longer resembled a bloodhound. He no longer resembled anything living. His head was a skull over which dead white parchment had been stretched. The rise and fall of his chest was barely perceptible.

"He talked," said Jane briefly. "He had a lucid moment, and he talked. He said that he was running away. But—and this was the odd part—he said that he was running *from* the Rim."

"From the Rim," whispered Maudsley in a barely audible voice. "From the Rim, and from the Outsiders. If I'd been sober I'd never have signed on aboard your ship. You're taking me back, and I'll not go." His voice rose to a shriek. "I'll not go. You can't make me." He laughed dreadfully. "There's wealth

and power and knowledge there, and I almost had it in my grasp, but I was afraid. I'm still afraid. If you take me back to the Rim I'll know that it's out there, waiting for me, and I'll be afraid to find it again and that will be the worst of all." He looked at Calver and Jane and Malone with intense, pleading eyes. "You must see that. Surely you must see that."

"What is it that's out there?" asked Calver,

A cunning look flickered over Maudsley's deathly face.

"I'll not tell you. It's mine, *mine!* If I tell you, you might get past the Outsiders, and then it would be yours. It wouldn't be fair. I lost my ship, I lost the *Polar Queen,* and I paid for it. Yes, I paid the price, and I'm still paying. I'll go back to the Rim when I want to, and I'll go Outside to find what I've paid for, but I'll go back to the Rim when I want to go. You can't carry me back against my will. You can't. Doctor, tell him that he can't. Tell him!"

"You'd better leave him to me," said Malone quietly. "He's frightened of you, Calver, and he hates you—"

"What about getting Levine in here?" whispered Calver.

"I'd like to—but he takes his oath very seriously. He'd never enter the mind of a nontelepath. You'd better leave me, both of you."

They sat in *The Outsider*'s saloon, their seat belts giving the not very convincing illusion of gravity. Calver was there, and Jane, and Doc Malone. Renault kept no watch in Deep Space and Bendix felt justified in leaving his Mannschen Drive in the competent hands of a Doctor of Physics. Little Brentano was there, and Levine.

Calver waited until pipes and cigars and cigarettes were under way, was amused to see that the ever efficient Brentano watched the drifting eddies of smoke until satisfied that the circulatory system was working properly.

He said, "As you all know, we have deviated from our track. The doctor advises me that only by landing Mr. Maudsley at the first convenient port can we save his life, that his psychological condition will grow progressively worse as we near the Rim. So we shall put him ashore at Dunsinane in the Shakespearian Sector.

"However, let us forget the technicalities of navigation, let us forget that we are spacemen and regard this as a shareholders' meeting. We don't own this ship just for the fun of it—well, I suppose that in a way we do, but skip that—but to make money. As you all know, our present intention is to run the Eastern Circuit on Rim Runners' Time Charter and then, later, to compete with our late employers on the same trade. I don't think that any of us are really happy about the idea of competing with a company that is, after all, as near as government owned. Some trade of which we would have the monopoly would be the ideal setup."

"That," said Bendix, "is obvious.. But what trade?"

"What about Outside?" asked Calver.

"There's nothing Outside," declared Bendix. "*Nothing*—not until some genius comes up with an Intergalactic Drive."

"That's what I thought," said Calver. "That's what we all thought—except, perhaps, for Levine. Anyhow, I'll start at the beginning. As you all know, our chief officer was dead drunk when we signed him on at Port Caledon, so much so that he could hardly have cared less where the ship was bound. He sobered up—but something was eating him. He managed to find old Doc Malone's private stock of what he calls Irish whisky—"

"And ye'd niver tell the difference!" interjected the doctor.

"That's a matter of opinion. Anyhow, our Mr. Maudsley hit the bottle again to try to drown his fears, and the more he tried to drown them the worse they got. What he's frightened of is something—or somebody—called the Outsiders. When we picked him up he was running, the same as we all were. But he was running *from* the Rim, not towards it."

"Something threw a scare into him," agreed the doctor. "It's likely that I'll have to keep him under sedation all the way to Dunsinane."

"Jane?" said Calver.

"I've been nursing him," she said. "I felt sorry for him from the very start. I feel sorrier for him now. I've listened to his ramblings. His ship was the *Polar Queen*, one of those odd tramps that drifts out to the Rim from time to time. He was master of her. He lost her—smashed her up making an incredibly bad landing at Port Farewell. Then he was with Rim Runners for a while—the Court of Inquiry suspended his master's ticket for six months but granted him a First Pilot's one. When the six months were up he reclaimed his certificate, left Rim Runners and has been trying to make his way back to the Center Worlds ever since."

"I've heard of him," said Bendix. "He was second mate of the *Rimstar*. They called him Windy Maudsley. He used to be in a state of near panic from blast-off to touch-down. Everybody thought that it was the aftermath of the loss of *Polar Queen*."

"What about the rest of *Polar Queen*'s crew?" asked Brentano.

"It was a bad crash," said Bendix. "I remember being told about it by old Captain Engels—*Lorn Lady* was in Port Farewell when it happened. Maudsley was in the control room and escaped with only slight injuries. His chief, second and third officers weren't so lucky. They weren't killed outright, but they died in the hospital without talking. The rest of the crowd were . . . mashed."

"Can you remember anything else, Bendix?" asked Calver.

"No. After all, I only got the story at second hand."

"I was just a kid when it happened," said Levine. "But I was crazy to get into Space, and anything

about spaceships or spacemen in the news I lapped up. As I remember it, Maudsley's breath stank of whisky when they dragged him out of the wreckage. Luckily for him, the investigation proved that a tube lining had burned out, otherwise he'd have lost his ticket instead of getting away with a six months' suspension."

"And you've managed to get in touch with Dunsinane?" asked Calver.

"Yes, captain. There are ways and means of stepping up the power of the psionic amplifier when you know how—although I think I'll have to indent for a new dog's brain when we arrive. Anyhow, I got in touch with Donaldson. He looked up the records for us. He tells me that *Polar Queen* was making a relatively short hop between Ultimo and Thule, and that at the time of her arrival at Port Farewell she was overdue. Maudsley said at the inquiry that his Mannschen Drive had given trouble. He was, of course, the only witness from the ship."

"Now, Levine," pressed Calver, "what do you know of the Outsiders?"

"They've always been a sort of a legend on the Rim. Some say that they're supernatural beings, even that they're the old gods of mankind and the other intelligent races driven outside the galaxy and waiting there to return when faith and belief return. Others say that they're intelligent beings like ourselves that have made the voyage across the gulf from some other galaxy. There used to be all sorts of wild tales about strange ships in the sky, fantastic artifacts found on some of the Rim Worlds and all the rest of it. As I say, there used to be. I haven't heard the Outsiders even as much as mentioned for years."

"Just suppose . . ." murmured Calver. "Just suppose . . . Just suppose that there is a big ship hanging out there, a ship that made the Crossing . . . Just suppose that her crew discovered intelligent life on the Rim Worlds—but discovered that life in the anti-matter systems . . . Just suppose that they decided that our entire galaxy was composed of anti-matter—"

"People with enough curiosity to make the Crossing wouldn't give up that easily," said Jane sharply.

"I suppose they wouldn't, my dear. I was playing with ideas. I've got this strong hunch that there *is* something out there, and that Maudsley stumbled upon it. I've got this hunch that it, whatever it is, is worth finding."

"Maudsley found it," said Jane, "and it drove him to drink, ruined his career. Whatever it is, it's dangerous."

"I don't agree. As far as we can discover, Maudsley's ship was undamaged until the crash. All his crew were accounted for, and they were all alive until the crash killed them. I grant you this—there was something there that was frightening. But— How shall I put it?

"I was raised on Earth, a country boy, in a farming district. Earth, as you know, is very old-fashioned and will never use tanks of chemical nutrient for growing food when there's good, honest dirt to hand. There were crops—cereals—and there were the birds that regarded the fields as huge, free-lunch counters. There were scarecrows—"

"What are they?" asked Levine.

"A rough figure of a man, made of old clothing stuffed with rags or straw, held erect by a post. If it's so constructed that the arms wave in the wind, so much the better. The birds take it for a man, and they keep off. Oh, some of the smarter ones spot the deception after a while and dig in, but the majority stay clear.

"Well, I'll get back to this hypothetical ship of mine. For some reason she's been abandoned. Her owners, however, have set up some sort of scarecrow that was good enough to scare off poor Maudsley, but not good enough to do any actual physical damage to *Polar Queen* and her people. We, expecting a scarecrow and, furthermore, having the right mental make-up for the Rim, might just find something worthwhile.

"This, then, is my proposal. We pump Maudsley of all he knows about the Outsiders, using every means of persuasion short of torture. We pay him well for what he tells us. Then, when our cargo is out, we go hunting Outside to find whatever it was that Maudsley found."

"Derek," said Jane, "you may be captain, but you are also no more than one of the shareholders. In all matters pertaining to the running of the ship your word is law—but in all matters concerning her future employment the Company decides."

"Then," asked Calver, "what do you propose?"

"That we put the matter to the vote. *I* move that we do not set off on any wild goose chases, that we put the ship on the Eastern Circuit on Time Charter to Rim Runners. We've been into all this before, and all of us agreed that, as things are at present, we need Rim Runners' repair, office and agency facilities. When we're well enough established we can set up our own shore organization."

"I second that," declared Brentano.

"A show of hands?" queried Bendix.

"All right," said Calver. "A show of hands. All in favor of Jane's motion?"

His own hand was the only one not raised.

"Derek," said Jane, "we must be sensible. We've all of us rehabilitated ourselves to an extent that would, not so long ago, have seemed impossible. Are we to throw it all away for a wild dream?"

Calver filled his pipe again carefully, used one of the archaic matches that he affected to light it. He said, "How shall I put it? I came out to the Rim as all of us did—because of the mess I'd made of my life in the Center. But there was

more to it than that, much more. After all—you can drink yourself to death anywhere in the galaxy where there are human vices—even those communistic bumble bees, the Shaara, make and use alcohol. I came out to the Rim because it was, I thought, the last frontier. I've learned that it's not, that there's still another one beyond it—"

Bendix puffed a cigarette into glowing life. "I see what you mean," he said. "And I think that it applies, to a greater or lesser degree, to all of us. But Jane is right, too. We must consolidate. We must let this ship pay for herself before we think of anything else. And, Jane, we must face the fact that Rim Runners will be using us only as a convenience and that as soon as their own fleet is built up they'll run us off the Eastern Circuit and the Shakespearian Sector trade. If we have some sort of ace up our sleeve—"

"If you can call it an ace," grumbled Brentano. "Odd legends with no foundation of fact, the ravings of a drunken derelict—"

"There's something out there," said Doc Malone. "And I, for one, would like to find out what it is. But there's no hurry. It will keep. After the ship has paid for herself, after the Time Charter's expired and we're on our own, will be time enough."

"Meanwhile," said Calver, "we must find out all we can from Maudsley. I'll leave that to you, doc—for the time being, at least."

"Talking of that," said Malone, "I'd better have a look at the patient, now."

He left the saloon with the unhurried grace of a fat man in Free Fall. He returned with more speed than grace. He reported that Maudsley had recovered, had left his cabin and had found somewhere a bottle of cleaning alcohol. Drifting in the air of his room were mingled globules of the alcohol what was left of it—and blood from his slashed throat.

On charter to Rim Runners they ran the Eastern Circuit—Tharn, Grollor, Mellise and Stree. Cappell, the spaceman turned grazier turned spaceman, stayed with them and, after intensive coaching by Calver, managed to scrape through the examination for his first pilot's certificate and was promoted to chief officer, replacing in that rank yet another drunken derelict whom Calver had been obliged to sign on in Dunsinane. Lloyd and Ritter liked the life and, with their already high academic qualifications, found no trouble in adding engineers' certificates of competency to them. Bendix married, and Julia, his wife, was a highly efficient secretary who became, in a very short time indeed, a highly efficient purser. Brentano married, and as his bride was a biochemist she was able to take over the care of the hydroponic tanks, the yeast and algae vats and the tissue cultures from Doc Malone. Tanya Brentano was of Slavic origin and, in the opinion of everybody but Malone, her vodka was far superior to the doc-

tor's "Irish" whisky. Brentano, as well as changing his marital status, changed his rank, sitting for and passing the Second Pilot's examination without any trouble, this making room for Elise Renault, who was a qualified radio technician.

They ran the Eastern Circuit for two years, for twenty-four busy, happy months. *The Outsider* was a home rather than a ship, her people a family rather than a crew. Maudsley was forgotten, Calver often thought, by everybody except himself. He had not forgotten. He still felt the tug of the Outside, the lure of the unsolved mystery out in the darkness. It was, he told himself, foolishness, that when the Time Charter expired *The Outsider* could run in competition with Rim Runners and, should this not prove successful, could go tramping through the galaxy. He told himself this, but he failed to convince himself. Every voyage he brought with him old books and records, carefully went through them to try to discover some sort of a clue.

They ran the Eastern Circuit for two years, until the Charter expired. For six months they tried to run as an independent company, and found that good will is all very well as long as it does not involve financial loss. Calver's friends on Tharn would have liked to have shipped their goods in *The Outsider*, but with Rim Runners' freight charges only sixty per cent of those asked by Calver did not feel justified in spending money on carriage that would

be better spent on imports. The drably efficient humanoids on Grollor were without sentiment—they had worked out for themselves the sound commercial principle of buy-

ing in the cheapest market and selling in the dearest long before Commodore Grimes' survey expedition landed on their planet. For a little while there was trade to be done with both Mellise and Stree—but even the happy amphibians and the philosophical lizards had begun to acquire from contact with humanity a sordid commercialism.

At the end of six months—the ship was at Port Forlorn discharging a pitifully small consignment of Mellisan dried fish and parchment record rolls from Stree—there was a shareholders' meeting. All hands were present, as Cappell, Lloyd and Ritter had been given—and had taken—the opportunity of taking some of their pay in shares and as the new wives had been given shares as wedding presents.

"Julia?" said Calver from his seat at the head of the saloon table.

The purser rose to her feet.

"You all know how things have been going lately," she reported in her cool, pleasant voice. "You'll not be surprised when I tell you that we're in the red. I have the figures here for the last six months—"

"You needn't bother with them, my dear," said Bendix. "Even I can see that running costs have been far in excess of income."

"I take it," said Calver, "that we're all in agreement on that point. Thank you, Julia." The purser resumed her seat. "As I see it, we have a little control over what happens next. I have a letter here from Commodore Grimes. Rim Runners are willing to buy the ship from us, the price to be determined after survey. Alternatively, they offer us a one-way charter to Nova Caledon, the implication being that it's as good a way as any to get us out of their hair. Then there's a third alternative—"

"Which is?" asked Jane.

"That odd business of Maudsley and the Outsiders. It stuck in my mind, if not in yours. I've been doing a deal of research on it, and even got hold of a pile of back numbers of the Port Farewell *Argus* covering the period of the *Polar Queen* disaster. At last I found what I was looking for. It was a typical Sunday Supplement article, written by some journalist who got drunk with Maudsley. It was a rehash of all the old legends about the Outsiders and it contained the statement, alleged to have been made by Maudsley, which I'll quote: 'Macbeth and Kinsolving's sun in line, and keep them so . . . That's the way that we came back. Fifty light-years and all of us choking on the stink of hot oil from the Mannschen Drive—' It's a lead."

"It could be a lead," amended Jane. "It could be. But tell me, why didn't Grimes follow it when he made his survey voyage in *Faraway Quest?*"

"Because Grimes, whom I've got to know quite well, is a pigheaded old man. He's made up his mind that there's nothing—and I *mean* nothing—Outside. He was one of

the Assessors at the Court of Inquiry before which Maudsley appeared, and is of the opinion that all Maudsley's talk of the Outsiders was no more than *delirium tremens.*"

"And it could have been," said Jane.

"I don't think so," said Doc Malone.

"Neither do I. Well, ladies and gentlemen, we own a ship. The ship is temporarily out of employment. We can sell her, and show a nice little profit on our venture. We can accept the one-way charter and then go tramping—and, as you know, tramps these days struggle along on the leavings of the big lines and government owned services. Or we can push off from Port Forlorn as soon as the cargo's out and the stores are on board and run West until we have Macbeth and Kinsolving's sun in line, and then—"

"I'd like to find out what's there, if there is anything there," murmured Bendix.

"And I," said Renault.

"And I," said Doc Malone.

"If you sell the ship," said Cappell, "I'll have to go back to farming, and I don't want that."

"Neither do we want to go back to teaching," said Lloyd, speaking for himself and Ritter.

"What have we got to lose?" asked Brentano.

"Only time," answered Levine, "and we've plenty of that now."

"And, possibly, our lives," said Jane. "Oh, if that really worried us we should never have become spacemen and—women. But there's a certain difference between a calculated risk and suicide."

"We've been over all this before," said Calver. "Maudsley's ship wasn't harmed and neither, so far as could be ascertained, were any of her people. They were all alive and at their stations at the time of the crash. Maudsley just wasn't psychologically adjusted to the Rim, that was his trouble. All of us have become used to that nothingness out there and it holds no terrors for us any longer."

"Oh, I want to come along for the ride," said Jane. "I wouldn't miss it for anything. I think that I'm speaking for Julia and Tanya and Elise—"

"You are," they said.

"Good. But it's just this, Derek. Women are different from men. Even though we are accepted in Space, even though we take the same risks as you, we still have that longing for security. One part of me hates to see the security that we have achieved thrown away. That part of me has spoken now. The other part of me wants to join in this crazy adventure. I think, with you, that there's something Outside.

"I want us, all of us, to find out what it is."

Once the decision had been made, time dragged.

The discharge of the cargo occupied only a day, replenishment of stores and supplies would have taken very little longer. It was the vagueness of Maudsley's sailing directions

that was the trouble. Put two stars in line right astern and then push out for fifty light-years, give or take a couple or three— But what is the actual departure? Ten light-years from the nearer of the two stars, or five, or one, or with the exhaust gas mingling with the photosphere? And is your destination a fixed point in space, relative to the galaxy and to the leading stars, or does it follow some orbit of its own that has carried it parsecs away from its last position?

There was, reasoned Calver, only one solution to the problem. In the Rim Runners' store at Port Forlorn was the Mass Proximity Indicator that had been carried by *Faraway Quest* during her voyage of survey and exploration. Also in Port Forlorn was Commodore Grimes, who was supervising improvements to the spaceport.

Calver went to see Grimes.

"Good to see you again, captain," said the Astronautical Superintendent. "I shall be sorry when you and your ship leave the Rim. Of course, if you change your minds we shall be willing to buy her and to take all of you over with the ship—"

"We haven't changed our minds," said Calver. "But I've come to ask you a favor."

"As long as it doesn't cost too much," grunted Grimes.

"It's that Mass Proximity Indicator in your stores. It's the only one on the whole of the Rim."

"I know," said Grimes. "And what a job I had wheedling it out of the Federation's Survey Service when we were fitting out the *Quest*."

"Would you let me have it? Buy or hire, whichever suits you."

Grimes laughed. "So you're thinking of surveying and opening up your own trade routes. It's not worth it, Calver. Head to the Galactic West and you strike the anti-matter systems, head to the East and there's nothing inhabited or even habitable for parsecs after Stree. If I thought that the thing would be any use to you, I'd hire it to you, but you'll only be wasting your time and money."

"We've no intention of heading either East or West," said Calver.

"Then what do you want the Indicator for?"

"We're going Outside."

"*Outside?* Are you crazy? There's *nothing* Outside."

"How do you know, sir?"

"I don't *know*, but I'd hate to be so gullible as to believe those old wives' tales about the Outsiders. The only Outsiders that I believe in are yourselves."

"You remember *Polar Queen?*"

"Of course. And I remember, now, that you had that drunken fool Maudsley as your chief officer on your maiden voyage from Nova Caledon. I know that one is not supposed to speak ill of the dead, but I can speak no good of a man who throws away his ship and the lives of all his crew through drink. Yes . . . there *were* rumors that he had found something Outside. But I never placed any credence in them."

"We," said Calver, "do. We think that it's something very valuable and, at the same time, terrifying. Terrifying, that is, to the wrong type of mind, such as Maudsley's. He was scared of the Outer Night, he didn't belong on the Rim. I don't think that we shall scare so easily."

"You really think that there is something?"

"Yes. We've been saving it up until such time as our charter ran out and Rim Runners began to make this part of the galaxy commercially untenable. It's a gamble, but we can afford it. We're richer now than when we got the salvage money and the few weeks that *The Outsider* won't be earning her keep don't matter to us."

"You're a fool, Calver," said Grimes amiably. "There's nothing out there, but if you insist on going to find out for yourself, and if that Mass Proximity Indicator will be of any help to you, I'll not stand in your way. In fact, I wish that I were coming with you."

"Then you'll let us have it?"

"For a nominal rental of one dollar a month—but your people do the installation and you pay the insurance on it. And I insist, too, that you give me a full report on what you find. Not to me as an official of Rim Runners, mind you, who'll try to snatch some commercial advantage from the report, but to me as an individual."

"Thank you," said Calver inadequately.

The Outsider lifted from Port Forlorn, climbed through the smog filled sky to the cleanliness of Outer Space. In her control room Calver and Cappell and Brentano made their calculations, put the ship into an orbit that would bring them to within half a light-year of Kinsolving's sun. They ran on Interstellar Drive with the warped, convoluted lens of the galaxy on their port hand and the Outside emptiness to starboard. They wondered, inevitably, what that emptiness held and they talked, often, of the drunken, frightened Maudsley and of the stories and legends that were part of the culture of the Rim Worlds.

At the appointed time *The Outsider* re-entered the normal continuum and the captain and his mates congratulated themselves on the accuracy of their navigation. Clear and distinct against the glowing Lens were the lead stars, almost in line. A carefully calculated hop of only minutes' duration and calling for the utmost skill on the part of the Mannschen Drive engineers put *The Outsider* into position.

Directional gyroscopes whined and the ship swung slowly. The Lens was directly astern of her now. Calver and Cappell and Brentano checked and rechecked, even going out through the air lock in spacesuits to make visual observations. Renault and Bendix stood by in their respective engine rooms and Levine concentrated his mental powers on the task of punching a message across

the light-years to his colleagues at the Rim World spaceports.

The great rockets rumbled and flared, building up acceleration and velocity, roared and flared and suddenly died. The spinning, gleaming wheels of the Drive blurred and faded as they began their time-twisting precession. Astern of *The Outsider* the Galactic Lens took on an appearance that was neither Klein Flask nor Mobius Strip but was reminiscent of both.

Ahead of her the Outside looked as it always looked.

For fifty light-years they ran—not, as Maudsley had put it, with all hands choking on the stink of hot oil from the interstellar drive; Bendix was too good an engineer for that. For fifty light-years they ran and then, with the Drive shut down, fell outwards through the emptiness. Neither radar nor the Mass Proximity Indicator gave any indication of anything in their vicinity. Levine reported only routine signals from the Rim, and Elise Renault, who was as good an electronics technician as Brentano had been, reported only signals that were, at the latest, half a century old.

Ten light-years West they ran, ten light-years In, twenty light-years East and another twenty Out. There were still no results, and Calver ordered the area of the search pattern increased.

It was during the running of the fourth search pattern that they found it. *It* was a glowing light and a flickering needle on the panel of the Indicator. *It* was a sense of vague unease in Levine's mind that worsened as the range decreased. *It,* at last, was a growing blip on the radar screen, but that was after the Mannschen Drive had been shut down once more and *The Outsider* was proceeding cautiously by rocket power.

They saw *it* at last, stared at it through the high-powered telescope in the control room. There was little that they could make out except that it was big and metallic and seemed to be of far too irregular a shape to be a ship—although, as Calver admitted, its builders may not have shared the Earthman's passion for symmetry.

Cautiously, with carefully timed and calculated rocket blasts, Calver nosed *The Outsider* in towards the . . . the derelict? He obtained readings of the mass of the thing and threw the ship into orbit around it. With his crew he stared out through the ports at the fantastic turrets, the suggestion almost of battlements and crenelations. It was like a huge castle. It was like a huge castle where no castle had any right to be.

"Levine," he called into the telephone. "Can you pick anything up? Is anyone there? Is *anything* there?"

"There's something there," replied the Psionic Communications Officer. "There's something there. Something. But it's not human. It's not . . . It's not alive, even."

"Do you believe in ghosts, captain?" asked Brentano.

"I do," said Calver. "But not in that sort of ghost. I believe in the ghosts that come from inside, not outside." He turned to Cappell. He said, "Mr. Cappell, some of us will have to go across to that . . . whatever it is—"

"I'm ready to go as soon as you give the word," said Cappell.

Calver grinned. "I'm sorry," he told his chief officer. "You're not going. You're my second in command. You stay here and stand by to render aid—or to get the ship out in a hurry. You, Brentano, can come if you want to. I want an electronics specialist."

"And I," said Jane Calver, who had just entered the control room, "am coming."

"You," said her husband, "are not."

"I am. It's high time that you people learned that spacewomen are as much entitled to take risks as spacemen. In any case, we took enough risks together in the old *Lorn Lady*."

"Jane," pleaded Brentano, "if you come, Tanya will want to come, too."

She did.

The boarding party was not sent, however, until after a great deal of discussion, some of it acrimonious. Calver argued that its composition was up to the master, not to a meeting of shareholders. He managed at last to convince the others of the legality of his stand. He made the point that it would be criminal folly to leave the ship without a large enough crew to take her back to the Rim. He was taking Brentano, he said, because of that officer's known versatility. He was taking Jane and Tanya because neither of them was indispensable. If anything should happen to either of them, Julia was quite capable of adding the catering officer's duties to her own, and old Doc Malone had, in the past, served as biochemist. He did not, he admitted to himself, altogether like the idea of having Jane along, any more than little Brentano liked to see Tanya risking her life. But he could see that both the women were of the breed that prefers to meet danger side by side with their men. He loved them for it, and wouldn't have changed them for all the Universe.

Suited, laden with equipment, the four of them left the air lock together. Together they stood on *The Outsider*'s sleek hull, waiting for the circular door to close. The curve of the shell plating hid the control room ports from them, but they knew the little compartment would be crowded, that all of their shipmates would be waiting there to watch them jet across the emptiness to the faintly gleaming enigma hanging in the black sky.

"Captain to chief officer," said Calver into his helmet microphone. "We are outside."

"Chief Officer to captain. I hear you, sir. Are there any further orders?"

"No, Mr. Cappell. You have your

instructions and in my absence you are in full charge of the ship. Captain to boarding party. Are you all ready?"

"All ready," they replied.

"Then follow me."

He kicked the magnetic soles of his shoes clear of the plating, activated his suit reaction units. He allowed himself briefly to wonder what it would be like to be lost out here, alone in a suit and with the darkness, unbroken by the friendly stars, all around him. He told himself that it would be no different from being lost anywhere else in interstellar space; the chances of survival would be the same—infinitesimal.

The bulk of the . . . the *thing* loomed ahead of him. It had seemed huge from the ship, but there had been no yardstick for comparison. He had his yardsticks now—the space-suited figures of Jane and Tanya, himself and Brentano. Had the thing looked more like a ship an *Alpha* Class liner could have served as one of its lifeboats.

Skilfully using their personal rockets Calver and his three companions made a feet first landing on a flat area of hull that was not cluttered with turrets and sponsons and enigmatic antennae. Calver expected the soles of his shoes to take hold by their magnetism, but they did not. And yet he did not bounce back into space after the impact of his landing, was held in place by a field that could only be gravitational.

"Captain to *The Outsider,*" he called urgently. "This thing has some sort of artificial gravity that must have just been switched on. You'd better adjust orbit accordingly."

"What do you think I am doing?" came Cappell's aggrieved reply. Calver saw the flare of rockets from the stern of his distant ship. He waited for the chief officer to get things under control. Then, "Sorry, sir," said Cappell more evenly. "That sudden gravitational field took me by surprise."

"And me," said Calver.

"Something," said Jane, "is looking at us."

Calver turned, saw that two of the antennae—like slender, flexible masts they were—had bent so that they were pointing at the boarding party, were following their movements.

"Mr. Cappell," said Calver, "put Mr. Levine on the phone." There was a brief delay. As soon as Calver heard Levine's voice he said, "There's something here, something intelligent. Can you pick anything up?"

"The uneasiness is still there," said Levine. "But there's more now. There's curiosity, but it's an unemotional sort of curiosity. There's a sort of hope—"

"Is there any animosity?"

"No."

"Can you get through to *it?*"

"I'm trying, captain. But it's like . . . like— Have you ever tried making love to a robot?"

"Have you, Derek?" asked Jane Calver.

He laughed, as they all did, the jest having broken the tension.

"All right," he snapped. "Boarding party to ship. We're going to try to find a way in."

"Service," said Jane. "With a smile?"

With no betraying vibration a circular doorway had opened. The four from the ship approached it carefully. They looked down into what was obviously an air lock. A short ladder ran down from its rim to its deck.

" 'Will you come into my parlor?' said the spider to the fly?" quoted Brentano.

"To judge from Maudsley," said Calver, "the worst that can happen to us is to be driven to drink. And we've all passed through *that* phase. Sorry, Tanya, you haven't."

"I'll take the risk," she said, matter of factly.

One by one, they dropped into the air lock. Suddenly, smoothly, the door closed above their heads. There were no visible controls for its reopening, but Calver was not unduly worried. He and the others carried equipment that could cut or burn through any metal known to man. What did worry him was that with the shutting of the door he had been cut off from radio communication with the ship.

"The place is filled with an atmosphere of sorts," said Brentano.

"I've a hunch," said Calver, "that it may be our sort of atmosphere. But we'll not risk taking our helmets off— There's another door opening. Shall we—?"

"What did we come here for?" asked his wife.

"The lighting," whispered Brentano. "It's . . . odd. Not a tube or globe along that whole great alleyway, and yet it's like broad daylight. How do they do it?"

"That," said Tanya, "is for you to find out. You're the electronics expert. Remember?"

"I hope," he replied, "that I do find out."

Calver strode along the seemingly interminable alleyway. Although the deck was of polished metal—as were the sides and deckhead—his booted feet made no sound. Even had he been walking in a vacuum, in normal circumstances, there would have been vibration. He looked down and saw his reflection, as clear as in a mirror. He looked to the side, saw his reflection and those of the others in the walls, stretching on either hand to infinity. It should have been an amusing experience, reminiscent of one of those mirror mazes found in amusement halls, but it was not.

He walked, and the others walked with him. Used as they were to Free Fall the exercise was tiring. Twice they stopped, sitting down to rest and sipping water from their suit tanks. On the second occasion they made a careful check of their air-supply gauges, found that they had adequate reserves before it would be necessary to connect up the spare bottles that they had brought with them.

They walked, and they came at last to a door. Of highly polished metal it was like all the rest of the alleyway.

For lack of any visual evidence to the contrary it could have been a bulkhead, but they knew it was not. The alleyway had to lead somewhere, and to have it leading to a blank wall made no sense whatsoever.

"But why should it make sense?" whispered Calver, voicing the doubts that he, like the others, was beginning to feel. "Why should it make sense? Why should we assume that our logic is the only logic, that our way of doing things is the only right way?"

The door opened.

I hate her, thought Derek Calver. *I hate her*. His mother was out of the room, busy in the kitchen. The boy glared at his baby sister gurgling happily in her cot, the little, drooling monster that had robbed him of the love and affection that were his right. *I hate her*, he thought again. He got up from his chair, walked over to the cot, struck the infant across the face with the magazine that he had been reading. He was back in his seat before the first

outraged wail broke the silence.

"Derek," demanded his mother, picking up the bawling child, "what happened?"

"I don't know, mother. I was reading."

"What are these marks on her face?"

"Where? Oh, I suppose she must have jumped around and hit her silly face on the side of the cot. In any case, mother, most parents send their babies to the robot nursery—"

"Bumble bee! Bumble bee! Fly back to your stinking hive, bumble bee!" yelled the children.

The Shaara drone, who had wandered away from his ship, away from the spaceport, and who had imbibed sufficient whisky in a tavern seriously to affect his powers of locomotion, tried to ignore them. He could not ignore the ill-favored mongrel, belonging to one of the boys, that, encouraged by its master, faced the unhappy extra-Terrestrial, its ugly face creased by a vicious snarl. The drone swiped the dog with one clawed foreleg and then clumsily took to the air, flying only a few yards before tumbling to earth. He tried to walk, but the movements of his six legs were ridiculously unco-ordinated. He turned to fight the mongrel, this time inflicting a wound so painful that the brute turned and fled, yelping.

"He's hurt my dog," screamed Derek Calver.

He picked up a stone and threw it, setting an example to the others.

Luckily the police arrived before any serious damage was done.

"Cadet Calver," asked the captain commandant of the Academy gently, "do you swear, on your honor as a Space Cadet, that you had no part in last night's race brawl?"

"I so swear," said Calver solemnly, thinking, *After all, I was on the outskirts of the crowd and I never even got a chance to kick the jerk—*

"You'll come back, Derek," pleaded the girl.

"Of course, darling," lied Fourth Officer Derek Calver, secure in the secret knowledge that he was to be promoted and transferred at the end of the voyage, and that with any sort of luck at all he'd never be on the Polaris Sector run again.

"Mr. Calver," ranted the notoriously irascible Captain Jenkins, "never in all my days in Space have I had to push such a sloppily loaded ship up through an atmosphere! You were in charge of the distribution of mass. What have you got to say?"

"There must be something wrong with the Ralston, sir," said Second Officer Derek Calver.

And there soon will be, he thought, if I can get my hands on it before this old crank makes his personal check.

"So you're quite determined," whispered Dorothy Calver. "Does this home I've made for you mean

nothing to you? Do the children mean nothing to you? Do *I* mean nothing to you?"

"No," replied Calver brutally.

"I should have realized," said Jane Calver bitterly, "that you can't make a silk purse out of a sow's ear."

Calver tried hard to keep his temper under control.

"Jane," he said, "I was chief officer in the Commission's big ships. I was happily married. I threw all that away so that I could marry you. But I'm not going to be made over the way you want me to be made over. I'm a spaceman, not one of those foppish, planetbound puppies that you seem to like running around with."

"Happily married?" She laughed. "That wasn't what you told me. You told me, too, that you were sick and tired of Deep Space and that you'd be happy to stay on the one planet all the rest of your life, as long as you had me there with you.

"Your trouble, Derek, is that you're selfish. I've changed, in lots of ways, just to try to make you happy. You *must* grasp the fact that a successful marriage consists of adjustments—by both partners. *Both* partners.

"But you won't adjust. You'll never adjust."

"I try to."

"You say you try to. You say this and you say that, you promise this and you promise that, but that's as far as it ever goes. You're so conceited that you really think that Derek Calver is the end product of evolution, with no room for improvement. You're so conceited that you think that the Universe owes you a living. And let me tell you, my dear, that father's getting rather restive, that he's beginning to wonder why he should be paying an executive's salary to a glorified office boy."

"My heart bleeds for your father," said Calver. Then, "Where are you going?"

"It's no business of yours. If you *must* know, I've been asked to the Sandersons'. And if you must know, Sylvia pleaded with me not to bring —I quote—'that drunken oaf of a spaceman.' "

"What courteous friends you have," said Calver. "As courteous as you are, darling."

Captain Derek Calver, with Jane Arlen at his side, stood in the master's cabin aboard the Trans-Galactic Clipper *Thermopylae*.

"Captain Calver," said Captain Hendriks, "my thanks are inadequate."

"I did what I could, captain," said Calver.

"At least," said Hendriks, "I shall do what I can, too. Sometimes, in wrangles over salvage awards, the owners of the ships involved are remembered and their crews, who have done all the work, are forgotten. But I am not without influence—"

"That aspect of the matter had never occurred to me," said Calver.

"You must hate it out here," said the other captain. "But you'll be able

to return now, to the warmth and light of the Center—"

"So we shall," said Calver, with a mild amazement. "So we shall."

And I shall be a rich man, he thought. *I shall be rich, and no longer dependent upon the charity of Jane's father and perhaps, if she has not remarried, or even she has—*

He turned his head slightly to look at the other Jane, Jane Arlen, his lover and loyal shipmate.

She'll manage, he thought. *She'll have her share of the salvage money — But perhaps money's not everything—*

His hand found Jane Arlen's and closed upon it, felt the answering warmth and pressure. "But I belong on the Rim," he said. "*We* belong on the Rim—"

And he hated himself for the smug nobility with which he had made the gesture.

They were standing in the huge, cubical chamber with its mirror bright floor and ceiling and walls—Calver and Jane, Brentano and Tanya. Calver put his arms around his wife. He saw her face through the transparency of her helmet—pale it was, and with lines of strain that had not been there before. Her eyes were the eyes of one who has looked on too much in too short a time. Yet she essayed a tremulous smile, and Calver forced himself to smile in answer. Reluctantly he turned away from her, looked towards Brentano and Tanya. They, too, were holding each other tightly.

Calver coughed.

"I assume," he said, "that we all went through the same experience—"

"I always had a rather high opinion of myself," whispered Brentano. "Until now—"

"But what did it mean?" demanded Tanya Brentano. "What did it mean?"

"Perhaps I know," murmured Jane softly. "Perhaps I know, or perhaps I can guess. There was a story I read once—it was when I had a crush on the Twentieth Century authors. It was by a man called Wells. It was called, I think, 'A Vision Of Judgment.' Wells imagined a Judgment Day, with all living, and all who ever had lived on Earth, called by the Last Trump to face their Maker, to be tried and punished for their sins or, rather improbably, to be rewarded for their good deeds... Everyone there had his session of Hell as his naked soul stood in full view of the multitude and the Recording Angel recited the long, long catalogue of petty acts of meanness and spite— All the trivial, shabby things, all the things in which even the most perverted nature could take no pride, no matter how much pride he took in some quite spectacular wrong-doing—"

"So you think that we have been judged?" said Calver slowly. "By whom, Jane? By whom? And why?"

"And how?" asked Brentano, but it was the genuine inquiry of a first-class technician, not a piece of stupid humor.

"There are other doors opening," said Tanya. "There is machinery behind them, apparatus—"

"Dare we?" asked Brentano.

You dare, said the voice in their minds. *You dare. The secrets are no longer secrets, and are yours to use as you will. Soon you will cross the Gulf, and you will be welcomed.*

They, the members of the boarding party, were back aboard *The Outsider* and were discussing their experiences with their shipmates.

"From Bernhardt's Nebula it must have come," said Calver. "How long ago? I don't know, but we shall be finding out. It's an intergalactic spaceship and, at the same time, an electronic brain that makes anything built by ourselves to date no more than a glorified abacus.

"It's a Quarantine Station . . ."

"A Quarantine Station?" asked Cappell.

"Yes. It's far more logical than any of ours, too. *Our* Quarantine Stations are used *after* travelers arrive at their destination; this one is used before they set out. That's the idea I got, anyhow. And truly alien entities need not fear biochemical infections; destructive ideas—thinking—is the really communicable disease of intelligent life. This Quarantine Station checks for that! Perhaps when Levine goes across with the next boarding party he may be able to establish better *rapport* with the mind of the thing—can a machine have a mind?—than we did, and learn more than we have done. There's an utterly alien way of thought behind their machines, for example, and what we take to be the intergalactic drive unit is altogether outside—*outside,* not *beyond*—our technology.

"But the Quarantine Station—

"The way I see it is this. There's intelligent life, highly intelligent life, on the worlds of Bernhardt's Nebula. It could well be that their manned ships have already visited this galaxy, at various times in the past before anything like real civilization started to develop. It could be, it seems to me, that the people of Bernhardt's Nebula want to make contact with us; for trade, perhaps, or cultural exchange, or just neighborliness.

"*But*—

"It could be that our neighbors in the next galaxy are, to all external appearances, horrible monsters, some utterly alien life form, something so different as to be frightening or sickening, yet something that has, underneath the shocking surface, a real and warm humanity. After all, we've come across nothing yet in our galaxy on those lines. Every race with whom we've come into contact has run very much to one or the other of the standard patterns—mammalian, saurian, arthropodal and whatever—"

"The Quarantine Station?" demanded the mate again.

"I was coming to that, Mr. Cappell. Please give me time, It was left here, out beyond the Rim—there may be others—in the hope that with the development of interstellar

flight it would be discovered. It was left here to test the fitness of its discoverers to use the treasures of scientific and technical knowledge that it contains, to build the ships capable of making the Big Crossing. We, the four of us, passed the test without cracking. Had we cracked, there is little doubt that we should have been bundled outside as unceremoniously as Maudsley must have been—bundled outside with the memories of the fear and of the horror and with some sort of post-hypnotic compulsion against talking about it. It is possible that some of Maudsley's crew did pass the test—but they died with *Polar Queen*.

"It is possible that some of you will not pass." He added, with an unwonted humility, "But if *I* did, there is little likelihood that any of you will fail—

"It's an ingenious test, and amazingly simple. It's . . . it's a mirror that's held up to you, in which you see . . . everything. Yes, *everything*. Things that you've forgotten and things that you've wished for years that you could forget. After all, a man can meet any alien monster without fear, without hate, without panic-motivated aggression after he has met and faced that most horrible monster of all . . .

"Himself."

THE END

IN TIMES TO COME

There are, usually, two stages in solving a problem; first diagnosis, and then treatment. Most of the time, it's getting an exact statement of the problem—the diagnosis stage—that's tough.

But in the Case of "That Sweet Little Old Lady," the FBI had a simple diagnosis—both of the problem, and the said Little Old Lady. They were—both problem and S.L.O. Lady—completely nutty. But, unfortunately for the harassed FBI men who were forced to deal with them, they were both crucially and immediately important.

The problem was, "How do you catch a telepathic spy?"

And that's where that Sweet Little Old Lady came in. If trying to catch a telepathic spy was a nutty assignment for an FBI agent—it was surpassed, but in spades, by the job of escorting their only hope—the telepathic, but magnificently nutty Little Old Lady around!

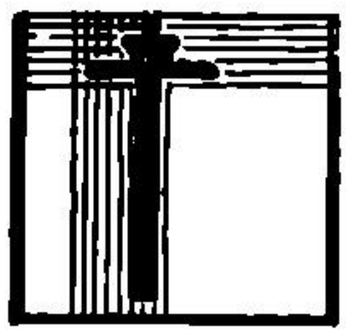
THE EDITOR.

SPACE FOR MADNESS

BY KENNETH JOHNS

An article on some of the problems of preparing a man to do what two billion years of evolution has developed instincts against doing—falling free in an airless space!

Illustrated by Freas



THEY took a man. They blinded him with translucent goggles. They cut off his sense of touch and deafened him with rubber. They shut him up in an air-conditioned box.

They drove him insane.

This is not a medieval chamber of horrors story, it has nothing to do with the light entertainment of the Spanish Inquisition. This epic of torture takes place in 1959, and is just part of the new work of psychiatrists as they plumb the unknown risks about to be encountered by men venturing into space. Already we know that there are worse dangers than cold and meteors to be met by the first spacemen. For, a man alone in the gulfs between the planets has to learn to live with himself.

Take a man away from his normal environment, expose him to new experiences, cut him down physically so he has to live in his own mind, bemuse him with drugs and lack of oxygen, add rebreathed air, take away gravity and deny him the solace of even knowing that reality exists around him so that he becomes unsure that he even possesses a body—and what is left may not be a man; it could be a gibbering idiot—and it might well be a gibbering idiot flying a spaceship to eternity, unknowing, uncaring and unaware just when it dies.

So, because man is going, one day, to the stars, this problem is being met halfway.

Out there, where the hard lights of the stars spangle a backcloth to a sense of isolation no planet-dweller can fully comprehend, there will be no time to debate the meaning of insanity. Take insanity as an inability to distinguish between hallucinations and reality, without entering into the old debate of just what is reality, take insanity as a breakdown of the normal brain functions; whatever it is, it is deadly. And machines cannot distinguish between a sane and an insane order.

In their desperate race to space, the scientists of the United States Air Force are more than aware of these problems; they are actively experimenting with cause and effect. If they can duplicate as thoroughly as possible the conditions of a spaceship journey and analyze each cause and effect upon the sanity of their guinea pigs, they can teach their pilots to remain sane in space. Because man was not designed to live in space he must undergo some discipline in order to survive there. The scientists' job is to find out what is necessary—and then find out how to apply it.

At San Antonio, Texas, Donald Farrell spent seven days in February, 1958 in a box three feet wide, five feet high and six feet long. Air pressure was lowered to eight pounds p. s. i. and oxygen was doubled to compensate. He was put on a fourteen hour day—TV lights burned all the time—two working shifts of four hours each, three half-hour meal and break periods and a mere four and

one half hours sleeping time. He ate heavily of rich foods. Everything he did, and by electrodes taped to chest and arms what he did involuntarily, was recorded. By adjusting the controls before him, he had to match one set of radarscope traces to another. He breezed through the test, tiring on the fifth day and making mistakes, but came through to finish strongly.

The main point of the experiment was to see if Farrell cracked up mentally. He didn't. So enclosure, frightening to a claustrophobe, is not itself the sole cause of insanity in pilots to be. Farrell himself has said that he's ready to be the man to take the first ride to the Moon.

The snag to this sort of test is, of course, that the subject *knows* he isn't really in space; that if he gets into the least trouble he has only to press the button and hordes of helpers will swarm in to "rescue" him. Attempts are being made to deal with this particular problem.

Allied to Farrell's ordeal, at the United States Air Force Department of Space Medicine, five-man crews spend five days in a cabin in an imaginary flight to nowhere, their mental, physical and nervous reactions exhaustively checked throughout the trip.

In a sealed chamber, subjected to the strain of high humidity and air poisoned by carbon dioxide, men are tested for their ability to solve the essential mental problems involved in long-distance flying. Hour after hour the gruelling tests continue as fatigue and exhaustion battle with determination to keep awake—and, one day, keep alive.

In relative comfort, like Farrell, or against bodily rigors like the "flight to nowhere" teams, scientists are seeking to duplicate space-flight conditions. And ever more clearly it is seen that the mental state of men in space will be the overriding factor—once the mechanical problems have been solved, although they are on a different level—but if there are ten physical and mental strains, there are over a thousand possible combinations of them, not taking into account degrees of each.

The question of the sanity of pilots is so fundamental that psychiatrists are having to revalue many of their ideas, correlating the results of chemistry, psychology and stories of refugees from Europe. It is necessary to delve to the core of the problem. First: how do you drive a man insane?

Pain can do it. So can grief. These may be expected to be beyond the control and outside what we may expect to find in space. Torture can do it. Legend has it that if a drop of water falls regularly and monotonously on a man's head, his mind will break. This is nearer to the subtleties of experimental psychiatry or the devilment of brain washing. Break a space pilot's health with insufficient and wrongly balanced food coupled with cold and darkness, starve him of oxygen, remake his thoughts by regulating *all* information he receives and

must accept in lieu of any other—and that *is* brain washing.

But psychiatrists had to begin farther back still. They needed to know how the mind ticks, how the great web of consciousness and understanding devolves on the flow of minute electric currents and strange chemical changes in the nerves. So far they have failed to find a completely satisfactory idea of the brain and mind. So their understanding of how and why the complex mechanism of the mind falters and becomes maladjusted is only just beginning.

Hallucinations and fantasies may be created by massive doses of drugs such as mescalin, as was so vividly described in Aldous Huxley's "The Doors of Perception." But for any material synthesized in the body to create such weirdness, it must be able to act in minute concentrations. Psychiatrists have begun to think in terms of mental strain forming such very active chemicals that rock the brain's stability. Imagine a man injured in such a way that his liver began to secrete alcohol enough to keep him in a state of continual drunkenness—his personality would be changed.

A trace of potent hormone might be antagonistic to the chemistry of the brain and create the fantasies of madness. If such could be isolated, analyzed and an antidote found, it would be as valuable as all the antibiotics group.

At Tulane University they claim to have isolated part of the blood containing such a material. Obtained from schizophrenics, this blood fraction called taraxein induces all the symptoms of severe schizophrenia in normal people. Their electrical brain waves became identical with the schizophrenic pattern, and, strangely enough, different individuals could become fixed in a catatonic state or warped into paranoids by the same amounts of the same blood fraction. Within four hours, the volunteers were back to sanity.

It has been known for some time that schizophrenics have a slightly different blood chemistry from normals; they use up adrenalin faster and their blood sometimes contains a K2 factor that gives a specific color reaction with NN dimethyl p phenylene diamine.

There has been one report that the effect of taraxein on monkeys could be countered by injections of beef brain extract.

Attacking the problem of insanity from another angle, it was discovered accidentally that lysergic acid diethylamide 25, known as L. S. D. 25, will produce weird hallucinations and mental attitudes similar to those of insanity; and this in quantities as small as five millionths of a gram. Self induced insanity allows psychiatrists to feel for themselves the crazy mixed-up emotions that cannot be told in words; the feeling that comes when walls and furniture flow into new shapes, when unearthly colors appear from nowhere and clear incisive voices speak but are heard only by the victim. In addition, it was discovered that tranquilizer drugs such

as chlorpromazine counter the effects of LSD and quickly return the volunteers to sanity.

Drugs are useful but crude; they do not explain the subtleties of, say, radar hypnosis, when an operator's attention is so fixed upon the screen that he cannot translate the meanings of what he sees into actual fact. Nor do they explain the evidence obtained at the National Institute of Health in the United States, or at McGill University in Canada.

The McGill University experiments have been the most extensive and rigorously controlled tests of the effect of monotony on the human mind. Victims were paid twenty dollars a day for as long as they could withstand being cut off from normal perception.

Before the experiments, each individual was given oral psychological tests and their attitude to the existence of ghosts and poltergeists discovered.

They were watched as they lay on beds in cubicles, their sense of vision cut off by translucent goggles, their sense of touch destroyed by cotton gloves and cardboard tubes over their hands and their hearing nullified by U-shaped rubber pillows. Their only contact with the sensory world was for meals and visits to the toilet and oral tests given at twelve, twenty-four and forty-eight hours after the beginning of their isolation. Part of the time they were allowed to listen to a recording of a talk biased in favor of the existence of ghosts and poltergeists.

Naturally, individual reactions to isolation varied; but there was an underlying similarity in experiences. The watchers noted that they sang, whistled and talked to themselves to relieve the monotony and the periods of intense restlessness that recurred. The volunteers, at first, had no difficulty in thinking about their problems and reminiscing about past events. Then they found it difficult to concentrate and many just let their minds wander—some even suffered complete blackouts. Then they became irritable and full of childish emotions, such as fear of the experimenters.

This phase was followed by visual hallucinations that grew from geometric patterns of lines and dots into recognizable figures. Cartoonlike yellow men with open mouths and black caps, babies, squirrels with sacks over their shoulders, prehistoric animals and eyeglasses walking a street were reported. Some of the volunteers said they could scan the images by moving their eyes, so real were the pictures, and could hear voices and choirs in full stereophonic sound.

Even the sense of touch was affected. One told of his experiences as a tiny rocketship circled him and he felt shots from it striking his body. Others reported that they were not alone on their beds, that someone else was lying next to them—or even co-existent with their own bodies.

Electroencephalographs, brain-wave recordings, showed two main results of isolation. In spite of the volunteer being wide awake his brain

waves could show the slow rhythms normally present during sleep; in general, the waves were slower than previous to the test.

Afterwards it was found that the ghost and poltergeist recording had altered the subjects' belief in supernatural phenomena; enough, in one case, to give ghosts a reality sufficient to be expected to be met at any moment.

At the National Institute of Mental Health, the technique employed was an attempt to remove the physical effects of gravity by floating a volunteer in a tank of water at 94°F; a temperature at which the skin has no sensation of hot or cold. A mask supplied air, and buoyed alone in the warm underwater darkness with only the sound of breathing, a man was in the nearest position to a foetus yet realized by an adult human.

Feeling was limited to the touch of his mask and underwater supports.

At first it was enjoyable, floating in a sea of nothingness, suspended in darkness. But, after forty-five minutes, he gradually found he needed some stimulus—any stimulus—to satisfy his mind's craving for experience. Cheating the design of the experiment, he moved his hands and touched one finger against another, to prevent the unbearable feeling forcing him to call off the test.

Persevering in the face of these nightmarish fancies, eventually the tension passed, and its place was taken by highly personal fancies which the doctor volunteer refused to publish. After two and a half hours in the tank he "saw" the darkness surrounding him as a black, empty place from which luminous objects, strange in shape, floated towards him. Slowly a tunnel of blue light stretching away to infinity appeared, and he strained to see through it.

Then his mask began to leak and the experiment was broken off.

Lack of oxygen or water can produce hallucinations. Drugs can interfere with the brain metabolism—when the body chemistry begins to fail there is a borderland where sanity leaves the mind. But, beyond this, these experiments have shown that insanity can be created when there is a breakdown in the flow of information from the sensory organs, as if the brain needs to be continuously activated to establish its own base line of what is reality.

And it appears that the easiest way to go insane is to undergo the sort of experiences spacemen may realistically expect to face.

How can these effects be combatted? Unconscious spacemen, knocked out by drugs and kept alive by low temperatures and intravenous feeding, would not be in a position to run a ship; but they would arrive sane at trip's end. Instead of drugs, hypnosis might work.

One psychiatrist, Donald Michael, has suggested that the already insane would have the mental stability to withstand the mind-wrecking rigors of space. Of course, certain types of insanity would have to be recruited

for this work; and the very areas of sanity needed to control a ship appear to be the same areas as are directly affected by that control.

Alternatively, members of contemplative societies, such as hermits, Eskimos, Buddhists or the exponents of the Eastern mystical ethos such as fakirs and the adepts in yoga, might well be better suited to take charge of spaceships than, say, the hard-headed, down-to-earth pilot.

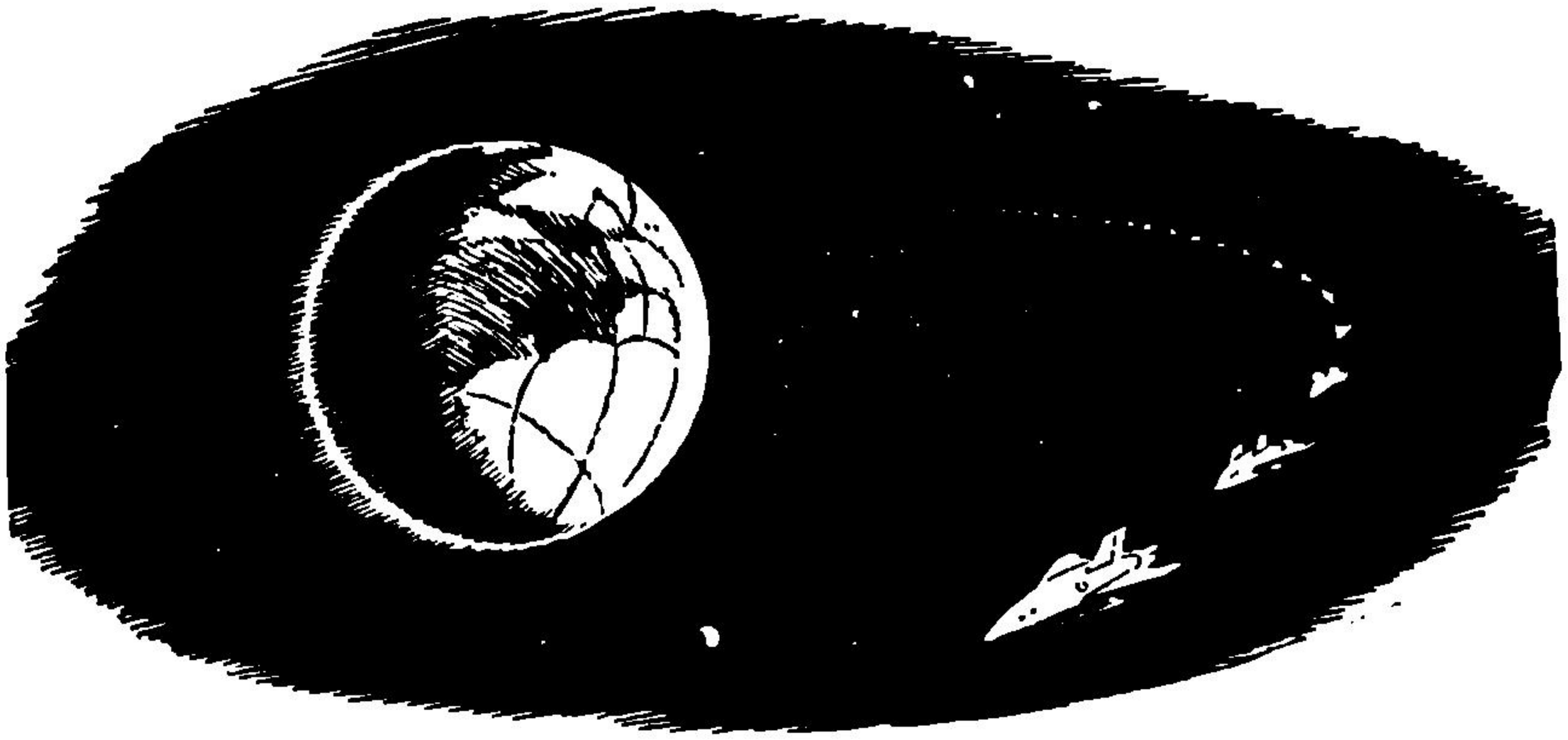
The feeling of isolation, of being cut off from *everything* that has meant anything to the human race over its turbulent history, the deep psychic conviction that he has been irrevocably cut off from the family of man, has ventured where no power on Earth can be of any use to him, these are the emotions and attitudes that must be explored and understood and conquered—if a man is, in fact, to *do* any of them.

There are many suggested remedies. Continuous, mind-occupying tasks, TV beamed broadcasts, tape recordings, occupational therapy, continuous mild intoxication, the employment of newlyweds as crew—all these things must surely be mere stopgaps until mankind has adapted itself to take and not notice the punishment that space travel hands out. Judging by mankind's deplorable lack of success in adapting to his modern methods of machine civilization, adaption is going to be a long and tough process.

But one thing emerges very clearly. So far, the prophets of the exploration of space have been concerned mainly with the problems of getting a body into space. It is frighteningly obvious now that, as the physical problems are overcome, the mind cannot be divorced from the body. Out *there*, the two are indivisible and indispensable.

As has been said before, the only thing that stands between man and space is man himself.

THE END

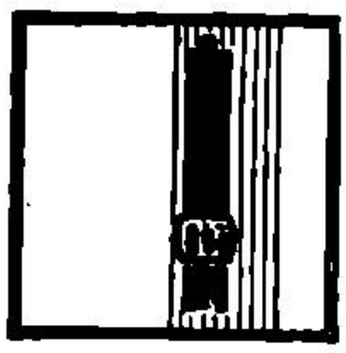


A MATTER OF PROPORTION

In order to make a man stop, you must convince him that it's impossible to go on. Some people though, just can't be convinced.

BY ANNE WALKER

Illustrated by Bernklau



IN THE dark, our glider chutes zeroed neatly on target—only Art Benjamin missed the edge of the gorge. When we were sure Invader hadn't heard the crashing of bushes, I climbed down after him. The climb, and what I found, left me shaken. A Special Corps squad leader is not expendable—by order. Clyde Esterbrook, my second and ICEG mate, would have to mine the viaduct while my nerve and glycogen stabilized.

We timed the patrols. Clyde said, "Have to wait till a train's coming. No time otherwise." Well, it was his show. When the next pair of burly-coated men came over at a trot, he breathed, "Now!" and ghosted out almost before they were clear.

I switched on the ICEG—intercortical encephalograph—planted in my temporal bone. My own senses could hear young Ferd breathing, feel and smell the mat of pine needles under me. Through Clyde's, I could hear the blind whuffle of wind in the girders, feel the crude wood of ties and the iron-cold molding of rails in the star-dark. I could feel, too, an odd, lilting elation in his mind, as if this savage universe were a good thing to take on—spray guns, cold, and all.

We wanted to set the mine so the wreckage would clobber a trail below, one like they'd built in Burma and Japan, where you wouldn't think a monkey could go; but it probably carried more supplies than the viaduct itself. So Clyde made adjustments precisely, just as we'd figured it with the model back at base. It was a tricky, slow job in the bitter dark.

I began to figure: If he armed it for this train, and ran, she'd go off while we were on location and we'd be drenched in searchlights and spray guns. Already, through his fingers, I felt the hum in the rails that every tank-town-reared kid knows. I turned up my ICEG. "All right, Clyde, get back. Arm it when she's gone past, for the next one."

I felt him grin, felt his lips form words: "I'll do better than that, Willie. Look, Daddy-o, no hands!" He slid over the edge and rested elbows and ribs on the raw tie ends.

We're all acrobats in the Corps. But I didn't like this act one little bit. Even if he could hang by his hands, the heavy train would jolt him off. But I swallowed my thoughts.

He groped with his foot, contacted a sloping beam, and brought his other foot in. I felt a dull, scraping slither under his moccasin soles. "Frost," he thought calmly, rubbed a clear patch with the edge of his foot, put his weight on it, and transferred his hands to the beam with a twist we hadn't learned in Corps school. My heart did a double-take; one slip and he'd be off into the gorge, and the frost stung, melting under his bare fingers. He lay in the trough of the massive H-beam, slid down about twenty feet to where it made an angle with an upright,

and wedged himself there. It took all of twenty seconds, really. But I let out a breath as if I'd been holding it for minutes.

As he settled, searchlights began skimming the bridge. If he'd been running, he'd have been shot to a sieve. As it was, they'd never see him in the mingled glare and black.

His heart hadn't even speeded up beyond what was required by exertion. The train roared around a shoulder and onto the viaduct, shaking it like an angry hand. But as the boxcars thunder-clattered above his head, he was peering into the gulf at a string of feeble lights threading the bottom. "There's the flywalk, Willie. They know their stuff. But we'll get it." Then, as the caboose careened over and the searchlights cut off, "Well, that gives us ten minutes before the patrol comes back."

He levered onto his side, a joint at a time, and began to climb the beam. Never again for me, even by proxy! You just *couldn't* climb that thing nohow! The slope was too steep. The beam was too massive to shinny, yet too narrow to lie inside and elbow up. The metal was too smooth, and scummed with frost. His fingers were beginning to numb. And—he *was* climbing!

In each fin of the beam, every foot or so, was a round hole. He'd get one finger into a hole and pull, inching his body against the beam. He timed himself to some striding music I didn't know, not fast but no waste motion, even the pauses rhythmic.

I tell you, I was sweating under my leathers. Maybe I should have switched the ICEG off, for my own sake if not to avoid distracting Clyde. But I was hypnotized, climbing.

In the old days, when you were risking your neck, you were supposed to think great solemn thoughts. Recently, you're supposed to think about something silly like a singing commercial. Clyde's mind was neither posturing in front of his mental mirror nor running in some feverish little circle. He faced terror as big as the darkness from gorge bottom to stars, and he was just simply as big as it was— sheer life exulting in defying the dark, the frost and wind and the zombie grip of Invader. I envied him.

Then his rhythm checked. Five feet from the top, he reached confidently for a fingerhole . . . No hole.

He had already reached as high as he could without shifting his purchase and risking a skid—and even his wrestler's muscles wouldn't make the climb again. My stomach quaked: Never see sunlight in the trees any more, just cling till dawn picked you out like a crow's nest in a dead tree; or drop . . .

Not Clyde. His flame of life crouched in anger. Not only the malice of nature and the rage of enemies, but human shiftlessness against him too? Good! He'd take it on.

Shoulder, thigh, knee, foot scraped off frost. He jammed his jaw against the wet iron. His right hand

never let go, but it crawled up the fin of the strut like a blind animal, while the load on his points of purchase mounted—watchmaker coordination where you'd normally think in boilermaker terms. The flame sank to a spark as he focused, but it never blinked out. This was not the anticipated, warded danger, but the trick punch from nowhere. This was It. A sneak squall buffetted him. I cursed thinly. But he sensed an extra purchase from its pressure, and reached the last four inches with a swift glide. The next hole was there.

He waited five heartbeats, and pulled. He began at the muscular disadvantage of aligned joints. He had to make it the first time; if you can't do it with a dollar, you won't do it with the change. But as elbow and shoulder bent, the flame soared again: Score one more for life!

A minute later, he hooked his arm over the butt of a tie, his chin, his other arm, and hung a moment. He didn't throw a knee up, just rolled and lay between the rails. Even as he relaxed, he glanced at his watch: three minutes to spare. Leisurely, he armed the mine and jogged back to me and Ferd.

As I broke ICEG contact, his flame had sunk to an ember glow of anticipation.

We had almost reached the cave pricked on our map, when we heard the slam of the mine, wee and far-off. We were lying doggo looking out at the snow peaks incandescent in dawn when the first Invader patrols trailed by below. Our equipment was a miracle of hot food and basic medication. Not pastimes, though; and by the second day of hiding, I was thinking too much. There was Clyde, an Inca chief with a thread of black mustache and incongruous hazel eyes, my friend and ICEG mate—what made him tick? Where did he get his delight in the bright eyes of danger? How did he gear his daredevil valor, not to the icy iron and obligatory killing, but to the big music and stars over the gorge? But in the Corps, we don't ask questions and, above all, never eavesdrop on ICEG.

Young Ferd wasn't so inhibited. Benjamin's death had shaken him—losing your ICEG mate is like losing an eye. He began fly-fishing Clyde: How had Clyde figured that stunt, in the dark, with the few minutes he'd had?

"There's always a way, Ferd, if you're fighting for what you really want."

"Well, I want to throw out Invader, all right, but—"

"That's the start, of course, but beyond that—" He changed the subject; perhaps only I knew of his dream about a stronghold for rebels far in these mountains. He smiled. "I guess you get used to calculated risks. Except for imagination, you're as safe walking a ledge twenty stories up, as down on the sidewalk."

"Not if you trip."

"That's the calculated risk. If you climb, you get used to it."

"Well, how did you *get* used to it? Were you a mountaineer or an acrobat?"

"In a way, both." Clyde smiled again, a trifle bitterly and switched the topic. "Anyway, I've been in action for the duration except some time in hospital."

Ferd was onto that boner like an infielder. To get into SC you have to be not only championship fit, but have no history of injury that could crop up to haywire you in a pinch. So, "Hospital? You sure don't show it now."

Clyde was certainly below par. To cover his slip he backed into a bigger, if less obvious, one. "Oh, I was in that Operation Armada at Golden Gate. Had to be patched up."

He must have figured, Ferd had been a kid then, and I hadn't been too old. Odds were, we'd recall the episode, and no more. Unfortunately, I'd been a ham operator and I'd been in the corps that beamed those fireships onto the Invader supply fleet in the dense fog. The whole episode was burned into my brain. It had been kamikazi stuff, though there'd been a theoretical chance of the thirty men escaping, to justify sending them out. Actually, one escape boat did get back with three men.

I'd learned about those men, out of morbid, conscience-scalded curiosity. Their leader was Edwin Scott, a medical student. At the very start he'd been shot through the lower spine. So, his companions put him in the escape boat while they clinched their prey. But as the escape boat sheered off, the blast of enemy fire killed three and disabled two.

Scott must have been some boy. He'd already doctored himself with hemostatics and local anaesthetics but, from the hips down, he was dead as salt pork, and his visceral reflexes must have been reacting like a worm cut with a hoe. Yet somehow, he doctored the two others and got that boat home.

The other two had died, but Scott lived as sole survivor of Operation Armada. And he hadn't been a big, bronze, Latin-Indian with incongruous hazel eyes, but a snub-nosed redhead. And he'd been wheel-chaired for life. They'd patched him up, decorated him, sent him to a base hospital in Wisconsin where he could live in whatever comfort was available. So, he dropped out of sight. And now, this!

Clyde was lying, of course. He'd picked the episode at random. Except that so much else about him didn't square. Including his name compared to his physique, now I thought about it.

I tabled it during our odyssey home. But during post-mission leave, it kept bothering me. I checked, and came up with what I'd already known: Scott *had* been sole survivor, and the others were certified dead. But about Scott, I got a runaround. He'd apparently vanished. Oh, they'd check for me, but that could take years. Which didn't lull my

curiosity any. Into Clyde's past I was sworn not to pry.

We were training for our next assignment, when word came through of the surrender at Kelowna. It was a flare of sunlight through a black sky. The end was suddenly close.

Clyde and I were in Victoria, British Columbia. Not subscribing to the folkway that prescribes seasick intoxication as an expression of joy, we did the town with discrimination. At midnight we found ourselves strolling along the waterfront in that fine, Vancouver-Island mist, with just enough drink taken to be moving through a dream. At one point, we leaned on a rail to watch the mainland lights twinkling dimly like the hope of a new world—blackout being lifted.

Suddenly, Clyde said, "What's fraying you recently, Will? When we were taking our ICEG reconditioning, it came through strong as garlic, though you wouldn't notice it normally."

Why be coy about an opening like that? "Clyde, what do you know about Edwin Scott?" That let him spin any yarn he chose—if he chose.

He did the cigarette-lighting routine, and said quietly, "Well, I *was* Edwin Scott, Will." Then, as I waited, "Yes, really me, the real me talking to you. This," he held out a powerful, coppery hand, "once belonged to a man called Marco da Sanhao . . . You've heard of transplanting limbs?"

I had. But this man was no transplant job. And if a spinal cord is cut, transplanting legs from Ippalovsky, the primo ballerino, is worthless. I said, "What about it?"

"I was the first—successful—brain transplant in man."

For a moment, it queered me, but only a moment. Hell, you read in fairy tales and fantasy magazines about one man's mind in another man's body, and it's marvelous, not horrible. But—

By curiosity, I know a bit about such things. A big surgery journal, back in the '40s, had published a visionary article on grafting a whole limb, with colored plates as if for a real procedure*. Then they'd developed techniques for acclimating a graft to the host's serum, so it would not react as a foreign body. First, they'd transplanted hunks of ear and such; then, in the '60s, fingers, feet, and whole arms in fact.

But a brain is another story. A cut nerve can grow together; every fiber has an insulating sheath which survives the cut and guides growing stumps back to their stations. In the brain and spinal cord, no sheaths; growing fibers have about the chance of restoring contact that you'd have of traversing the Amazon jungle on foot without a map. I said so.

"I know," he said, "I learned all I could, and as near as I can put it, it's like this: When you cut your finger, it can heal in two ways. Usually it bleeds, scabs, and skin grows under the scab, taking a week or so.

*Hall, "Whole Uupper Extremity Transplant for Human Beings." Annals of Surgery 1944, #120, p. 12.

But if you align the edges exactly, at once, they may join almost immediately—healing by First Intent. Likewise in the brain, if they line up cut nerve fibers before the cut-off bit degenerates, it'll join up with the stump. So, take a serum-conditioned brain and fit it to the stem of another brain so that the big fiber bundles are properly fitted together, fast enough, and you can get better than ninety per cent recovery."

"Sure," I said, parading my own knowledge, "but what about injury to the masses of nerve cells? And you'd have to shear off the nerves growing out of the brain."

"There's always a way, Willie. There's a place in the brain stem called the isthmus, no cell masses, just bundles of fibers running up and down. Almost all the nerves come off below that point; and the few that don't can be spliced together, except the smell nerves and optic nerve. Ever notice I can't smell, Willie? And they transplanted my eyes with the brain—biggest trick of the whole job."

It figured. But, "I'd still hate to go through with it."

"What could I lose? Some paraplegics seem to live a fuller life than ever. Me, I was going mad. And I'd seen the dogs this research team at

my hospital was working on—old dogs' brains in whelps' bodies, spry as natural.

"Then came the chance. Da Sanhao was a Brazilian wrestler stranded here by the war. Not his war, he said; but he did have the decency to volunteer as medical orderly. But he got conscripted by a bomb that took a corner off the hospital and one off his head. They got him into chemical stasis quicker than it'd ever been done before, but he was dead as a human being—no brain worth salvaging above the isthmus. So, the big guns at the hospital saw a chance to try their game on human material, superb body and lower nervous system in ideal condition, waiting for a brain. Only, whose?

"Naturally, some big-shot's near the end of his rope and willing to gamble. But *I* decided it would be a forgotten little-shot, name of Edwin Scott. I already knew the surgeons from being a guinea pig on ICEG. Of course, when I sounded them out, they gave me a kindly brush-off: The matter was out of the their hands. However, I knew whose hands it *was* in. And I waited for my chance—a big job that needed somebody expendable. Then I'd make a deal, writing my own ticket because they'd figure I'd never collect. Did you hear about Operation Seed-corn?"

That was the underground railway that ran thousands of farmers out of occupied territory. Manpower was what finally broke Invader, improbable as it seems. Epidemics, desertions, over-extended lines, thinned that overwhelming combat strength; and every farmer spirited out of their hands equalled ten casualties. I nodded.

"Well, I planned that with myself as director. And sold it to Filipson."

I contemplated him: just a big man in a trench coat and droop-brimmed hat silhouetted against the lamp-lit mist. I said, "You directed Seed-corn out of a wheel chair in enemy territory, and came back to get transplanted into another body? Man, you didn't tell Ferd a word of a lie when you said you were used to walking up to death." (But there was more: Besides that dour Scot's fortitude, where did he come by that high-hearted valor?)

He shrugged. "You do what you can with what you've got. *Those* weren't the big adventures I was thinking about when I said that. I had a team behind me in those—"

I could only josh. "I'd sure like to hear the capperoo then."

He toed out his cigarette. "You're the only person who's equipped for it. Maybe you'd get it, Willie."

"How do you mean?"

"I kept an ICEG record. Not that I knew it was going to happen, just wanted proof if they gave me a deal and I pulled it off. Filipson wouldn't renege, but generals were expendable. No one knew I had that transmitter in my temporal bone, and I rigged it to get a tape on my home receiver. Like to hear it?"

I said what anyone would, and steered him back to quarters before

he'd think better of it. This would be something!

On the way, he filled in background. Scott had been living out of hospital in a small apartment, enjoying as much liberty as he could manage. He had equipment so he could stump around, and an antique car specially equipped. He wasn't complimentary about them. Orthopedic products had to be: unreliable, hard to service, unsightly, intricate, and uncomfortable. If they also squeaked and cut your clothes, fine!

Having to plan every move with an eye on weather and a dozen other factors, he developed an uncanny foresight. Yet he had to improvise at a moment's notice. With life a continuous high-wire act, he trained every surviving fiber to precision, dexterity, and tenacity. Finally, he avoided help. Not pride, self-preservation; the compulsively helpful have rarely the wit to ask before rushing in to knock you on your face, so he learned to bide his time till the horizon was clear of beaming simpletons. Also, he found an interest in how far he could go.

These qualities, and the time he he had for thinking, begot Seedcorn. When he had it convincing, he applied to see General Filipson, head of Regional Intelligence, a man with both insight and authority to make the deal—but also as tough as his post demanded. Scott got an appointment two weeks ahead.

That put it early in April, which decreased the weather hazard—a major consideration in even a trip to the Supermarket. What was Scott's grim consternation, then, when he woke on D-day to find his windows plastered with snow under a driving wind—not mentioned in last night's forecast of course.

He could concoct a plausible excuse for postponement—which Filipson was just the man to see through; or call help to get him to HQ—and have Filipson bark, "Man, you can't even make it across town on your own power because of a little snow." No, come hell or blizzard, he'd have to go solo. Besides, when he faced the inevitable unexpected behind Invader lines, he couldn't afford a precedent of having flinched now.

He dressed and breakfasted with all the petty foresights that can mean the shaving of clearance in a tight squeeze, and got off with all the margin of time he could muster. In the apartment court, he had a parking space by the basement exit and, for a wonder, no free-wheeling nincompoop had done him out of it last night. Even so, getting to the car door illustrated the ordeal ahead; the snow was the damp, heavy stuff that packs and glares. The streets were nasty, but he had the advantage of having learned restraint and foresight.

HQ had been the post office, a ponderous red-stone building filling a whole block. He had scouted it thoroughly in advance, outside and in, and scheduled his route to the general's office, allowing for minor

hazards. Now, he had half an hour extra for the unscheduled major hazard.

But on arriving, he could hardly believe his luck. No car was yet parked in front of the building, and the walk was scraped clean and salted to kill the still falling flakes. No problems. He parked and began to unload himself quickly, to forestall the elderly MP who hurried towards him. But, as Scott prepared to thank him off, the man said, "Sorry, Mac, no one can park there this morning."

Scott felt the chill of nemesis. Knowing it was useless, he protested his identity and mission.

But, "Sorry, major. But you'll have to park around back. They're bringing in the big computer. General himself can't park here. Them's orders."

He could ask the sergeant to park the car. But the man couldn't leave his post, would make a to-do calling someone—and that was Filipson's suite overlooking the scene. No dice. Go see what might be possible.

But side and back parking were jammed with refugees from the computer, and so was the other side. And he came around to the front again. Five minutes wasted. He thought searchingly.

He could drive to a taxi lot, park there, and be driven back by taxi, disembark on the clean walk, and there you were. Of course, he could hear Filipson's "Thought you drove your own car, ha?" and his own damaging excuses. But even Out Yonder, you'd cut corners in emergency. It was all such a comfortable Out, he relaxed. And, relaxing, saw his alternative.

He was driving around the block again, and noted the back entrance. This was not ground level, because of the slope of ground; it faced a broad landing, reached by a double flight of steps. These began on each side at right-angles to the building and then turned up to the landing along the face of the wall. Normally, they were negotiable; but now, even had he found parking near them, he hadn't the chance of the celluloid cat in hell of even crossing the ten feet of uncleaned sidewalk. You might as well climb an eighty-degree, fifty-foot wall of rotten ice. But there was always a way, and he saw it.

The unpassable walk itself was an avenue of approach. He swung his car onto it at the corner, and drove along it to the steps to park in the angle between steps and wall—and discovered a new shut-out. He'd expected the steps to be a mean job in the raw wind that favored this face of the building; but a wartime janitor had swept them sketchily only down the middle, far from the balustrades he must use. By the balustrades, early feet had packed a semi-ice far more treacherous than the untouched snow; and, the two bottom steps curved out beyond the balustrade. So . . . a sufficiently reckless alpinist might assay a cliff in a sleet storm and gale, but he couldn't even try if it began with an overhang.

Still time for the taxi. And so, again Scott saw the way that was always there: Set the car so he could use its hood to heft up those first steps.

Suddenly, his thinking metamorphosed: He faced, not a miserable, unwarranted forlorn hope, but the universe as it was. Titanic pressure suit against the hurricanes of Jupiter, and against a gutter freshet, life was always outclassed—and always fought back. Proportions didn't matter, only mood.

He switched on his ICEG to record what might happen. I auditioned it, but I can't disentangle it from what he told me. For example, in his words: Multiply distances by five, heights by ten, and slickness by twenty. And in the playback: Thirty chin-high ledges loaded with soft lard, and only finger holds and toe holds. And you did it on stilts that began, not at your heels, at your hips. Add the hazard of Helpful Hosea: "Here, lemme giveya hand, Mac!", grabbing the key arm, and crashing down the precipice on top of you.

Switching on the ICEG took his mind back to the snug apartment where its receiver stood, the armchair, books, desk of diverting work. It looked awful good, but . . . life fought back, and always it found a way.

He shucked his windbreaker because it would be more encumbrance than help in the showdown. He checked, shoelaces, and strapped on the cleats he had made for what they were worth. He vetoed the bag of sand and salt he kept for minor difficulties—far too slow. He got out of the car.

This could be the last job he'd have to do incognito—Seed-corn, he'd get credit for. Therefore, he cherished it: triumph for its own sake. Alternatively, he'd end at the bottom in a burlesque clutter of chrom-alum splints and sticks, with maybe a broken bone to clinch the decision. For some men, death is literally more tolerable than defeat in humiliation.

Eighteen shallow steps to the turn, twelve to the top. Once, he'd have cleared it in three heartbeats. Now, he had to make it to a twenty-minute deadline, without rope or alpenstock, a Moon-man adapted to a fraction of Earth gravity.

With the help of the car hood, the first two pitches were easy. For the next four or five, wind had swept the top of the balustrade, providing damp, gritty handhold. Before the going got tougher, he developed a technic, a rhythm and system of thrusts proportioned to heights and widths, a way of scraping holds where ice was not malignantly welded to stone, an appreciation of snow texture and depth, an economy of effort.

He was enjoying a premature elation when, on the twelfth step, a cleat strap gave. Luckily, he was able to take his lurch with a firm grip on the balustrade; but he felt depth yawning behind him. Dourly,

he took thirty seconds to retrieve the cleat; stitching had been sawed through by a metal edge—just as he'd told the cocksure workman it would be. Oh, to have a world where imbecility wasn't entrenched! Well—he was fighting here and now for the resources to found one. He resumed the escalade, his rhythm knocked cockeyed.

Things even out. Years back, an Invader bomber had scored a near miss on the building, and minor damage to stonework was unrepaired. Crevices gave fingerhold, chipped-out hollows gave barely perceptible purchase to the heel of his hand. Salutes to the random effects of unlikely causes!

He reached the turn, considered swiftly. His fresh strength was blunted; his muscles, especially in his thumbs, were stiffening with chill. Now: He could continue up the left side, by the building, which was tougher and hazardous with frozen drippings, or by the outside, right-hand rail, which was easier but meant crossing the open, half-swept wide step and recrossing the landing up top. Damn! Why hadn't he foreseen that? Oh, you can't think of everything. Get going, left side.

The wall of the building was rough-hewn and ornamented with surplus carvings. Cheers for the 1890s architect!

Qualified cheers. The first three lifts were easy, with handholds in a frieze of lotus. For the next, he had to heft with his side-jaw against a boss of stone. A window ledge made the next three facile. The final five stared, an open gap without recourse. He made two by grace of the janitor's having swapped his broom a little closer to the wall. His muscles began to wobble and waver: in his proportions, he'd made two-hundred feet of almost vertical ascent.

But, climbing a real ice-fall, you'd unleash the last convulsive effort because you had to. Here, when you came down to it, you could always sit and bump yourself down to the car which was, in that context, a mere safe forty feet away. So he went on because he had to.

He got the rubber tip off one stick. The bare metal tube would bore into the snow pack. It might hold, *if* he bore down just right, and swung his weight just so, and got just the right sliding purchase on the wall, and the snow didn't give underfoot or undercane. And if it didn't work—it didn't work.

Beyond the landing, westwards, the sky had broken into April blue, far away over Iowa and Kansas, over Operation Seed-corn, over the refuge for rebels that lay at the end of all his roads. . . .

He got set . . . and lifted. A thousand miles nearer the refuge! Got set . . . and lifted, balanced over plunging gulfs. His reach found a round pilaster at the top, a perfect grip for a hand. He drew himself up, and this time his cleated foot cut through snow to stone, and slipped, but his hold was too good. And there he was.

No salutes, no cheers, only one more victory for life.

Even in victory, unlife gave you no respite. The doorstep was three feet wide, hollowed by eighty years of traffic, and filled with frozen drippings from its pseudo-Norman arch. He had to tilt across it and catch the brass knob—like snatching a ring in a high dive.

No danger now, except sitting down in a growing puddle till someone came along to hoist him under the armpits, and then arriving at the general's late, with his seat black-wet. . . You unhorse your foeman, curvet up to the royal box to receive the victor's chaplet, swing from your saddle, and fall flat on your face.

But, he cogitated on the bench inside, getting his other cleat off and the tip back on his stick, things do even out. No hearty helper had intervened, no snot-nosed, gaping child had twitched his attention, nobody's secretary — pretty of course — had scurried to helpfully knock him down with the door. They were all out front superintending arrival of the computer.

The general said only, if tartly, "Oh yes, major, come in. You're late, a'n't you?"

"It's still icy," said Ed Scott. "Had to drive carefully, you know."

In fact, he *had* lost minutes that way, enough to have saved his exact deadline. And that excuse, being in proportion to Filipson's standard dimension, was fair game.

I wondered what dimension Clyde would go on to, now that the challenge of war was past. To his rebels refuge at last maybe? Does it matter? Whatever it is, life will be outclassed, and Scott-Esterbrook's brand of life will fight back.

THE END

ANYBODY GOT AN EXPLANATION...?

There's been considerable discussion about contaminating the Moon with living organisms from Earth, in case one of the lunar probe devices lands on the Moon. (With the very poor aim the rocketeers have achieved so far, anything aimed within twenty thousand miles of the Moon is apt to hit it.) Scientists want to be able to tell whether the Moon has any native life cells, when they get there; introducing them from Earth would invalidate any evidence accumulated later.

I read with wondering interest that the lunar probe devices are being sterilized . . . with ultra-violet light!

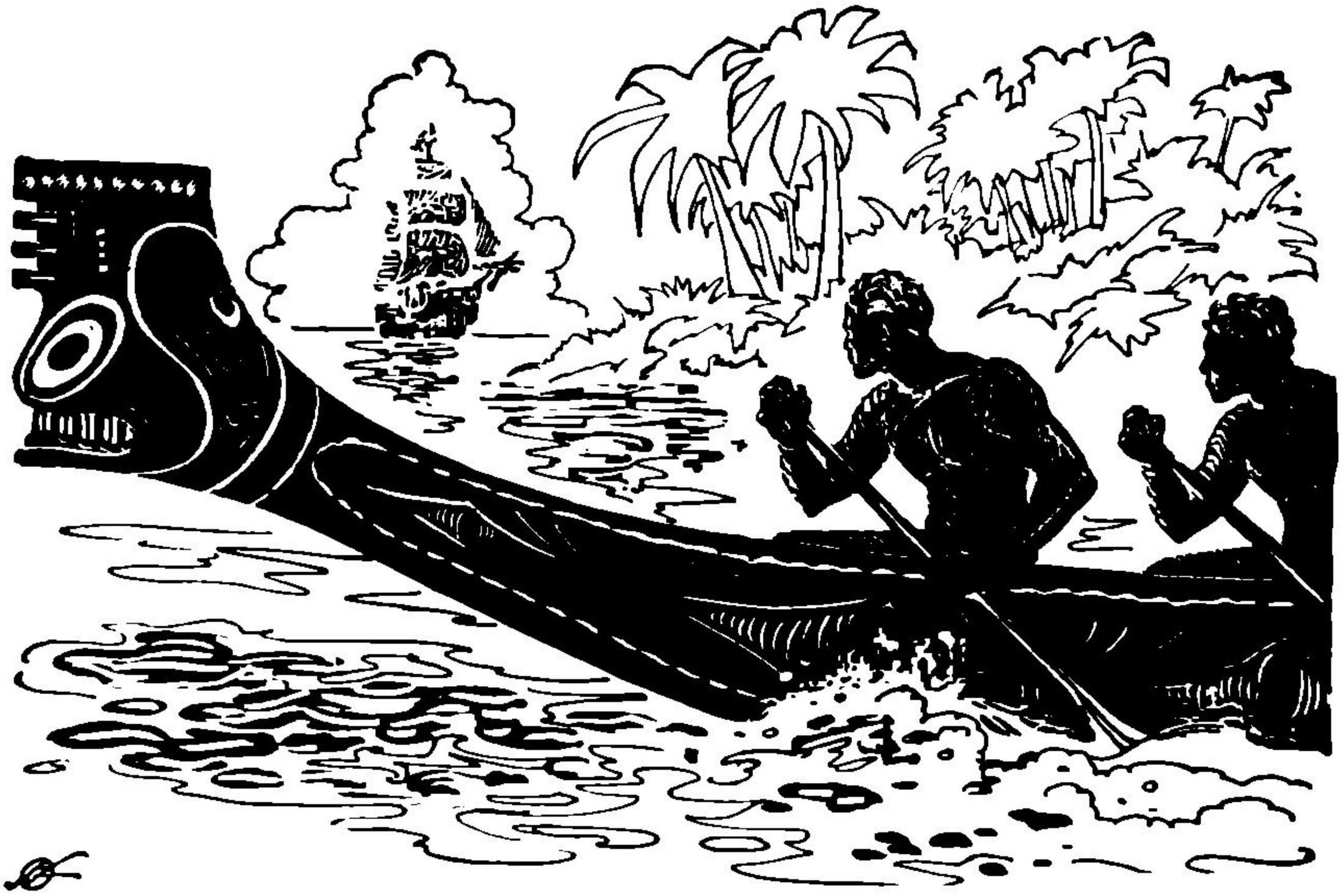
I'd like to know why they try that—I really would. Inasmuch as the Sun gives off more, and enormously more vicious ultra-hard ultra-violet and soft X-radiation . . . what're they doing with those feeble little UV sterilizers on some gadget that's about to be bathed, for days, in direct, raw, absolutely unfiltered solar radiation, huh?

FAMILIAR PATTERN

A pattern may be an old and familiar one, many times repeated in history. But it's still a totally new and unpredictable catastrophe that never happened before...when it happens to you.

BY GEORGE WHITLEY

Illustrated by Freas



WHEN Captain Lessing had written his Night Orders the previous night he had asked to be called either when Hunter Island Light was sighted or if the light was not seen when the vessel was within the extreme range. He had, therefore, turned in with the expectation of being aroused at approximately 0530 hours. He did not anticipate being called before; the weather was fine and, according to the forecasts and the behavior of the aneroid barometer, would continue so. His three officers were trustworthy and almost as experienced on the trade as he was himself.

He was awakened by the irritating buzzing of the telephone at the head of his bunk. This, by itself, gave slight cause for alarm—usually, if all was clear the officer of the watch would come down from the bridge to call the master in person. Before answering the 'phone, Lessing switched on his bunkside reading lamp and looked at the clock on his cabin bulkhead. The time was 0335. *Something,* thought the captain, *is wrong. To have been within range of the light at this time we should have had to have done twelve knots —and this underpowered tub never did twelve even downhill with a following wind . . .*

The instrument buzzed again.

Lessing lifted the handset from its rest, barked into the receiver, "Yes?"

"Second officer here, captain. There's a big aircraft just come down in the sea, about five miles ahead of us—"

"I'll be right up," said Lessing as he swung his long legs out of his bunk, his feet searching for his slippers. He pulled his dressing gown on, lit the inevitable cigarette and hurried up to the bridge.

He found the second officer out in the starboard wing, staring through his binoculars at a pulsing luminosity on the dark horizon. It could have been the loom of a shore light, a lighthouse, but the period was too irregular. It could have been the glare of the bright working lights of a fishing vessel, dipping at intervals as the craft lifted and fell in the swell. It was nothing to get excited about.

"Is that it, Mr. Garwood?" asked Lessing.

The second officer started. Then, "Yes, sir," he replied. "That's it. Big, it was, and all lit up. There seemed to be jets or rockets working —but I don't think it was an airplane. It looked . . . wrong, somehow—"

"There are so many experimental aircraft these days," said the captain, "to say nothing of the artificial satellites that everybody seems to be throwing about—" Then, half to himself, "I wonder what the salvage on one of those things would be?"

"Plenty, I should imagine," said the second mate.

"I'd imagine the same," said Lessing. "You'd better notify the engine room, Mr. Garwood. The mate'll be up in a few minutes so he can see about clearing a boat away."

"So you're going to take it in tow, sir?" asked the second officer.

"Not so fast!" laughed Lessing. "We don't even know what the thing is yet. Come to that—I don't even know if it is any sort of aircraft. Those lights out there could be . . . anything."

"You can ask the lookout," said Garwood huffily, "or the man at the wheel."

"I prefer not to doubt the word of my officers," replied the captain stiffly. "But whether or not we tow the thing depends largely upon what it is." He stared ahead. Bright lights were becoming visible now instead of the diffused glare. "And that," he added, "we shall soon find out."

He left the bridge and went down to his cabin, putting on a uniform over a heavy woollen jersey. He returned to the bridge. The ship had come alive during his brief absence. Shadowy forms were at work on the boat deck, electric torches were flashing and there was the sound of low-voiced orders and replies, the thud and clatter as equipment not needed in the boat was passed out and stowed well clear of the winch.

The chief officer clattered up the

ladder from the boat deck to the starboard cab of the bridge.

"I take it you'll be sending away the Fleming boat, sir?"

"Yes, Mr. Kennedy. It'll be the handiest, especially in this swell. There'll be no catching of crabs when there are no oars out." He pointed ahead to the bright lights that lay on the heaving surface of the sea. "What do *you* make of it?"

Kennedy lifted the ship's binoculars from their box, put them to his eyes. "I don't know," he said slowly. "It's an odd looking brute, whatever it is. All those vanes and wings or whatever they are. It's like no aircraft that I've ever seen."

"It could be American," said the second mate.

"Or Russian," said Kennedy. "I suppose it *is* manned—"

"Sparks has been trying to raise it on all the frequencies he can muster," said the second mate, "but there's no reply."

"Perhaps," ventured the third officer diffidently, "it's a flying saucer—"

"All the way from Alpha Centauri, or Rigil Kentaurus," laughed the mate, pointing to where Cross and Centaur hung in the dark sky directly over the mystery of gleaming lights and shining metal. "Perhaps we can ask 'em which of the two names for their home sun *they* prefer. I'm an Alpha Centauri man myself—"

"But it *could* be," insisted the third mate.

Lessing listened, faintly amused. He neither believed nor disbelieved in flying saucers, but thought that they were things that he would prefer not to see—they carried with them a greater aura of disreputability than did sea serpents. But this thing ahead, this affair of lights and metallic surfaces that they were rapidly closing, wasn't a flying saucer. It couldn't be. Only cranks saw the things, and then in circumstances remarkable for a paucity of reliable witnesses.

He said, "There's no wind. I'll keep the thing on my starboard side. Who's going away in the boat? You, Mr. Kennedy? Good. Take a torch with you—you might save time by flashing back to us what you find." To Garwood he said, "Put her on Stand By."

"Stand by, sir."

The jangling of the engine room telegraph was startlingly loud.

"Stop her. Full Astern."

Lessing looked down from the window of the starboard cab, saw the creamy turbulence created by the reversed screw creep slowly from aft until it was abreast of the bridge.

"Stop her. Switch on the floodlights."

Kennedy ran down to the boat deck. The starboard boat was already turned out. Six men were sitting at the handles of the Fleming gear, a seventh sitting in the bows. The mate caught hold of a life line, swung himself from the boat deck into the sternsheets.

"Lower away!" he shouted.

"Lower away, sir," replied the

man at the winch. It was, the captain noted, big Tom Green, the bos'n, Tom Green, who was a pure-blooded Polynesian, and proud of it. Good officers are not rare—good bos'ns are rare and precious. Tom Green was a good bos'n.

He lifted the brake. The wire falls whispered from the drum of the winch, through and around the lead blocks. They hummed softly through the purchase blocks and the boat dropped swiftly from sight. Lessing went again to the starboard cab window, saw the boat hit the water, saw the blocks unhooked and pulled up and clear by the light lines bent to them.

"Give way!" came Kennedy's order. The men at the handles swayed back and forth in the untidy rhythm unavoidable with a Fleming boat, the hand-driven propeller began to spin. The boat pulled slowly away from the ship. Lessing called the bos'n up to the bridge.

"Tom," he said, "I suppose the chief officer's told you what all this is about."

"Yes, captain. We are ready for all eventualities. The reel of the after towing wire works freely and we have a good supply of shackles and wire snotters."

Lessing looked at the big dark face that hung over his own and wondered, as he had often wondered, what this man was doing as bos'n of an Australian coaster. Fo'c's'le—and saloon—rumor had it that he had been educated at Oxford, that he was the son of a chief. Certain it was that he spoke impeccable—although pedantic—English and possessed in no mean degree the power of command.

"Tom," said Lessing, "what do you make of it?"

A white grin split the dark face. "It is like no aircraft that I have ever seen, sir, either in actuality or in photographs. It's too big for a satellite—as you know, *they* are only little balls or cylinders, at the largest big enough to house only a small dog—"

"Well?"

"It happened to us," said the bos'n. "It happened to us. Your ancestral navigators found our islands by chance, putting in to replenish their supplies. Sooner or later it had to happen to you."

"What do you mean, Tom?" asked Lessing.

"What I said, captain. That it's happening to you."

"Rubbish," said Lessing, after a long pause. "That thing's just some experimental aircraft that's come to grief."

"Is it?" asked the bos'n.

"The chief officer's flashing us!" shouted the second. He came out to the wing of the bridge, carrying the Aldis lamp.

Lessing looked to the enigmatic bulk of the thing in the water and saw a little light, feeble in comparison with the glaring illumination that was streaming from the aircraft —if it was an aircraft—making a succession of short and long flashes. The beam of the Aldis stabbed out into the darkness.

" 'Returning with passenger,' " read Lessing. He said, "So the thing is manned—"

"Of course," said the bos'n. "Your ships were manned, weren't they?"

"You'd better get down to the boat deck, Tom," said Lessing.

He picked up his glasses, watched the tiny shape of the lifeboat detach itself from the floating enigma. He watched it as it crept across the water. As it pulled alongside he could see that there was another figure sitting in the stern with Kennedy. In the glare of the boat floodlights he saw that it was wearing a uniform of some kind—an overall suit of silvery gray with what could have been marks of rank gleaming on the shoulders. He saw Kennedy's bowman catch the painter and make it fast. He saw the gray-clad man coming up the pilot ladder with what was almost, but not quite, the ease of long practice. He saw the chief officer following him.

After a short lapse of time they were on the bridge.

"Captain," said Kennedy, "this is Malvar Korring vis Korring, Chief Officer of the *Starlady*. Mr. Korring, this is Captain Lessing, Master of the *Woollahra*."

Automatically, Lessing put out his hand. The stranger grasped it, said in a voice that was metallic and expressionless, "I hope, sir, that this first meeting of our two races proves auspicious."

"Kennedy," demanded Lessing, "what sort of hoax is this?"

"Sir," replied the chief officer, "this is no hoax. I'm quite convinced that these men are from Space."

"Come down to my room," said Lessing. "Both of you."

In his cabin, with the bright deckhead lights switched on, Lessing studied the man from the . . . the spaceship. The stranger sat on the settee, almost insolently at ease. His body, beneath his tightly fitting uniform, seemed human enough, as did his lean, deeply tanned face. The eyes, however, were a disconcerting golden color and there was a faint tinge of green to his fair hair, which was worn far too long for the exacting standards of any Earthly service. His voice came not from his mouth but from a small square box that was strapped around his waist.

"We developed a leak in our water tanks," the stranger was saying. "It was necessary for us to replenish our supplies. This planet was the handiest to our trajectory. We had no idea that it was inhabited."

"You know that this is salt water," said Lessing, rather stupidly.

"We know. The minerals dissolved in the water will be very useful to us."

"I can't believe this," said, Lessing, getting up out of his armchair. "It must be a hoax."

"I was inside their ship, sir," said Kennedy. "I didn't see much—but I saw enough to convince me that she was never built on Earth. She's a cargo vessel, like ourselves, and she's on a voyage from some planet

around the Southern Cross—it may be one of the planets revolving around Acrux—to somewhere in the Great Bear."

"That's what they told you," said Lessing.

"That's what I told him, captain," said the spaceman. "And it's true."

"I should report this," said Lessing. "It's my duty to report this. But they'll think I'm mad if I do."

"We'll back you up," said the chief officer.

"Then they'll think that you're mad, too."

"Perhaps," suggested Korring, "I could leave proof with you."

From one pocket of his clothing he produced a slim tube, metallic, the size of a pencil. "This," he said, "is a torch—similar to the one that Mr. Kennedy is carrying, but rather more efficient. Leave it in bright sunlight for one . . . hour, I think is the word. Or leave it in artificial light such as this for double the period, and it will burn continuously, if so desired, for all of the night." He handed the torch to Lessing, produced from another pocket a packet of little brown cylinders. "You put this end in your mouth," he said, "and inhale sharply. The other end starts to smolder. You suck in the smoke. It is most refreshing—"

"We smoke, too," said Lessing. "Which reminds me—I'm not being a very good host." He produced whisky, and glasses, and opened the cigarette box on his desk. "You do drink, I suppose? This is one of our alcoholic liquors. You might like to try it."

"Thank you," said the spaceman.

Lessing splashed whisky into each of the three glasses. He passed the cigarettes around, struck a match to light them.

"The most interesting thing you have," he said, "is that box you talk through. What is it?"

"A psionic translator. It picks up my thoughts and converts them into your speech. It picks up your thoughts, as you speak, and converts them into my language. A simple device . . ." He drew on his cigarette, sipped his drink. "You know, you people are quite far advanced. This liquor of yours. These smoking tubes. And those little wooden sticks that burst into flame when you rub them against the box . . . I know that I am being very primitive, but I wonder if we could barter? This electric torch of mine, and a packet of my smoking tubes for, say, a bottle of this subtly flavored alcohol and a packet of your smoking tubes?"

"It'd be a fair trade," said Lessing. And it'll be proof, he thought. Proof I must have. I can't swear the whole ship to silence. "It'll be a fair trade—"

The box at Korring's belt squawked, then uttered a few syllables in an unknown language.

"They want me back," said the spaceman. "We must be on our way."

A few minutes later, when he was ferried back to the spaceship, he was carrying a carton of cigarettes, a

packet of matches and a bottle of whisky. A few minutes later still Lessing stood on his bridge and watched the alien vessel take off. There was no flare of rockets, no noise, no bother. There was a flickering luminosity under the vast hull as she lifted up and clear of the water, that was all. She rose slowly at first, then with increasing speed. For a short time she was a waning star among the stars, and then she was gone.

Lessing said to the mate, "We have to make a report on this—but what shall we say?"

"The truth," replied Kennedy. "But we shall never live it down."

It was, Lessing was to realize, very fortunate that he had made the trade with the alien spaceman. Had it not been for that highly efficient—and absolutely mysterious—torch he and his crew would have been branded as picturesque liars. They were so regarded at first. Pressmen are justifiably skeptical of flying saucer stories. Eventually—after it was obvious that *Woollahra*'s entire crew had either suffered a mass hallucination or actually seen something out of the ordinary—the Navy condescended to take an interest in the case. Lessing had returned on board from a rather stormy interview with the company's branch manager and local marine superintendent when he found a young, keen lieutenant commander waiting for him.

"About this flying saucer, captain," said the two and a half ringer.

"It was not a flying saucer," said Lessing. "It was more like a flying pineapple, or flying porcupine. There were all sorts of vanes sticking out at odd angles."

"And you say you really saw the thing? I've been talking to your chief officer, and he tried to convince me that he was actually aboard it."

"He was," said Lessing. "And, furthermore, one of the officers from the thing was aboard here." He unlocked the door of the cabin, motioned the naval officer to a seat. "Furthermore, he was sitting where you were sitting."

"Was he human?"

"He looked human."

"What language did he talk?"

"I don't know. He was wearing a little box on his belt that he said was a psionic translator, whatever that might be."

"And so you talked, you say. I suppose he told you that the people of Mars or Venus or Jupiter were watching us, and that if we didn't stop making atomic bombs it'd be just too bad, and all the rest of it."

Lessing flushed. "I've read those silly books, too," he said, "and I believe them as little as you do. This spaceship of ours was an interstellar cargo vessel, and she made an emergency landing in the Bass Strait to take on water, her tanks having sprung a leak. We were, it seems, the nearest handy planet. The crew of the spaceship were as surprised to see us as we were to see them—they thought that this world was uninhabited. Anyhow, they took their water and they pushed off to con-

tinue their voyage." Lessing opened a drawer of his desk and pulled the key to his safe from under an untidy layer of papers. He got up from his chair, went to his safe and opened it. He took out the packet of alien cigars, the torch. "I've been waiting," he said, "for the chance to show this evidence to somebody official for a long time. These are cigars—of a sort. They're self-igniting—"

"There was a self-igniting cigarette on the market a few years ago," said the lieutenant commander. "It never caught on."

"All right," said Lessing. "Then what's this script on the packet? Is it Greek, or Arabic, or what? Take one of the cigars and smell it. Does it smell like any tobacco you've ever come across?"

"No," admitted the naval officer.

"Then there's this torch. I don't know how it works. You have to leave it out in bright sunlight for an hour and it will burn all night. No, there's no way of opening it. I've tried."

"Do you mind if I take these with me?"

"I'd like a receipt."

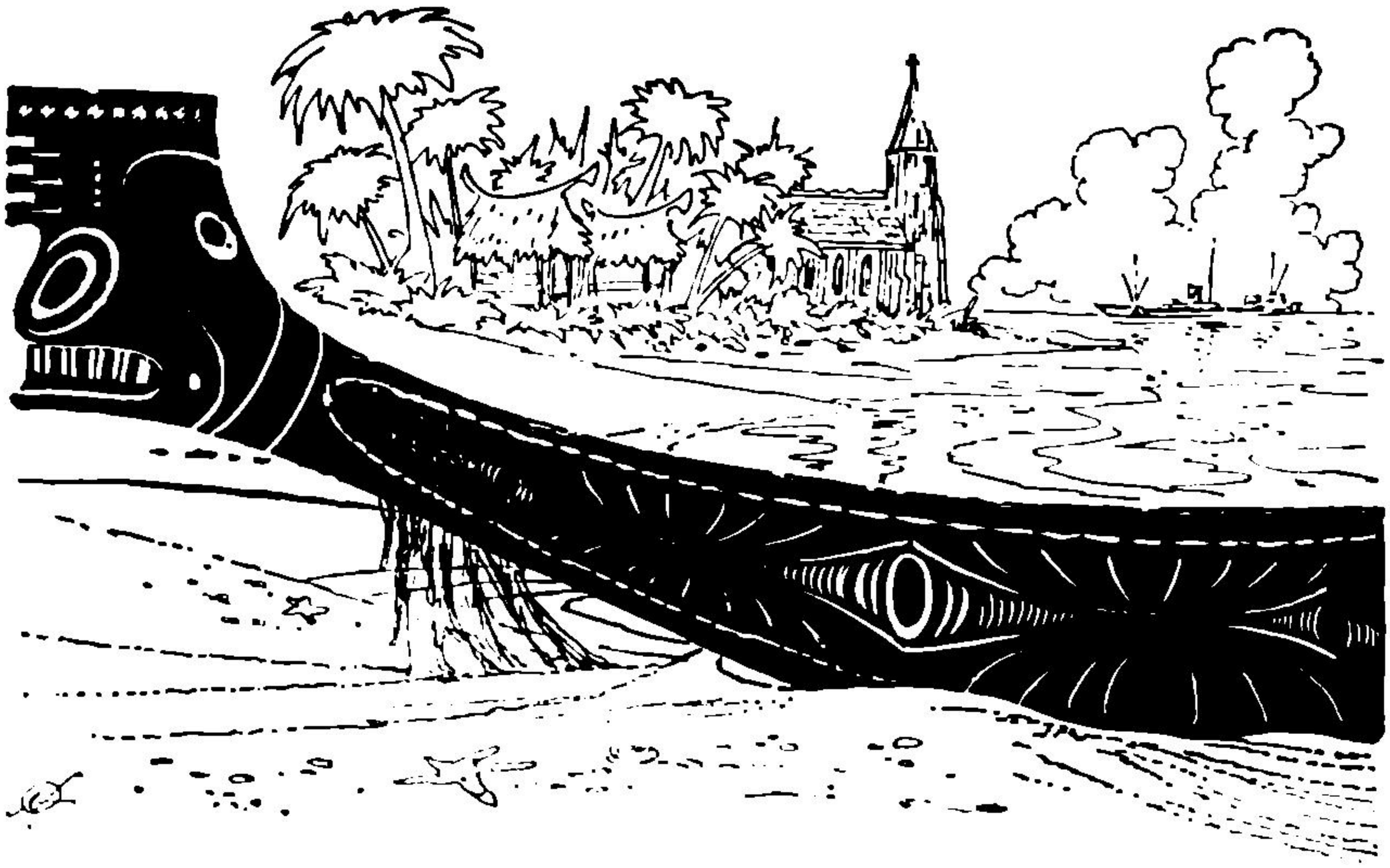
"You shall have one. Oh, one more thing. Would you mind not saying another word about this to the Press?"

"Would *you* mind," replied Lessing, "telling the Press to lay off my crew and myself?"

It is axiomatic that the tide runs sluggishly in official channels. The Press had long forgotten Captain Lessing's flying saucer when he received a letter from the company's head office. This informed him that he was to be relieved of his command and that after handing over his ship he was to proceed to Canberra, there to be interviewed by sundry highly placed gentlemen. Like most Australians, Lessing had a distrust of politicians, maintaining that they came in only two varieties, bad and worse. He did not look forward to his trip to the nation's capital city.

The day of his journey was not an ideal day for flying. During the bumpy passage a cup of hot coffee was upset over Lessing's lap, and as he was wearing a light gray suit his appearance suffered as well as his feelings. He was very bad-tempered when the 'plane touched down at the airport and found it hard to be courteous to the obvious civil servants who were there to greet him. They were diplomatic enough to suggest a drink or two before he was taken to see the high officials who had required his presence, and after a couple of stiff whiskies he felt a little better.

He did not feel better for long. He said afterwards, "They made me feel as though I were a Russian spy. And I was expecting rubber truncheons and glaring lights and all the rest of it at any minute. The trouble was, they just didn't want to believe me. There was the evidence of the torch, and the evidence of the cigars, but they just didn't want to believe me. But they couldn't explain the



things that I got from the spaceship any other way."

Lessing was interviewed. Lessing was interrogated. After the politicians had finished with him it was the turn of the scientists, and then the lawyers took over to see if they could trap him in any inconsistency. The following day he was joined by his chief and second officers and the bos'n. Their stories tallied with his; there was no reason why they should not have.

The day after that the spaceship landed in the Bass Strait, just twenty miles north of Albatross Island.

Lessing, of course, was one of the last people to hear about it. It was the young lieutenant commander to whom he had given the torch and the cigars who told him the news. He burst into the comfortable hotel room in which the captain was almost a prisoner and said, "They'll have to believe you now. Another of those things has come down, just about where you saw the first one."

But it wasn't another of those things. It was the same one, and she was, apparently, on her return voyage. She lay there in the water until she was sighted by *Woollahra*, northbound to Melbourne. *Woollahra* was the only ship on the trade and she maintained a fairly regular service, so the coincidence was in time rather than in space, and was a temporal coincidence only inasmuch as the spacecraft did not have to wait longer than three hours.

Again *Woollahra* sent a boat, and again the chief officer of *Starlady*, Malvar Korring vis Korring, was ferried from his own ship to the surface vessel. Apparently he expressed surprise at not being greeted by Cap-

tain Lessing and Mr. Kennedy, and said that he especially wished to see Captain Lessing to organize some sort of trade agreement.

"They're rushing you down to your old ship," said the lieutenant commander. "There's a special 'plane laid on from here to Melbourne, and, as luck would have it, there's a destroyer at Williamstown ready for sea. There's all the high brass going with you. I wish they could find room for me—"

So there was another flight, no better than the first one had been, and then an even more uncomfortable sea journey as the destroyer pitched, rolled and shipped green water in the heavy South Westerly swell. It was late afternoon when she made her rendezvous with *Woollahra* and *Starlady*. *Woollahra,* designed for the rapid and efficient handling of cargo, was her usual unlovely self. Lessing gave her no more than a cursory glance, then stared through a pair of borrowed binoculars at the other ship, the spaceship. It had been at night that he had seen her before, and he retained no more than a confused impression of glaring lights, of gleaming surfaces that reflected the illumination at all kinds of odd angles. Seeing her now, in the light of day, he was pleased to note that his description of her as a "flying pineapple" had not been too unjust. That was what she looked like—a huge pineapple of some black, gleaming metal.

Lessing was aware that orders were being given and reports acknowledged by the destroyer's captain, that the warship's armament was manned and ready. His attention, however, was occupied by the winking daylight lamp from *Woollahra*'s bridge.

"Alien officer on board," he read. "He wishes to speak with Captain Lessing."

"Commander," said Lessing, "that spaceman, Korring was his name, is aboard my old ship. He is waiting for me. Will you send me across in one of your boats?"

The destroyer captain sucked thoughtfully at his pipe.

"I wish they'd given me more specific orders, Lessing," he said at last. "All I have is a sort of roving commission—to find out what cooks and to shoot to defend my own ship if necessary, but on no account to start an interplanetary war. It seems that these people are quite determined to see you—"

One of the civilians on the destroyer's bridge interrupted. "I think that I should go with Captain Lessing."

"All right, doctor. It seems to me that this situation calls for an astronomer as much as anybody." He turned to his first lieutenant, gave orders for the clearing away of the motor launch.

In a matter of minutes Lessing was sitting in the boat. With him, in the stern sheets, was Dr. Cappell, the astronomer, and the sub-lieutenant in charge. The boat was lowered to the water with a run, too fast for Lessing's taste; he was used to the more

leisurely procedure of the Merchant Service. She hit the water just as a huge swell came up beneath her and the sea fountained on either side of her. The patent slips were released smartly and the lower blocks of the falls whipped up and clear on their tripping lines. The motor was already running and pulled the boat out and clear from the destroyer in a matter of seconds. After the swift efficiency of their launching the journey across the narrow stretch of water seemed painfully slow.

At last they came alongside the *Woollahra* and Lessing clambered up the pilot ladder to her low foredeck. He was followed by the scientist. The young sub-lieutenant, after giving a few curt instructions to a petty officer, followed. The third officer was there to receive them. Lessing acknowledged the courtesy absent-mindedly, himself led the way up to the bridge.

Fat Kimberley, who had relieved Lessing, was there to meet him. He was exhibiting all the bad temper of the easy-going fat man jolted out of his comfortable routine.

"Really, Lessing," he said, "this is rather much. First you have to get me called back in the middle of my holidays, and then you have to wish this bloody flying saucer on to me. My wife's flown down from Sydney to be with me for the week end in Melbourne—and I have to waste precious time loafing around in the Bass Strait standing guard over this . . . this—"

"I must apologize, captain," said a metallic voice. It came, as before, from the little box that Malvar Korring vis Korring carried at his belt. "We thought that Captain Lessing would still be here." He advanced to Lessing with outstretched hand. "Greetings, Captain Lessing."

"Greetings," replied Lessing, feeling rather foolish. "And what can I do for you, Mr. Korring?"

"You remember," said the spaceman, "that the last time I saw you we bartered goods. You gave me some of your . . . cigarettes, and a bottle of the liquor you call whisky, and some boxes of . . . matches—"

"But this is incredible," the scientist was saying behind Lessing's back. "This is fantastic. The meeting of two races from different worlds, and all this man is worried about is cigarettes and whisky—"

"And wild, wild women?" wondered the sub-lieutenant audibly.

"We showed what remained of the cigarettes and the whisky to the . . . commissioner on Maurig, and he was rather impressed. He requested us to call here on our homeward voyage and to make arrangements for regular trade between this planet and the other planets of the galaxy—"

"This is marvelous!" Dr. Cappell was saying. "Marvelous! The secret of the interstellar drive is ours for the asking!"

"Who is this man, captain?" asked the spaceman.

"One of our astronomers. His name is Dr. Cappell."

"Dr. Cappell," said Korring, "the secret of the interstellar drive will

never be yours until you work it out for yourself. We hope to set up a trading station, and you can rest assured that only goods with which you can do no damage will be sold to you."

Lessing remembered what Tom, the big Polynesian bos'n, had said. How was it? *The familiar pattern—the chance contact, the trader, the missionary, the incident, and the gunboat*— But, he thought, Tom is biased. The early European seamen were a rough lot, and the politicians in their home countries were as bad, although more sophisticated. We can expect nothing but good from a people able to travel between the stars.

"Then," persisted Cappell, "you might allow us, some of us, to make voyages in your ships, as passengers."

"We might," said Korring vis Korring, and the mechanical voice coming from the translator at his belt sounded elaborately uninterested. He turned to Lessing. "You, captain, are the first native of this planet with whom we made real contact. In our society—I don't pretend to know how it is with you—the masters of merchantmen are persons of consequence. In any case, we want somebody who is, after all, our own sort of people to act as our . . . our agent? No, that isn't quite the word —or is it?"

"I think it's the nearest you'll get," said Lessing. "But it is only fair to warn you that I am a person of very little consequence on this planet. The masters of *some* merchantmen are people of consequence —but *Woollahra* isn't *Queen Mary.*"

"But we know *you*," replied the spaceman. "Perhaps if you were to come aboard our ship we could draw up a contract."

"May we use your boat?" Lessing asked the sub-lieutenant.

"I'll have to ask," replied the naval officer. "Have you a signalman?" he demanded of Captain Kimberley.

"We have not," replied the fat man. "But if you're incapable of using the Aldis lamp doubtless my third mate will be able to oblige. And he can ask your captain if I'm supposed to hang around here while you all play silly beggars. I want to be getting back to Melbourne."

The daylight lamps flickered on the bridges of man-o'-war and merchant vessel in staccato question and answer. After a few minutes Lessing was shaking hands with Kimberley, and in a minute more was clambering down the pilot ladder to the destroyer's boat. The boat was barely clear of the ship when Lessing heard the jangle of engine room telegraphs, saw the frothing wake appear at *Woollahra's* stern. *Woollahra's* whistle blurted out the three conventional farewell blasts. And then the alien starship was ahead of them, bulking big and black and ominous in the golden path of light thrown by the setting sun.

Lessing wasn't quite sure what to expect when he boarded the spaceship, but he was rather disappointed. Entry was effected through an ob-

vious air lock—but thereafter the overall effect was that of one of the larger and more luxurious liners on Earth's seas. Korring vis Korring led Lessing, Cappell and the sub-lieutenant through alleyways that were floored with a brightly colored, resilient covering, whose sides and overheads were coated with a light, easy-to-keep-clean plastic. They passed through what seemed to be public rooms, fitted out as they were with conventional enough chairs and tables and even, in one or two cases, functional looking bars. Crew members and passengers, both men and women, looked at them with polite interest. The women, decided Lessing, were indubitably mammalian and very attractive.

They came at last to a large cabin in which, seated behind a desk, was a middle-aged man wearing a uniform similar to that worn by their guide. Like Korring, he wore one of the translators at his belt. He got to his feet as they entered.

"I am Captain Tardish var Tardish," he said. "Which of you is Captain Lessing?"

"I am," said Lessing.

"Welcome aboard my ship. Please be seated."

The Earthmen lowered themselves into chairs that proved to be as comfortable as they looked. Korring vis Korring busied himself with a bottle and glasses, then, after everybody had a drink in his hand, opened a box of the self-igniting cigars.

Lessing sipped his drink. It was undeniably alcoholic, but far too sweet for his taste. He took a pull at the cigar. The smoke was fragrant, but lacking in strength.

"My chief officer," said Tardish, "has doubtless told you of the purpose of our return visit. It has been decided that your world produces many commodities that would be valuable elsewhere. We are prepared to open a trading station, and we want you to be in charge of it from your side. One of our own people, of course, will be in over-all charge."

"And what do you want?" asked Lessing.

"Your liquor, your cigarettes, your little firesticks. No doubt you have other goods that will be of value on the Galactic market."

"No doubt," agreed Lessing. "And what do you offer in exchange?"

The captain pressed a stud at the side of his desk. There was a short silence as the men—Earthmen and aliens—waited. Then two uniformed women came into the cabin. Each of them was carrying a box not unlike a Terrestrial suitcase. They put the boxes down on the desk, opened them. Lessing, Cappell and the sub-lieutenant got to their feet, stared at the objects that were being unpacked. There were more of the sun-powered electric torches—half a dozen of them. There were slim, convoluted bottles holding a shimmering fluid. There were bolts of dull-gleaming fabric.

Korring vis Korring joined the Earthmen.

"These," he said, "are our sam-

ples. You already have one of the torches, but, no doubt, others will be interested in these. I must warn you that the manufacturers of them are very jealous of their secret; each one is a sealed unit and any attempt to open one up will result only in its complete destruction. The bottles contain an alcoholic liquor of which we are rather fond; it is possible that it may appeal to the taste of some of your people, just as your whisky has appealed to ours. The cloth? It is dirt repellent, water repellent, wrinkle proof. Used as clothing, it keeps you cool in summer and warm in winter—"

Cappell interrupted. His thin, bony face was flushed and his carroty hair seemed suddenly to have stood erect. He said, "I'm a scientist, not a shopkeeper. I'd like to know just where you come from, and how your ship is powered, and whether or no you exceed the speed of light—"

"Enough!" The spaceship captain had got to his feet and was looking at the astronomer as though he were a mildly mutinous crew member. "I am master of a merchant vessel, just as Captain Lessing is. My primary function in the scheme of things is trade, *trade, TRADE.* I have no intention of seeing this world of yours raise itself to our technological level, of seeing your ships competing with ours along the Galactic trade routes. If you find out the secret of the star-drive yourselves—then good luck to you. But we're not helping you." He turned to Lessing. "There you are, then, captain. You're appointed our agent as and from now. On our next call here we shall bring with us a full cargo of the goods of which we have given you samples. We want you to have assembled a large consignment of such goods as you think might interest us."

"This," said Lessing, "is all very vague. To begin with—when can we expect to see you again?"

"In one-tenth of a revolution of your planet about its primary."

"And where are you landing?"

"Here, of course. Our ships can land only on water. You have surface vessels; you can bring the cargo out to us."

It was Lessing's turn to feel exasperated.

"To begin with," he said, "I haven't said that I'll take the job. Secondly—you're quite vague about weights and measures. How many tons of cargo do you want—and is it weight or measurement? Thirdly—it's obvious that you don't know that this one is one of the most treacherous stretches of water in the world. You've landed here twice, and each time you've been lucky. The next time it could well be blowing a gale."

"Don't you have weather control?" asked the captain.

"No. Now, I suppose that you people have made some attempt at photographic survey of this world on your way down?"

"Of course."

"Could I see the photographs?"

The captain opened his desk,

handed a dozen or so glossy prints to Lessing. The seaman studied them.

"Here," he said at last, "is your ideal landing place." He put the tip of his finger on Port Phillip Bay. "It's well sheltered, and there are transport facilities, and there's the possibility of knocking up a few warehouses on the foreshore, or of taking over warehouses that are already there. I suggest that you come in at night, and that you make some sort of signal before you do so. On your next visit, of course, we'll have to tackle the problem of radio communication; meanwhile you could let off some sort of rocket that will explode with a bright green light high in the atmosphere an hour or so before you're due. This will give us a chance to outline your landing area with flares."

It was the haphazardness of it all that appalled Lessing, the way in which the onus had been placed upon Earth to make all the arrangements. Later, when he was back aboard the destroyer and on his way back to Melbourne, he realized that this was the way it must have been in the days of the early explorations. A ship, short of water or other supplies, would stand in for some hitherto undiscovered island, would make fortuitious contact with the inhabitants, would trade a few knives and axes and mirrors for whatever they had to offer and then, having realized the possibility of commerce, would promise to return at some vague date in the future, bringing further trade goods in return for pearls or spices or anything else that would fetch a high price on the European market.

The month and the few days were over, and all Earth was waiting for the return of the aliens. From observatories all over the planet reports had poured in that a huge, unidentified object was in orbit about the world, something far larger than any of the tiny satellites yet launched. Melbourne had become the Mecca for pressmen and photographers, for radio commentators and television cameramen—and for military observers, trade delegations and high diplomatic officials from all nations.

Waiting on the observation tower that had been erected on Station Pier was the Terran Trade commissioner. Like many shipmasters, Lessing was not inclined to underestimate his own worth, had driven a hard bargain. The aliens had insisted on dealing only with him—and he had unbiased witnesses to prove it—so it was only fair that he should be given pay and rank to match his unsought responsibilities. With him stood his two assistants—Kennedy and Garwood, who had been his chief and second officers in *Woollahra*. Lessing wished, as he stood there in the rising, chilly, southerly breeze that big Tom Green, the bos'n, had been willing to come ashore as well. He was a good man, Tom—and it was just possible that his non-European mind might be able to spot some catch in

the seemingly advantageous arrangements.

On the deck below Lessing were the diplomats and the scientists and the service chiefs. Lessing had insisted on this arrangement, not as a further bolstering of his self esteem but as a hangover from his seafaring days. He was a firm believer in the principle of *Unauthorized Personnel Not Allowed On The Bridge.* He didn't like to have anybody around except his officers when he had to make decisions—not that there would be many to make in this case. He stared at the clear sky. Cross and Centaur were high in the south and Jupiter, with Antares, was just rising. He tried to make out the spot of light that would be *Starlady.* Suddenly there was a brilliance in the heavens, a great sun of vivid green with a core of blazing blue drifting slowly downwards.

"All right," he said to Kennedy. "Tell them to switch on the floods on the buoys—and tell them to switch off all the city lights apart from the essential ones."

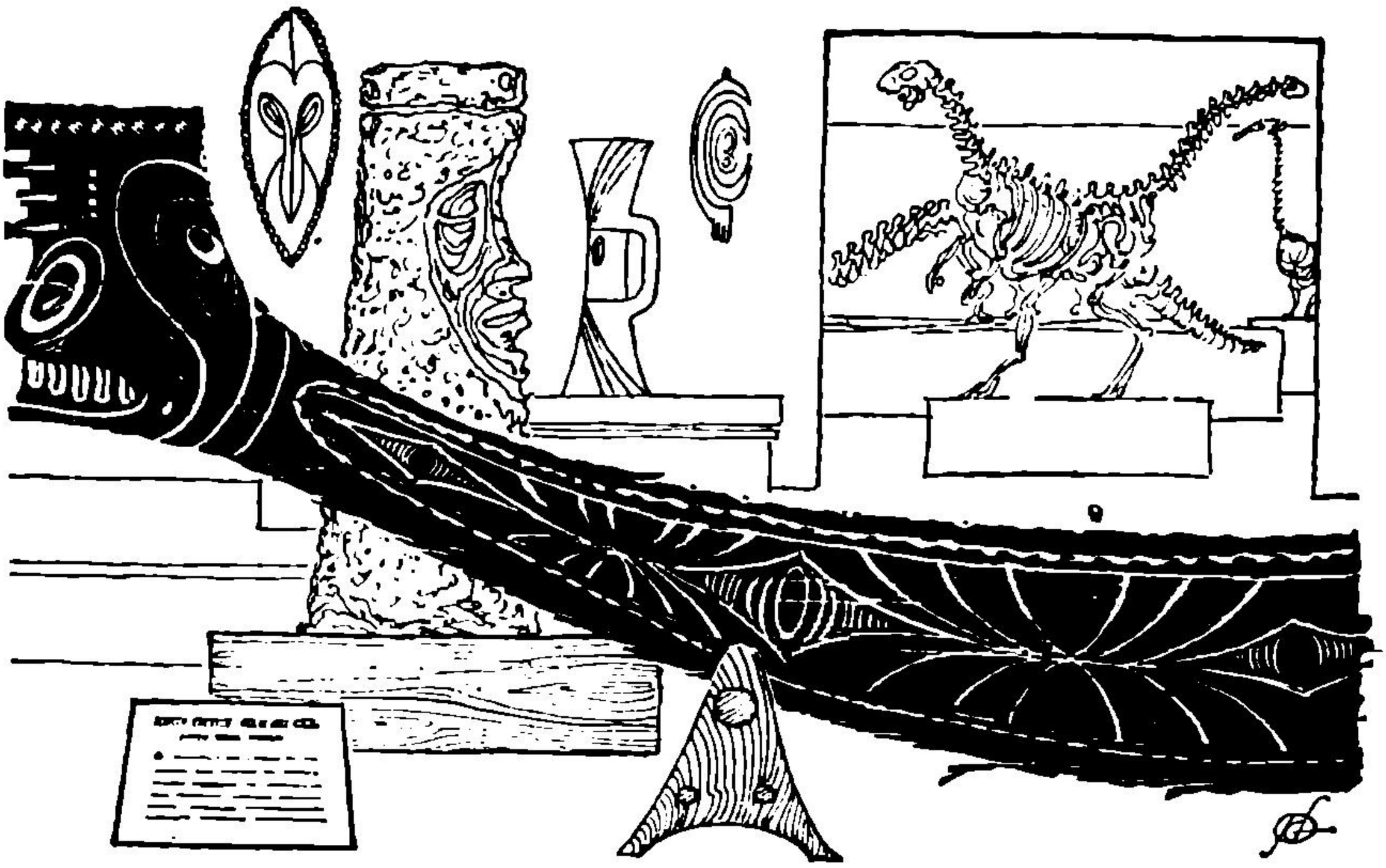
The glare of lights in the bay came hard on the heels of his command. The brown-out of the city took longer. Lessing remembered how long he had had to argue with civic officials about the necessity for this order. He looked shorewards from his high platform, saw the lights going out one by one—the neon signs advertising whisky and biscuits and breakfast foods and beer, two street lamps in every three. While he was watching, the green flare in the sky faded and died. It was suddenly very dark.

There was an eerie flickering along the foreshore. Lessing wondered what it was, then realized that it came from the flaring of matches and lighters as the crowds lighted their cigarettes. He had been against allowing the public so close to the starship's landing place, but in this matter he had been overruled. He was pleased, however, that the Bay had been cleared of all pleasure craft and that the Entrance had been closed to inward and outward traffic.

It was a long wait. It was some sharp-eyed watcher along the beach who first spotted the spaceship. A long drawn out *aaahh* went up from the crowd. Lessing, Kennedy and Garwood stared aloft, saw at last the little, but visibly waxing point of light that was *Starlady.*

She came in slowly, cautiously. It was all of an hour before the watchers could see the big bulk of her, gleaming dimly above the flickering luminescence of her Drive. She came in slowly, seemingly at first a little uncertain of her landing place. I should have ordered a complete blackout, thought Lessing. She circled, and then steadied over the rectangle of water marked by the special buoys with their floodlights. With increasing speed she dropped. The wave created by her coming lapped the piles of the pier, drove up in foaming turbulence on to the beach and the road beyond.

Lessing came down from his tower, walked without haste to the head



of the steps by which the launch was moored. Kennedy and Garwood followed him. They boarded the launch. The skipper cast off, steered for the dark bulk of the alien ship, for the circle of light that was her air lock. He seemed unimpressed by the momentous occasion. He grunted, "I'd'a thought you'd'a had some o' them admirals and generals along, cap'n. And a few boys with Owen guns."

"I know these people," said Lessing, "and they know me."

"You're the boss."

They were passing through the line of buoys now. Even the launch skipper fell silent as he looked up to the vast bulk of *Starlady*. All that he said was "Can that thing *fly?*" Then, expertly, he maneuvered his craft alongside the circular, horizontal platform that was the outer valve of the open air lock.

There were people standing in the air lock itself—men and women. One of them stepped forward—it was Korring vis Korring—and caught the launch's painter, snubbed it around a convenient projection. "Welcome aboard, Captain Lessing," he said. His voice was warmly human and came from his mouth, not from a box at his waist.

Lessing stared at the spaceman. He was wearing colorful garments —a sky blue blouse, scarlet trousers, knee high boots that could have been made of dark blue suede. "Congratulate me," he said.

"Why?" asked Lessing stupidly.

"Because I've got a planet job. I'm no longer chief officer of this

wagon . . . I'm now the local Galactic Trade commissioner. I'm to work with you."

"But your translator—"

"Oh, *that.* We brought along a team of experts this time, and we were picking up the programs of your various broadcast stations before we could pick you up in our telescopes. A few hours under the hypno-tutor, and I'm a linguist. So are those who are staying here with me. I'll introduce 'em all when I have time. There's a professor of linguistics, a sociologist, a dietician, a biologist and *the* expert on women's fashions. Oh, and a priest. I'm sure that you have your own religion, but he thinks . . . he *knows,* rather . . . that ours is better. He's still inside getting his baggage packed. He was deep in prayer while the rest of us were packing ours."

Lessing stepped from the launch on to the platform. He shook hands with the professor of linguistics, a scholarly, birdlike, gray-haired man. He shook hands with the sociologist, who was short and fat and merry. He bowed stiffly to the dietician and the biologist, both of whom were women, and attractive women. He wasn't sure whether to shake hands with or bow to the fashion expert, then decided that such things were probably the same all through the galaxy as on Earth, and shook hands. He was going to shake hands with the lean, scarlet robed priest who had just come into the air lock, but Korring, with an unobtrusive gesture, restrained him. The priest raised his arms in benediction and intoned, "The blessing be upon you, my son." Lessing felt embarrassed and vaguely hostile.

They all went then into one of the big ship's public rooms. Soft-footed stewardesses served drinks. Lessing tried to hurry matters, told Korring vis Korring of the crowds of people who were waiting ashore for some word of what was happening. "Let them wait," said the spaceman. "Our cargo consists of only luxury goods."

"Life without luxury is drab, my son," said the priest.

Lessing looked at him with a fresh interest. His figure was lean, but his face was not the face of an ascetic. It was the face of a man who has enjoyed, and who is still enjoying, all the good things of life. Perhaps, he thought, their religion has its points—

"We shall require accommodation," said Korring. "We shall be staying here after the ship leaves. I take it that you will make the necessary arrangements."

"I will. But I should like to find out now what cargo you have brought, and what goods you want in exchange. We have a warehouse full of cargo—whisky, gin, all sorts of wines, all sorts of cigarettes and tobacco. There are representatives of other nations waiting ashore, and all of them have brought samples of wares in which you may be interested. Then there's the problem of how you're going to get the cargo from out of your ship on to the lighters,

and from the lighters into your ship. I'd like to get our stevedore out here to talk it over with whoever has relieved you as chief officer."

"All in good time, Lessing," laughed Korring. "Try to remember that you're no longer a seaman, just as I'm no longer a spaceman. We're persons of importance on this planet now. The world waits upon our decisions—and while the world is waiting we have another drink."

They had another drink. It was some strong, over-sweet and over-scented spirit. Lessing would have preferred beer. But he had another drink, and then another, and the next morning, when he awoke in a strange bunk in a strange cabin with a splitting headache, he had vague memories of trying to teach the spacemen some of the bawdier drinking songs in his repertoire, and had more vague memories of their having reciprocated in kind.

A stewardess brought him in a cup of steaming fluid and a white capsule. Lessing assumed that the capsule would be good for his headache. It was. He was standing in front of the mirror when Korring came in and told him that the jar of white cream on the shelf was a depilatory. Lessing shaved—if the smearing on and off of cream can be called shaving—and dressed, and felt a lot better. He found Kennedy in the adjoining cabin, and was told that Garwood had prevailed upon the launch skipper to take him ashore when the party started getting rough. Garwood was married, and was a little afraid of his wife. There would be, said Kennedy, a launch on hail by the air lock until required.

The sun was high in the sky when at last Lessing and the party from the ship boarded the waiting launch and made their way shorewards. The crowds still packed the road inshore from the beach, and the Station Pier was alive with people. Of the aliens, only Korring was unperturbed. He stood in the bows of the launch, letting the wind play with the black cloak that he was wearing over his finery. He looked, thought Lessing, like a character out of a comic strip.

The launch pulled up alongside the stage to a great coruscation of flash bulbs. Korring stepped down from the bows to allow Lessing to lead the way up the steps. The party from the ship, after a minute or so, stood facing the civil and military dignitaries. Lessing performed the introductions, explained what the arrangement was. Then, at Korring's insistence, a visit was paid immediately to the warehouse in which the goods were stocked. He smiled his approval. He said, "We can take perhaps half of this, and we will discharge an equivalent volume of cargo. The cargo from the ship will have to be discharged first, of course—"

"I've discharged and loaded ships before," said Lessing dryly. "In any case, you still haven't told me what arrangements you want for handling cargo. We'll send lighters and water-

side workers out to your ship. What happens then?"

"We discharge our cargo into them," said Korring.

"Yes. But how?"

"You'll see. Come out with me in the first lighter."

Lessing did so. The dozen or so waterside workers who were in the craft were not awed by the civil and military dignitaries who rode with them and were even less awed by Korring. Lessing smiled as he heard him referred to as Superman and Mandrake the Magician. Korring ignored them, told Lessing to tell the tug to pull around to the other side of the ship. There was a larger air lock there, and obviously one used for cargo rather than for personnel.

The lighter was hardly fast when the first bale came floating out and settled with a thud into the open hold. As it was followed by a second and a third the Earthmen gawked.

"Just a simple application of antigravity," smiled the spaceman.

"Could we have it?" asked the Air commodore who was one of those present. His voice was pleading. "Could we have it?"

"No," said Korring flatly. He said to Lessing, "We aren't stevedores. I suggest that you call a boat and have us taken ashore again. There is still the matter of the accommodation for myself and my people to put in hand. Also, I would like to see your city, and your shops."

"You stay in charge, Kennedy," said Lessing. He waved to one of the official launches.

"I think I'll stay here too," said the Air commodore, still looking at the stream of bales with fascination.

"As you please," said Korring. "But I must warn you that there are armed guards throughout the ship who have orders to shoot any unauthorized visitor."

"A taste of his own medicine," laughed one of the wharfies.

The airman did not hear him. When Lessing looked back from the launch he saw him still standing there, still staring at the stream of merchandise flowing from the ship as though on an invisible conveyor belt.

That, so far as Earth was concerned, was the beginning of interstellar trade. At intervals of roughly a week the big ships dropped down, each landing in Port Phillip Bay, which had become the world's first spaceport. All sorts of exotic drinks and foodstuffs they brought, and all sorts of fascinating gadgets. There were cameras that took photographs in three dimensions—the result, if a portrait, looking like a little statuette mounted in a cube of clear plastic. There were all sorts of devices that made direct use of solar power—for cooking, for the warming of houses, for the motivation of light machinery. There were bales of the marvelous synthetic cloth that represented the idea towards which all of Earth's manufacturers of synthetic fabrics were striving.

They took away whisky and cigarettes, brandy and chocol.. ', wine and honey, books and paintings. They took away things of value and things that most Earthmen considered trash. They took away living animals of every species to stock the interstellar zoos throughout the galaxy.

Malvar Korring vis Korring, and the biologist, the slim, brunette Edile Kular var Kular, who was his wife, stayed. The other technicians and experts came and went. The aliens were not unpopular guests in the hotel that they had made their headquarters. The priest, Glandor, stayed also. (Lessing was never able to work out the system of nomenclature used by the aliens. It involved complex family relationships, and the priesthood was held to be related by bonds of love to all men and women.)

The priest stayed, and he was joined after a while by more scarlet robed priests and priestesses; all of them young, all of them attractive. A church was built to his specifications on the outskirts of the city. Lessing was not particularly interested in religion and did not know, for a long time, what went on in the building. He did not know, in fact, until he accorded an interview to a delegation of representative churchmen in his office.

"Mr. Lessing," said their leader, "these people are pagans. They preach the gratification of every lust, every desire. They say, *What shall it profit a man if he die before he has lived?*"

"Fair enough," said Lessing.

"But, Mr. Lessing, you don't understand. We, in this State, have always prided ourselves upon our rectitude. In Victoria, if nowhere else in Australia, the Sabbath is still the Sabbath. These aliens are desecrating the Sabbath."

"How?" asked Lessing, interested.

"In that so-called temple of theirs they serve alcoholic liquor to all comers. There is music—profane, not sacred music—and dancing. There is at least tacit encouragement of immorality."

"Immorality?" asked Lessing. "What do you mean by the word? Usury was once one of the seven deadly sins—but your Churches are now among the usurers themselves. Murder is an immoral act, and so is lying—"

"You know what I mean," said the churchman. "What we want to know is this—what are you doing about it?"

"Nothing," said Lessing. "I am merely the Trade commissioner. These people have signed a treaty with the sovereign government of this country—this *country,* not this *state*—giving them, among other things, freedom to make converts to their religion. It may be an odd one—but there have been some odd ones on this planet. There still are, in all probability."

That, as far as Lessing was concerned, was that.

But when trouble came—and it was not long in coming—it came not from the churches but from those

who were, officially, their enemies. The big breweries, who are also the hotel owners, hate competition. It was never proved that they were the paymasters of the mob that destroyed the aliens' temple, but the riot was too well organized to have been spontaneous. The high priest was killed, two of the priestesses were murdered. A dozen Earthly converts lost their lives.

It was Korring vis Korring who brought the news to Lessing, bursting into his hotel room and shaking him into wakefulness.

"Lessing," he said. "I like you. I'm telling you to get out, and to take any friends of yours with you."

Lessing was still drowsy. "Why?" he asked vaguely.

"Because, my friend, we're pulling out. All of us. We're pulling out before the retaliation starts."

"Retaliation? What for?"

"What for, you ask! A mob of Puritans or wowsers or whatever you call them has just destroyed the temple. There has been bloodshed, murder. Our fleet is already in orbit about your planet and will be opening fire in a matter of minutes."

"What?" Lessing was fully awake now. He sat up in the bed and caught Korring vis Korring's arm. "Korring," he said quietly, "tell me something. Were you people as ignorant of Earth as you made out at our first contact?"

"Let go of me!" snarled Korring.

"Not so fast. Tell me, did you pick a State notorious for its blue laws, its restrictive legislation, in which to make your headquarters, in which your missionaries could start preaching their gospel? Was it deliberate?"

"Let me go!" shouted the spaceman, breaking free. He was through the door in a second. Lessing, following, tripped in his bedclothes and fell heavily to the floor. When he got out into the corridor he found that the rooms in which the aliens had lived were all empty. He had to wait a long time for the elevator to come back up to his floor. Then, at the hotel entrance, the night porter informed him that the "Space Ladies and Gentlemen" had just been picked up by some sort of aircraft.

All that Lessing could do was to use the telephone. But it is one thing knowing whom to call, and another thing to convince them of the truth of what you are saying. From the politicians and service chiefs he got little joy. When at last, in desperation, he thought of calling the city's high ranking police officers it was too late. The telephone went dead just as the first rumble of dreadful thunder deafened him, just as the first glare of the aliens' lightning blinded his eyes.

He remembered little of what happened afterwards. He was a seaman, and his instinct was to make for the water. Kennedy was with him, and Garwood, and Garwood's young wife. Somehow they passed unscathed through the fire and the falling wreckage, somehow they found a car and in it joined the press

of refugees making for the Bay. Something hit Lessing—he never found out what it was—and he lost consciousness. He recovered when the cold salt spray drove over his face, and realized that he was in an overcrowded, open launch just clear of the Heads.

There were the lights of a ship towards which they were steering.

Lessing was not surprised when he found that for him the business had ended where it started, felt a sense of the essential fittingness of things when he dragged himself painfully up the pilot ladder and found himself standing on the familiar deck of his old ship, the *Woollahra.*

Somebody was supporting him. He saw, in the reflected glare from the overside floodlights, that it was Tom, the big, Polynesian bos'n.

"Captain," asked Tom, "is it true that Melbourne has been destroyed?"

"Yes. And other cities too, perhaps . . ."

"The familiar pattern," said the bos'n, as though to himself. "The chance contact— The Trader— The Missionary— The incident— And the gunboat—"

"And after the gunboat?" asked Lessing.

"We learned the answer to that question many years ago," said Tom. "Now it's your turn."

THE END

THE ANALYTICAL LABORATORY

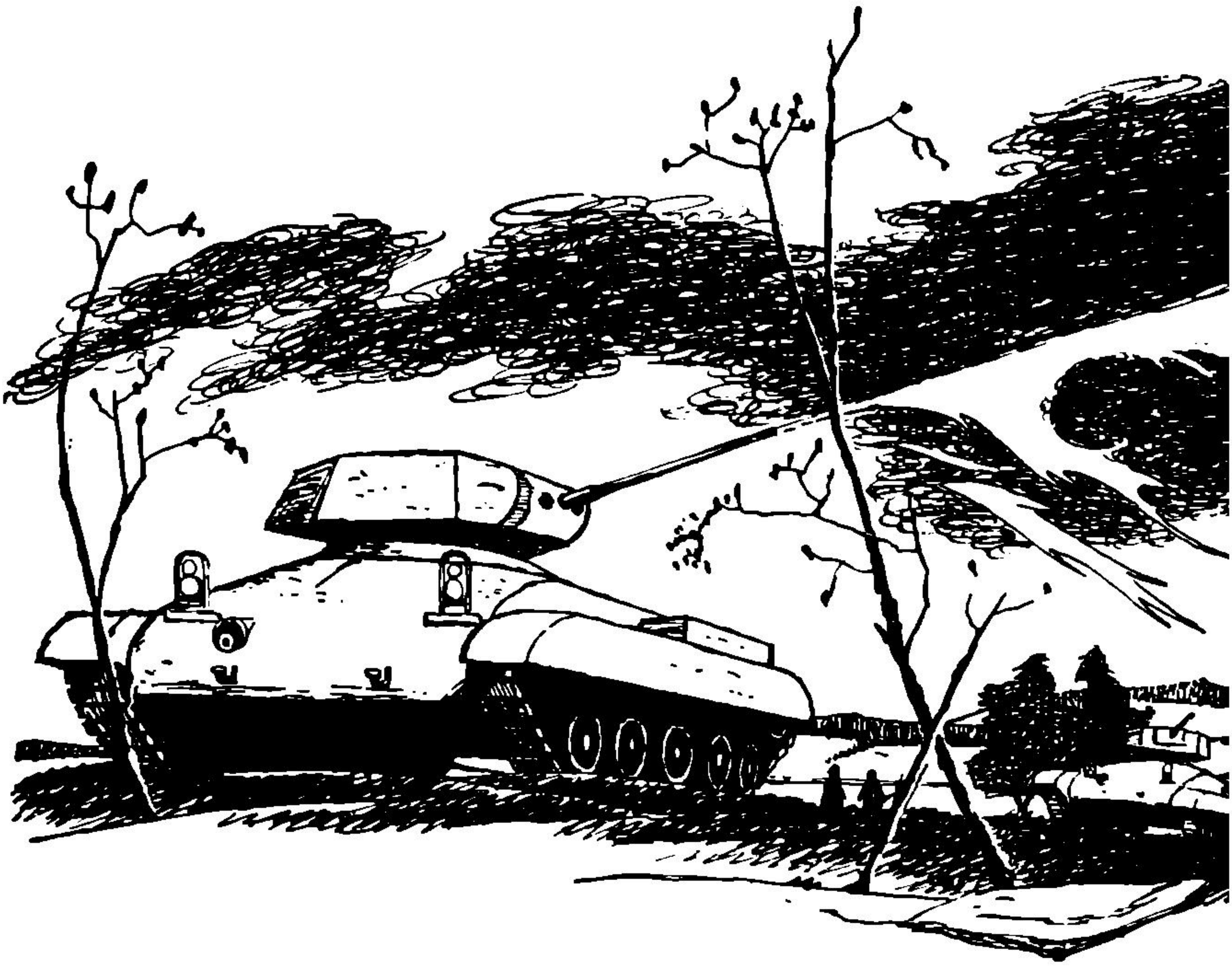
The May, 1959 issue, herewith reported on, was unusual in at least one respect; we don't ordinarily run seven fiction pieces in one issue. (That's not a matter of policy, save that your reader-votes consistently indicate an over-all preference for longer rather than shorter stories. But it just so happened that seven shorter stories fitted neatly into the available pages in May.) The result, of course, was a seven-way, instead of the usual five-way battle royal for first place. This, in turn, made point-scores higher. And it came out thus:

PLACE	STORY	AUTHOR	POINTS
1.	Cum Grano Salis	David Gordon	3.00
2.	Dorsai! (Pt. 1)	Gordon R. Dickson	3.06
3.	Hex	Larry M. Harris	3.46
4.	We Didn't Do Anything Wrong, Hardly	Roger Kuykendall	3.77
5.	Operation Haystack	Frank Herbert	3.81

Just to remind those of you who may have forgotten, and for new readers . . . the reader votes that came in on the May issue decide which of the,

(*Continued on page* 145)

DAY...



When a government is found to be incompetent, it is right and proper that it be changed. But sometimes there just isn't time for the usual process....

. . . OF SUCCESSION

BY THEODORE L. THOMAS

Illustrated by van Dongen

ENERAL Paul T. Tredway was an arrogant man with the unforgivable gift of being always right. When the object came out of the sky in the late spring of 1979, it was General Tredway who made all of the decisions concerning it. Sweeping in over the northern tip of Greenland, coming on a dead line from the Yamal Peninsula, the object alerted every warning unit from the Dew Line to the radar operator at the Philadelpia National Airport. Based on the earliest reports, General Tredway concluded that the object was acting in an anomalous fashion; its altitude was too low too long. Accordingly, acting with a colossal confidence, he called off the manned interceptor units and forbade the launching of interceptor missiles. The object came in low over the Pocono Mountains and crashed in southeastern Pennsylvania two miles due west of Terre Hill.

The object still glowed a dull red, and the fire of the smashed house still smoldered when General Tredway arrived with the troops. He threw a cordon around it, and made a swift investigation. The object: fifty feet long, thirty feet in diameter, football-shaped, metallic, too hot to inspect closely. Visualizing immediately what had to be done, the general set up a Command Headquarters and began ordering the items he needed. With no wasted word or motion he built toward the finished plan as he saw it.

Scientists arrived at the same time as the asbestos clothing needed for them to get close. Tanks and other materiel flowed toward the impact site. Radios and oscillators scanned all frequencies seeking—what? No man there knew what to expect, but no man cared. General Tredway was on the ground personally, and no one had time for anything but his job. The gunners sat with eyes glued to sights, mindful of the firing pattern in which they had been instructed. Handlers poised over their ammunition. Drivers waited with hands on the wheel, motors idling. Behind this ring of steel a more permanent bulwark sprang up. Spotted back further were the technical shacks for housing the scientific equipment. Behind the shacks the reporters gathered, held firmly in check by armed troops. The site itself was a strange mixture of taut men in frozen immobilty, and casual men in bustling activity.

In an hour the fact emerged which General Tredway had suspected all along: the object was not of Earthly origin. The alloy of which it was made was a known high-temperature alloy, but no technology on Earth could cast it in seamless form in that size and shape. Mass determinations and ultrasonic probes showed that the object was hollow but was crammed inside with a material different from the shell. It was then that General Tredway completely reorganized his fire power, and mapped out a plan of action

that widened the eyes of those who were to carry it out.

On the general's instructions, everything said at the site was said into radio transmitters and thus recorded a safe fifty miles away. And it was the broadcasting of the general's latest plan of action that brought in the first waves of mild protest. But the general went ahead.

The object had lost its dull hot glow when the first indications of activity inside could be heard. General Tredway immediately removed all personnel to positions of safety outside the ring of steel. The ring itself buttoned up; when a circle of men fire toward a common center, someone can get hurt.

With the sound of tearing, protesting metal, a three foot circle appeared at the top of the object, and the circle began to turn. As it turned it began to lift away from the main body of the object, and soon screw threads could be seen. The hatch rose silently, looking like a bung being unscrewed from a barrel. The time came when there was a gentle click, and the hatch dropped back a fraction of an inch; the last thread had become disengaged. There was a pause. The heavy silence was broken by a throbbing sound from the object that continued for forty-five seconds and then stopped. Then, without further sound, the hatch began to lift back on its northernmost rim.

In casual tones, as if he were speaking in a classroom, General Tredway ordered the northern, northeastern, and northwestern regions of the ring into complete cover. The hatch lifted until finally its underside could be seen; it was colored a dull, nonreflecting black. Higher the hatch lifted, and immediately following it was a bulbous mass that looked like a half-opened rose blossom. Deep within the mass there glowed a soft violet light, clearly apparent to the eye even in the sharp Pennsylvania sunshine.

The machine gun bullets struck the mass first, and the tracers could be seen glancing off. But an instant later the shaped charges in the rockets struck the mass and shattered it. The 105's, the 101 rifles, the rocket launchers, poured a hail of steel onto the canted hatch, ricocheting much of the steel into the interior of the object. Delay-timed high-explosive shells went inside and detonated.

A flame tank left the ring of steel and lumbered forward, followed by two armored trucks. At twenty-five yards a thin stream of fire leaped from the nozzle of the tank and splashed off the hatch in a Niagara of flame. A slight correction, and the Niagara poured down into the opening. The tank moved in close, and the guns fell suddenly silent. Left in the air was a high-pitched shrieking wail, abruptly cut off.

Flames leaped from the opening, so the tank turned off its igniter and simply shot fuel into the object. Asbestos-clad men jumped from the trucks and fed a metal hose through the opening and forced it deep into

the object. The compressors started, and a blast of high-pressure air passed through the hose, insuring complete combustion of everything inside. For three minutes the men fed fuel and air to the interior of the object, paying in the metal hose as the end fused off. Flames shot skyward with the roar of a blast furnace. The heat was so great that the men at work were saved only by the constant streams of water that played on them. Then it was over.

General Tredway placed the burned-out cinder in charge of the scientists, and then regrouped his men for resupply and criticism. These were in progress when the report of the second object came in.

The trackers were waiting for it. General Tredway had reasoned that when one object arrived, another might follow, and so he had ordered the trackers to look for it. It hit twenty-five miles west of the first one, near Florin. General Tredway and his men were on their way even before impact. They arrived twenty minutes after it hit.

The preparations were the same, only more streamlined now. The soldiers and the scientists moved more surely, with less wasted motion than before. But as the cooling period progressed, the waves of protest came out of Washington and reached toward General Tredway. "Terrible." "First contact . . ." "Exterminating them like vermin . . ." "Peaceful relationship . . ." ". . . military mind." The protests took on an official character just before the hatch on the second object opened. An actual countermanding of General Tredway's authority came through just as the rockets opened fire on the half-opened rose blossom. The burning-out proceeded on schedule. Before it was complete, General Tredway climbed into a helicopter to fly the hundred miles to Washington, D. C. In half an hour he was there.

It is one of the circumstances of a democracy that in an emergency half a dozen men can speak for the entire country. General Tredway stalked into a White House conference room where waited the President, the Vice President, the Speaker of the House, the President pro tempore of the Senate, the House minority leader, and a cabinet member. No sooner had he entered when the storm broke.

"Sit down, general, and explain to us if you can the meaning of your reprehensible conduct."

"What are you trying to do, make butchers of us all?"

"You didn't give those . . . those persons a chance."

"Here we had a chance to learn something, to learn a lot, and you killed them and destroyed their equipment."

General Tredway sat immoble until the hot flood of words subsided. Then he said, "Do any of you gentlemen have any evidence that their intentions were peaceable? Any evidence at all?"

There was silence for a moment as they stared at him. The President

said, "What evidence have you got they meant harm? You killed them before there was any evidence of anything."

General Tredway shook his head, and a familiar supercilious tone crept unbidden into his voice. "*They* were the ones who landed on *our* planet. It was incumbent on them to find a way to convince us of their friendliness. Instead they landed with no warning at all, and with a complete disregard of human life. The first missile shattered a house, killed a man. There is ample evidence of their hostility," and he could not help adding, "if you care to look for it."

The President flushed and snapped, "That's not the way I see it. You could have kept them covered; you had enough fire power there to cover an army. If they made any hostile, move, that would have been time enough for you to have opened up on them."

The House Speaker leaned forward and plunked a sheaf of telegrams on the table. He tapped the pile with a forefinger and said, "These are some of thousands that have come in. I picked out the ones from some of our outstanding citizens —educators, scientists, statesmen. All of them agree that this is a foolhardy thing you have done. You've destroyed a mighty source of knowledge for the human race."

"None of them is a soldier," said the general. "I would not expect them to know anything about attack and defense."

The Speaker nodded and drew one more telegram from an inner pocket. General Tredway, seeing what was coming, had to admire his tactics; this man was not Speaker for nothing. "Here," said the Speaker, "is a reply to my telegram. It is from the Joint Chiefs. Care to read it?"

They all stared at the general, and he shook his head coldly. "No. I take it that they do not understand the problem either."

"Now just a min . . ." A colonel entered the room and whispered softly to the President. The President pushed his chair back, but he did not get up. Nodding he said, "Good. Have Barnes take over. And see that he holds his fire until something happens. Hear? Make certain of that. I'll not tolerate any more of this unnecessary slaughter." The colonel left.

The President turned and noted the understanding in the faces of the men at the table. He nodded and said, "Yes, another one. And this time we'll do it right. I only hope the other two haven't got word to the third one that we're a bunch of killers."

"There could be no communication of any kind emanating from the first two," said General Tredway. "I watched for that."

"Yes. Well, it's the only thing you did right. I want you to watch to see the proper way to handle this."

In the intervening hours General Tredway tried to persuade the others to adopt his point of view. He succeeded only in infuriating them.

When the time came for the third object to open, the group of men were trembling in anger. They gathered around the television screen to watch General Barnes' handling of the situation.

General Tredway stood to the rear of the others, watching the hatch unscrew. General Barnes was using the same formation as that developed by General Tredway; the ring of steel was as tight as ever.

The familiar black at the bottom of the hatch came into view, followed closely by the top of the gleaming rose blossom. General Tredway snapped his fingers, the sound cracking loud in the still room. The men close to the set jumped and looked back at Tredway in annoyance. It was plain that the general had announced in his own way the proper moment to fire. Their eyes had hardly got back to the screen when it happened.

A thin beam of delicate voilet light danced from the heart of the rose to the front of the steel ring. The beam rotated like a lighthouse beacon, only far far faster. Whatever it touched it sliced. Through tanks and trucks and guns and men it sliced, over and over again as the swift circular path of the beam spun in ever-widening circles. Explosions rocked the site as high explosives detonated under the touch of the beam. The hatch of the object itself, neatly cut near the bottom, rolled ponderously down the side of the object to the ground. The beam bit into the ground and left seething ribbons of slag. In three seconds the area was a mass of fused metal and molten rock and minced bodies and flame and smoke and thunder. In another two seconds the beam reached the television cameras, and the screen went blank.

The men near the screen stared speechless. At that moment the colonel returned and announced softly that a fourth object was on its way, and that its probable impact point was two miles due east of Harrisburg.

The group turned as one man to General Tredway, but he paid no attention. He was pacing back and forth, pulling at his lower lip, frowning in concentration. "General," said the President. "I . . . I guess you had the right idea. These things are monsters. Will you handle this next one?"

General Tredway stopped and said, "Yes, but I had better explain what is now involved. I want every vehicle that can move to converge on the the fourth object; the one that is now loose will attempt to protect it. I want every plane and copter that can fly to launch a continuing attack on it. I want every available missile zeroed in and launched at it immediately. I want every fusion and fission bomb we've got directed at the fourth object by means of artillery, missiles, and planes; one of them might get through. I want a request made to Canada, Brazil, Great Britain, France, Germany, Russia, and Italy to launch fusion-headed missiles at the site of the

fourth object immediately. In this way we might have a chance to stop them. Let us proceed."

The President stared at him and said, "Have you gone crazy? I will give no such orders. What you ask for will destroy our middle eastern seaboard."

The general nodded. "Yes, everything from Richmond to Pittsburgh to Syracuse, I think, possibly more. Fallout will cover a wider area. There's no help for it."

"You're insane. I will do no such thing."

The Speaker stepped forward and said, "Mr. President, I think you should reconsider this. You saw what that thing could do; think of two of them loose. I am very much afraid the general may be right."

"Don't be ridiculous."

The Vice President stepped to the President's side and said, "I agree with the President. I never heard of such an absurd suggestion."

The moment froze into silence. The general stared at the three men. Then, moving slowly and deliberately, he undid his holster flap and pulled out his pistol. He snapped the slide back and fired once at point-blank range, shifted the gun, and fired again. He walked over to the table and carefully placed the gun on it. Then he turned to the Speaker and said, "Mr. President, there is very little time. Will you give the necessary orders?"

THE END

THE ANALYTICAL LABORATORY

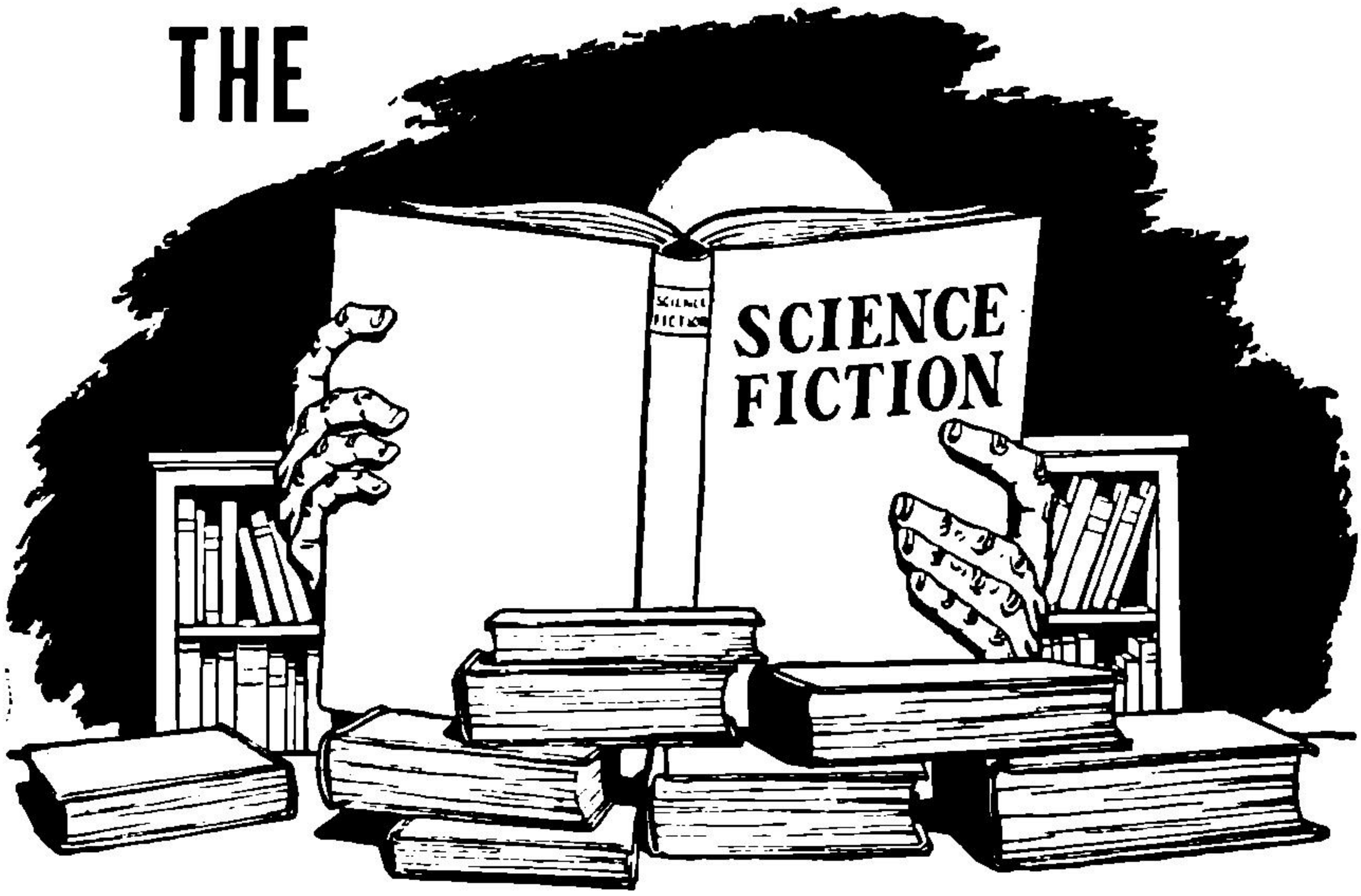
(*Continued from page* 137)

authors get the bonus payments. The story you voted into first place earns David Gordon an additional 1¢ per word on his story; your second-place vote means an additional ½¢ a word for Gordon Dickson on that first part of "Dorsai!"

And in this connection—may I remind all readers that (1) I read all stories submitted, and that (2) our monthly budget for stories represents the cash-on-acceptance prizes in an always-running wide-open contest. The best science-fiction author in the world has probably never had a story published . . . yet. I buy stories, not authors' names; do a bang-up job on a yarn, and you'll get payment at 3¢ a word immediately on acceptance, plus the 1¢ a word bonus from the readers.

I've never recommended science-fiction writing as a profession—but it's a very handy way of earning some extra vacation funds, or extra income for that expensive, but desirable, piece of hobby equipment.

THE EDITOR.



THE REFERENCE LIBRARY

BY P. SCHUYLER MILLER

JUDGMENT OF ITS PEERS

WITHOUT the fan publishers, I suspect, we would not have enough hard-back science fiction to keep a department such as this going. There might have been a paperback SF movement—there are indications that the paper-covered books may be taking over, in any case—but the typical American publisher is far too conservative a businessman to have pioneered in so outlandish a type of fiction, until he saw someone else making money at it.

This money-making may, of course, have been pure illusion. Publisher after publisher has risen and fallen, and today only Gnome Press makes any pretense at maintaining a schedule of new books, although Au-

gust Derleth's Arkham House is showing signs of renewed activity. Others—Grandon in Rhode Island, Dawn Press at Hamburg, New York—put out an occasional title. And of the main-line publishers, only Doubleday and Bouregy, with its Avalon Books, publish science fiction in any quantity. Other general publishers toss in a title from time to time, but not many more than before the fan-inspired boom. Some—and I'm told that this is coming to be true in England also—go out of their way to conceal the fact that a novel has a science-fiction theme. I suspect this is partly because the monstrosities on TV and in the drive-ins have given the dog a very bad name.

Whether an amateur publisher with a personal enthusiasm for science fiction can stay in business is something that Marty Greenberg at Gnome is now slugging out almost singlehanded. He, Lloyd Eshbach at Fantasy Press, August Derleth at Arkham House, and Melvin Korshak at Shasta gave themselves the added handicap of publishing books that were well printed and bound—in a word, expensive to produce. Since the editions were small, any Gnome or Shasta or Fantasy Press book probably cost its fan publisher more to produce than the same book would have cost Doubleday or Simon and Shuster. Other publishers tried to cut the quality of typography and binding, to make ends meet. Most of them are now out of the running: Prime . . . F.P.C.I. . . . Shasta . . . others you will recall. Fantasy Press may have joined them, though I hope the obituary is premature and that Lloyd Eshbach is just resting, as Derleth has been.

Meanwhile there has been another aspect of science fiction which the big publishers were never tempted to take over, and this may be where the enthusiasts can keep things to themselves. I mean, of course, the serious treatment of science fiction and fantasy . . . as a genre in literature . . . as a field for biographical and bibliographical research . . . as an area for critical studies. From the beginning Shasta we had the Bleiler/Dikty "Check List"—full of the errors that creep into any such bibliography when you compile several people's work, but a book no collector wants to do without. From Oregon we have Don Day's great "Index to the Science Fiction Magazines," with a supplement due any day. From Brad Day, on the east coast, has come the supplementing index to fantasy and science fiction in the many magazines that Don did not cover, followed by his studies of individual authors, and finally by a good book edition of Edgar Rice Burroughs' "Beyond Forty." There have been many more that I haven't seen, and others that have remained in the fan magazines, whence they may some day be rescued.

Latest to pick up the torch is the Chicago group calling itself Advent: Publishers. Since their books are available in only a few rather dedicated specialist shops, you'll need

their address—Advent: Publishers, P.O. Box 9228, Chicago 90, Illinois —to get any titles you may want. First of these was the collection of damon knight's critical essays on science fiction, "In Search of Wonder." Then they rescued the annual anthology of "best" science fiction, selected by Everett Bleiler, that Frederick Fell had abandoned. And now they are back with another serious critical work, "The Science Fiction Novel: Imagination and Social Criticism"—160 pp.; $3.50—a symposium by Robert A. Heinlein, C. M. Kornbluth, Alfred Bester and Robert Bloch, with an introduction by Basil Davenport.

The four essays are based on lectures given during the winter of 1957 at University College, the University of Chicago, shortly before Kornbluth's tragic death. The order of presentation has been changed for better organization: Kornbluth's "The Failure of the Science Fiction Novel as Social Criticism" came first —there was a mid-term lapse of a month, or perhaps another address that hasn't been included—then came Heinlein's "Science Fiction: Its Nature, Faults and Virtues," Bester's "Science Fiction and the Renaissance Man," and Bloch's "Imagination and Modern Social Criticism." In the book, Heinlein's essay has been placed first to define and set reasonable limits on the field, then come the three critics.

Since I think you should read the book for yourself, I have no intention of summarizing the arguments of these four writers or taking a position of my own, pro or con their ideas. If you don't feel that you want books *about* science fiction in your personal library, you should have a try at persuading your public library to get a copy—or copies, since we want people like Advent to stay in business. It should be a "must" for any college or university library that has an English Department that recognizes the existence of modern, popular writing.

Of the four essays, Heinlein's is—like his books—the one that seems most carefully and thoroughly reasoned out, that covers the most ground, and that would do well as a representative of science fiction in a symposium on all forms of fiction. Bester's is—like his "Demolished Man" and "The Stars My Destination"—bright, entertaining, and rather clearly delivered to an audience of tickled listeners: in short, what you'd expect from a radio and TV writer. Kornbluth's is the most brilliant of the four, seriously and closely argued: it belongs in a symposium on social criticism through fiction of all kinds. Bloch's, finally, strikes me as a talk deliberately planned to stir up discussion in its audience. If there was discussion after these addresses, I'm sorry it wasn't taped and reproduced with the talks, as is often done at scientific meetings.

Robert Heinlein, like the former mechanical engineer he is, begins by working out a definition for science

fiction—which, by the way, he prefers to call "speculative fiction." He arrives at a number of conclusions that ought to stir up discussion in any literature class and in many bull sessions. Most radical of these is his classifying science fiction with contemporary *realistic* fiction, as distinct from fantasy. Fantasy, he says, deals with things that are imaginary and *not* possible; realistic fiction deals with things imaginary but possible. On the basis of this clear-cut division, he goes on to analyze realistic fiction, arriving at this definition for science fiction:

"Realistic speculation about possible events, based solidly on adequate knowledge of the real world, past and present, and on a thorough understanding of the nature and significance of the scientific method."

He also makes a very important point for the many readers who throw time-travel, ESP, and faster-than-light drives into the category of fantasy: "The science-fiction author is *not* limited by currently accepted theory nor by popular opinion; he need only respect established fact." The *theory* of relativity—constantly under attack and reappraisal—says we can't travel faster than light in empty space, though nuclear particles do it in liquids and produce the so-called Cerenkov radiation. We don't even have a sound theory of time. And we have a developing science of psi-phenomena.

Heinlein makes another point that would start a storm in any general writers' conference: he says science fiction is the hardest kind of realistic fiction to write. The contemporary novelist writes about life in the world of his own time, that he can see and experience. The historical novelist can draw on the research of hundreds of scholars when he seeks to re-create any period or society in the past. Only the science-fiction writer must create his world from scratch, and "sell" it to his readers as the setting for his story. This, as you know, is something Heinlein does consummately well.

Three-quarters of the book is devoted to science fiction's role as social criticism, and the three men speaking and writing come to the same conclusion by slightly different roads: SF has no particular social effect because neither the writer nor the readers want or expect it to have —they have, according to Kornbluth, an unwitting compact to suspend reality; as Bester sees it, most science fiction is a kind of running bull session. On the other hand, they are shoulder-to-shoulder in denying the common complaint that it is purely "escape" fiction. It's "arrest" fiction, designed to stimulate and excite people's imaginations and start ideas buzzing, Bester says—which makes it poor reading for people who live under constant tension. It turns the reader inward to contemplation of possible worlds, rather than outward to action, Kornbluth says.

As a conservative Northeast US-American, with no real foundation in modern psychological theories, I

do object to the lengths to which Kornbluth carries his analysis from Freudian symbolism. He sees the use of hollow, oval or spherical spaceships and underground refuges in space opera as evidence of basic, "retreat-to-the-womb" immaturity. I claim that you use a spherical spaceship because you get the largest volume with the smallest radiation surface and construction mass, that you surround yourself with a fort so that the other guy can't get at you, and that you put your bomb shelter, or the Emergency Pentagon, or the files of the Corn Exchange Bank, underground in an abandoned mine or dry cave, because that's where the bombs can't get at them. I can assure you that primitive man preferred a dry cave to a wet one, no matter what symbolism says—and got arthritis anyway.

Any of the four essays, of course, could launch a whole volume of argument and discussion by itself. Robert Bloch—and these are some of the things that I suspect he may have used to stir up his audience—suggests nine points, or stereotypes, which he finds in such science fiction as does have a theme of social criticism. I won't detail them—though I think that in five out of the nine cases, the stereotype may have the status of a probable or most probable trend for the future. The other four, I'd say, Bloch has justified himself by making another point that only he raises: to reach an audience for whatever he wants to say, any author who doesn't publish his own books—as both Edgar Rice Burroughs and Upton Sinclair did, for quite different reasons—must write something he can sell; the publisher and editor who buy his stories must, in turn, print what readers will buy.

"Great writers need great readers," Bloch points out, "and if science fiction novels have not, on the whole, offered more penetrating social criticism, it is largely because science fiction novel readers have not wanted it."

And that, great readers, is the point where you start to appraise yourselves.

THE TRIUMPH OF TIME, by James Blish. Avon Books, N. Y. No. T-279. 1958. 158 pp. 35¢.

In this original novel James Blish ends his "Okie" series by ending the universe. With a bow to Archbishop Ussher, who wasn't able to make his carefully computed Creation in 4004 B.C. stick, the Ginnagu-Gap arrives in 4004 A.D. But Blish has something up his sleeve . . . something, perhaps, connected with this too-pat date, because the story opens with a selection from a book written *after* the cataclysm.

The series opens with the book called "Year 2018!", available in this country only as Avon T-193, though there is an English hard-cover edition. It continues with the Okie stories in "Earthman Come Home" (Avon T-225), most of the episodes

having been taken from this magazine. In this third book, thousand-year-old John Amalfi, Mayor of New York, is again the hero, and it will pay to read "Earthman Come Home," if you haven't, in order to make the best sense out of such oddities as the City Fathers, the wandering world of He, the spin-dizzies, and other refinements.

This is almost an anachronism: a "hard science" story in the vein of E. E. Smith's "Skylark" yarns, of John W. Campbell's "Mightiest Machine" series of nearly twenty years ago. It would have been much more at home then, for it hasn't much kinship with the novels of personality that Blish has been writing lately. At least one reader I know considered the discussion of the scientific problem so much technical double-talk.

Amalfi's city has been grounded on a New Earth in the Lesser Magellanic Cloud. He is old and tired, content to let others take over. Then the world of He returns from the far reaches of space with evidence that the universe is coming to an end. There is a contra-universe of anti-matter—what Jack Williamson long ago wrote of as contraterrene or see-tee matter—in which Time runs backward, and it is going to collide with ours to the utter annihilation of both. The New Yorkers and the Hevians begin to work on the problem, then discover that someone else back in the galaxy is probing too—someone or something known as the Web of Hercules.

All in all, a very unsatisfactory book . . . except that, as in the "good old days" of Seaton and Duquesne, Arcot, Wade and Morey, it leaves you with a nagging feeling that you've missed the point.

STAR SCIENCE FICTION NO. 4, edited by Frederik Pohl. Ballantine Books, New York. No. 272K. 1958. 157 pp. 35¢.

The "Star" series, which started out as a series of Ballantine's simultaneous hardback and paperback editions, then had an incarnation as a one-issue magazine, is back now as a paper-back series of all-new stories.

The collection contains nine stories, and a rather uneven lot they are. Best of the lot are a slashing little satire, "The Advent on Channel Twelve," by C. M. Kornbluth, which must be read—not described, Fritz Leiber's "Space Time for Springers," my own favorite, about the kitten that never became a man . . . and James E. Gunn's "The Immortals," taking about a third of the book, with its viciously moldering society. This is by no means the up-beat anthology that Ray Healey insisted upon when he launched this idea of all-new anthologies.

The opening story is, like Kornbluth's, a memorial to a writer who deserved to live longer. Unfortunately, Henry Kuttner's "A Cross of Centuries" is not up to his best level, although it offers some sober thoughts on the traps of immortality. In

Richard Wilson's "Man Working" we have pure farce, with an unusual kind of invasion of Earth that may have been suggested by what American movie companies are now doing to most of the far corners of the planet. Lester del Rey is welcome with "Helping Hand," a rather routine story about Us and Them, meeting unexpectedly on the Moon. Miriam Allen de Ford offers a slight blend of SF and mystery in "The Long Echo," which I gather is founded on a factual puzzle.

We have left "Tomorrow's Gift" by a newish English author, Edmund Cooper, which is going right into a Ballantine collection by the same name—some kind of record for speed of reprinting—and Damon Knight's "Idiot's Stick." Cooper has a lady-or-the-tiger storyette about conflicts in a future society, while Damon Knight is playing with an old puzzle-theme: how to turn the alien invaders' own weapons against them.

I'd be satisfied with the Leiber yarn; the Kornbluth is a bonus, and Gunn's story makes the book a bargain. The rest I can take or leave.

LOST IN SPACE, by George O. Smith. Avalon Books, New York. 1959. 224 pp. $2.75

Some of you must remember the series of stories by George O. Smith, describing the gradual solving of the problems that stood in the way of an interplanetary communications system, that were finally collected as "Venus Equilateral." It was one of the best books of its realism-with-action type that have come our way. This new, very short, opus from a 1954 *Startling* is of the same kind if not the same caliber.

Three stories are neatly interwoven. A cargo ship, bound for the colonial planets of Gemini, blows up; passengers and crew escape in two lifeboats, and a task force led by Commodore Ted Wilson—whose girl is in one of the lost craft—begins to comb space in search of them. Meanwhile the fleet of a Galactic empire, which has just discovered Mankind, is standing by to see what will happen. Meanwhile, too, Alice Hemingway is maintaining a precarious balance between the temperaments and advances of her two companions: her middle-aged tycoon boss, and the bushy-tailed pilot of the wrecked ship, who feels they should make lots of music while they can.

In the technical problems of quartering a vast volume of space, to find two poppy seeds of lifeboats, you have a yarn in the best "Venus Equilateral" tradition, livened a bit by efforts to make a new type of detector work. In the arguments aboard the Alien flagship, as two ambitious young officers try to persuade their admiral to settle Mankind's hash fast and get on with their regular business, you have a "hidden menace" element that ties into the other plots near the end, with a race to the lost lifeboat. In the Alice-among-the-wolves element, I'm afraid, you have

only motivation for the commodore.

This won't be remembered as long as some of George O's other books, but it's enjoyable reading. And these Avalon titles are now included with Gnome Press's in Marty Grenberg's "Pick-a-Book" plan, whereby you can get new books for as little as $1.20 each, by ordering direct and in quantity.

THE MOON MAKER, by Arthur Train and R. W. Wood. Dawn Press, Hamburg, N. Y. 1958. 84 pp. $3.00

The background of this "lost classic," now rediscovered by Fran and Ken Krueger, is something that its publishers should certainly have put into an introduction or, at least, on the jacket. Instead, you'll have to look for a biography of one of its authors, "Dr. Wood, Modern Wizard of the Laboratory," by William Seabrook, and published in 1941 by Harcourt, Brace. The story of Dr. Wood's ventures in science fiction is told on pages 172-177.

"The Moon Maker" is a sequel to a fairly well-known, pioneering SF yarn, "The Man Who Rocked the Earth," published by Doubleday, Page in 1915 and previously serialized in the *Saturday Evening Post* as what may have been that magazine's first science fiction. The sequel ran in *Cosmopolitan*—which did know what SF was, having serialized some of H. G. Wells' best books, without a batch of photographs of a spaceship on the Moon, the Earth from space, and other wonders, which Wood made himself and which the editors considered too realistic.

In the earlier book, a standard-model mad scientist with noble intentions, naming himself Pax, set out with a kit of potent inventions to force mankind to stop World War I—which the United States had not entered, as yet. He turned the Sahara into a sea, shifted the Earth's axis, and operated a very potent disintegrating ray.

R. W. Wood was a physicist with a sense of humor and a legendary aptitude for clarifying and visualizing abstruse optical phenomena. His friend and collaborator, Arthur Train, was a lawyer who had become better known as a novelist and creator of the "Mr. Tutt" stories. Their yarn had everything in it, and the science held water. In this short sequel, a comet collides with an asteroid, and the asteroid will in turn smash into the Earth unless something is done. Harvard Professor Benjamin Hooker, who had taken the Flying Ring away from Pax, sets out to disintegrate it with the Ring's powerful ray. He takes along a beautiful young mathematician-stowaway —hopelessly compromised by 1915's standards—and the flier pal who had helped him salvage the Ring from Pax. They land on the Moon—Rhoda is nearly lost—they rescue her —and so, on to the asteroid, which becomes a second moon.

If the combination of Wood and

Train had taken their science fiction a little more seriously—and I have a hunch they were burlesquing the popular novels of the time with their heavy humor and melodrama—we might have had something more like the books Dr. E. T. Bell soon began to publish as "John Taine." As is, it's a period piece that I'm glad to have next to my copy of "The Man Who Rocked the Earth." Frank McSherry's jacket is fantastically handsome; his interior plates are not so hot. I wish the Kruegers had been able to find Professor Wood's original photos for the book, one of which is in the Seabrook biography.

WHAT HAS FOUR WHEELS AND FLIES? by Douglass Wallop. W. W. Norton & Co., New York. 1959. 192 pp. $2.95

This is a rather corny burlesque of American automobiles, or a drawn-out shaggy dog story, as you prefer. The author wrote the baseball fantasy, "The Year the Yankees Lost the Pennant," which in turn gave birth to the wholly wonderful Broadway musical and movie, "Damn Yankees." If for no other reason, we should go a little way with Mr. Wallop, out of sheer gratitude.

There is no Broadway hit in this, even for Rin-Tin-Tin or Lassie. The assumption is that by 1965 Detroit has made its latest automobile so elaborate, so automated, and so safe that a five-year-old can use one as a touring playpen. This being so, a wealthy English bulldog named Hobbs—who has been left a fortune in automobile stocks and a valet named Vincent by his late mistress—decides that dogs can also drive cars, and that when they do, a tremendous new market will open up, and his stock will rise.

The story has to do with the misadventures of the pack of mis-assorted dogs who are rounded up by Hobbs as his first trainees. They go through canine counterparts of most of the human reactions to cars and driving, and become altogether too human in the process.

The hero of all this is an Irish setter—noble, of course—named Hank. There are various villains, including the tycoonish Hobbs and a German shepherd psychiatrist named Kenneth. On second thoughts, UFA might make quite a cartoon out of the book. But for a really penetrating animal satire, give me "The Barford Cat Affair."

TOMORROW'S GIFT, by Edmund Cooper. Ballantine Books No. 279K. 1958. 164 pp. 35¢

Ballantine is adding to its laurels as publisher of top English science fiction with this collection of short stories and novelettes by the author of "Deadly Image." The cover-blurbist is stretching a point, however, when he says seven of the ten stories in the book are published for the first time: this may be true for the United States, but the copyright

page gives previous credits from seven sources, including the *Saturday Evening Post,* and the title story was in Ballantine's own "Star S.F. No. 4" collection just a few months ago.

The book provides excellent proof —if it was needed—that English writers are producing just as good science fiction as Americans. Several of the stories would have been right at home here in Astounding. There is no straining for attention—what has been called the "Oh gee, lookit the stars!" approach—but a kind of forthright realism that helps make the strangest of paradoxes plausible.

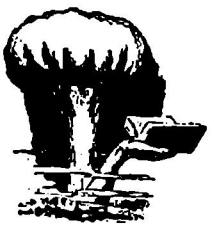
And there are some familiar and unfamiliar time paradoxes involved. "Repeat Performance" shows us a man caught up in some kind of closed cycle in time. "The Jar of Latakia" shows us a future psychic researcher to whom men of our time are ghosts. A "voice" that may be in or out of our own time-space system is one of the unexplained mysteries of the voyage to "M 81: Ursa Major," with its super-drive taking Man beyond the stars.

"Tomorrow's Gift," as I've said, is a story about a rather unpleasant future society, with a lady-or-the-tiger ending: will or will not the rebellious Dr. Byron be surgically incapacitated? In "A Question of Time," the inventor of a new stellar drive takes his twin along via telepathy, on a test voyage to the stars that ages him twenty years in a few hours. In "The Butterflies," the fallibility of an infallible robot traps a group of explorers on a distant world, and in "The Brain Child" an impatient parent has another robot take over the teaching of his son, with drastically effective results.

Of the remaining tales, "Falcon Chase" is the familiar but nicely handled tale of a flying saucer that crashes in the midst of a hunt for an escaped maniac. "The Enlightened Ones" gives us the first human contact with an intelligent, humanoid race—not so low in the scale of civilization as it appears at first. And in "The Intruders," the first rocket to the Moon finds a camp of robots already in residence.

Familiar themes? Yes—but you should know by now that most present-day SF scores, not for striking new concepts but for the way old ones are handled. And Edmund Cooper handles his well.

THE END



(*Continued from page 7*)
white to black through variations of pink and red. This could be proven readily with a spectrophotometer.

But the human observer sees blue skies, green grass, yellow flowers, and a girl in a red dress. Not only the full black-white range, but the full blue-red range!

(Incidentally, if a picture of the screen is taken with standard color film, when the color slide so produced is projected in the normal way, the human observer will see the full range of colors . . . but a spectrophotometer will prove that the colors aren't there! Reason: the three-color emulsions of standard color film will accurately reproduce the same actual pink-white illumination on the screen. And the human observer will, of course, see that precisely as he sees the original pink-white—in full color!)

Anyone who "knows" anything at all about the physics of light, and human three-color vision "knows" of course that such a thing is starkly impossible. Physically, it's nonsense. Mathematically it can be proven to be impossible.

Unfortunately, on the screen the audience sees the full-color picture, and is hard to convince they can't possibly be seeing it. And so the Society For Monkey's Uncles acquires some new members.

Curiously, while Dr. Land is a magnificent empiricist, he didn't have any theoretical explanation of how or why his system worked. I most sincerely hope he has a fine network of unbreakable patents covering it; he doesn't need an explanation of why to have valid patents, and he richly deserves the patent rights.

But two days later, Dr. Wayne Batteau, of Harvard School of Applied Physics, was scheduled to deliver a paper on some theoretical work he had been doing. It concerned the use of Hilbert Space analysis and its applications to instrumentation and data-encoding. I'm not a mathematician of that level; experts forgive my slips, but the general idea seems to be this: Hilbert Space analysis is a complete generalization of the sort of graphing I learned in high school, where we used either rectangular (Cartesian) co-ordinates, or circular (Polar) co-ordinates. Hilbert Space allows the use of co-ordinates at any angle, and of any shape. You don't have to use co-ordinates at 90° after all—and the co-ordinates don't even have to be straight lines, actually. Nor do they have to be linear functions; after all, standard log-log graph paper uses exponential co-ordinates.

Dr. Batteau's work showed that it should be possible to encode *any* color with *two, and only two* parameters. The one slight catch being that, to express all four quadrants of a graphing system, you need both positive *and negative* numbers.

Anybody here know what "negative light" would be? How could you get negative numbers from light . . .?

Given that item, Dr. Batteau's Hilbert Space analysis would explain in

full what Dr. Land's process was doing. Two non-identical parameters would be both necessary and sufficient—and with a white-light image, and a non-white-light image of every color-point in the entire field, there would be data enough to encode all the color in the field.

The final clue I got from Dr. McCulloch, who's doing neuro-physiology research at M.I.T. with some of the most remarkable techniques going. Science fiction hasn't dreamed up anything to beat some of his tricks! When I was there, he had some electrical pick-up probes in the optic center of a frog's brain. The probes are glass tubes, with physiological saline solution in them as the conducting electrode. Now visible red light has a wave length of about 600 millimicrons, or 0.6 microns. The *outside* diameter of Dr. McCulloch's neural probes is *0.5 microns*. Looking at them, you can see fine glass tubes, tapering down to finer and finer diameter, until they disappear into invisibility. With probes like those, he can get electrical signals from selected individual nerve fibers!

When I was there, he had an oscilloscope showing the output of the optic center fibers; when a light near the frog's eye was turned on, there was only a noise-trace across the scope; when the light was *off*, there were strong bursts of neural signals. I asked why the light inhibited the discharges.

Dr. McCulloch explained that the

probes were picking up signals from darkness fibers—*fibers that signaled darkness, not light.* A blind man, he told me, does not see blackness; he sees neutral gray, because his optic center gets neither lightness signals, *nor darkness* signals.

Look—your *eye* may see light. But *your brain doesn't;* it receives nothing but neural impulses. And your brain gets both positive *and negative* readings! There may be no such thing as negative light—but there is, very definitely, such a thing as negative signals about light!

Dr. Batteau's theoretical analysis of instrumentation theory is correct; the human visual system uses a Hilbert Space analysis of light, and is set up to use both positive and negative numbers, thereby making it possible to encode all possible colors with two, and only two, parameters.

We do not have three-color vision!

The entire effort of medicine to explain color-blindness has foundered on the old superstition that we do. The psychologists investigating color perception have gone down the will-o'-the- wisp path of folklore, believing they "knew of course" we had three-color vision. The movies used three-color. Technicolor. The film makers of the world used three-color processes.

And the ones who started all this, the artists . . .?

They, sirs, were perfectly correct; three primary colors are both necessary and sufficient. The difference is, you see, you can't have negative-objects; for object-color, you do in real fact need three parameters. They dealt with objects, not light.

Nevertheless, Cezanne did one painting that was a clue that could have been followed up. It shows a billiard table, with the traditional green cloth . . . when you view the picture as a whole. Block off the rest of the picture, however, and the area proves to be a brilliant, pure yellow.

To map all possible points in a plane, two and only two parameters are needed. What happens if you use three, instead? You over-specify the system; inevitably you specify not one, but three lines. Two points establish a line-of-relationship; three points establish three lines-of-relationship.

Any of the modern three-color transparency films shows the results. You have to get a film designed for the kind of light-source you are going to use, because the three-color system specifies not only the object-color, but in addition carries information about two other color-systems —the light-source color, and the projector-lamp color. A color transparency projected by sunlight will appear much too blue; they must be projected by a 2900°K projection bulb. The three-color system specifies three things—two of them unwanted specifications.

The Land process will make possible available-light color photography, because, with two parameters only, the object color and only the object color can be specified. The result is that a picture taken by daylight, by the 15,000° white of north

sky light, by tungsten light, or by firelight will all look correct! And—which none of the present films can do, no matter what corrective filters you try to use—a shot taken by mixed 15,000° sky light, and 1,500° fire light will look perfectly natural!

All interstellar explorers will use Land-type film; whether they're shooting scenes under a 2,000° red-giant sun, or under the 50,000° blue-white of a class Ao sun, the pictures will give normal color rendition. No three-color film could possibly do that!

There have been no satisfactory color pictures of the stars; the three-color process introduces two entirely unwanted, and unevaluable parametric systems. Land-process approach will make it possible for men to see what the colored stars of Space look like even before men can ride the probe rockets.

It shouldn't be too surprising that this universal color-film is possible. After all . . . our own eyes have been doing it for ages, haven't they? Consider; a black automobile standing in full sunlight actually reflects more light-energy to your eye than does a sheet of white paper under moonlight—but the car looks black, and the paper looks white.

Eyes were not developed in order that we might appreciate the aesthetic beauty of a sunset, or a da Vinci painting; they were evolved strictly for military purposes—to detect enemies, and to seek out prey. Both enemies and prey went to elaborate

lengths in seeking to develop camouflage techniques that would render optical devices ineffective. We evolved optical techniques that would negate the effectiveness of camouflage.

One of the high-priority problems was to evolve a system that would not be thrown for a loss by shifting light-source color; it's essential that a leopard look leopard-colored by the blood-red light of sunset or dawn, and just as leopard color when he's standing in a shaded glade, illuminated by the blue-white light of the sky. Modern color films make a complete hash of that problem; our eyes don't. The Land-process film won't.

Overspecification of the three-color system has another area of acute troubles. The present three-color TV system gets into even more trouble than color film; to work properly, it would be necessary that each of the three separate color channels have precisely determined characteristics, and that they hold those characteristics exactly. Otherwise the color balance and intensities will shift; the pretty little blond singer comes out the Girl With Green Hair, and with a cry of "Hi-yo, Silver!" the Lone Ranger rides off on a henna-rinsed horse.

Unfortunately, electronic components being what they are, keeping three separate channels in exact balance compares in difficulty with the feat of balancing three eels on their tails. Personally, I have yet to see a color TV set that wasn't excused by the owner with "The service man is still working on the adjustments; he hasn't got it quite balanced yet," or with "The antenna doesn't work quite right yet, but . . ."

Applying the basic Land discovery to color TV will be, physically, a snap—and, economically, a blow. With a two-parameter system, only two, not three, channels are needed. Further, the two-point system is inherently self-balancing to a very high degree. Instead of balancing three eels on their tails, it's more like balancing two two-foot sections of 2 x 4 on their ends on a sturdy table.

And now the psychologists and philosophers can have no end of fun arguing some of the finer points of human color vision. Consider this: imagine an ordinary black-white photograph of a mouse sticking his head out of a mousehole gnawed in the baseboard of a room wall. There's the long shadow of an alertly watching cat on the wall.

Notice that in the described picture, not only do you not see any cat —you do not see any evidence of a cat. In fact, very literally and specifically, it's something you do *not* see—a negative-signal—that allows you to deduce the presence of the cat. You deduce the cat's presence by the fact that you do *not* see a portion of the wall; the shadow is an area of the wall which is *not* seen.

Now . . . is a fact deduced from evidence, not perceived, but simply deduced, a "subjective" or an "objective" piece of evidence?

Given a Land-process projection, the blue of the skies is not perceived

—it's deduced from the data that is presented. Is that "subjective color," then?

The Land-process films will undoubtedly be the major process used by all photographers in a relatively short time. The graphic arts business is going to be hit almost as hard as the color-TV business—because at the purely objective-physical level, the Land-process films will not yield a full-color representation. How do you make the necessary—because it's object color, not light-color—three-color-and-black plates required for printed color covers and pictures?

The color process discussed here some months back that was developed by the Printing Developments people, which uses an electronic computer to go from an Ektachrome transparency to the required four plates can handle the problem.

A computer can be programed to do logical deduction. The optical center of the animal brain is a logic-computer; it automatically deduces the object-color seen. An electronic computer is capable of the same type of process; it, too, can do logical deduction from the data given, and "print-out" the conclusions.

If a phenomenon can be reproduced by a physical device, is it a "subjective" phenomenon? Is a logically deduced phenomenon "objective" or "subjective"?

But inasmuch as professional scientists so loathe the very idea of "subjective phenomena", I'm sure they'll decide that Land-process color is not subjective after all.

That, you see, is the basic mechanism that keeps the Society for Monkey's Uncles growing. They *know* subjective phenomena aren't real—so naturally Land-process color, now it's been proven real, can't possibly be subjective.

Wonder who, in what field, is going to make the next big enrollment of involuntary members of the Society for Monkey's Uncles?

THE EDITOR.

THE END

HOW TO DO IT...

THE LAND COLOR PROCESS

There's a fair proportion of amateur photographers in Astounding's audience—and a few who aren't interested in photography, but are interested in technical methods. For them—

I got pretty fair color results on the first try; the optical center in the brain computes out most of the errors you make. I used Panatomic X film, developed in UFG developer, four minutes at 70°; that normally calls for a film speed rating of 50. I used the 35 mm. Nikon, naturally working on still-lifes, since I don't have Land's special two-negatives-for-one-shot camera. (Anyone with an old one-shot color camera is in business!) With the camera securely set and focused, on a sturdy tripod or other appropriate anchorage, take one shot through a Wratten 25 (A) filter, with an 8x filter factor. (Or call the film speed 6.) Then a second shot through a Wratten 58 (tricolor green) filter, and expose heavily—a fairly dense negative turns out to be needed. Use a filter factor of 12 to 16 (or rate film at 2 to 3).

I made contact-print transparencies on Eastman Fine Grain Positive film, developed five minutes in Dektol at 70°. The transparencies were slipped into Readymounts, and put in two projectors. The red-filtered shot was projected through a Wratten A filter; the green-filtered shot with white light only. A Variac allowed me to adjust the red-filter projector for optimum color result, but a flanged-up lens-diaphragm would have done as well.

Yellows and blues are weak; I'm still experimenting.

The two-projector system makes things somewhat less than perfect, since you're bound to have some degree of parallax between the two projector-lens positions.

You can, also, get fairly recognizable color on the screen projecting the long-wavelength shot (red filtered) through a yellow filter, and the short-wavelength shot (green filtered) through a green or blue filter. Or by using a red filter on the long-wavelength shot, and a yellow filter on the short-wavelength shot.

Anyone with the equipment to start playing with this will shortly discover that the orthodox theory of Color Vision has definitely joined the Phlogiston Theory and the Flat Earth Theory. When you see emerald green glassware on a screen illuminated solely with pure red and white light . . . you *know* the old concept of color-vision is dead!

THE EDITOR.

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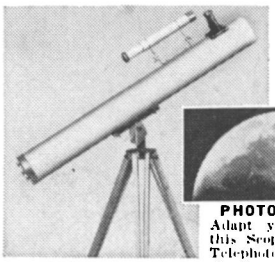

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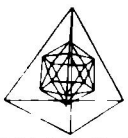

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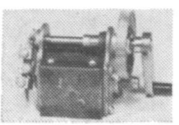

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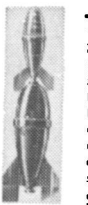

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