NEW WORLDS SCIENCE FICTION

No. 101
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2/6

JOHN RACKHAM
Trial Run

KENNETH BULMER
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COLIN KAPP
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Article
Time and
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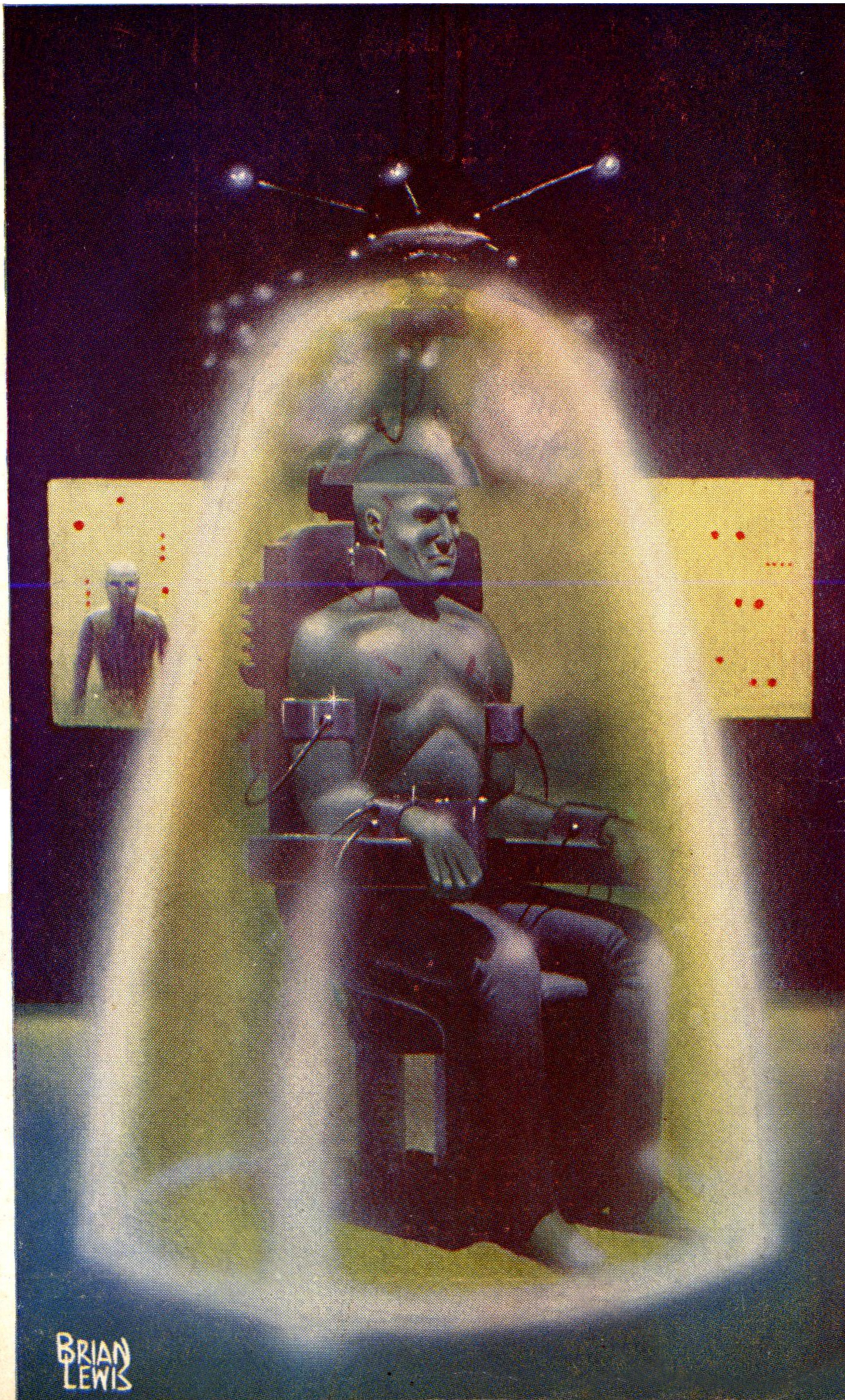
★

A Nova Publication

★

15th Year
of Publication



John Rackham

London

John Rackham has steadily resisted our request for some biographical material about himself (until now) preferring to remain on the sidelines and observe, but as one of our regular contributors we felt that it was time he relented.

"Born 1916," he writes, "into a family with little wealth, and not over ambitious, but great readers, discussers, philosophers. Have been surrounded by books, journals, magazines and the like, ever since. The first books I ever read were by Wells, and Verne, Mark Twain, Swift, Jack London and others of that persuasion. Burroughs, too. All of him. Have yet to tire of reading, and hope I never will. Formed the impression, very early in life, that specialization may be a good idea, financially, but it calls for sacrifices in other fields. I have avoided that. Thus have no distinctions, degrees, qualifications of any kind. I may regret it, some day, but not so far, because I am still free to take a keen interest in just about anything.

"Have very few convictions, but among them are these; that science fiction is the only fiction being written that has anything worthwhile to say; that it is just about the only field left for exploration on an individual basis; that if it is to last and earn the solid future it merits, it must be aimed at the young. Not the 'juvenile' or the 'childish,' but the keen and tough young minds which can take difficult, challenging concepts, and bite on them. Notice, sometime, the standard of material currently being put out for high-schools on radio and T.V., and you'll have what I mean. Science fiction can reach this level, and be good fun, too.

"For the record, I work for the Central Electricity Generating Board, and do my reading and writing in my spare time. As I also have a wife and three lively children, that spare time is pretty well taken care of. I'll be glad when some genius invents a longer day. Or Wells's 'accelerator,' maybe. Any biochemists in the house?"

NEW WORLDS SCIENCE FICTION

DECEMBER 1960

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Sturgeon serial...

The ink was hardly dry on John Peters' letter in last month's issue (with a plea for experimentation in our story content) when I happily read Theodore Sturgeon's new novel *Venus Plus X* which has just been published as a book in USA. Investigation showed that it had not been serialized in any of the American magazines and air letters and cables enabled us to obtain the necessary Rights so that we can commence this outstanding Sturgeon story next month. So John Brunner's listed serial has been put back until later.

Frankly, I couldn't understand why this superb (even for Sturgeon) novel had been missed by the leading American science fiction magazines for it is a story *any* quality magazine would be proud to publish, until correspondence with the author pointed out that it had never been offered for serialization but went straight to book publication. So, as with Eric Frank Russell's " Wasp " two years ago, circumstances have allowed us to obtain an otherwise normally unobtainable piece of fiction.

Venus Plus X will be run in four parts—it is good to cut, and my opinion at this early stage is that it will be the Big Book of 1960 ; nothing so far published this year is comparable to it in scope, idea or theme. Basically, it contains about 70,000 words of biology, philosophy and theology, in the form of *two* parallel stories intertwining yet never quite meeting (except on a philosophical level). This, I feel sure, is the Sturgeon book we have been waiting for since the high promise of *More Than Human* back in 1953.

Space cannot do justice to the complex plot theme (and who would want to be told so much in advance ?)—a presentday man waking " somewhere " alien, yet in a gentle world where humanity has developed along different lines, and asked to study them and reach a judgment before being returned to his own society. Interwoven with the central character's travails is a comprehensible but utterly alien world of the future (word-painted with masterly precision) against which runs the second story of an American family and their nearby friends and the humdrum everyday life of a rural community. This latter sequence sneaks up on you so quietly that you will probably reach the postcript before the pieces fall completely into place.

. . . next Month

Part of the fun of reading any novel is to try and guess how the author will work out his ending (and how badly some of them contrive this these days !). In *Venus Plus X* no amount of guessing will pay a dividend for the plot logically changes direction so many times.

For years science fiction readers have quoted Philip Jose Farmer's novelette " The Lovers " as a masterpiece of new invention ; Ted Sturgeon's novel takes over where that left off, widens, deepens and improves along philosophical lines the highly combustible and controversial subjects of sex and religion—and comes out honorably.

For what to expect in *Venus Plus X*, let me quote from Ted Sturgeon's own words in the book :—" You homo saps. are funny people. I just read some figures wherein a large group of my fellow-citizens were asked if they thought all men were equal, and 61% said Yes. The same people were then asked if Negroes were equal to whites and with the very next breath 4% said Yes—and this without the sound of a shifting gear.

" To illustrate further : I once wrote a fairly vivid story about a man being unfaithful to his wife and no one made any scandalous remarks about me. I then wrote a specific kind of narrative about a woman being unfaithful to her husband and nobody had anything scandalous to say about my wife. *But* I wrote an empathetic sort of tale about homosexuals and my mailbox filled up with cards drenched with scent and letters written in purple ink with green capitals.

" You cannot be objective about sex, especially when it's outside certain parameters. Hence this disclaimer—keep your troubles to yourself.

" It was my aim in writing *Venus Plus X* (a) to write a decent book (b) about sex. It is impossible to attempt such a thing without touching rather heavily upon religion, which is impossible to do without touching rather heavily upon some of your toes."

Until next month, when we introduce the strangest science fiction story Ted Sturgeon has ever written . . .

John Carnell

This is John Rackham's first long novelette for New Worlds *although he has been steodily selling short stories to all our magazines. For a 'first' he has tackled the space-time theory and come up with a particularly exciting story.*

TRIAL RUN

by JOHN RACKHAM

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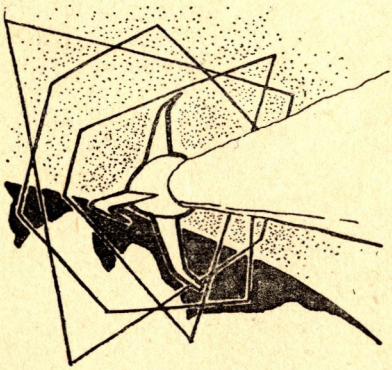
one



Commander Fowler stretched out wearily on his bunk, forcing himself to relax, hovering between the tension of effort and the effort to release tension. The chronometer over his head, when he could see it, showed a quarter past midnight, ship's time. Between the lurches and the bumps, an automatic part of his weary brain spun into calculations of the minutes and hours

still to be got through, in this jarring nightmare, before they reached Base Five. Around him, space splintered and became solid, shattered and became solid, dwindled and became solid, spun and became solid. The ship jarred, jerked, jumped in unsteady, irrational intervals. He sighed, shut his eyes, and cursed, for the thousandth time, one Jules Romaine, the eccentric genius who had fathomed the secret of the ' pseudo ' universe drive.

How the hell could any normal man be expected to work, or think . . . stand up, even, much less sleep, in a universe which snapped in and out of existence at split-second intervals, like a goods-train sliding down an endless switch-back on stuck wheels ? Yet his brain reminded him, people did sleep through this. He, himself, was going to sleep, now . . . going to sleep . . . any moment now . . .

An alarm chattered in his ear. He sat up, grim but wakeful, clinging to the edge of his bunk as he groped for the button.

" Distress signal, sir !" That was Lieutenant Masters, from the bridge. " It's wide-band, faint. Suit-radio, by the sound, and close. I'd say it was a Marsie, sir !" Fowler smothered a curse. Masters was his Communications Officer, and a good one. If he said a Marsie had baled out in free-space and was screaming for help, then it was so. It would be a bloody high-ike Marsie, too.

" General alarm, Mr. Masters," he growled, " I'm coming up." He let go the button, rolled out of his bunk, found his boots, and staggered out into the leaping, corkscrewing corridor, to fight his way up to the bridge. A Klaxon began to blare. Up the jarring, pitching ladder, he found Masters, a shadowy intermittent figure, clutching a hand-hold and striving to take readings from a cluster of jittering gauges. His thin, eager face, boyish in its tan, was tense with concentration.

" Near as I can tell, we'll be at minimum displacement in six point four minutes," he said. " Should be about thirty miles, real distance, from there." Fowler wormed into place, peering at his instrument-board, letting the pattern settle into after-images as it winked in and out of reality.

" Your guess is as good as mine, Mr. Masters," he said, " Set up the shifter, will you, and give me a general on the P.A. Where's Mr. Clarke ?" A red light blinked on and off and Masters chucked a thumb at it.

" On the job, by the look of it. Grappling gear all ready."

" Good !" Fowler thumbed the speaker button. " Mr. Clarke . . . we shall be shifting out in six minutes, approx. Keep Wallace with you for grappling. Cross and Harvey to upper and lower corridors. This sounds like a Marsie in trouble, and if he's running true to form, there'll be an Arc on his tail, for sure. Keep your fingers out !" One long ' beep,' followed by two shorts, told him the message was heard and understood. Fifteen seconds later two more reds winked on, from the fire-control panel. Fowler noted them, with satisfaction.

In the two years he had skippered this six-man striker, he had never carried out a genuine rescue, but the operational drill had been well-rehearsed. Clutching a hand-hold, he turned to Masters, flickering beside him.

" Better stand by the bow-torps, Mr. Masters," he said, quietly. " This Marsie might just have an Arc heavy chasing him. Let's not take any chances."

" Right !" Masters clung to his panel a moment. " Shift is all set, sir, and reaction-drive hotted up and ready. I'm off," and he lurched away, down the ladder.

Fowler, alone on the bridge now, shifted his seat to where he could watch the cynchroscope. On either side of the gauge hung two miniature but perfect nude dolls, Mr. Masters' personal fetishes. Another pair decorated the fire-control in the forward torpedo-space, which was Masters' standing action-station. Fowler ignored them, ignored the slamming of the ship, as its whole fabric jerked and bucked insanely, ignored everything but that gauge, with its twin needles and spinning dial. The red needle was real time, creeping and inexorable. The green needle and the white dial below, reading ship's time and place, spun and swung by their own weird mathematics, but at each shudder the green needle and the white dial zero hovered nearer and nearer that crawling red pointer.

Fowler braced himself, easing his hands to the feel of the drive-controls, ready to scan the view-screens which waited to glow into life, alert to read the proximity tell-tales ; ready for anything and everything. The red needle crept. He cut out the Klaxon, cancelled the distress-alarm, clipped the microphone of the P.A. to his shoulder-strap. The bridge was silent, snapping, bucketing, lurching, but silent.

Roll on the day, he mused, as he had done a thousand times before, when he would be free to go back to being a civilian, free of this damned insane war, free to teach history, which he loved, to juveniles who hated it. But it was strange how irrational things were. You had a naturalist like Darwin, and a pessimistic parson like Malthus, and you mixed them, and you got evolutionary theory, and Mankind was never to be the same again. Similarly, you took a wild-eyed metaphysician like Jules Romaine, the wreck of an alien space-ship, and some baffled physicists, and you had the ' pseudo-universe ' drive, and again Mankind was changed beyond recall.

According to Romaine, and other metaphysicians, there were three universes. There was your own, unique, universe, which you generated by interaction with the real-space-time universe, which was the second. And there was everyone else's, which was the third. That idea, plus a wrecked Arc ship, and some high-pressure physics, had produced the Romaine field generator. In the real, everyman universe, space and time were incorruptible. But the Romaine generator literally created its own pseudo-universe. It was fragmentary and incomplete, never quite out of touch with the real universe, but never quite in touch with it, either. It was just real enough to travel in, genuine enough to get round the barriers of space and time. In its own pseudo-universe, the *London*, Fowler's six-man striker, could make the twelve light-years from Sol to Base Five in just four days. It was sickeningly uncomfortable, sick-making in every sense, but it worked.

Red, zero and green came together. There was a bone-jarring crack as one universe ceased and another began. Fowler went into fast and familiar action, as the view-screens showed a squirm of corkscrew light-lines. *London* spat out into real space in multi-axial spin, and his first task was to kill it. Under his practiced fingers drive tubes belched reaction-mass. Tangential jets flared in timed sequence, their bellowing coming back through the hull. The giddy whirls of starlight slowed, and straightened, and were steady.

Now a fix, he thought, swivelling to face Mr. Masters' vacant place. The ship, and the universe, were steady, now, but the uneasiness had crept into his belly. Where the hell was the Marsie ? Ah, he saw the blurred, out-of-focus streak on the detector—there ! Down twenty, he guessed, and the star-field slid upwards on the screen as he caressed the controls. The

detector trace grew strong. He eyed it, critically. Starboard, ten—he nursed the controls until the trace became crisp and sharp. Bang on. Now, how far away was the beggar ?

He eyed the panel again, making quick estimates. Twenty three miles, give or take a yard or two. He depressed the main-drive throttle, felt the ship kick against his tight body. The drill, now, was simple enough. Gain speed, flip over, lose speed again, snatch the Marsie, and snap back into ' pseudo.' With luck and no interference, they could do it in something under three minutes. If not—but he caught that train of thought and killed it, giving full attention to his task. With the near-intuition that was the outcome of long practice, he cut the drive, spun the ship end-for-end, and set the jets bellowing again, braking furiously. His habitual cold fear itched to break out. A flickering neon on the panel caught his eye. Irritably, he flicked a switch, and a grossly casual, almost sneering, voice filled the quiet bridge.

". . . be my lucky day. Imagine someone being handy, just like that ! Jolly good, and so forth. Sorry to bother you, whoever . . ."

" Cancel your radio !" Fowler snapped. " You'll alert every damned Arc within parsecs. You can do your bragging later, when you're safe." Then he broke the link, noting that the Marsie, for all his flippancy, had shut off his transmitter. Damn all big-heads, he thought. A wonder he condescended to call for help at all. When the Mars colony had been planted, a hundred years earlier, in 1990, there had been stringent limits on applicants. Only those with a fantastically high I.Q. had been able to make the preliminary application. Their descendants had never let anyone forget it, either, and wore their superiority like an unspoken insult to all other lesser breeds. What made it more insufferable was that the Marsies were very nearly as superior as they thought they were. Throughout the Solar system, they were known as high-ikes, or Marsies, usually with an adjective. Fowler stifled his resentment, clicked on his P.A. microphone.

" Mr. Clarke. Ready to pass control to you, when you want it . . ." *London* was now within a mile of the space-suited castaway and braking to a stop, and Clarke, by the grappling-point, was in a better place for the fine manoeuvring that would be needed to come alongside the small target.

" On a count of five," Clarke's gruff voice was emotionless. ". . . two . . . three . . . four . . . now !" and Fowler took his hands away from the dead controls, forcing himself to concentrate on the peripheral view-screens, to let Clarke get on with his delicate task. Arcs were the big danger, now. It was Marsie single-man fighter practice to go adrift in free space, to let themselves be found by an Arc, and then fight it out. Arcs seldom travelled in single spies, and the result was usually suicide for the Marsie, but such was their outlook that they counted it well worth it, if they could smear a few Arcs in the process. This chap, whoever he was, had been lucky. Fowler had no such suicide wish. He kept his eyes peeled.

An alarm screamed, thin and high-pitched. His eyes found the corresponding trace, hurriedly.

" Enemy . . . up, over," he snapped. " Bearing 85 up, right, 15 rear . . . coming into range."

" I have him, sir," came a grunt in the rich brogue of Crewman Harvey. "It's a one-man job—and would you look at the in-and-out routine of him—sure them Arcs must have guts like tin !" Fowler grinned, tightly, as he watched the trace. It was there—and then not—and there again, but much closer, at a fantastic rate as the Arc fighter jumped in and out of ' pseudo.'

It was known that they came from Arcturus. The one and only ship of theirs that had been complete enough for inspection had yielded the clue to the ' pseudo ' drive that they had, and it was reasonably certain that they were humanoid. No Solarian had ever seen an Arc, and all that was known of them had been deduced from the bloody smears in that one ship. But to be able to snap in and out of ' pseudo ' like that argued either an incredibly rugged physique, or a fanatical disregard for personal discomfort. Fowler shivered at the thought of attempting the same, and shifted his attention to the broad picture. Harvey could be relied on to cope.

" Are we within screen limits yet, Mr. Clarke ?" he asked, and the ship shuddered, momentarily, to the tangent jets.

" Hundred yards, sir." Clarke's voice was still calm. " Grapnels away—safe to screen."

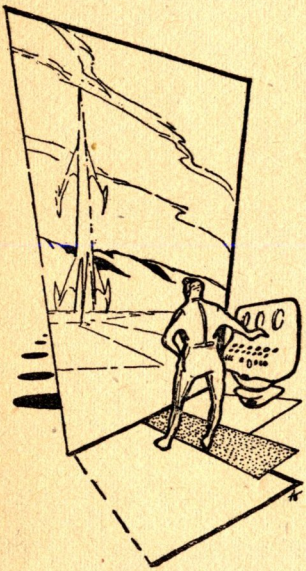
" Thank you." Fowler shoved a foot-switch full home, half a dozen red neons flared, and he felt easier. *London*, and her castaway target, were now englobed in a mega-gauss screen that could nullify anything the one-man Arc fighter could throw.

had done it. Some had survived. Not many. The gauss-meters crept, complaining loudly, into the red-for-danger zone. A big, blonde, tousle-haired head showed through the hatch, to be followed by a matching pair of shoulders, bulking hugely in an escape-suit.

" Fun and games," the stranger drawled, hauling himself into a corner. " Yonder Arc is burning to fry us, skipper. Let us not stand upon the order of our going, but get, eh ? Or is this an example of Earthcrawlers keeping cool ?"

" I command this ship, mister," Fowler grunted, without turning. " You will keep quiet, please, and hang on to something. The next few seconds may be a bit lively."

" Giant killers. A notably under-staffed profession. My name's Donovan. If I'm to quit this precarious vale of tears in a bright flash, may I know the name of my travelling companion ?" The big Martian wrapped an arm negligently about a stanchion and eyed the gauss-meters warily. " Oh, and thanks for saving my skin, and all that."



" Fowler. Commander Gordon Fowler. And you can stuff that idea of being burned out. That Arc is due for a shock. He's just about got us in focus, now." Into the mike he said " Stand by for drive " and slammed the main-drive full over. The heavy hand of inertia squashed him back in his seat as the ship shuddered and sped straight into the cone-beam of the Arc cruiser. At once the gauss-meters sagged. The success of the move lay in its unexpectedness. Putting himself in the Arc commander's shoes, Fowler would have looked for the little ship to run, or dive into ' pseudo.' Instead, this ship was blasting straight at its attacker.

" They can't focus down fast enough to keep us in the point of the cone," he muttered, aside, to Donovan, " especially if

we hop about a bit," and he rapped the tangential buttons in a fast and random pattern. The little ship groaned and weaved in a crazy path, but always towards the Arc. " The only thing we have to worry about is lesser armament solid slugs, or torpedoes and they haven't thought about them yet, we hope . . ." Into the mike again, he said, quietly. " Stand by, torpedoes. Fire when I straighten out. On three." He began to juggle the tangentials again. " One . . . two . . ." and the ship was steady, now, " three . . . !" The ship thumped, one-two . . . and one-two again. Fowler cut the drive and the screens, and slid home the ' pseudo ' shift, all in one movement. Again there was that universe-stopping clang.

Weary disgust soured all thoughts of success as Fowler saw his immediate universe revert to a jerking, jarring, jumping intermittency. The brawny bulk of Donovan became a flickering, half-seen shadow. The deck slammed and lurched against his feet. He saw Masters climb up through the hatch and weave to his seat. He thought the Communications-officer was grinning, but could not be sure.

" Get us back on course, Mr. Masters," he said, wearily. " Take a statement from Mr. Donovan. Wallace stand by, and see Mr. Donovan bedded down in the wardroom, as soon as ready please."

" Sir !" Wallace waved a flickering arm in a flickering salute.

" We got that Arc, sir," Masters announced, gleefully. " I have his trace in the scope. Heavy dispersal of energy, just where he ought to be, so that's him, all right."

" Good !" Fowler paused at the top of the hatch. " Make a note of it in the log, will you ? Sorry I can't offer you a drink, Donovan. As you can understand, it's just not possible, in these conditions. Some other time, perhaps ?"

" I'll keep you to that." Donovan's voice was curiously tight. " You mind, very much, if your man showed me that wardroom, right away ?"

" Oh, I see," Fowler staggered back from the hatch, understandingly. " That will be all right. Off you go. The statement can wait." Donovan shambled past, grabbing handholds, and disappeared down the hatch. In a moment of steadiness, Fowler saw a grin on Wallace's face as he followed, and the same from Masters.

" Can't blame him," the Communications-officer muttered, charitably. " I was as sick as a pig, myself, the first time I had a dose of this lark. He'll get over it." Fowler waited long

enough to let the burly Martian get decently clear, and then followed. Somehow, the jumping, jittering nightmare didn't seem quite so bad, now. So, the high-ike Marsies, for all their superiority, got ' pseudo ' sick, just like the lesser breeds, did they ?

" Big in the head, weak in the stomach," he muttered, as he sat on the edge of his bunk, to kick off his boots and begin relaxing all over again. One-man ships, he mused, stretching out, were so light and went so fast, that their ' pseudo ' space was a frantic shiver that one could readily get used to. Heavy cruisers, with their giant-sized Romaines, built up a more complete universe, and swam along in reasonable stability. It was the intermediate six-man striker that had it rough. So musing, he drifted off into an uneasy doze.

two

Thirty-six ship hours later he was again on the bridge, this time with Lieutenant Clarke at his elbow. If Masters had guessed his figures well, *London* was only a few ' pseudo' minutes away from the approach-zone of Base Five, and a ticklish moment. They could shift into real space a few seconds too soon, and be half-a-million miles away from the contact-screens. That would mean burning a lot of reaction-mass to cover the distance. It would mean being grossly late on their arrival-time. It would also mean they'd be a sitting duck for any Arc in the vicinity. On the other hand, they could make the shift into real space just a few seconds too late and burst into being inside the contact-screens of Base Five. And that would trigger into automatic and lethal activity every defence weapon the Base had, which was plenty.

Fowler tried to focus his gaze on the flickering indicators, and knew that Clarke was doing the same. There was a trick to it, a knack of letting your eyes go slightly out-of-focus, so that the intermittent solidities formed a stable after-image in the same way that a rapidly flickering stroboscopic lamp could stop rapid motion. Only, a stroboscopic device wouldn't work with random motion or would it ? The germ of that wonder grew in his mind, so that he was startled by Clarke's sudden word.

" We're about there, sir." Fowler blinked, nodded, and switched the auto-shift into circuit. That was another head-

ache device. The auto-shift was ideal for throwing out the Romaine-field accurately to a pre-set time, but its fantastically complex innards had a maximum spread of ten minutes. So you had to set it within ten minutes of the time you wanted to shift, pre-set it for the exact time, and then hope that your universe, the real universe, and your guess, would all come to synchronisation within that range. The red and green needles danced. Dial zero jerked, blurred and swung, jerked again. All three came together. The crazy dance stopped with a crash.

" Peace . . . it's wonderful !" Fowler grunted. " Take a fix as soon as ever you can Mr. Clarke !" and he got busy, with intense concentration, to kill the wild multi-axial spin of the ship. A green indicator-light showed Masters standing by in the radio-room, with codes and log-books ready. This was a vastly different matter from the short-range relay on the bridge. If and when *London* brushed the outer contact-screen of Base Five, signals would fly to and fro. They would be fast and accurate, or it would be just too bad for *London*. Base Five hung poised within an array of multi-mega-gauss screens two thousand miles deep, and the englobed space was liberally strewn with anti-matter space-mines, itching to hurl themselves upon any unwanted intruder. Masters had only to stutter, hesitate, or misread one signal, and someone on Base Five would move a finger and that would be the end of S.S. *London*.

The ship slowed into steadiness. Fowler sharpened his eyes, knowing that the three crewmen, in their turrets, were doing likewise. Should an Arc pop up now, they would have to jump and jump quickly. He could feel the ice settling on his spine as he tried to read six screens and their tell-tales, all at once. Lieutenant Clarke, short and sturdy, dark-faced and solemn, sat by the plot. He had taken his readings with a minimum of motion, and was now waiting, broodingly, as the computer chuckled and chittered over the figures. He seemed to be quite coldly aloof from the general tension. The plot gave a gentle ' ping ' and he began to recite figures, steadily. Fowler fed power to the jets, carefully, swinging the ship's nose until it lined up with the settings. Gently . . . gently . . . and his palms were wet on the control handles.

" That's it, sir," Clarke said, quietly. " Bang on !" Fowler shivered, hoping it didn't show. He cut in the main drive, and the microphone.

" We are under way, Mr. Masters," he said, gruffly. " One eighth drive. Standing by to stop, when you say."

" Righto, skipper. Any minute now." Masters sounded cheerily confident, as always. Fowler had a sudden flash of vision, of Clarke, remotely calm and almost indifferent, of Masters, grinningly cheerful, patting the smooth plastic bottom of one of his lucky dolls at any tense moment, as he was probably doing right, now of the three crewmen thinking of nothing except the possible sight of an Arc, and the burning desire to blast him from space and he realised that of them all, he was the only one with nerves, with fears. Yet they all relied on him, trustingly. To get his mind away from dangerous thoughts he said,

" How's Lieutenant Donovan shaping, now ? Any better ?"

" I imagine he will be, now, but he was feeling pretty sorry for himself as I came up on watch. He's convinced we take some sort of pill to counteract the jitters, swears we are keeping it from him."

" It's a thought," Fowler muttered, keeping his eyes roving on a sweep over the screens. " If we had any such drug, I'm damned if we'd feed any of it to a Marsie."

" Oh, I don't know, sir. He's a fighter-pilot, after all, and they're all unbalanced, even in our mob. They have to be, to volunteer for a job like that. But Marsies aren't all insufferable swine, like this chap . . ." There was a shrill bleat and a flicker of red from Masters. Fowler cut the drive and slammed on the tangentials, all in one jerk. Then, as the ship lost its proper motion, he cut all the jets, and *London* went eerily quiet. It was a hush which seemed to last forever, but it was only a few seconds. Then Masters' voice came, cheerily as ever.

" Clear to proceed, sir. E.T.A. sixteen twenty-five, Base time." Fowler felt a stomach-sagging sense of relief. The coward dies a thousand deaths, he thought, and drilled himself to cover his weakness with official starch.

" Thank you, Mr. Masters," he said, briskly. " As soon as you have that statement from Lieutenant Donovan, you will signal it to Base and a copy for the log, please." To Mr. Clarke he said. " E.T.A. sixteen twenty-five, plot that, please. Better make it to three places." He paused a moment, to collect his thoughts, then switched in the P.A. system.

" Attention, all hands. We shall be putting down on Base Five in about four hours. I needn't tell you that this is Mars Force H.Q., and there will be sharp eyes watching us. I want

them to see that Earth ships and crew are as good as anything they can put up. I'll ruin the man who lets us down. All right, now, let's get cracking !" He knew his crew well enough to be sure that they would take his meaning without any further elaboration, and that *London* would be all spotless and gleaming by landing time.

Lieutenant Clarke completed the fiddling task of matching ship-to-base time, reset the master clock, and passed across a long ribbon of figures.

" Four hours and ten minutes," he said, gently. " Damned if I know why we have a plot at all, when you can guess them as close as that." Fowler grinned, in spite of his inner tension.

" That's about all there is to this stupid game," he said. " You try to outguess machines, all the time." He fed the strip of figures into the autopilot and sagged back into his chair, fumbling for cigarettes. " First time I've ever been to Base Five, although I've heard a lot about it. Same as all the rest, only plus. Fur-lined and with luxuries. Only what you'd expect, from the Marsies. They do themselves well, always."

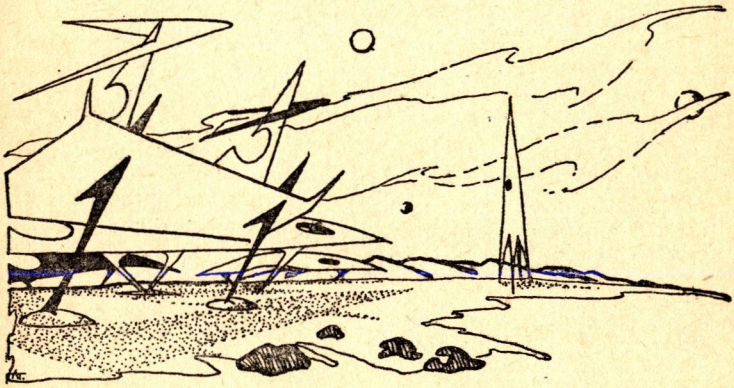
" You can't blame them." Clarke puffed his own cigarette alight, eyeing the dark screens, spotted with out-of-focus star-images. " I did a year on Mars, on a training programme. Hell of a place. Only natural that anyone raised there would be obsessed with creature comforts."

" Yes . . ." Fowler murmured. " You've worked with Marsies, haven't you ? Know a lot more about them than I do. Currently, I mean. What I know is from history. Would you care to hazard a guess as to what they want with us ? I mean . . ." he shrugged, ". . . all I know, and it's no secret, is what was in my orders. From Combined Solarian H.Q., through Earth H.Q. S.S. *London* to report to Base Five. Ship and crew at the disposal of General Haggard, Supreme Commander, Mars Force, for strategic exercises. Whatever that may mean. How the devil can a six-man striker co-operate in strategic exercises with a battle-fleet ? Better than their own strikers, I mean. Why us ?" He glanced across at Clarke, whose heavy-set face was a brooding mask. " Come on," he invited, " you're in touch with Marsie thinking. Why would they pull us all the way from Solar patrol, why us, eh ?" The banter in his tone was deliberate. Ned Clarke, outwardly heavy and solid, was a very bright brain indeed, in matters technical. The very fact that he had been invited to take a

year's course on Mars was, in itself, a sign, for the Marsies were fussy who they worked with.

" I'm no guesser," Clarke smiled, slowly. " That's your special bent. But I can see some significant facts. Mars strikers and fighters do very little ' pseudo ' travel. They prefer to travel in real space, and save ' pseudo ' for evasive action. Only their heavies do any degree of ' pseudo ' time. That's why Donovan was sick. Could be why they want us." He drew on his cigarette, thoughtfully. " Then they've been working for some time now on a new weapon, something very new and special."

" Ah !" Fowler sat up. " That sounds more like it. Any idea what ?"



" Now this *will* be a guess," Clarke smiled. " When I was there, I heard that they had a whole team of mathematicians flogging away on universe-shift theory. I heard they were convinced that it should be possible to analyse the frame-values of any ' pseudo ' universe, from outside. And they were excited about it."

" Well . . ." Fowler sat back, frowning. " I don't know too much about Romaine-field stuff. That's for better brains than mine. But supposing they could do it ; supposing they could get an accurate analysis of a ' pseudo ' universe field, so what ? I mean, when we shift into ' pseudo,' we create our own little universe, we *are* that universe. All of it. What good

would it do anyone else to know its exact parameters ? It's like something locked in a safe, surely. You know where it is, and what, but you can't get at it, can you ?" Clarke smiled again.

" That analogy, skipper, may be the very thing they're working on. I can only go by mess-room gossip, of course, but when you come to think of it, if you know the combination of the safe, you can get inside, can't you ? Similarly, if you could plot the exact parameters of a ship in ' pseudo,' and you had the right gadget, and you didn't care much, you could shift your own ship into that same universe." Fowler thought over this, carefully, then shook his head.

" I pass," he sighed. " What would happen then ?"

" Still guessing," Clarke said, but with a growing gleam in his eye. " It would be messy, for certain. You'd have two ships, two objects, occupying the same space—" and he interlocked his fingers by way of illustration. "—so they'd be all merged together, somehow. Whether or not it's possible for two things to occupy the same space in ' pseudo ' I don't know, but it would be messy, at any rate. Then, almost certainly, the Romaines would break down, and the resulting conglomerate would be ejected into real space . . ." Fowler shuddered and stubbed his cigarette out.

" Isn't there something you should be doing ?" he demanded. " If I listen to you much more, I'll have the screaming jim-jams !" Clarke got up, still grinning, and went to the hatch. Half-way down, he paused.

" What a weapon, though, skipper if they can make it work !"

Fowler chuckled, despite himself, and got busy with the log. One Arc fighter destroyed by corroder-fire. Credit Crewman Harvey ; intelligent anticipation of enemy behaviour. That was guessing, too, he mused, as he appended Harvey's official number and letters. You observed the pattern ; you guessed ahead ; you fired a corroder-burst ; the projectiles exploded to release a short-lived mist of frantically active metal catalysts. No known metal molecule was proof against them. A hit ship literally dissolved in seconds, until the main power-unit blew. The rest was an eye-searing flare of radio-active dust. But the corroder-mist had a small spread and a very short active life. Accuracy counted. Accurate guesswork.

One Arc heavy cruiser destroyed, he wrote, carefully. By anti-matter torpedoes, delivered in ' hot-run ' tactic. Credit ship's company as unit.

" Thank you," he said, " but I'm under orders, you know. I imagine General Haggard will have his own ideas as to what he wants us to do."

" Oh, duties . . ." Donovan patted the air with a large hand. " Plenty of time for those. A word from me, and Jack Haggard will say ' Hello ' to you, and then give you all the liberty you ask for. I'll see to it. Dash it, skipper, you need a break, after a trip like that !"

" The trip . . ." Fowler said, stiffly, ". . . was routine. My ship and crew are at General Haggard's disposal, now, this minute, if necessary. I must ask you not to interfere. I shall request liberty, of course, subject to what the General has to say. After that, if possible, we shall be happy to accept your offer of hospitality." Even as he said it, he realised how stiff-necked it sounded. This business of being one lone Earth ship on the fabulous Mars Base was giving him an acute inferiority consciousness, and he made an effort to unbend. " In the meantime—I did promise you a drink. Synthetics of course. Genuine liquors won't stand the bashing about, you know."

" It's a thought," Donovan said, negligently. " Ethyl alcohol is a cut better than water, at any rate. A protoplasmic poison, and a ruinous habit, but palatable, with a citrate or two, some ice-dust, and sugar." Fowler dialled a vodka-and-lemon formula into the synthesizer, waited a moment, then handed the misting glass to the Martian. He took it, and stared.

" How about you ? I hate drinking alone."

" No thanks," Fowler shook his head. " I have a landing to make. See you when we're safe down." He went back to the bridge, slowly, settled himself, and scanned the screens.

Base Five was just beginning to show as a point on the radar screen. A glance at the clock showed just under an hour to go. Down from the bridge again, he prowled forward. The crew-space was all buttoned up neatly and shipshape. The rescue grapnels had been carefully coiled and stowed. The bow-torpedo space was neat and taut. He went down another deck. The belly corroder-bay was all square. A bulkhead patch-box was an inch out of line, and he squared it with a touch. The paint-work, here, could do with a freshener, he thought. That would be something to keep the hands busy, in an idle moment. He went on, to an outlet port, where a red-light burned. He paused by the intercom box.

" Captain here. Who's out there ?"

" All three of us, sir," came Harvey's voice. " We're loxing the hull. Be all done in ten minutes." Bert Harvey, senior crewman, had shipped with Fowler in this ship right from the first, and was the type who needed little telling.

" All right," Fowler said. " But see that it is ten minutes, mind. And easy with the lox. We have a landing to make." Liquid oxygen was ideal for imparting a mirror-like gloss to the beryl-chrome hull, but it was also a precious fuel component. He went on, to the stern-tunnels, where Clarke was making a cold and rigorous last-minute inspection of the drive-gear. He looked round.

" Half-an-hour," Fowler said. It was enough. They all knew, without having to be told, that landing was the hardest part of any trip. And this landing, under the full gaze of critical Martian eyes, would have to be just that bit better than perfect. Furthermore, once begun, it was all Fowler's. The men knew it, and were doing everything they could, to help, beforehand. Once he took the controls, there would be little they could do. One hundred and fifty tons of squat, bullet-shaped ship had to be set down, on end, with precision, and he had to do it. He wiped the sudden sweat from his palms and went back to the bridge. The clock crept on, inexorably. Base Five should be an identifiable shape, now. He settled in his seat and wound up the magnification on the view-screen until he could see details.

three

Distant one third of the forty light years that separated Arcturus from Sol, the Solarian forces had hung an array of defence bases, seven in number, like a giant snowflake pattern, two light-years across. Six outer bases in a circle, of which Earth mounted One and Four, Mars staffed Two and Five, and Venus accounted for Three and Six. The seventh and focal centre was Allied High Command. The bases were structurally alike, built to a design that had proved itself as the most efficient. As Fowler looked at it now, Base Five appeared just like any of the others, but he wondered how different it was, close to. Four equilateral triangles, welded edge to edge to make a tetrahedron, a mile a side. Warning antennae spiked from each corner. Flood-lights orbited in close brilliance. The flat, gleaming, steel-sponge facets were pock-marked and pimpled

in patterns of landing pits. Just like any one of the other bases. But inside, just how super-efficiently different was it, he wondered ? Very few non-Martians had ever visited this base, but there were rumours and to spare, all of them probably exaggerated.

As he watched, one face of the slow-spinning hulk glowed green. That was the guide-beacon, telling him where to bring down his ship. A needle shivered and swung on his panel, measuring the growing drag of the base gravity-fields, as the ship fell into their grasp.

Lieutenant Masters came scrambling up through the hatch, excitedly waving a signal-sheet, passed it across.

" Billet orders," he said, superflously. Fowler took the sheet, clipped it to the panel, switched the microphone to general P.A., took a deep breath.

" Landing stations ! All stations report !" Almost at once, two reds lit up, one from Masters, only a few feet away at the approach radar, the other from Clarke in the main-drive room. Split-seconds later came three more reds as the crewmen reported from the pit-strut bays. The green-lit face of Base Five grew in the screen. Fowler wound the magnification back to zero, took a quick glance at his drive panel, then stared again at the landing site. His jaw set, grimly, as he analysed the position.

" I make it that Pit 15 is that clear one in the middle of the group, at about five o'clock," he said. " Check me, Mr. Masters."

" Checking . . ." Masters studied the layout, frowned, and whistled, softly. " You're right, sir—and that's a bitch of a lay, if ever there was one. It looks as if somebody wants us to fumble this."

" That's what I thought," Fowler growled. It was far from nice. His billet orders specified pit 15. And pit 15 lay empty inside a solid ring of bedded-down strikers, each snug in its pit each pit designed to fit that class of ship, with barely a yard clearance in the hole. In theory, a skilled skipper should be able to drop his ship plumb in the middle of his pit, like a cork in a bottle. In cold reality, however it usually took a bit of juggling around. Cautious skippers found it less wearing on the nerves to put down on the flat, and leave it to a crane-crew to hoist and drop the ship into the pit. But there was no room, here, either for juggling, because the jets could wreak havoc with the closely packed ships around, or for backing down on

to a flat area, because the nearest flat was several hundred yards from the pit, and the crane-crew would have to spend many hours juggling the ship up and over the serried ranks of the already berthed ships.

" What's the form, sir ?" Masters queried. " You going to put her down on a flat ?"

" I'm damned if I do," Fowler gritted. " If they want to play it fancy, then I'll play it that way, too. I'm going to put the cork in the bottle, first pop, or muck up a few of their ships trying. Keep your fingers crossed, I'm turning her over." His voice was light, but his stomach was knotted into hard lumps as he spun *London* end-for-end, switched to rear viewing, and caressed the jet controls. His palms were wet again, and he snatched a brief moment to wipe them on his trouser legs. From the corner of his eye he saw Masters reach out and pat the plastic bottom of a dangling blonde doll. He put his eyes back on the target, and they misted over as he concentrated on that black dot. He squeezed his eyes tight shut for a second, took a deep breath, and settled down to it, grimly.

" Seventy-five thousand . . ." Masters called. " Seventy . . . sixty-five . . . sixty . . . fifty-five . . ." Fowler eased off the firing handled, just a shade. Come down too slow and you wobbled about all over the place. Fast and straight was best, if you were on aim. The black spot grew, slid a little off centre and he corrected, with delicate touch.

" Thirty-five . . . thirty . . . twenty-five . . ." Masters droned.

" Aha ! Belting into the old home stretch, eh ?" Donovan's lazy drawl cut into the tense silence, and Fowler jerked, nervously. Correcting instantly, he kept his head rigidly forward, on the screen.

" Get that bloody fool out of here !" he said, harshly.

" Shove off, you idiot !" Masters warned. " You want to wreck us all ? Get away out of it !"

" So sorree . . ." Donovan drawled.

" Fifteen . . . fourteen-five . . . fourteen . . ." Masters took up the drone again. " We're dropping fast, sir."

" I know, damn it !" Fowler snarled. He snatched a hand to the viewer, to boost the magnification for a moment. Now he could see the ring of pit lights, at the bottom of the shaft. Centre on them—centre, damn it—the lights slid to one side and he corrected, desperately. A bit more, still more, the ring of lights grew into the whole screen.

" Five hundred . . . four-fifty . . . four hundred . . . still dropping fast, sir." Fowler watched the lights, holding his breath, holding on ; then he slid the firing handles full over. The heavy hand of decelleration smashed him down in his chair, and the view dissolved in a heat-haze of ravening jets. Now his only guide was the echo-proximity needle, swooping towards zero. It flew, and slowed, and crept, and hovered, just short of ground zero, and stopped. And before it could begin to swing back again, he cut the whole panel. There was one sharp, jarring thud. Then silence. Into the microphone, as calmly as he could manage, he said,

" Out struts !"

The three reds winked out. The silence in the little bridge cabin grew and became oppressive, for fifteen seconds. Fowler clutched his seat arms. He knew Masters was doing the same. As the struts hit the pit walls, the whole ship would be locked safe, but not till then. Then the deck shivered to a thump, through the hull, and the three reds lit up again. Fowler let out a sigh of relief. It was echoed by Masters.

" That was a hell of a landing, skipper," he said, with deep respect. " Bang on, all the way down."

" Plenty of luck," Fowler shrugged, " and some good guesswork."

" That's not what I saw, from here," Masters disagreed, politely. " I'd call it skill, and damn good judgment. That's something for me to aim at, if and when I get my own command. I hope I can do it as slick as that."

" I hope so, too," Fowler grinned across at his Communications-officer, to see him give a congratulatory pat to his dolls. " Strictly between us, that was largely good guessing, though. It's the sort of thing a chap sometimes can pull out of the hat when he's damn well got to. I reckon Haggard laid on that billet deliberately, as a sort of test. I'd say, also, that we've managed to pass the test with flying colours. Wiped their eyes, in fact. And I suggest we can make it even better, just a shade, by pretending that it was just routine. You know, that we do this sort of thing regularly. Will you pass that on to the rest of the crew ? See that our passenger doen't hear you, of course. All right ? Now, get me H.Q. on the visor, and then go and see about getting a gangway out."

" Right, sir." Masters busied himself with his panel. " I still think it was a great job of piloting, though." The intercom

screen swirled into life, to show a smooth, unpainted female face, with all the cold perfection of a Greek marble. Fowler stifled his surprise, heard Masters give a low, appreciative whistle, shot him a rebuking side-glance, then,

" S.S. *London* to Base H.Q. Commander Fowler reporting. All secure and awaiting instructions."

The beautiful mask said, " I will connect you with Supremo . . ." there was a click, and then another face, thin and sallow, but hard of chin and jaw. There were deep lines of weariness around the mouth, and a brooding depth to the dark eyes, shadowed under an almost bald pate. The uniform was stiff with gold and gay coloured facings.

" Ah ! Commander Fowler, I believe. Glad to have you aboard, Commander. I'm Haggard. Your time-keeping does you credit. I trust you had a pleasant trip ?"

" Nothing out of the ordinary, sir," Fowler said, stiffly, " apart from the rescue, that is."

" Yes, that . . ." General Haggard glanced aside for a moment. " Lieutenant Donovan, I believe." His tone indicated that the name had made certain things very clear to him, and his next words proved it. " You mustn't let the ebullient Donovan give you a wrong impression of us, Fowler."

" No, sir. Any immediate instructions ?"

" No. Nothing urgent. You have the usual allowances, of course. Fuel, stores and replacements . . ."

" And liberty, sir ?"

" Certainly. Freedom of the base for the next twenty four hours, at least. I'll send a signal to confirm that, immediately. Now . . ." and he glanced aside once more, ". . . I'd like to have you join me for dinner, at . . . let me see . . . nineteen hours, can you manage that ? And if you would pass that information along to Donovan, he can act as your guide."

" Very good, sir, and thank you. Formal ?"

" Eh ?" Haggard looked startled for a moment. " Space, no ! Formalities are formulae for the fuzzy minded, Fowler. We don't bother much with them, here. Come just as you are."

Fowler switched off, and sat a moment, pondering that tag about formalities. That attitude could play hob with discipline if everyone had it. He took up the microphone, setting for P.A.

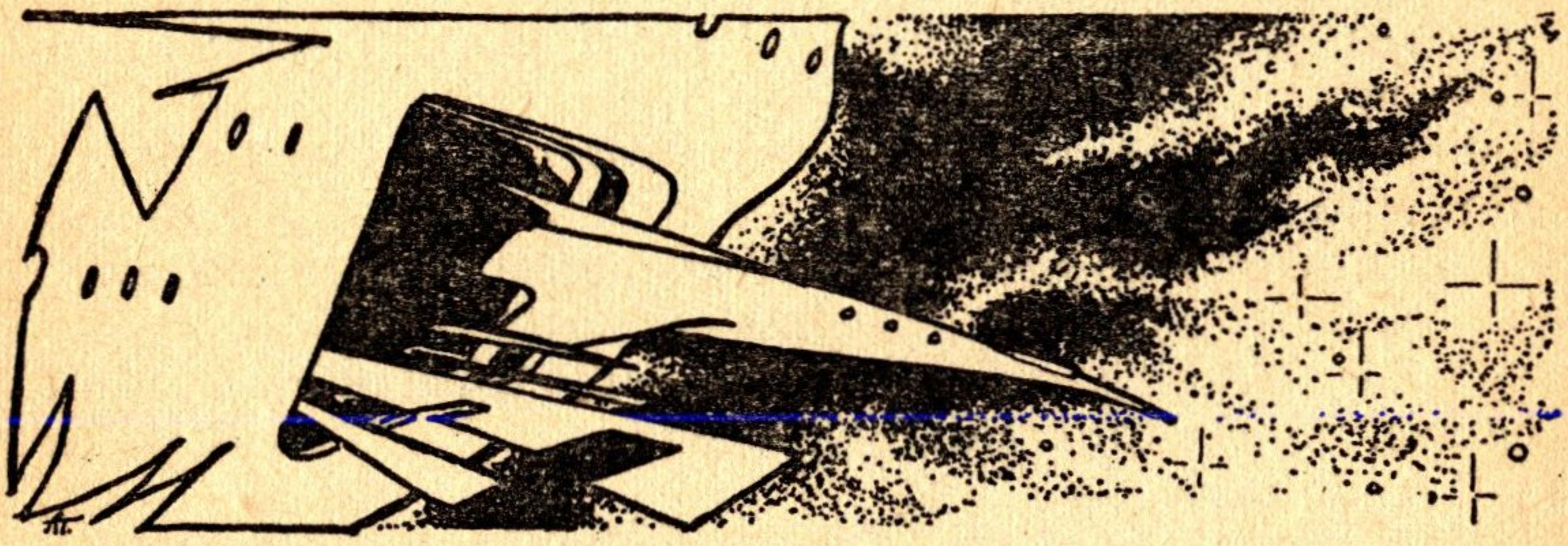
" Attention, all hands. Captain speaking. We have been granted freedom of the base for twenty-four hours. Mr. Clarke

will come to the bridge, please. Also crewman Harvey. Lieutenant Donovan will await me in the wardroom in ten minutes."

Clarke and Harvey arrived together. Fowler eyed them, thoughtfully. He had never been able to solve, in his own mind, the right balance of emphasis between strict discipline, and easy relaxation. And here the problem was again.

" I want everything checked and double checked," he said, quietly. " I want this ship on top line, immaculate, stored, ready for space—the lot, before any man sets foot on that gangway. Understood ?" They both nodded.

" And one thing more . . ." he hesitated, awkwardly. " I may be wrong, but I have the feeling that Supremo is going to lumber us with a right swine of a job. I've no idea what it will be, but it will be something their own people can't do, you may be sure. That means it will be rough. It also means that we



have something of a name here, already, and we've got to keep it up. We've made a fair start, so let's keep it that way. Take your liberty, by all means, but take some common sense with it. Let's not have any pickled livers or throbbing hangovers to cope with. And I should imagine the local chaps will hate our guts—so stay away from trouble with the Marsies. Understood ?"

Ten minutes later, he confronted Donovan, in the wardroom. " I have a message for you, from General Haggard. I'm to take dinner with him at nineteen hours, and you're to be my guide." Donovan gave a lusty whoop.

" Dinner with the boss, eh ? Something large looms, and I shall be there to hear. Bliss unadulterated. The time now is . . ."?

" Sixteen forty-five."

" Fair enough." The burly fighter-pilot heaved himself up out of his chair. " I'll scoot, now, and clean up a bit. Catch you here, at eighteen thirty, eh ?" and he went off, limping.

" Stop a minute," Fowler called. " You're hurt."

" It's nothing. Bent my ankle when you threw out the anchor just now. The sick-bay will fix it in a couple of jiffs. You always bash in to land like that ?" Fowler stifled his glee beneath a formal smile.

" Just a routine landing. Nothing special about it."

" Routine is a rut, is ruinous," Donovan said, heavily. " But neat, all the same. I'll be seeing you."

For a long moment after the Martian had gone, Fowler stood quite still, ticking off in his mind all the routine matters involved in settling into Base. Then deciding there wasn't anything of pressing urgency, he went to his cabin, set his bulkhead clock for eighteen-fifteen, linked in with the intercom, just in case, and was asleep almost as soon as his head hit the pillow.

One minute short of eighteen-thirty, freshly laundered and shaved, he stood by the head of the gangway, where an accordion-pleated tunnel slanted down into the underworld of Base Five. Through a plexiglass window he could look down into the landing pit. He smiled. Sheer luck, of course, but *London's* hull stood as perfectly centred as if she'd been lined up with a micrometer. His smile became rueful as he realised what a standard he had set for himself. He might not be so lucky, next time. A clatter on the gangway distracted him, and he turned to look. This should be Donovan.

His look became a stare, and chill rage grew in his mind as he took in the details. It was Donovan—with Wallace, and Cross, and Harvey—and they looked as if they'd been trampled by an army. Bloody but unbowed, he thought, involutarily, as Donovan led them up the ramp. The Martian's nose was red, and visibly throbbing, his bottom lip split, an angry graze across his left cheek-bone, and there were spots of blood on his whites. But his grin was as big and breezy as ever.

" Ah, but you should see the others," he boomed. " It was murder. Great stuff. Haven't had a fracas like that in a dog's age. It's all right, friends, you trot along. I'll tell the tale." But Harvey stood respectfully, by the ladder-top, and his crewmates with him.

" Well ?" Fowler said, grimly. " Give me the gist. I'll have the details later."

" It was nothing we could help, sir," Harvey said, thickly. " There we were, having a quiet drink, you see, and not paying any attention at all. The Martians fancy they have the great wit, so they do, and they were making remarks about old Digger, here—cracking on about Darwin, and all that—but he don't mind it," he shrugged a shoulder at Cross, who grinned, painfully, through a fast-closing eye. His six-foot three of hairiness and muscle had let him in for many such sarcasms, and he was used to them.

" Too right, they were begging for trouble," he said. " So we were drinking up, as fast as we could, and getting set to pull out. We'd have had to bash them, if we'd stayed there, you see . . ."

" That's true," Harvey took up the tale. " We were just after leaving, peaceful, as you might say, then along comes this feller and he says we shouldn't put up with all the insults like that . . ."

" That will do !" Fowler put up a hand. " Get below. I'll take this up in the morning. I can't wait now. Shall we go, Lieutenant ?"

" Certainly !" Donovan grinned again, and waved a sloppy salute to the three crewmen. " See you again, sometime, boys. This way, skipper," and he went tramping down the gangway again.

Fowler followed, in furious silence. Even on Earth's Base One, which he knew reasonably well, he had never been quite happy at threading the bewildering maze of ride-walks and lifts of a four cornered, multi-level world. Here, where the Martians, with their ultra-keen wits, had dispensed with all signs, guide-colours or direction-aids of any kind, he felt hopelessly lost. That, in itself, was disastrous to his confidence without the added burden of a shocking breach of inter-allied relations. A drunken brawl, with all his crew involved, and this great loud-mouthed fool of a Donovan in the thick of it. Fowler writhed, inwardly, at the prospect of facing General Haggard with that load of trouble on his mind, so much so that he gave up any attempt to learn the route, and followed Donovan blindly.

" Interesting shindig, that was," Donovan commented, cheerfully. " Could see your cohorts preparing to withdraw

under bandinage. Couldn't allow that. Gives a nasty taste in the mouth. Damn it, they saved my skin. Fine fellows. So I put in a gentle word. Soskin and Barrat—very sharp-tongued pair, especially when oiled, tangled with them before—know their form. So I told them to put up or shut up, you know . . ."

" So . . ." Fowler said, coldly. " You started it, did you ? I hope you'll be good enough to say so, when I have to account to General Haggard. I particularly warned my crew to keep out of trouble."

" Trouble ?" Donovan roared, as they stepped out of a lift on to a ride-walk leading down a corridor tinted with rose-neons. " What trouble ? Who minds a spot of cathartic violence, in Space's name ? Man has the right to defend his opinions, surely ?"

" Not to the detriment of self-control and discipline !"

" Discipline ! That's for those who'd fall down without it. Man should be able to stand on his own feet, damn it. Do what you think right, and the hell with anybody who thinks different. Discipline ! You sound like a Venus sister."

Which was, Fowler thought, choking, the ultimate insult in polite language. He fought his rage, striving to remember that this man was, after all, a fighter pilot. Such men, in all the allied forces, were chosen from those who were so individualistic as to be almost psychotic. But to be classed with a Venusian ! He bit on his anger, and rode on in silence.

Venus had been colonised by the United States of America, at a time when that country had reached a peak of conformity in its culture, at a time when it was axiomatic that all men were equal, any man was as good as any other man, and it was heresy to be different. In that day and age, it was ' togetherness ' which counted, and ' deviate ' was a bad word. Thus the Venus colony became epitome of uniformity, orthodoxy, security—and the inevitable mediocrity which goes with such beliefs. And it was done thoroughly, too thoroughly.

Within three generations, the U.S. pendulum had swung back and the nation had become what it was eminently suited to be, the Sears-Roebuck of the Solar System. But Venus had crystallised into the original mould, and continued its own way, disowning its parentage. Now Venus was noted for cloying suavity, insistence on doing the accepted thing, and for a tendency to choose maternal-minded middle-aged women for high executive posts. Consequently their ships were lushly

comfortable, their uniforms beautiful, their efficiency impeccable, and their battle record depressing.

A Venusian ! Fowler was still simmering as he was ushered into the presence of General Haggard. The General, standing, was a little man, almost frail alongside Fowler's well-knit five-foot ten, but there was a power of command about him that was almost tangible. He took Fowler's hand, glanced past him at Donovan, and smiled.

" I've heard the full story, Commander. I know how distressed you must be, so let me say, at once, that your men are completely exonerated. I have already taken steps to reprimand the real offenders, all except one. Daniel, my lad, you will have to wait until I can devise a fitting punishment for you. Now, Commander, let's go in to dinner shall we ? I've invited a few guests, all eager to meet you, and to hear a bit more about that ' hot-run ' tactic . . ."

four

It had been a really first-class dinner, Fowler admitted to himself, as he surreptitiously let out his belt a notch. And a sharp-eared, keen-minded audience, too, quick with brief but penetrating questions and comments. His brain felt laundered and pressed as the guests took their leave, all but one. Haggard led the way into the mellow quiet of his study.

" You too, Daniel," he ordered. " You and Carradine over there. Fowler, here by me. And try a glass of this." ' This ' was a rich, purple red liquor with a bouquet faintly reminiscent of tangerines. It slid over the tongue like silk, spreading a warm glow as it went. " It's not alcoholic, in the strict sense. Juice of a native Martian berry, processed to a special formula. Molecular structure very similar to adrenochrome. Too much and you'll see visions, so be warned."

" That's all right, sir," Fowler smiled. " I'm strictly a taster. Don't believe in going too strong for anything, unless I have to."

" Forgive me," Haggard chuckled, " but that's a tale you'll have to keep for the mythical Marines. I watched your landing, remember. But now, to business. I have asked Lieutenant Caradine to be here in his capacity as mathematical physicist, just in case I lose myself in the complications, and to answer questions. You have no idea why you are here, so I'll

tell you. I asked for you. More precisely, I asked for a striker and crew of known and very high efficiency, to be of assistance in a rather important and delicate series of experiments. I have no striker of my own force which comes anywhere near the standard I need. I am being very frank with you, Fowler."

" I appreciate that, sir. I gather, also, that you were not taking our reported efficiency for granted. I hope you're convinced, now ?"

" Let's say that I'm impressed, shall we ?" Haggard chuckled again, then his face went solemn. " I'd like to review the current situation, just to get it into a perspective. It's bad. We, of the Solar System, have been at war with Arcturus now for fifteen years. The situation is as senseless now as it was the day it all began. We still have no idea why the Arcturans attacked us, what they want, what they are like, or anything about them. As you know, they began it all with an out-of-the-blue attack on our three worlds. They caught us flat-footed, and we took a devil of a beating."

" I've often compared that with the Hitler-German assault," Fowler mused, " You may recall it, sir, from the books ? If the Nazi forces had kept their original advantage, the whole course of history would have been vastly different."

" The parallel is a good one," Haggard nodded. " If the Arcs had kept coming, we wouldn't be here now, that's a certainty. However, they didn't, and we were lucky. We had one of their ships, and a barrel of observations and by frantic makeshifts, we were able to copy some of their stuff. Their star-maps told us where they were from. We paid them a visit. We clobbered a lot of ground installations on their five-world system. They did us a lot of damage. We did it back to them. They lost ships. So did we. And so it has gone on. Both sides have set up massive planetary defenses. Stalemate, there. In space, it's the same story. We match them, ship for ship. Weapons ? They have disintegrating solid-slugs, we have corroders. They have UHF beams, we have anti-matter torpedoes. They have screens, we have them. And we both have the ' pseudo ' drive. Neither side is getting anywhere, or so we hope and think, but we do not know.

" We cannot treat with them, because we cannot communicate. Possibly because they do not *want* to communicate with us. We can, and do, catch something we believe is their equivalent of radio, but we cannot crack it, so far. We dare

not apply the parallel here, for they may be listening to us, they may have learned our tongue. That would put us at a grave disadvantage. As of this moment, and all the time until now, we have been retaliating, on the defensive—we have a tiger by the tail, and we dare not let go. But we want to. We must. We must end this whole business soon, or we will ruin ourselves. As it is, we are thinking wrongly. This whole Base system is nonsense—was the result of panicky thinking. As if one could hang up a barrier, in space ! It is painfully obvious that we must take some initiative, somehow !"

Fowler took a deep breath. It was worth a gamble, he thought, as he eyed Haggard's careworn face.

" So . . ." he said, quietly. " It *is* a new weapon, then ?" Haggard cocked an eyebrow, instantly.

" That is a very good guess, Commander. Logical, of course, but very good, just the same." He paused, and his other eyebrow went up. " You have that look, as if you knew, or thought you knew, what the weapon is. Care to guess again ?"

" I might," Fowler said, outwardly calm, but jittering, inside. Out on a limb, now, he thought. Might as well go the whole hog. " I think . . ." he said, very slowly, ". . . that you are working on some way of projecting into the ' pseudo ' frame of a ship." Haggard put down his glass, steadily, and looked across at Carradine, who was frankly staring.

" That's too good, you know," he said, softly. " I think there has been a leak of some kind. Carradine ?" The mathematical physicist sat quite still, his long sad face twisted in thought.

" Not a leak . . ." he murmured, almost to himself. " But a good guesser, with one strong hint, an Earthie who might have had the chance to hear a thing or two." He shut his eyes, then smiled, suddenly. " Got you . . ." he looked at Fowler. " You must have been talking to someone with a contact, and the only one I can think of, recent enough to know, would be Ned Clarke." He turned to Haggard to explain. "I remember him sir. Very good man indeed. Did a year training, in Heliopolis." Haggard nodded, and turned a quizzical look on Fowler.

" My turn to be impressed," he admitted, readily. " You're quite right. Not that he gave me any great details, of course."

" You're damn right, he didn't," Carradine interrupted, warmly. " We don't know all the details ourselves, yet. We're just hoping that it will work. Ned Clarke, eh ? How long since you spoke to him, Commander, and what's he doing, these days ?"

" I was talking to him only a few hours ago," Fowler grinned. " He's my tech-engineer." Carradine started, spilling his drink.

" You mean, he's here, with you ? Sir . . ." he swung on Haggard, excitedly, " We can use him. A first-class man."

" Relax," Haggard smiled. " Of course we'll use him. We're using *London*, are we not ? I like this more and more, Fowler. I had no idea you were going to be such a prize packet."

" Smooth as cream, these boys," Donovan boomed. " You should have seen them snatch me out of the big dark," Fowler shrugged, awkwardly.

" Can we get down to cases, sir ?"

" Of course. I'll make it simple. You know that the Romaine field is like a blister in space-time, creates a quasi-universe of its own. And this ' pseudo ' universe is intermittently in contact with the real universe at infinitely small points, just as the point of contact between two spheres is infinitely small, in theory. You also know that the matrix-values of the field are the product of the inter-action between the field generator and the object which has been ' shifted.' Therefore, just because there are no two things exactly alike in this world, so no two Romaine fields are ever alike. The chances are infinitely small that any two ' pseudo ' universes will be identical . . ."

" That's the crux," Carradine broke in. " You see, only a few molecules of difference will produce a completely unique universe. That has been our biggest headache, to find a method of matching values with a given field."

" You speak for yourself," Haggard rebuked him. " My difficulty has been to mount a ship efficient enough to take sufficiently accurate readings. The whole point is . . ." he turned his gaze on Fowler, ". . . the matching has to be done from ' pseudo.' There just is not any way of detecting a Romaine field from real space."

Fowler put down his glass, hurriedly, and coughed.

" But, you're not suggesting, sir, that we could attempt any sort of fine-degree instrumentation, or detecting, in 'pseudo' . . .?"

" I am suggesting it. It's the only way. Only with a ship inside a Romaine field is there any chance at all of detecting another Romaine field. It can't be done any other way."

" But it isn't possible to do anything accurate, in ' pseudo '!"

" This is no time for modesty, Commander," Haggard said, sternly. " You made a high-precision pick-up on Donovan, here. You contacted our screens within seconds of your estimated time. You locked down into pit 15, precisely on time, and dead-centre. That's precision. That's what I want."

Fowler felt trapped. He itched to protest that his performance was all guesswork and high-degree intuition, which was the truth, but it didn't sound very convincing, even to himself. He knew, dismally, that these men would never believe his story.

" Lieutenant Donovan," he said, appealingly. " You know what it was like, on *London*, in ' pseudo.' You've had experience . . ."

" That will do, Commander !" Haggard put an edge on his voice. " This is the way it is going to be, I'll have no argument. I shall be putting a construction crew aboard *London*, tomorrow. I expect your co-operation and assistance, and you, Carradine, will go along, to supervise and instruct on the operational controls. We'll lift off as soon as ready. I have a drone ship ready, as target."

" How about staff, sir ?" Fowler asked, miserably.

" Yes, your men will be fully occupied, won't they ?" Haggard mused. " You will need a fast-response calculator." His brooding gaze swept across to Donovan, who groaned.

" Not me Jack, please. I get sick, with all that jittering."

" You'll report for hypno-therapy. That will fix that. Let's have no more of this grumbling. That is an assignment !" Fowler saw the steel under his quiet manner, and Donovan subsided.

" Hoist with my own petard," he mumbled, and Fowler knew exactly how he felt.

He went back to his ship with a trim-uniformed gorgeous girl as his guide, and such was his mood that he hardly spared her a thought. Even young Masters, he thought, would be hard put to it to work up lechery, with a load of grief like this.

A vision plagued him, of a huge sphere, like a soap bubble, with two little bubbles bobbing about on the outside, trying to to break in. And he knew that if either of the little bubbles bumped the other too hard, both would burst, and cease to exist. That wine, he thought, as he scrambled into his bunk. Potent stuff. He hoped he wouldn't have a head from it, in the morning.

Forty-eight hours of Base time slid rapidly by in the press of urgency. A gang of hard-eyed technicians swarmed aboard, laden with equipment. As they crawled the hull, *London* sprouted three new and complex antennae on her bows. The torpedo bay was gutted, transformed, filled with weird and intricate devices, and sealed off. Remote controls grew, in the already crowded bridge, and Fowler put in a bitter complaint to Carradine.

" Blast it," he said. " There's hardly room for us in here, now, without all this stuff. We'll never be able to manage three men."

" Four," Carradine corrected, " and it's purely temporary. We need all this to get the data, but once we have it, we can sweat a lot of this down to automatics. We have to get the data first, though."

Fowler stifled his dismay. He hated the thought of a crowded bridge in operations. The fear that rode on his back was most evident, then.

" Tell me," he asked the physicist. " Supposing we succeed in matching the field of another ship, and then shift an object into that field. Then what ?" Carradine rubbed a finger alongside his nose, thoughtfully. On the other side of a gauge panel, Clarke raised his head, to listen, intently.

" We don't know for sure," Carradine said, " but it should be one of three things. If the match is more than one per cent inaccurate, the projectile will be rejected, will bounce back at us. Just a solid impact."

" A mere detail," Fowler said, sarcastically. Carradine grinned.

" A more perfect match should break down the field, and eject both the ship and the projectile into real space. A really good match, though, should fuse the ship and projectile into simultaneous existence, within the field."

" Hmm !" Fowler forced himself to consider this, objectively. " It doesn't sound very effective. Nasty, I know, to be

struck with a projectile, but the ship might still be able to function. Like a chap with a bullet in him."

" True, but not if the ' bullet ' was an anti-matter torpedo," Fowler froze. For a long moment his voice refused to function Then, swallowing, he said,

" Thanks. Thanks very much. That's made my day."

As he took his place on the bridge for the first trial run, he was still having visions of an engagement with the enemy, of launching half-ton torpedoes loaded with anti-matter warheads, of having them bounce back and the vision curdled his blood. He sat. Haggard had already lifted off in his flagship, *Mars*. The drone was ready to blast. *London* was to follow the drone, at a five-second interval. Masters, squashed into a corner, was intent on his screen.

" Drone away !" he called, suddenly. " Four . . . three . . . two . . . one . . ." and Fowler leaned on the drive-controls. Muffled thunder shook the ship. The ground-zero needle shivered and began to lift, steadily. They were off. Seven minutes later, and a hundred miles outside the outer screen, Fowler poised himself, again waiting for Masters. It had been a screaming ascent, hard-over all the way, and the drone just ahead. One hundred and fifty miles away, *Mars* hung, watching. The drill was simple. The drone was programmed to shift into ' pseudo,' and remain at rest, in so far as any object could be said to be at rest in a Romaine field. Still keeping the five-second interval, *London* would shift after her, try to locate her field traces, try to match them, preset a dummy projectile to those values, then launch it. The dummy was the same size as a torpedo, for accuracy, but merely solid steel. Merely ! Fowler thrust the thought away, wiped the sweat from his palms, and waited.

" Drone gone !" Masters called. " Four . . . three . . . two . . . one . . ." and there was that bone-jarring clang as Fowler threw in the Romaine field switch. A giant hand shook the ship and its contents, like dice in a pot, and went on shaking it, irritatingly. The lights flared and died, flared and died. Reality came and went, and came again. Fowler recalled a description he had once read. ' The object is squeezed out of real space-time, and tries, incessantly, to batter its way in again.'

Dials and pointers jiggled and danced before his straining eyes. Clarke and Donovan, heads together over their improvised panel, became intermittent phantoms. He hoped they felt more confident than he did. In the middle of his own panel was a new dial, for steering. ' Steering '—in ' pseudo,' he thought, grimly. Nothing, in no place, going nowhere. But this dial was fed from the observations that Clarke and Donovan were hoping to make. They would load the tracking needle. It was his job to juggle the base, the dial, to follow.

" I'm getting something," Clarke mumbled.

" Likewise," Donovan choked. " It could be merely nausea-induced hypnagogic imagery. However . . ."

" Loading the tracker, sir," Clarke warned, and the needle began to jitter off to the left. Fowler had never biassed a ship by hand in ' pseudo,' nor had anyone else, so far as he knew. The controls felt sluggish, and stiff. The ship seemed to skid and slip and twist, as he watched the needle, and fiddled to get the dial zero back into line with it. He wanted to shut his eyes, or rub them, knowing full well that either course would not help at all. The senseless, never-ending pounding began to get on his nerves. The needle slewed again, and he tried to correct for it. He was beginning to get the feel of it, a bit.

" Stronger, now," Clarke mumbled. " You getting anything, Don ?" to Masters, who was intent on his own screen.

" Something there, all right," Masters jerked. " If only this damn bucket would hold still long enough to get a fix on it."

" I'd like to get it a bit finer," that was Clarke again. " I'm going to swing her a bit." Fowler saw his needle slew. He corrected, patiently. It slewed back the other way, and he followed it, gaining precision with every try. He felt the beginning of a splitting headache, but ignored it.

" That will have to do," Donovan growled. " Hell, if you get it any finer than that I couldn't set it up on the projector, anyway, so what's the point ?"

" All right," Clarke muttered. " As you say. Ready to throw, sir."

" That's the stuff. Let's get rid of it, and go home." Donovan sounded as if he was thoroughly sick of the whole business.

Fowler couldn't blame him. Touching the microphone switch he said, " Stand by, all. We are about to fire." and he nodded to Clarke. " When you're ready, mister." There was

light, and tap his helmet, his voice coming thick and querulous over the radio.

" Damned foolish effort, all this," he said, " How the blazes can a man hit a fine reading in this hiccuping nightmare ?"

" I wonder you couldn't figure out some kind of automatic device, a slave system, perhaps. Eliminate the human factor, why not ?"

" It was thought of," Donovan sounded disgusted. " Not so simple. It would have needed a computer. Just not enough room for that. Finest computer in the world, right here," and he tapped his helmet again, ". . . but useless without accurate data. No good when you can't see straight." Before Fowler could comment, there was a snapping jerk, and a clang, and the Romaine field was off. In the sudden, steady, dim stillness, he felt his suit inflate against the external pressure-drop. It was a grim sign. It could only mean that the fabric of the ship was so badly warped that the section-doors were no longer airtight.

" Mr. Clarke ?" he said, anxiously. " Report, please." Silence—then a click.

" Clarke here, sir. We have Cross in a suit and safe—but he's badly crushed, bleeding internally, and there's nothing we can do for him, in a vacuum."

" Other damage ?"

" Lower forrard section is badly holed. The projectile slammed right in as far as the messdeck. Main power-plant still functioning, but I doubt if you've any controls. Bow fuel tanks gone. The bow tangents look all right, but there's a fire-hazard, now."

" We'll have to chance that, if only to get us out of our spin. That much we have to do. If we get that far, I'll consider us dead, officially. Get Cross to a cabin, then take Harvey and Wallace and shore up where you can, try and get something air-tight. I'll cut the gravs as soon as we're stable. That, should help a bit." He thought, swiftly. " Mr. Masters, screens, please."

The view-screens glowed into dim life, with their crazy swirls of star-light. Fowler took hold of the jet controls, let out a breath, and hoped. Then with the corkscrew patterns for guide, he began firing, delicately. Pushed to the back of his mind was the hag-rising thought of fire. It was just about the worst possible thing that could happen, now. A pin-point lox leak, oxygen mist—a holocaust—but he had to get the ship out

of its spin. His gloved hands shook, and he cursed, silently. But the swirling light-lines slowed, and crept and became steady points.

" Get a fix, Mr. Masters," he said, from a throat dry as dust, waited. The news, when it came, was as bad as it could be. The insane mechanics of ' pseudo ' shift had thrown them slightly more than three million miles away from Base Five, in the general direction of Arcturus. Even as he was listening to the figures, Fowler was cutting out the gravity-generators, the atmosphere plant, the fans, all the drive controls, everything to lift the load from the main power unit. With unreliable controls, it was as dangerous as a bomb. There were so many things that could go wrong, now. Worst of all was the unguessable factor—would Haggard, in *Mars*, risk himself and his flagship, to rescue one helpless and crippled striker, this far into the enemy side of the danger-line ?

" Make a signal, Mr. Masters—full power, broad band and open—this is no time for code. To *Mars* from *London*. Crippled and helpless, but alive. One man injured. Give our co-ordinates. Request instructions. Repeat it, once, and then shut down transmission. We have to conserve juice." The message sent, he turned again to Donovan, leaving Masters to keep listening.

" See here," he said, giving vent to a thought that had been nagging him for some time. " Why the hell can't they try this gadget out in a cruiser ? They have much more stability in ' pseudo '." Clarke's voice came back, over the radio.

" I heard that, sir. Simple answer is, a cruiser's Romaine field is too dense to get an outside reading. It's been tried."

" Right," Donovan agreed. " It's been considered for a fighter, too, but they just aren't big enough to carry the equipment or the power. Strikers are elected. Fact is, we've already tried it in three of our own craft. Lost the lot."

" Lost them ? How ? What happened ?"

" Who knows ? They didn't come back to tell. At a guess, I'd say they were stuttering even worse than we did. How the hell *can* you get accurate settings when your whole universe is dancing a drunken fandango ? It's just not possible."

Until that very moment, Fowler would have agreed with him, but there was a something in the Martian's absolute conviction of defeat that stirred the imp of perversity. So Donovan thought it was impossible, did he ? And from him,

that idea would feed back to the whole of the Martian force—if this news ever got back. What a wipe in the eye it would be if a dumb Earthie came up with a workable solution. Even as he thought it, Fowler sneered at his own conceit. Yet there had been a vagrant idea, at the back of his mind, some time ago. He frowned, trying to revive it, to call it back. What . . .? And it came, all at once, so that he gasped—and he saw the mass-detector lift and swing.

" Alert !" he snapped. " General alarm and stand by. Something big has just emerged in our immediate vicinity." There was a grunt from Masters.

" All clear, sir. It's *Mars*. Quite close, too. Good figuring."

" And is that a relief !" Donovan sighed. " Jack Haggard is my uncle, you know. I wouldn't have put it past him to seize this chance of getting shot of me once and for all. He's often promised to do just that."

five

They were back on Base Five—*London* to refitting pens, ' Digger ' Cross safely in medical hands before Fowler could get the chance to contact General Haggard again. The old man had new lines on his face, and was savagely calm, as he received Fowler in his suite.

" No blame to you, Commander," he said, at once. " Donovan has told me just how impossible it was to get a precise setting. But it's damnable, just the same. After all our high hopes, and at a time like this, to be defeated by the human element. Damnable !"

Fowler eyed him, wonderingly. He had expected the old man to be disappointed, of course, but there was a degree of seething irritation under the surface, out of all proportion to the event of a simple failure of an experiment that had already failed three times before.

" Utterly damnable," Haggard repeated, savagely. " While we were out, I had word, via sub-ether, of a ghastly smash-and-run raid on Venus. A whole fleet of Arcs—the five major cities of Venus in smoking ruins."

" Good God !" Fowler stared, unbelievingly. " What the hell went wrong with their planetary defences—with their lockstep efficiency ?"

" You may well ask," Haggard shrugged. " Space knows, I hate to criticise them, now that this has happened, but, from this distance, and now that it's too late, the answer is obvious. You know their almost pathological insistence on uniformity, everything on the whistle, everybody just so, all in step. Faultless discipline—and it was their weak point. The Arcs were damned cunning. They launched five perfectly timed, simultaneous attacks, precisely when the Venus forces were changing shifts. Caught the bloody lot of them with their pants down. One watch going off, the other watch coming on, all confusion and chat. and shambles, just like that. Routine-minded—and they have paid dearly for it."

" But that means—it must mean, that they can read our radio . . .?"

" Yes. Sticks out, doesn't it ? The stalemate is over, Fowler, and we're on the losing end. They can read us, but we can't read them. Not that they'll hit us, or Earth, for that matter, with the same stunt. We're not quite so routine-bound, thank the powers. But we must have other weaknesses—and you can bet they will winkle them out. If only that damned gadget could have been made to work. Ah well. I suppose we'll just have to try to think of something else."

" You're giving it up, then ?"

" Definitely. No point in carrying on with it. I am taking your performance as decisive, Commander. If you can't make it work, then it's out of the question as a general weapon, obviously. Just as soon as Cross is fit, and your ship in condition, I shall release you from my command."

" General Haggard," Fowler was hesitant. " With your permission, sir, I'd like to try it again, with a modification. I think I may have the germ of an idea that will make it workable." Haggard stopped his pacing up and down, and fixed Fowler with a bleak eye. He was silent a long moment. Then,

" All right. I'll buy it. If you say you have an idea, that's good enough for me. You have a way of being right, Fowler. If you can come up with an idea to make this gadget work, every man on this base will hate your name, but we'll use it. What is it ?"

" Well, I'd like to try it out on Carradine, and Clarke, first, sir. They would be best qualified to know whether the basic idea is valid." Without a word, Haggard stepped across to a bell. An aide came, quickly.

" Get Lieutenant Carradine and Lieutenant Clarke here, at once." The aide trotted off. Haggard drew out a cigar, bit off the end, lit up, all in cold silence. Fowler felt uncomfortable. He had the uneasy suspicion that he was about to make an inglorious fool of himself. Carradine arrived within minutes, his long face as sad as ever. Clarke, behind him, looked faintly surprised.

" Mr. Clarke," Fowler said, urgently, " you know our lighting system pretty well, so listen. Lieutenant Carradine, is there any way of anticipating the irregularities of ' pseudo '?"

" Ahead of time, you mean? Hardly. The effect is absolutely random, due to the minute uncertainties in the continuum. Why?"

" Well . . ." Fowler tried to loosen the tension in his chest, but it wouldn't go. ". . . I had in mind some sort of stroboscopic effect, with the lighting times to coincide with the moments of solidity. If it could be done, it would create an illusion of stability, wouldn't it?"

There was a silence in the suite which grew into tension. Carradine's long face went quite slack with the concentration of thought on the inward problem. Clarke watched in quiet silence. Haggard stared, intensely, wonderingly. At last Carradine sighed.

" The colour of a pea-hen's egg," he muttered, and for one dizzy moment Fowler could follow the implications of the apparently insane comment. An old joke. You asked someone the colour of a peacock's egg, which was a silly question, but a catch, because it sounded reasonable, at first glance. But the question had a proper answer, if it was asked in a proper manner, if you asked about a peahen's egg. And that was all the trick to so much of progress, asking the right question in the right way. And he had been right, after all. Carradine confirmed it, with a slow smile.

" Out of the mouths of babes and sucklings," he said, " cometh forth wisdom," and Fowler was too dazed by that insight into high-level thinking to take any offence at the implications. Clarke grinned, suddenly.

" Nice work, sir," he said. " Oh, very nice. Wiped their eye, again."

" What the blazes is all this?" Haggard demanded, and Carradine smiled.

universe object within that field, then the actual size of the projectile, in real space, doesn't matter very much, does it ? So why can't we modify the projector, reduce the projectiles by a factor of ten, stock up a whole magazine of them ? Then, if they bounce, they can't do us a lot of damage, but if they match they will be just as effective . . .?"

Haggard's face was a study in battling emotions. He chewed on his cigar, violently.

" All right," he said, at last, in a grating tone. " Fowler, damn you, I'm beginning to wish I'd never thought of asking for you. You're making us look a pack of rank amateurs. Blast it, what were you, before you took the oath ?"

" A historian, sir. One thing history drums home is the value of experience. The other chap's experience. As Bismarck said ' Learning from your own experience is doing it the hard way.' I've learned a lot from your experience, that's all. You've done all the hard thinking."

" Would you care for a permanent position on my staff ? Whichever way you do it, you have the kind of thinking I can use, man !"

" No fear !" Fowler grinned. " Thanks all the same, but I'm not such a fool as to think that I can go on being so lucky. Besides, if this thing works, you won't have a staff very much longer."

" You're right, there, too. It's no good, Fowler, I can't touch you. You're too good for me. All right, Carradine, get on with it, and keep me informed."

Seventy-two frantic hours later, the strange trio of ships lifted off again. For the sake of himself and his crew, Fowler was glad to be off-base, and its stormy atmosphere. The story had gone round in lightning time. The dumb Earthies had cracked a problem that had baffled the best brains of Mars. The air had been thick with dagger-drawn tension. He watched his panel, tensely. Masters called the drone away, and began the count. Fowler heaved a deep breath. This was it. This had to work, not just for the war-effort, but for the name and reputation of Earthmen, everywhere. The thought came to his mind that this would work, or *London* would be a total write-off, one way or the other. He pushed the idea away as being childish, but it came back. He couldn't go back down there, as a failure.

With the clang of the Romaine field, the universe began its sickeningly familiar, depressing jitters, but this time the bridge lighting was a bilious green, from the new lamps. He watched Carradine, who had volunteered to replace Donovan, concentrating on an adjustment to the feed-back circuit. Donovan, at his own request, was replacing ' Digger ' Cross, in the forrard action-station. It was a futile gesture, as he had in no way been responsible for the man's injury, but he had insisted, and Fowler had agreed. Carradine twisted on a vernier, and then another, and the flicker became a ripple—and then pin-point clarity.

The effect was eerie in the extreme. The ship still slammed and bucked as if it was runaway downhill on square wheels over corrugated iron, but everything *looked* still, and solid, and steady. Clarke glanced up from his panel with a grin, raised his fist, thumbs-up, and bent again to put his head close to Carradine. Masters screwed round in his seat, wide-eyed.

" I say !" he chuckled. " This is all right, isn't it ? Makes a change !" and he patted the brunette doll's bottom affectionately. Fowler spared him a tight grin, then concentrated on his own panel, waiting for the operators to begin loading the tracker-needle. It swung, suddenly, and he eased the controls to follow it. Whether it was the benefit of previous experience, the uncanny steadiness of everything, or just a feeling of confidence that everything was going to be all right, this time, he didn't know, but the controls seemed a lot easier, and the dial zero slid smoothly up to the wandering pointer.

" Hold that, sir. Carrie—what do you read ?"

" Strong and clear," Carradine mumbled. " I've got him to a thousandth. We'll never do better than this. Up to you, now."

" Right. Ready to throw, sir." Fowler nodded, gave the general order to stand by, and looked back to Clarke.

" When you're ready, mister," he said, and blinked a bead of sweat from his eyebrow. Clarke hit the ejector button. And there was nothing at all, no reaction, nothing but the ceaseless jarring.

Carradine jerked his head. " I'd say we got him. What do you read, Ned ? I've lost the trace altogether. Not a sign of him."

" Same here," said Clarke, with rare excitement. "Complete blank."

" What do you think ?" Fowler demanded, anxiously. " Successful ?"

" It would seem so," Carradine looked up. " Can't be certain, of course, but the drone trace is gone. The board is quite clean."

" Oh no it isn't," Clarke said, suddenly. " Look again, Carrie." Carradine's head went to peer, and he whistled.

" Space ! That's right off the other end of the board. We've warped his field, or something."

" Look again," Clarke advised, tensely. " That's not the drone trace, at all. Let's get it full on, and see. Tracking, sir." Fowler saw his needle swoop hard over, and compensated strongly to bring it back into line.

" What ?" he snapped, and Carradine whistled again.

" That's a whole cluster of traces, and big beggars, too !"

" Could they be our ships, out of Base Five ?"

" Not a chance," Carradine shook his head. " Nothing into ' pseudo ' for the duration of this test. That's a direct order from Haggard himself."

" Then there can be only one answer, mister." Fowler was suddenly cool and crisp " Those are Arc ships. And that's what we're here for. Get me a track, Mr. Clarke !"

" Wow !" said that usually cold and stolid individual. " There must be about a dozen of them, and the size of those fields !"

" Mr. Clarke !" Fowler roared, in a parade-ground voice. Clarke ducked.

" Yes, sir. Tracking, sir. What the hell do you make of them Carrie ?"

" I don't know . . ." Fowler leaned on his controls, expertly now, and listened as the physicist mused. " They're bloody *big* fields. Miles too big for a cruiser, even. And steady, too."

" Will that make a difference, Mr. Carradine ? To our weapon, I mean ?"

" Not a bit. Easier, if anything, to match up. It's the size of them—unless . . ." and he hesitated.

" Unless what ?"

" Well, we've often wondered whether it would be possible to run a cluster of ships inside one Romaine field. We've never tried it, because we just couldn't afford to risk losing that many ships on a guess. But that's what this looks like. At a guess, I'd say those fields are big enough to shift six cruisers as big as anything we have. At least six."

settings slid into correspondence, there was that familiar clang, and the green light was a flickering nuisance, until Carradine shut off the strobe circuit. Masters got busy with his radio-panel.

" Signal, sir, from *Mars*, direct vision. General Haggard." Fowler saw his intercom screen swirl into life, to show that grim old face, above the glitter of gold and ribbon colours.

" Damn you, Fowler," the old man said, harshly. " I don't want you. Let me talk to Carradine."

" Very well, sir." Fowler moved stiffly aside, to give room.

" Well ?"

" Provisional only," Carradine muttered, " we found, and cancelled, the drone trace. We subsequently detected several other traces, large ones, and took action, successfully, to eliminate them. As a rough approximation . . ."

" Never mind that," Haggard barked. " Where were you, in real space ?"

" My computer is busy on that, right now, sir," Fowler said, stiffly. He felt a nudge from Masters. The Communications-officer passed him a slip of paper, and his face was a careful blank. Fowler glanced at the figures, then at the hastily scribbled note at the foot. His stomach sagged. Bracing himself, he looked the General full in the eye.

" These figures show, sir, that we were in the immediate vicinity of Base Six. Venus H.Q."

" Exactly," Haggard grated. " I had a long signal from them, by sub-ether, just ten minutes ago. We saw the unholy flare of the drone, from here. It apparently ejected into real space, and disintegrated. In this universe, or any other, two objects *cannot* occupy the same space, simultaneously. Consequently, there was an immediate and total conversion of mass into energy." Fowler prayed to sink through the solid deck, into limbo. Only ingrained discipline kept him sitting there, as he tried to imagine what had happened to those eight ' things ' that had been wiped out by his orders.

" From Venus H.Q. we had report of the most spectacular display of cosmic fireworks they have ever seen, just beyond their outer screens. They thought it might be some new Arc weapon, and radioed us to see if we knew anything about it." Fowler blinked, and stared at the old man, in a daze.

" Then it wasn't Venus ships ?"

" Damn and blast it, no !" Haggard roared. " Commander Fowler, I have to tell you that you, in *London*, have succeeded

in the total destruction of at least sixty Arc cruisers. The very fleet, in fact, which plastered Venus, and who were getting set to repeat the dose on Venus Base Six. Completely wiped out. More kills in five minutes than we have been able to log up, with our whole force, throughout the whole damned war. You're the best hated man in the Solar System, Fowler." His hard old face kept the grim scowl for another ten seconds, then cracked into a wide grin.

" Nice work, Commander. I'm not kidding, mind you, about the way we feel, but you're a bloody hero, just the same. We're requesting you a bit longer, so that you can brief us on the new weapon tactic."

" Don't count on it, sir," Fowler said, unsteadily. " My guess is that the Arcs will treat for peace, just as soon as they find out what we've got. And then the whole stupid war will be over. I hope so, anyway."

" Not satisfied with teaching us our jobs, eh? Now you want to take the job away from us. Still, let's pray you're right, lad. I shan't be sorry. All right, prepare to land. You may go down ahead of me, Commander. You've earned the right."

John Rackham

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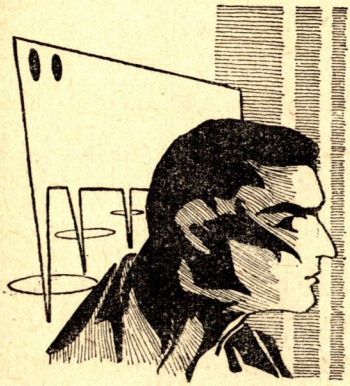
The bell was an outward and ethical symbol of a regimented world where even to kiss in public was a violation of morals (if caught). The end result, however, was decidedly unethical.

THE BELL OF ETHICONA

by COLIN KAPP



"Brother Micl Fredric Nean, you are charged with conduct prejudicial to the maintenance of Statutory Moral Law inasmuch as on the seventeenth day of Germinal in the year two thousand, six hundred and seventy you were seen to kiss a female person in a doorway adjacent to a public highway. How do you plead; guilty or not guilty?"

"I plead not guilty."

"Do you wish to challenge the validity of the evidence?"

"No, only the validity of the charge as such. I'm fighting this as a moral issue.

A murmur of anticipation ran round the court. Although the morning was still young, the day's proceedings had already grown tiresome with its seemingly endless procession of drunks, blasphemers, pickpockets and similar small-time malcontents. Now, with the advent of Nean, tall, and gaunt in a way unfitting his twenty six years, the court visibly brightened at the prospect of a more lively exchange.

The wizened arbiter adjusted his glasses to obtain a better view of the defendant. " Is anything known about this man?"

" Yes, Your Equivalence. The accused was convicted at this court two years ago on a charge of attempted flirtation. Fined thirty credits. Also convicted at Old Brighton last year for appearing on a public beach clad only in a swim-suit. Fined five-hundred and bound-over for six months."

The arbiter frowned. " Not a very impressive record, is it, Brother Nean. I will take the police evidence first, if you please."

The lawman entered the witness box and produced his notebook.

" At twenty-two hundred hours on the seventeenth of Germinal last, and acting on information received by radio from a member of the public watch, I proceeded to number sixteen Penji Street where I found the accused kissing and embracing a female person in the front porch of the house. The informing watchman was also with me and had already taken a number of infra-red photographs of the offence. These I now offer in evidence."

The arbiter accepted the photographs and scanned them quickly. " Thank you, Brother. Proceed."

The lawman coughed. " I then approached the accused and informed him that he was to be taken into custody, stating the nature of the complaint against him. He said: ' And what the hell has it got to do with you?' When charged at the chapter-house he repeated this remark and added: ' People who use infra-red and super-radio techniques to pry into private places have no right to complain about things they weren't intended to see '."

" A curious form of logic," commented the arbiter drily, " but it does raise the legal point as to whether the porch was, in fact, truly adjacent to a place of public access." He glanced at the photographs again. " Was the porch easily visible from the road?"

" Not from the footpath, Your Equivalence, but by climbing to the top of the wall . . ."

" Very well," said the arbiter. " I accept the evidence as given. Brother Nean, since you do not contest the validity of the statements against you I charge you to state your case."

Nean drew himself up to his full height and surveyed the court.

" It is a matter of history that World War Three terminated in a moral collapse which nearly wrecked what little was left of civilization. That is no surprise to anyone. Children were born into a world of poverty, horror and decay, ridden with radiation and tormented with remnants of twisted ideologies. A man had the life expectancy of a match and about as much freedom as a slave camp or labour combine would allow. The results easily rivalled the decline of ancient Rome in all but the grandeur and the laughter. When a man has nothing else to lose in freedom, happiness or self-respect, you can apply no further sanctions to restrain his instincts."

" Very true," said the arbiter irritably, " but I do not see how it is germane to the case."

" It is highly relevant. When the Great Peace was established a moral code was drawn up to control all those whose formative years had been spent in the ethical and intellectual decay of the previous era. This code was necessarily over-strict and backed by force of law because it had to weld a conscience back into the souls of men. It was a great achievement in ethical engineering and sociological mechanics. Only now it is six hundred years and twenty-four generations out of date. This same code now hangs like a millstone about our necks, and its enforcement twists the humanity from our society."

" May I remind you," said the arbiter, " that we are here to dispense justice not to determine moral law. State your case clearly or accept judgment."

" I submit there is no case to answer. Kissing is not in itself a crime. It is illegal only where it can be evidenced by a third party, but with the application of modern methods of scientific personal surveillance there is scarcely a place left in the world where one can kiss without detection. Even houses are not inviolate. I suggest the felon in this case is the watchman, whose over-zealous prying led him to great pains to observe a purely private act."

The arbiter was slightly amused. " It is a dangerous premise to suppose that the method of detection mitigates the enormity of the crime. You are not the first to mouth such heresies in court. If you were a common thief I should belittle your impertinence with five years forced labour. But heresy is a contagion which strikes at the heart of the faith by which we live. In the public interest I have no option but to award to you the highest penalty which lies within my power.

" Micl Fredric Nean, I find you guilty as charged and sentence you to be placed under the jurisdiction of the Ethical Control Authority until such time as they are prepared to endorse your return to society. Now stand down and reflect upon your conduct. If there is any bitterness within you remember that I do this entirely for your own good."

The savageness of the sentence brought a great silence upon the court. The jurisdiction of EthiConA was usually the last resting place of habitual offenders against the Moral Code. Men who went to EthiConA seldem came out again—or if they did only their names remained the same. The men themselves were changed beyond belief.

The appeal clerk caught Nean's eye and came forward to ask the statutory questions, but Nean, white faced and more gaunt than ever, waved him aside and staggered from the dock like a sick man.

He fainted in the corridor outside.

" Cheer up, Brother! " said his cell-mate. " You're not dead yet."

Nean opened his eyes and surveyed the tall, casual giant who occupied the other bunk. Then he closed his eyes again and groaned. The white, clinical sterility of the cell contrasted strangely with the dank grimness of the police transit unit from which he had just come, and struck awe and terror deep into his heart. His stomach ached from the recurrent sickness, and, though the air was warm, he felt colder than a live man had any right to feel.

" You'd better take these," said the giant, offering him two small white tablets and a glass of faintly antiseptic water. " The doctor left them for you. No substitute for God, but the next best thing."

Nean took the tablets and waited until the quaking palsy had lessened and his thoughts grew more coherent. " I tried to kill myself," he said at last.

"I know. The police doctor used a stomach pump. You were still unconscious when they brought you in. Had me properly worried. I don't much care for sharing cells with corpses."

Nean smiled wryly. "I might as well be dead for all the good that life can do me here."

"That's not true," said the giant. "Where there's life there's hope. I know, I've spent most of my life behind bars and it hasn't broken me yet."

"'Ever been in EthiConA before?"

"No, but I had it coming. I'm Karl Baptiste, pirate, rebel and true-blue heretic."

"I'm Micl Nean," said Nean bitterly. "I kissed a girl at thirty paces from a watch informer. For that I also go to hell."

Baptiste shrugged. "I've been in earthly hells so many times I don't much fear this one."

"I'm a coward," said Nean. "I wish I had your equanimity."

"Don't," said Baptiste. "There are two types of coward: those who run from fear and those who would sooner face it than face their imagination of it. I am merely of the second class of cowards."

"What do you think they'll do to us?" asked Nean. "Is it really true they can twist a man's mind until his personality is gone?"

"I don't know," said Baptiste philosophically, "but they say that seven years with the wrong woman destroys a man's soul surer than hell. Well, I've survived the woman so I doubt if they've anything here can destroy me now."

He chuckled richly at Nean's discomfort, then settled on his bunk with the obvious intention of having a good sleep. Nean regarded his composure with wonder, then fell to shivering violently and was sick all over again.

Later a wan doctor came and felt his pulse and listened to his heart.

"You were lucky, Brother Nean. The police surgeon knew his job."

"It wasn't luck which brought me alive to EthiConA. I know how you warp men here."

"You know too much and think little," said the doctor. "Are you fit enough to stand?"

" I—I think so."

" Good, then come with me. The reception officer has yet to complete his records."

Nean stood with patient horror whilst he was photographed and documented, and while his fingerprints, blood tests and ocular-identographs were duly tabulated and filed away. He went through all these functions in a mild daze, trying to convince himself it was part of a bad dream. But it was no dream; the blood cloyed in his veins with frantic, fearful speculation.

He was directed into an office and told to sit down and relax. The next stage was interrogation, an examination of his heresies. Nean had no doubt that this quiet office was but the threshold to a far more sinister inquisition.

The examining officer was a white-haired, thoughful type of man who arrived with an air of distraction and then abruptly focused his attention on the case in hand. His eyes held a deep hypnotic quality and betrayed undertones of the quiet control of a powerful mind.

" You are Micl Nean? "

Nean nodded dully.

" I am Marc Ophels. Whilst you are under the jurisdiction of EthiConA I shall be the person responsible for your physical and moral welfare. If you respond to our treatment in a satisfactory way I have the power to certify your return to society. If you do not respond I also have the power to bury you."

" Must we have this hypocrisy? " asked Nean. " Must you dress sadism in a cloak of civilization? "

Marc Ophels smiled slightly. " Is that how you think of us—as sadists? "

" Yes. Why else did you stop me committing suicide? I had already determined my own destiny."

" But *we* had your moral welfare at heart. The body is the merest nothing compared to the soul. It was all for your own good."

" Why," asked Nean bitterly, " must Man's inhumanity always assume the guise of virtue? Was there ever a foul deed committed which was not claimed to be justified by some high moral purpose? Even God would be hard put to answer for the atrocities done in His name? "

" I can't answer for God," said Ophels, slightly amused,

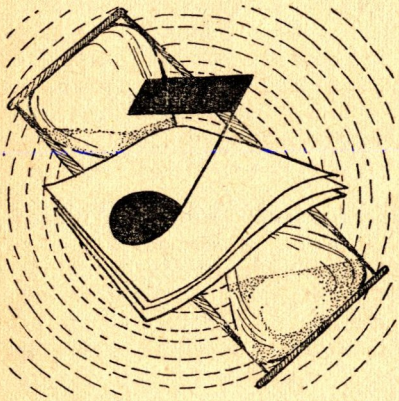
" but I can answer for ourselves. You see, Brother, we believe in what we practise. We believe it most passionately, and when you leave us you too will passionately believe. It is simply a question of adjusting one's viewpoint."

" Brainwashing," said Nean. " The rape of the mind. I don't doubt your ability to make me believe that black is white and that the earth is flat. The fact that you can warp a mind is one thing—whether you can also claim moral justification for so doing is quite another matter."

" A typical example of shallow thinking," said Ophels. " Dear me, if the science of ethics was that simple we at EthiConA would be out of a job. You have no understanding of the subtleties involved. All we propose to do at EthiConA is to show you to yourself. I don't promise it will be pleasant but it will be revealing."

" An inquisition by any other name . . ."

" Don't fight me," said Ophels, sadly. " You've troubles enough as it is."



He returned to his cell then. Karl Baptiste the heretic was gone, and his absence brought home solidly to Nean the perils of his own predicament. He lay on his bunk sweating cold fear and listening to the heavy footsteps journeying in the corridors outside. He had no means of telling night from day, but presently he slept.

He was awakened by the crash of the door and the return of Karl Baptiste, The giant, no longer proud, but white and strangely older, stood unseeing by the door; listening as if to voices which were never there to hear. The eyes that met Nean's were haunted by a deep internal dread.

" My God, it's hell! " was all that Baptiste said.

Quaking with fear Nean helped him to his bunk, looking anxiously for signs of injury or ill use. He found nothing

which could justify complaint. Baptiste pulled a pillow over his head, curled up into a foetal position, and swiftly went to sleep; leaving Nean to magnify a thousand times in his imagination the ordeal which lay ahead.

Four hours later they came for Nean. Two EthiConA guards, experts in the handling of reluctant bodies, forced him from his bunk and down a series of sinister, echoing corridors to the chamber with the stars upon the door. Here they were met by Ophels and two white-coated technicians, and all six entered the room.

It was a large chamber, soundproofed with soft esparto bricks and as silent as a grave. Even the floors had the soft resilience of a plastic foam composition, and the sound of their footsteps was attenuated to the merest muted whisper. One wall was inset with a panel of glass beyond which could be seen control consoles and high-banked racks of apparatus dotted with the sore red eyes of indicator lamps.

In the middle of the chamber stood the bell.

On a dais stood a throne of steel with polished clamps to hold the subject in his place. Above it hung the bell of EthiConA, a beautiful, shining bell of exquisite shape and finish. More sinister was the cap of electrodes at its crown and the wires which corded the chains up into the high ceiling. Nean was strapped into the throne and his head secured with padded clamps. Then the others went away and left Ophels at his side.

"Thought," said Ophels, "is only sub-vocal speech. Although you do not say the words or sounds, when you think, they form unbidden in the muscles of your throat. By vibrating these muscles with a sensitive transducer we can extract from you every sound-image and every word that flits across your mind although you do not utter a syllable. These sounds we amplify and give back to the bell. Do you understand what I'm saying?"

Nean fought back the horror which clouded his mind. "Yes, I understand."

Ophels stretched up and stroked the bell with his fingertips, evoking a chord of incredible music.

"See how it sings," he said. "Listen how the melodies change and alter, the transpositions and the harmonies. The bell can give you every sound you ever heard, singly or together, just as your fancy pleases. It can be beautiful or

cruel, delicate or lethal. It can speak to you with the tongues of old friends, shout with the fury of your enemies, or numb you with the discords of your own futility and anger. It is a sound-mirror of all you ever knew or ever thought, spanning years of experience in an instant, breaking the barrier between the man and the things he has learned to forget.

"Love, hate, compassion—each emotion has a different signature and the bell can reproduce them all with marvellous fidelity. Only two things can still its tongue: one, that you have learnt to face yourself; the second, that you are dead. Which way it quietens is largely up to you."

He signalled, and the bell dropped lower over Nean's head, rhyming and chiming with an infinite complexity of sound.

"One thing more," said Ophels, distantly. "The mind is a liar to the man. Consciousness recalls only a fragment of the richness of the mind. Behind the censor there lies a great storehouse of things forgotten, things repressed; the blind, black bogeys of childhood and all the darker, violent shades of things we dare not face. Also the seat of men's ambitions, the basis of the instincts, and the life-force which drives the living soul. This world we also give to you."

Nean felt the transducers being clamped around his throat and the quick pain of the hypodermic needle flooding his veins with the drug to release his unconscious mind to conscious recognition. Then, with eyes shut tight and his throat gripped by a tight band of fear, he was left alone to listen to the bell.

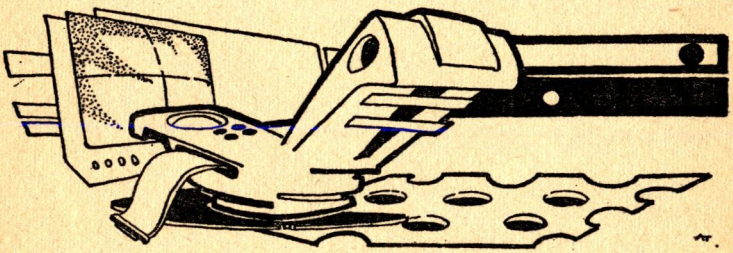
Strident discords broke around his head like a flood-tide, signalling the fear which had driven coherent thinking from his mind. The crashing symbols of panic beat at his ears with shafts of excruciating agony, slashing him down into a merciful pit of unconsciousness.

He awoke with music in his ears, then voices; the arbiter, the lawman, his own mother reading the State-church catechism. He experimented, and remembered his brother reading moral verse in a high, faulting voice before the street-kirk altar. All this he heard with the clarity of a bell. He forgot his fear in the midst of the wonder, and tried harder, recalling the high lark and the warm sounds of a lost summer.

Thus was born a kind of joy and satisfaction at re-living things past. The sounds intensified the image, and the image improved the timbre of the sound. His mind wandered throughout the picture book of his experience and played

anew with the best things that life had held. Then he went deeper into himself and the bell shrieked with remembered agonies of mind and body. Drawn with a kind of masochistic fascination he plunged more deeply still. He was still screaming when they came to release him.

For seventeen days they led him to the bell. Gradually his terror grew less as the bell translated pent-up emotions into violent peals of sound. When brought out and recognised, the memories gained the different sound of quiet acceptance, and the ordeal grew more bearable. Only once, when he touched the basic life-force, did they drag him stiff with horror from the throne. And on the eighteenth time the bell was still. A careful phasing of the circuits of the bell damped the response of memories which carried no emotional overtones. Only by willing joy or love or fear would the bell bring forth its voices, and finally Nean grew weary, and soft tongues of distant music lulled him off to sleep.



"How do you feel?" asked Ophels.

"Incredibly empty," said Nean, with quiet resignation.

"Hell, isn't it?" Ophels motioned for the escort to leave the room. "The old psychoanalysts would have given their eyes for something like the bell of EthiConA. It provides the means by which a man may know the worth of his own opinions."

"Every man," said Nean, "knows the worth of his own opinions. The bell reveals only the worthlessness of opinions. Having emptied my mind of the pride and the prejudice I presume you now intend to force me to accept your ethical dogmas to fill the vacuum. I can't resist you, Ophels, because

you have the power to turn me into a cringing dog. When you say 'jump' I will jump because I have no option. There is one thing, however, that I shall never do: you may alter me if you like, but I shall never accept that you have a moral right to do so."

"You misjudge me," said Ophels. "I have done with you all that I intend to do. We have cleared your mind of the anger and the hurt. For the first time in your life you can think rational thoughts and give purely reasoned answers. This is the moment where I am the arbiter of your fate."

"Then you have failed," said Nean. "Though it cost me my life I shall damn you. I arrived as a rebel and I am still that rebel. Quite rationally I have no other choice."

"Then I will surprise you," said Ophels quietly, a slight smile on his lips. "You have given me the answer I wished to hear. I endorse your return to society. Moreover I have a proposition to discuss."

"I don't think I understand."

"Look," said Ophels. "How long do you think you could study ethics before coming close to the same conclusions as you have done? After the Great Peace the new Ethical Code was formulated to assist man to regain his self-respect. It was designed to form a self-perpetuating, self-propagating system which would automatically eliminate any further possibility of collapse. You know, and we at EthiConA know, that the rigid application of the code is neither desirable nor advisable."

"Then why don't you break it down?" asked Nean.

"We are doing just that. But the process takes time. Ethical standards are a matter of acceptance by the individual. A man brought up under one code cannot easily accept another. If we dropped the code now only confusion and misery could result, so we have a long-term plan of guidance and education. Do you know why you were sent to EthiConA?"

"Because I was seen kissing a girl."

"No, because the watchman suspected you were a rebel and a freethinker. He was part of a vast conspiracy, as was also the arbiter who sentenced you. Your sentence was deliberate and pre-arranged.

"A conspiracy against the Moral Code?" asked Nean in wonder.

" Just that! " Ophels smiled expansively. " A sociological doublecross. You see, Nean, we need men like you to place in positions of trust and responsibility. Only by having the right men in the right place can we swing the balance back to sane morality without tension and without conflict. I want you to join the Ethical Engineers."

" In what capacity? "

" Initially as a watchman, to watch for others of similar mind. It's a double-edged sword. You wink at petty offenders and report the rebel and the freethinker."

" If what you say is true," said Nean, " why did I have to suffer the bell before coming to this point of decision? "

" A safeguard," said Ophels. " You are now a rational man. We can't afford to have our cause served by bigots. One man still clinging to the remnants of his childhood schooling could bring the whole scheme to disaster. Few men really know what strange faiths and sympathies lie deep in their conscience. Karl Baptiste was a case in point."

" What did happen to Baptiste? "

" He died under the bell. I think he found that he was a fanatical moralist at heart. He couldn't reconcile his past life with his new knowledge."

" You've got yourself a new watchman," said Nean at last.

The system was a triumph of sociological mechanics and ethical engineering. Six hundred years had proved it sound and stable. In another thousand years it would still remain unchanged save for the increased rigidity of its application.

This was a tribute to the rare genius of a man, long dead, who realized that a system can have no more zealous guardians than those who mistakenly believe they are working for its destruction. Not one in a hundred of the rebels who entered EthiConA lived through their struggle with the bell —and the few who did became watchmen and fanatical hunters of the freethinkers and the heretics. That was the beauty of the system: it was self-perpetuating, self- propagating and automatically eliminated any possibility of collapse.

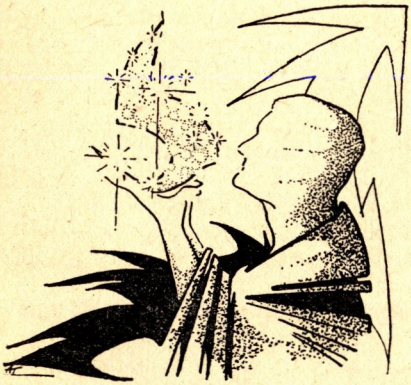
Only one point remained unresolved: it just was not ethical!

Colin Kapp

A philosophical piece by the author of that delightful satire "The Wingys And The Zuzzers" in the July issue, but this time the satire is missing as he introduces the "chalo," a sentient form of energy which cleanses Man's mind of its warlike impulses.

REASON

by ROBERT J. TILLEY



The perspective of the mind is a vulnerably flexible thing.

I realise that this isn't very subtle thinking and not even particularly well expressed, but I've never been forced to recognise its truth so clearly before. A man has died, and because of this and the things he said to me before he died, all the carefully selected blacks and whites that made up the majority of my opinions and beliefs have been suddenly and violently smudged to an unreadable, faceless grey.

Somewhere in that grey the truth is hiding. Why? Why does it hide? I still sense its presence, but I can't see its colour or the form it takes, and for the first time I feel a sense of reluctance in my own acceptance of the relationship that exists

between us. Can this be right, chalo, this sudden wariness ? I feel you now, applying your cooling compresses of reason to my fevered imagination, but there's a flacidity, a lack of something—interest ?—in your actions.

I'm afraid of you.

I might as well face up to that now. Fear, of course, breeds fear, and already I find it frightening that I should feel fear at all. Crazy thinking ? How can it be ? This is a world of sanity, where man and chalo have cast out the devils and tormentors and sweet reasonableness is king. But as I sit here, scribbling these notes in the gradually cooling greenness of my conservatory, the fear remains, and this provides me with a tangible of a kind, a dark starting-point where I can begin to at least try and grope my way out of the mist and re-arrange my thoughts into some sort of coherent order.

And although my conversion to a belief in the ultimate goodness of creation is a recent thing and possibly exempts me from the right to expect an answer to my prayers, God knows that it is for the sake of all men that I hope they make the same pattern as before . . .

I first saw the man by the ornamental lake that occupies the centre of Willis Park. His back was towards me as I approached along the path that leads to it and then skirts its perimeter, and even though I couldn't see his face I could sense his indecision. It was in his stance ; the hunch of his shoulders, the oddly identifiable immobility that broadcasts acute uncertainty.

I walked past him, glancing casually as I did so. I caught a glimpse of a white, hard-fleshed face that carried a shadow of beard, and bright eyes that stared fixedly ahead, empty and unseeing.

At the time I felt only mild curiosity in the matter. He was simply an unshaven man, better-dressed than most unshaven men are, admittedly, who seemed to have a problem that was really none of my concern. I left the park and completed my errands, taking perhaps an hour. As soon as I re-entered by the south gate, taking my customary short-cut, I saw him again. He didn't appear to have moved at all, and although considerable distance separated us, I could still see the oddly bunched, spring-like tension of the way he stood facing the water, almost animal-like in its immediate connotations.

the medical sense of the word. This was the sickness of fear, the sickness of a mind that sees something dark encroaching on it and can find no escape.

His opening remark was delivered in an oddly colourless voice. He said, " You look like a sane man."

" We're all sane men," I said. I reached for the matches again, smiling, and trying to choose my words with care. "It's a sane world at last. Sane and safe."

" Safe," he said, and suddenly almost retched. He pushed a hand against his mouth, a sheen of sweat glistening on his face. His eyes closed, and he leaned slowly back against the seat, his hand still spread across his mouth.

I said, carefully, " Look, you don't seem to be any too well. Might I suggest you tell me what you think is wrong ? I'm a doctor."

His eyes opened and slid sideways, displaying something that might have been slight curiosity. He said at last, almost inaudibly, " Cancer."

I felt a tug of pity.

" Is it inoperable ?"

He breathed slowly and deeply, nodding his head.

" And there's no doubt at all that you have it ?"

His sick, bright eyes rested on my face again.

" We all have it."

I stared at him for a long, silent moment, pulling on my pipe and floundering a long way out of my depth.

" What do you mean, exactly ?"

He ignored the question, his eyes roaming restlessly across my face. Then he said, " What kind of doctor are you ?"

" I'm retired, actually," I said. I felt vaguely and unnecessarily embarrassed. " I was a G.P. I sold my practice three years ago."

He nodded, disinterestedly.

" What do you know about the brain ?"

I shook my head, slowly, still uncomfortable. " Not a great deal. That kind of thing is for the specialists. Do you have reason to believe that you have cancer of the brain ?"

He said again, " We all have it."

I stared at him, suddenly understanding, a mixture of shock and terrible pity flooding through me.

" For God's sake, do you mean the Chalo ?"

His face jerked to sudden life. Its planes altered subtly, frantic dartings of movement like the lightning passage of shadows flickering across its damp whiteness. His breathing was suddenly fast and shallow, and the sheen on his skin was very bright.

Then it was gone, and the haunted eyes were watching me from a face that was suddenly drawn and shrunken and very old. When he spoke, his voice was a dull, dead sound, almost devoid of inflection.

" You say you think it's a sane world at last, do you really believe that ? '

" Of course I do."

" Because of the Chalo ?"

" Yes," I said. " Of course. Without them—"

" What are they ?"

I said, " I'm not quite sure that I—"

He was impatient, interrupting again with sudden, restless urgency.

" What are they ? What are they, really ? What do you, an educated, intelligent, thinking man, think they are ?"

I said, slowly, " I think that they're what they say they are. The next stage in our evolutionary programme. Controlled energy of a very special nature that wanders through the universe in watch-dog packs, instinctively homing on species like ourselves who are at the end of their emotional tether and staying with them until insanity has been bred out of the genetic pattern." I looked at him, questioningly. " Do you have any particular reason to suppose differently ?"

Again he abruptly veered onto a different conversational tack, ignoring my question.

" What were you doing when they came ?"

I sucked on my pipe and thought.

" I was gardening," I said. The picture swam to the front of my mind and hardened into focus. " Cutting flowers, to be exact."

The faintest glimmer of a sick smile played on his face. " It was hot around here, wasn't it ? Plenty of insects about, I expect."

I glanced at him. " Yes, there were."

" And you were finding them a nuisance." It was virtually a statement, not a surmise.

I nodded. " I was. But then I suddenly felt this coolness in my mind, this—calming freshness, I suppose you could call it, as if somebody—but, of course, you know."

His shudder was very real, and he moved his lowered head in jerking, nervous movements, as though seeking some misplaced thing. " I know."

" Then my own, personal chalo introduced itself," I said. I talked very calmly, watching the white, never-still face beside me. " It told of the countless billions of miles that it has travelled on its endless errand of mercy. It told of the other peopled worlds in our own galaxy and beyond, and the beings that inhabit them, some very much like ourselves, others vastly different. And it told of how many of these had had to be saved from themselves and their unbalanced technical and sociological achievements, and, like us, eventually made into complete, fully rational entities." I reached for my matches again. " An incredible record of good works, wouldn't you say ?"

He was looking at me with a kind of exhausted curiosity.

" And you believe all this ?"

I said, patiently, " In the eight months since they came, they've banished lunacy, war, and all their attendant evils. Suddenly, when we were so close to self-annihilation that it seemed utterly impossible to avoid it, we became sane." I stared at him. " You say we have cancer of the mind. We haven't, not now. It was the international disease before the Chalo came and did us the service of cutting out the rotten bit of our nature. Now, each man, woman, and child has the chain of its consciousness completed by a link that permits only rational thought and action. A man's chalo is the barrier between him and his old world of lunacy, unreasoning anger, and a million and one other signs of emotional immaturity." I struck a match and re-lit my pipe, surprised but pleased at my garrulity. " Is this the sickness that you're afraid of ? What kind of sickness is it that saves a world from its own inherent self-destructiveness ?"

" And you find this an acceptable cure, despite its unnaturalness ?"

" Unnatural ?" I stared at him again. " But what could be more natural ? What do we know about ourselves, let alone the rest of the universe ? Now we've been granted a further glimpse of both. In my profession, before they came, it was sometimes incredibly hard to see any point in our being here at all, existing with senseless death and decay. It was one of the most difficult things in the world to believe in a God, other than one that epitomised futility. But the Chalo have done what no

church-man ever did or could ever hope to do. By severing the channels of communication that translated unreason into action, they gave us the two things we needed most, hope and a future. And remember, nothing else was touched. Our natural traits of curiosity and ambition remain unimpaired—tempered by reason now, of course—which rather cancels out any accusations that might be levelled regarding the destruction of human initiative, and so on."

His sudden grin was a tight, bloodless affair, skull-like and entirely devoid of humour.

" What would you describe this as ? An incredible exercise in selective lobotomy ?"

" Miraculous," I said.

His eyebrows slid upwards, forcing dark lines of corrugation against his white forehead.

" But how do we know that it was ?"

It had seemed that the conversation had at last reached something resembling firmer ground, but now I floundered again, unable to finger the relevance of his question. " I'm not sure—"

" Let me ask you again," he said. " What do you know about the brain ? What do any of us know ?"

I said, rather shortly, " Personally, very little, as I've already told you. Specialists know a great deal in some cases."

He grinned his death's-head grin again, and there was something derisive in it this time.

" Do you know how long it would take to map in full detail, one square inch of the surface of the cortex ?"

I wasn't as surprised by the question as I perhaps might have been. Hypochondria often breeds its own illness, a rather unhealthy curiosity, and most libraries carry a basic selection of medical books.

I shook my head. " No, I don't."

" A quite incredible amount of time. So long, in fact, that only relatively few have been even roughly plotted." He was speaking in a more rational tone now, staring directly ahead across the faintly wind-rippled water of the lake, but it was a forced calm, induced by will-power and not peace of mind. " The brain is still a vast, unexplored continent as far as we're concerned, cluttered with so many points of intense interest that it's almost impossible to decide where to begin an investigation. And since we know so little about this all-important

piece of ourselves, how do we know just what they've done to us ?"

I said, "Because they've told us and it makes sense, surely."

" Does it ?" His features were suddenly puckered as he stared at me. " We've been told that an incredibly clever piece of surgery has been performed on each of us, and we've believed it, unquestioningly. Why this eager, ready acceptance of the first explanation that's offered when there's an alternative that's just as logical ? There's a simpler answer to that. Surgery generally means the permanent removal of whatever ails you. It's a far more comforting thought to assume that the evil has been cut out and cast away, rather than consider the temporary alleviation that could be provided by sedation of some kind." His expression was one of growing anger.

I nodded, slowly.

" And so the possibility that drugs and not surgery have been used has been comfortingly ignored or pushed into one of the dark, forgotten attics of our minds. Forgotten by all but a few, that is. Not the people with the best minds, perhaps, but the ones with the most inquisitive." He smiled, a sudden, rather ferocious and ugly smile. " It's an uncomfortable thing to live with, inquisitiveness. It nags, like a discontented tenant that you can't throw out, and it has an inevitable off-shoot. The hypothesis, another fascinating but prickly fellow to have around. He has innumerable variations, but like so many works of the imagination he eventually worms his way pretty close to the truth at times. And when he does, you know it."

The glisten of sweat was back on his face, and hysteria was gradually fighting its way through. I was bewildered and confused. In all my years as a medical man I had never felt so ineffectual, so completely at a loss. This was a man filled with illogical, twisted fear, the paranoic nightmares of the demented, yet he lived in a world where such darkness no longer existed. I could almost see the struggle that raged behind the wet, shaking mask of composure. It was anger versus fear, the age-old battle between pride and panic, magnified now to frightening proportions.

I cleared my throat, and said, " And you think you've discovered another, altogether different reason for the presence of the Chalo ?"

He nodded, a sharp, fierce jerk of his head.

" What is it ?"

He said, hoarsely, " Listen to the ravings of a madman in a sane world. See what you say to my hypothesis, my little work of lunatic fiction." I watched his hands. They were grasping at one another, never still, like white, perspiring wrestlers seeking vainly for a hold. "Somewhere on another world, life evolves. It reaches intelligence, and eventually, when such a feat is technically feasible, and for one of a dozen possible reasons, it moves out into space, taking with it a formidable natural weapon. In the course of its evolution it's developed one of two things, both very alien to our own pattern. Either symbiosis is involved, or it's an entity capable of thought projection, which can enter and study the minds of others with which it comes into contact."

" You mean telepathy ?"

He shook his head, violently.

" No. This goes beyond that, but it still has its limitations. It can exercise some control over the mind that it infiltrates, but when it comes up against intelligence above a certain level its hold is relatively slight. So, to handle such contingencies, it evolves a strategy, a long-term method of attack that is subtle and utterly invincible. It carefully selects certain items, the communicatory fibres that lead from the mind and activate the excessive physical responses to anger, insanity, and all the traditionally black segments of sensory reaction. Then it blocks them."

I said, fumblingly, " Blocks—?"

" It seals them off. With drugs, or more likely, some form of mental block that it can induce. It seals them so that no trickle of sensation can pass through, no irrational action can be sparked into being. Then it introduces itself to the race that has become its chosen victim, tells its meticulously conceived and quite plausible story, and is received with paeons of thanksgiving. Then it waits." Fear and fury were thickening his voice, clogging the wild flow of his words. " It waits, while foolishly joyful people put their world in order for the very first time, destroying the arsenals and their world-poisoning contents. And while it waits, all the countless minor irritations that clutter day to day existence go on, the yelling children, the too-loud radio next door, the clumsy housewife and her never-ending crockery bills, the dog that leaves its hairs on the best upholstery, cold food that should have been hot, burned toast, traffic-jams—" He paused, breathless for the first time. " All registering as sight, sound, feel, or taste. Registering, and being recorded."

For the first time I felt the cold, probing fingers of doubt that fumbled at my mind, trailing a confusion of shadows behind them. As I watched the twisting, furious face that talked on beside me, I seemed to be catching sudden, frightening glimpses of sanity behind its sweat-streaked contortions.

" Minute, infinitesimal things in themselves, like the blows of a feather. And gradually the silt builds up, pushing against the barriers that have been erected in their natural outlets. No safety-valve remains open, no brief, cleansing spasm of temper is permitted. And then, when the good, rational things have been done, the poison of ultimate war neutralised and the arsenals replaced by buildings that house only the sane, humane activities of mankind, they withdraw."

I said in a thin, foolish voice that was a devitalized mockery of my own, " You mean they—leave ?"

Suddenly, he crumbled. It was a horrible thing to see. His face, already ashen, became a soaking rag of dead flesh that twitched uncontrollably. The anger was gone, seared out of existence by the fear that tore at him unopposed now. And with it, something else had gone. His eyes were an animal's eyes, wide, wild, and almost empty. He tried to speak, but all that came was a rasping, muffled sound, utterly devoid of intelligibility.

Then he was gone, lurching up from the bench and across the close-cropped grass towards the boundary of the park. I heard fading sounds as he ran, choking, animal-like noises that lashed at my consciousness. I pushed myself to my feet, shouting after him, but there was no pause in his grotequely clumsy progress.

I looked desperately around. Two women with prams had broken off their conversation and were staring as he blundered past them. No-one else was in sight. I started to run, but no man of sixty-seven is equipped for such demanding activity. My breath was gone almost immediately, but I stumbled on, my mind a sluggish, groping blur, and my legs automatically jerking forward and back, forward and back, like two rusted, unwilling pistons.

I'd covered barely twenty yards when he reached the gate and vanished. There was a lapse of perhaps three or four seconds, then the bitter squeal of tyres sounded suddenly from the road outside. I jolted to a stop, breath suspended, hearing, almost feeling the faint thud, followed instantly by the grinding crash of metal on stone.

I moved on again, but slowly now. My heart was nearly pushing its way through my chest, and I felt desperately sick with the certainty of what I would find.

He was a crumpled, boneless heap on the far side of the road. Just beyond him a van was wedged drunkenly across the pavement, its nose half-buried in a sagging brick wall. As I passed through the gate, its off-side door squealed protestingly open and a man almost fell through it. He was holding his head with one hand and cursing wildly.

A knot of white-faced people were gathering. I walked through them, forced myself to my knees beside the still bundle, and pushed my hand beneath his jacket. There was nothing. No movement at all, no faint stirring that would have meant hope, however small.

I crouched there, looking down at the twisted face that carried its own strange look of peace now, the confusion thickening darkly in my mind.

I was still kneeling by him when the police and ambulance came. The two women who had been in the park were present at the front of the crowd then, staring at me with poorly veiled suspicion and occasionally turning sharply and whispering to one another. A constable questioned me, then a sergeant that I knew slightly. I told them both the same story, aware of the womens' sharp-eared attention, watching their faces soften gradually to near-belief of what I was saying. I told them that he was a stranger to me, a seemingly sick man that I'd offered to help and who had confided his fears that he had cancer. Suddenly, in the middle of his tirade, he had simply bolted in a seemingly uncontrolled panic, raced into the road, and been unavoidably hit by the van.

The van driver, his head bandaged by the ambulance people, interrupted at this point. He said that the accident *had* been avoidable, not by himself, but by the dead man. He claimed that he had run head-on at the approaching van, as though it was a deliberately death-seeking action on his part. Two people in the crowd corroborated this, and the sergeant observed, with professional off-handedness, that the chain of incidents seemed to tie together logically enough and that the post-mortem would soon confirm or deny the presence of cancer and any justification, legal or otherwise, for the act.

The body, when searched, provided no means of immediate identification, but his raincoat yielded a laundry mark that

Before commencing these notes, I read a book. It isn't a new book, and far more definitive documents on its subjects have been written since, but it's the only one I have. It has reminded me of many half-forgotten things and told me some that I never consciously knew. It tells of a man called Penfield and his early experiments with the epileptics in his care, how stimulation of their temporal lobes induced remarkable feats of memory. It reminded me of the hypothalamus, the small, vital knot of tissue at the base of the brain-stem that triggers the actions that satiate our wants and desires. In my own mind these things are now inextricably tangled, completing a strangely ominous pattern.

For these, and perhaps other strange weapons unknown to us yet, could transform the wild imaginings of paranoia into possibilities. With them, it would be possible to pervert what men of medicine, men of mercy have done, and spur this black and evil sediment, if it exists, into blind, senseless action, scattering its shards of indiscriminating destruction and ensuring rapid, total victory. For a brief while the gates of hell would open here on Earth, and we would be helpless, mewling children, less than children, less than the beasts of the field and forest, wreaking mindless vengeance on each other, unleashing the torrent of our vindictiveness against ourselves and bringing the hard-won world of man thundering down around us.

Is this what you have planned, chalo, you and your kind? Are you the Devil and not the God that mankind thinks it has found at last? Did this tortured man open a door and show me the ultimate darkness that you have hidden there, a world that will murder itself, but still remain a place where others can live? Are you what he thought you were, only segments of viscious beings that wait in the patient darkness, waiting until you have done your work and then drawing you back to themselves to wait a little longer while we, the suddenly mindless, do what remains to be done?

I'm very tired now, and very frightened. If I'm wrong to question your intentions, as he did, then you must try to forgive me. But a possibility can be a terrible thing, and these things are at least possible. We know so little about the universe, this vast, endless cave of mystery that contains us, that such happenings may be merely inexplicable parts of the scheme of things.

Article

Time and Dr. Mossbauer

by KENNETH JOHNS

Simple measurement by the Greeks demonstrated that the Earth was a sphere; Galileo's experimental results pointed to the Earth moving, whilst Newton's and Kepler's calculations illustrated, to a high degree of accuracy, the movements of the Solar System. Then came Einstein's theories to explain the apparent anomalies which more accurate measurement had shown to exist in the simple Newtonian picture.

The finest of modern methods of measurement have still to correlate completely observations and Einstein's theory—but at least they show that Einstein's Universe is a better representation of what the Universe may truly be, than the Newtonian one.

Experimental science can be no better than its methods of measurement and it is certain that many great scientific discoveries have resulted from refinements in instruments and techniques which led to greater accuracy. Yet every unit of measurement can be broken down into three—and only three—factors: time, mass and length. Any instrument or method measures these or their combinations.

This basic fact is why the world of physics was excited recently when a new and fantastically accurate means of comparing the time rates of two systems was announced.

With one idea to light the way, it suddenly became possible to check Einstein's Special and General Theories of Relativity to an unparalleled degree of accuracy. A whole field of almost infinitesimally small time-dependent phenomena can now be investigated in the laboratory whereas, previously, stellar masses and interstellar distances were necessary for the phenomena even to be detected.

and any incrase in energy must be accompanied by an increase in mass, which will alter the vibration frequency of a nucleus. The alteration for a 1°C change is minute; but it is still enough to outweigh any change in frequency due to the gravity shift.

But take a more complex problem. You want to check that time passes more slowly in a spaceship slashing through the Galaxy at near light speeds than it does to the stay-at-homes? We now have the means to do-it-ourselves right here on Earth without waiting for a starship to be built.

The method involved takes advantage of a Doppler effect. The normal Doppler effect you hear as a train approaches and recedes with its whistle blowing, and the Doppler red shift shown by light from distant Galaxies as they race away from us are well known. But not so commonplace as a talking point is the theoretical *transverse Doppler effect*. In fact, it has never been experimentally observed until now.

If time is dilated in a fast moving system—and experiments with the near-the-speed-of-light, unstable particles suggest that it is—it follows that radiation shot out sideways should show a decreased frequency due to the slower, as seen by us, vibration of the electrons and nuclei.

This has now been measured using the Mössbauer effect and a revolving disc, taking advantage of the fact that the edge of the disc moves faster than the centre. Even at five hundred revolutions per second, the nuclear resonance of nuclei at the centre proved to be greater than similar nuclei at the periphery of the disc. So, it is at least theoretically possible to make a round stellar trip at close to 186,000 miles per second and discover that a few thousand years and any number of civilisations have passed since you set off.

If this is all so simple, why wasn't it utilised before now?

The problem was one of experimental techniques and materials. The usual material used for these resonance studies is iron -57, an isotope of iron formed by the radio-active decay of cobalt -57. In all probability you didn't run across these atomic weights when you were studying; iron -57 makes up only two per cent of natural iron, whilst cobalt -57 is made artificially in cyclotrons by bombarding iron with heavy hydrogen nuclei. You can buy it now—ten years ago you would have been met with a blank stare and a shrug.

When cobalt -57 decays it forms *activated* iron -57 which has a half-life of only 10^{-7} seconds, a ten millionth part of a second, before it loses a gamma ray and reverts to inactive iron -57.

Since the gamma ray has just the right resonance frequency to activate iron -57, it is easily absorbed by iron -57, providing its source and absorber have similar time rates. Alter the time rates of either—and the gamma radiation is not absorbed.

The experimental problem occurs at the moment of release of the gamma ray, the emitting nucleus tends to recoil and absorb part of the ray's energy, thus lowering its frequency and detuning it with respect to the absorber. It was Dr. Mössbauer's great achievement to demonstrate that locking activated iridium -191 into a crystal lattice at very low temperatures prevented the recoil and thus enabled the gamma radiation to carry off the whole of the activation energy.

Soon after this, it was found that iron -57 was better since it could be held in a crystal lattice at room temperature without recoil. Radio-active cobalt -57 made in a cyclotron is separated from the impurities and is built into a pure iron crystal lattice and rolled into thin foil. Great care is taken in the preparation of the foil so that no cobalt -57 atom is near another cobalt atom, thus preventing activated atoms interacting. The crystal structure is rigid enough to prevent recoil and the thin foil also enables the gamma rays to escape without much absorbtion.

The detector is merely another foil containing iron -57 with a scintillation counter behind it to measure the number of gamma rays passing the foil.

Activated iron -57 is also convenient as the emitter since it gives out 14,000 electron volt gamma rays and the upper limit for this method is about 100,000 electron volts to prevent recoil. For comparison, yellow light photons have two electron volts of energy.

The longer the half-life of the activated nucleus the sharper is the frequency of its gamma rays. Activated nuclei with half-lives of months are known but it is doubtful at this time if any with just the right energy and convenience of iron -57 will be found. Anyway, with extremely sharp frequencies, the emitter and absorbers would have to be moved relative to one another at speeds accurate to better than a hundredth of a millionth of centimetre a second—quite a mechanical problem in itself.

Experimentally it is found that about a fifth of activated iron -57 nuclei break down without recoil at room temperature, the other four fifths give a fairly wide band of gamma radiation frequencies.

The Mössbauer effect is not an end in itself, it is a tool with which scientists can probe deeper and with a growing understanding into the structure of the nucleus, as well as the macrocosm. Nuclear physics is paying off not only as a means of building war weapons—it is becoming increasingly apparent that Man's outward drive will have to be based on techniques as yet unknown. Most of them will have to come from studies of the complexities inherent in the interior of atoms.

Already the Mössbauer effect has been used to investigate the strength of the magnetic fields in activated nuclei, these being of the order of half a million times as great as the Earth's magnetic field. It is impossible to isolate one part of science from another and, sooner or later advances in one field will be reflected in others.

The purely scientific work being done today and being planned today for experiment tomorrow may easily lead into applications of new techniques that will be as surprising to us as the idea of going out and buying cobalt -57 would have been to laboratory assistants fifteen years ago.

It may not be long before we have fantastically accurate gyroscopes using spinning nuclei instead of relatively crude, clumsy and inaccurate wheels; gyroscopes that will be accurate over periods of centuries instead of hours.

Coupled with the new solid state electronic devices and microminiaturisation, it will be technically feasible to build all the controls for a spaceship into a box easily carried over his sholder by the pilot. A complex computer might, with the aid of these new techniques, be built and operated in a space that would neatly fit a matchbox.

The only limits, it seems, will be set by the crudity of the panels needed for human operation. A couple of decades from now might see the sight—amusing to us—of a computer head and reading, printing and control systems of the basic size necessary for human operation, connected up to a matchbox-sized object where all the work is done.

Kenneth Johns

Unfortunately, this will probably be the last of the Webley stories featured in that humorous outfit calling themselves 'Creatures, Incorporated'—we have lost touch with the author. The two previous stories oppeared in Nos. 95 & 97

WHEN IN DOUBT

by LARRY MADDOCK

I looked up as the Aldebaranian stepped into my office, stooping so his antennae cleared the archway. He looked like—well, if you were to cross a grasshopper with a praying mantis and add a liberal amount of indigestion, you might come close, especially if you remembered to make the result eight feet tall. I was hoping he spoke English as I'm no linguist and Webley hadn't come in yet.

"Missker Graank?" he chirped.

Grant's my name, but Graank is pretty close for an Aldebaranian stridulation. My oversize visitor's lack of vocal chords excused him from any hurt feelings on my part. You should hear a Venusian sand-borer try to say it.

"Yes, sir," I said, standing up to greet him.

"I am call Kaara," the grasshopper-like creature said. "I hass heark ssat you can fine jok for me, no?—in your emm-kloy-menk agency."

"Mister Kaara," I said, "Creatures, Incorporated is not an employment agency, but perhaps we can be of assistance. What sort of work do you do?"

"On my klanek, I am a kriesk or a minisker, a seeker of souls."

"Oh," I said, looking thoughtful. The market in New York, even in the reasonably enlightened year of 2073, for Aldebaranian priests is rather slim. "Perhaps," I said, "you had better tell me your story."

"Kerhaps," Kaara agreed, and informed me that he had been saving up for most of his adult life for a vacation, which he was now in the midst of, so that he could study the religious cultures on many of the known worlds. He was almost through with his investigations, and had his passage home all paid, but he had miscalculated his funds for personal expense and was, in short, flat broke. Someone, he said, had told him of Creatures, Incorporated and of our policy of finding jobs for aliens. "I feel I will kett hunkry in anokker week," he added.

The telephone on my desk erupted into life and I excused myself to answer it. It was Kelly, boss of the tunnel project, and he looked hopping mad.

"You and your damned creatures!" he exploded. "That new boy you sent over yesterday is ruining the blessed project!"

"How?" I asked. "What's he doing?"

"You're the alien expert—you figure it out. None of 'em are working—they dug a hole off to one side, went in, and they won't come out. I'll be damned if the company'll pay for something like this. Every minute those slugs refuse to work we're losing money!"

He wasn't kidding—a delay on a construction job like the tunnel project can mean forfeiture of bonus money offered for completing it ahead of schedule.

"A hole, huh?" I said brightly.

"Yeah, a hole."

"I'll be right over," I said, breaking the connection.

"Trukkle?" Kaara asked, his antennae bristling with curiosity.

"Trouble," I agreed. "If you'll excuse me, I'm needed elsewhere."

There was still no sign of Webley, so I left word with Nancy to tell him where I was and to sit tight until I returned. Then I tried to set a new speed record in getting from our office to the site of the tunnel project.

The digging was at a standstill, which made me sweat pure money. Something like this could ruin Creatures, Incorporated; we were a new firm, and the tunnel project was only our fourteenth job. So far, there had been no serious trouble on any of the other assignments, but a full-scale work stoppage was something else again.

I had sent six Venusian slugs to do the excavation. They come from a sand-boring culture, and on Venus they've built complex underground tunnel-cities. When Ajax Construction was faced with the job of cutting service tunnels under some tricky swampland, Venusian slugs seemed ideal for the purpose.

For a week, the work had progressed without a hitch, but with the arrival of slug number seven, everything had come to a halt.

The slugs, more properly called Mantashi, can construct remarkable tunnels at an almost fantastic rate, as they line the holes they dig with a quick-drying slime from their own bodies. In addition, they're peaceful creatures, sharing man's curiosity (a necessary characteristic for any species that plans to develop more than a basic survival culture) but without man's aggressive tendencies. It seemed entirely out of character for the last Mantashi I had sent to the project to be a trouble-maker.

Kelly was still upset when I arrived. "Look," he said without preamble, "we were doing fine until Zurpul showed up. Then the other slugs went nuts, crawling all over the flaming place. You're the expert—what's going on in there?"

Actually, Kelly knew almost as much about the Mantashi as I did, but I wasn't about to tell him that. "Where are they now?" I asked.

The burly Irishman pointed at tunnel number three. "About a quarter mile down this one. They've dug a room off to one side, and they won't come out."

"Let me talk to them."

We climbed into a rubber-tyred runabout and entered the hole. Sitting erect, our heads just cleared the top of the tunnel. It was hard to believe that the walls were hardened body slime; the surface was as smooth as if it were concrete applied by a master mason. The Mantashi enjoy working in darkness, so there was really no reason for lights in the tunnel. The only illumination came from the headlamps of the runabout.

Within minutes we came to the spot where the Venusians had built their ante-room, and Kelly wheeled the vehicle around so the lights shone inside. The head of a slug appeared in the entrance. Although to most Earthmen all Mantashi look alike, I recognized it as Siache, one of the original six.

"Siache," I called. "This is Mr. Grant, from Creatures, Incorporated. Perhaps you can tell me what this is all about."

"Go away," Siache slurped, his speaking orifice working furiously. "We are busy." He withdrew his head from the opening, as if the interview was over.

"Siache! I am your employer! What's going on in there?"

The head re-appeared and regarded me coldly. "We are busy," he repeated.

"You said that before," I told him. "What about the job? I can't pay you if you don't do the work."

"Go away," the Mantashi said. "We will finish job. Right now, we are busy." He pulled his head back inside and Kelly snorted in disgust.

"What did I tell you! Your gawddammed slugs are *busy!* How about that?"

"How long have they been in there?" I asked.

"About three hours," he said.

"Let's go," I told him. "Creatures, Incorporated will take all responsibility. I'll have 'em back to work as soon as I can."

Kelly was still fuming when I left. I stopped at the nearest pay phone and called the office.

Nancy, our secretary - receptionist - girl - Friday, seemed upset. "Bill, your grasshopper friend is still here," she said softly.

"Fine. I'll be in shortly. Any word fromWebley."

She shook her head.

"Damn! When you really need a telepath he disappears. Well, get out all the information you can find on Venusian habits, and have it ready when I get there. Also see if you can get me an appointment with the Mantashi embassy."

"Trouble?" she said.

"Of sorts," I said, and hung up. Then I called Alex Barnham, the one man I could think of who makes a hobby of alien oddities.

"Alex," I said, "what do you know about the Mantashi?"

"Oh, a lot of things," he replied. "Why? Creatures got a problem?"

"Big problem," I said, and explained the situation as briefly as I could.

"Hmmm," he said thoughtfully. "I wish I knew more about them, but, frankly, Bill, I've been specializing in human types of late. I don't have the foggiest idea what your Mantashi are doing. Now if your problem was with Callistan vampires . . . "

I interrupted him. "Do you have any idea who *would* know?"

"I'd try the Mantashi embassy," he offered.

"I'm working on that," I said. "Thanks, Alex."

"Anytime."

Ten minutes later I was at the office. Nancy seemed relieved to see me. At times, I wonder about that girl. She has beauty, talent, nerves of steel—she can look most aliens in the eye without a qualm, but she's rather squeamish about overgrown insects. "Relax," I said. "Kaara won't hurt you."

"He said he was hungry," she objected. "He doesn't eat people, does he?"

"Only young virgins," I said. "You're safe."

"I'm not so old," she protested, handing me the Mantashi file. "I'm still trying the embassy. No one seems to answer."

"Great. Still no sign of Webley, I suppose."

"Not a word."

"If he doesn't get here pretty soon I'll tear him limb from psuedopod."

Kaara, the giant Aldebaranian grasshopper thing, was waiting in my office. Stretched out on the couch, his mandibles resting on the arm of a nearby chair, his legs piled in an untidy heap around him, he looked less like a creature from

another world and more like a mad scientist's basement workshop."

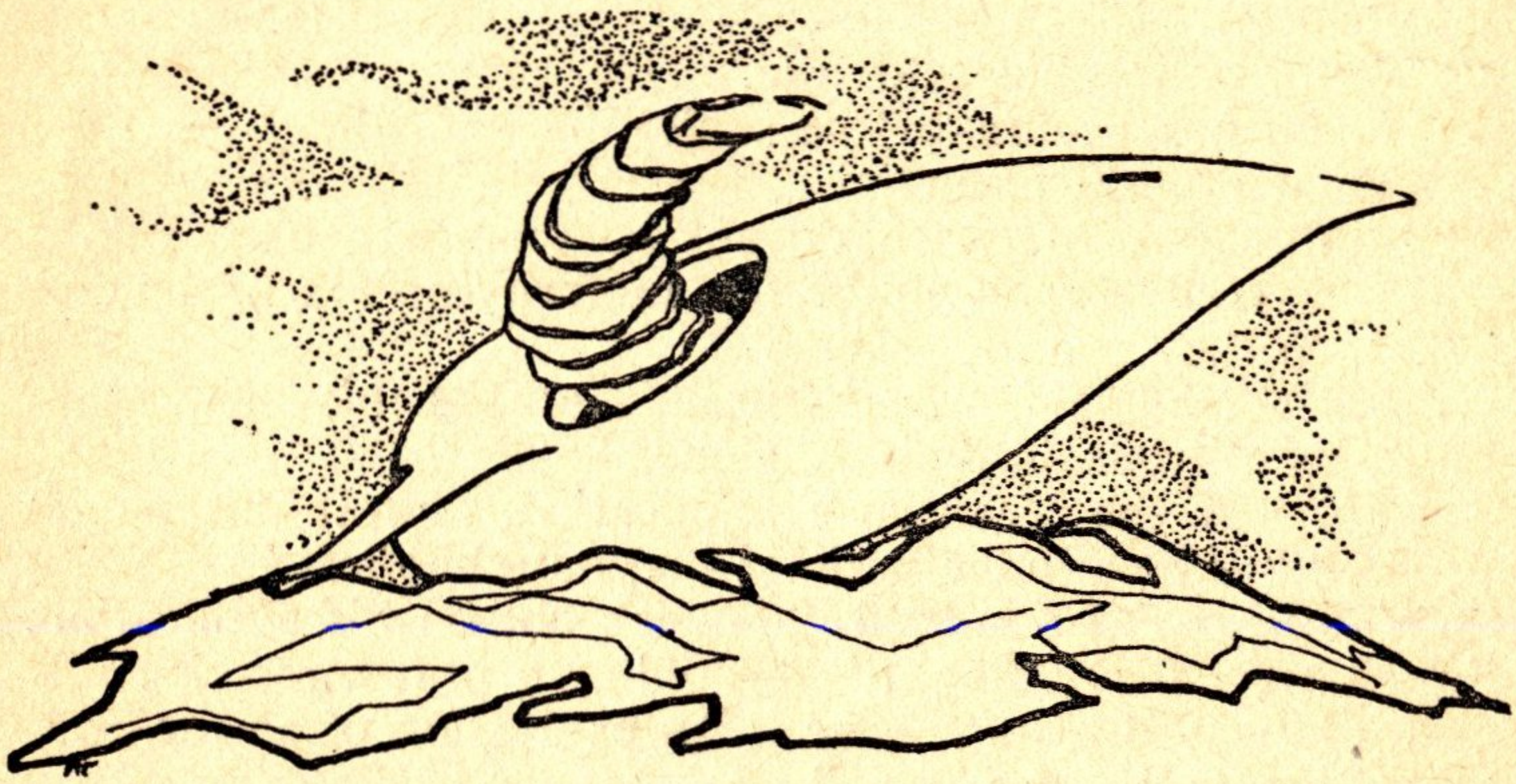
"Kaara," I said, "you're not an authority on the Mantashi, are you?"

"Their religion," he stridulated, "iss mosk inkeresking."

"I'm afraid this isn't a matter of religion," I said, "but then again it might be." I told him what the trouble was at the tunnel project.

"Firsk," my alien friend requested, "kell me how Creakures Inkorkeraked works. You hire creakures and renk them ouk, rike?"

"Right," I said. "We've been in business for almost a year. We started out as a travel agency specializing in alien



accommodations. A Kabobra from Sirius II came to us in search of a job; no one else would hire him because of the enormous amount of legal technicalities and paper work involved. There was plainly a need for some sort of agency to place non-human creatures in productive jobs; we are that agency. Most of our employees are creatures like yourself, stranded on a strange planet and in need of money."

"I see," chirped the Aldebaranian priest.

"We are not an employment agency," I continued. "We hire you, for instance, and then rent your services to anyone who has a legimate need for your talents. Mantashi are great tunnel-builders—the Kabobra, a hawk-like race with the most powerful wings in the known universe, make excellent messengers. I placed one of them with a concession operator

on Coney Island, to give aerial rides to children. Usually, we have no great trouble with our employees, but this Mantashi sit-down strike has me worried."

"Kerhaps," Kaara mused, "there iss some kaady function they neek time to perform."

"Body function? No," I said referring to the Mantashi file. "Not that I know of anyway. They ingest whatever they're tunneling through, eat the organic matter it contains, and transform the rest into the slime with which they line the tunnel. They're peaceful creatures—they respect their elders—they love their children—and they hold motherhood sacred. But none of this explains their sudden work stoppage at the project."

"No," Kaara agreed. "Thak iss the ex-kenk of your information?"

"More or less," I told him.

"Ik iss nok accurake," he said.

"What do you mean?"

"Motherhook, Mankashi do nok holk motherhook sacrek."

"Oh? Well, Kaara, you're the authority on alien religions. What do they consider sacred?"

"Sekks," he said. "Sekks itself. Karhaks thiss new Mankashi iss a kriesk in their religion."

I checked the Venusian's application. Xerptl (his name) professed to be a tunnel-builder—no more, no less.

"Could be," I admitted, "but it's not on his application. So what are they doing, then—holding a prayer meeting?"

Kaara waved his antennae in an expression of amusement. "No," he said. "An orgy."

"Fine!" I buzzed for Nancy. "Any luck with the embassy?"

She shook her head. "Not yet. They don't answer the phone."

"How about Webley?"

"No sign of him."

"See if you can rouse anyone at the Martian embassy," I said. "They're right across the hall. Ask for Cholly Emlach —maybe he'll know what's up with the Mantashi staff."

"Right."

"Kaara," I said to the Aldebaranian, "What goes on during a Mantashi religious orgy?"

"Thak," he said regretfully, "I am un-akle koo say."

"Nancy?"

"Yes?"

"See if you can find an authority on Mantashi biology at one of the universities. You might start with Professor Nelson at N.Y.U."

"Yes, sir," she said. "Martian embassy—alien biologist—coming up."

In a few moments, the assistant to the Martian ambassador was on the phone, his hairy face a mask of polite indifference. Martians look like aristocratic teddybears, and invariably seem to be sneering at you, although at heart they're very amiable creatures. This one I had had dealings with before.

"Cholly," I greeted him. "How's it going?"

"Fine, Beel," he replied. "What's up?" It's remarkable how adept the Martians are at picking up Earth idiom.

"I'm trying to get in touch with the Mantashi ambassador, but no one answers."

Cholly wagged his head from side to side. "Their office is closed today—something about a Mantashi holy day, I think."

"Okay, Cholly—and thanks for your trouble. I'll buy you a drink someday."

"No trouble. I'm happy to be of service. You've got a problem with an employee?"

"Yeah, but I think you've given us the clue I was looking for. I'll tell you all about it the next time I get over that way."

We said our goodbyes and hung up.

"Well!" I said. "Kaara, what happens on a Mantashi holy day?"

"I do nok know, excepk thak ik krokooses more Mankashi. Ik iss a secrek rike—no visikors can see ik."

"Produces more Mantashi, eh? Somebody," I said, "is lying to me, and it's one of my Mantashi. I could have sworn they all said they were male."

The intercom hummed softly. "Yes?"

"Bill, I've got a Dr. Taylor on the line; he seems to know something about alien biology. Professor Nelson recommends him highly."

"Thanks, honey." I picked up the phone and Taylor's face appeared in the viewscreen. He was younger than I expected—about my own age.

" Dr. Taylor? This is Bill Grant at Creatures, Incorporated. We have a little problem over here that we thought you might be able to help us solve."

" I'd be happy to co-operate," he said.

" Fine. Are you particularly well-versed in the physiology of the Mantashi?"

Taylor smiled. " As well as anyone," he said. " I did my doctoral thesis on them. What do you wish to know?"

" How do they reproduce?"

" They lay eggs. They dig a hole in the ground, line it with slime, and fill it with eggs. Why? "

" We've got seven Mantashi working on a tunnel project—and it looks as if they've taken time off to lay their eggs."

" Seven? " he said. " Brother, you *do* have a problem. That's what they're doing, all right. And with seven of them involved, I don't know what you're going to do about it."

" What do you mean? "

" Seven. It's almost a magic number among the Mantashi. That was the title of my doctorate: *The Mystic Rite of Seven.* You're familiar with the ' daisy-chain ' idea among humans? "

" Yes."

" Well, imagine a daisy-chain composed of seven Venusian slugs. Mantashi, you know, are really neither male nor female, but they're by no means sexless. In fact, they're just about the most oversexed creatures in the universe. They have seven stages of sexuality, just like the seven basic colours of the spectrum. Picture them as Red, Orange, Yellow, Green, Blue, Indigo and Violet. Each colour is a compromise with the next—each colour, you might say, is especially designed to fit in one position and one position only. In the same way, each Mantashi assumes one of the seven positions in the daisy-chain, and blends perfectly with the partners on either side."

" Oh," I said. " And then they lay eggs? "

" Eggs, too," he chuckled. " Every normal Mantashi is capable of producing eggs, and when a daisy-chain takes place, each one does, provided he hasn't been in a daisy-chain and laid an egg within the preceding 47 days. In common with most intelligent life-forms, the Mantashi enjoy sex, and get together as often as possible."

" I can see why you said I had a real problem with seven of them. These ' stages of sexuality '—can they lay eggs at any point in the circle? "

"No—each Mantashi has to reach the top stage of the seven to do so, so during the mating process they all, so to speak, change colours. I assume your problem is getting them back to work."

"Right. What do you suggest?"

"You'll just have to wait it out, I suppose. I've never heard of anyone interrupting a Mantashi daisy-chain, so I couldn't tell you how you'd go about it."

"How long does this orgy last?"

"About eight hours. Then they'll seal up the hole and go on about their business as if nothing had happened. Until next time, of course."

"Great," I said. "So now I'm stuck with a roomful of eggs. Any suggestions?"

"I'm afraid not," Taylor said, "although I'm sure the University would be interested in having them here to study while they're developing."

"Thanks, Doc," I said. "I'll let you know if I can work something out."

"That's perfectly all right."

I put the phone gently back on its cradle and looked at Kaara. "Now you know," I said, "what takes place during a Mantashi prayer meeting."

"Yess," he stridulated. "Mosk inkeresking."

Webley chose that moment to ooze under the office door. Webley, I should explain, is a versatile little guy who is about as shapeless as they come. Usually he looks like a cat, but he's really an amazingly adaptable glob of protoplasm without any real shape of his own. On top of that, he's a telepath.

"You're about four hours too late," I told him.

"Sorry, Bill," he said, as soon as he built himself a vocal arrangement with which to speak, "but I was unavoidably detained. Got mixed up flowing through a screen door and had a devil of a time putting myself back together." He looked over his shoulder, noticed that he'd forgotten something, and pushed out a pseudopod that in a moment became a most enviable tail. "We in trouble, or what?"

"You might call it that. Listening?"

"Yeah—got you tuned in perfectly."

I quickly ran over the salient points of the day's adventure in my mind; Webley "listened" and absorbed the entire problem at a glance. Then he started laughing.

" What's so funny? "

" Ha! " he said. " What a crazy way to lay an egg! "

" Isn't it, though? " I agreed. " Well, how are you fixed for ideas? "

" Simple," he said. " Wait until they get through with their orgy, and then take one of 'em off the job. I suggest the last one, since he's the trouble-maker—the one named Xerptl."

" Okay, wise guy, I've thought of that. But what do we do with the eggs? We can't have a colony of infant Mantashi hatching out in the tunnel project. It just wouldn't look right."

" Genklemen," Kaara said, " may one so hunkle as I make a sukkeskion? "

" Sure—go ahead."

" Kake ekks koo Universiky—ank akkoink one of Mankashi as carekaker."

" Hey! " Webley exclaimed. " Your friend has a good idea. But instead of *giving* the eggs to the professors, let's *rent* them to them. That way we can afford to pay Xerptl a small salary for looking after them."

" Webley, you're a genius," I said.

" I know," he replied modestly.

" But can we sell the Mantashi on the idea of moving the eggs? "

" Hmmm," Webley said.

" Why nokk? " asked Kaara, gesturing with his antennae. " The Mankashi love their chilkren," he stridulated. " Give them a choice—either move the ekks to the Universiky, or keskroy them."

I nodded. " You know, Kaara, I've just figured out how to put you on the payroll. We'll call you ' Consulting Engineer and Spiritual Advisor for Ajax Construction Tunnel Project.' "

" You honour me," chirped the Aldebaranian grasshopper.

" Oh," Webley insisted grandly, as if it was his idea, " think nothing of it. A group of hopelessly confused scientists recently made our brilliant friend here an Honorary Doctor of Alien Semantics, whatever that means. I'm about the only one around this place who doesn't have a title, and I do all the work."

" Well," I said, " since Xerptl number one was the one who caused all the trouble, we'll give you the title of Xerptl Two."

" That sounds like a dirty word," Webley said.

" You're the linguist," I reminded him.

The Mantashi concluded their orgy at twelve minutes past five that afternoon. I informed Kelly and the other Ajax dignitaries that we had negotiated a new contract with the slugs, and they agreed to let the Mantashi make up for the lost time by working on their day off.

The Mantashi themselves weren't too overjoyed at the idea of moving their eggs to the University, but when they were faced with the alternative of having them destroyed, they gave in. We even made it look like a gesture of good will when we pulled Xerptl off the job and put him/her/it in charge of the eggs.

When I returned to the office it was late. Nancy should have been gone hours ago, but she sat at her desk doodling on a sheet of paper. It looked like a man's name.

"Who's that?" I asked, indicating the doodling.

"Who's what?" she said.

"Roy G. Biv," I said. "Boyfriend?"

She laughed. "No—sort of a rainbow. R.O.Y.G.B.I.V.," she spelled out. "Red, Orange, Yellow, Green, Blue, Indigo, Violet. What a complicated way to do it."

"Yeah," I agreed.

"I'm sort of glad that with humans it only takes two."

"Yeah," I agreed, "So am I."

Larry Maddock

Erratum

We regret that in the last issue we misquoted the title of John Brunner's first major novel which was published by Gollancz Ltd. It should have been "The Brink."

Here is another Bulmer story centred on Man's endeavours rather than the mechanics of science, even though the setting is in a spaceship riding the neutrino flux field to - and from - another planet Particularly from.

GREENIE GUNNER

by KENNETH BULMER

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one

The door of Briefing was shut. Security tight. *Well, I'll know soon enough where we're going. I could do with an easy one, this trip.*

Gregory Strickland, tail gunner second class, walked past the closed door of Briefing, heading down towards the flux-wagons. All about him in Base Ship lay a thick, oppressive brooding, a palpable tension in the air.

It's probably always like this before a mission. Everyone nervous and

Sorensen laughed. The fear was in him, too; but hidden, controlled, used.

" Maybe you are, Kelly. But until you've been through a flux field, you're a Greenie. That's the way it is."

Strickland looked up. On the bows, painted carefully; but chipped here and there, and fading. M74.

Well, I've found her.

" How much longer? " he asked.

Sorensen banged Kelly on the back. *My twenty-ninth mission.* The thought was neutral. *Well, these two may be Greenies; but it's nice to have a couple of gunners extra along. They expected too much, for techs to double up on weapon turrets. Comforting.*

But the fear in Sorensen—in every fluxer—was only marginally reduced. Not enough to notice.

" Not long now, Greenie," Sorensen said.

" Where are we going, anyway? " asked Kelly.

" We'll know that when the skipper boards. Thirty wagons in this strike; fair size."

" Diving into a flux field like a pot of stew," grumbled Kelly. " It isn't decent."

" Just pray the Octos don't fork us out, that's all."

Strickland listened without hearing. He went over to the ladder. The metal was warm and slick under his fingers, stilling the tremble in his hands. He stared up at the fluxwagon's bulge above him.

Oh, sure, I know the theory fine. But now I'm here, about to board a real honest-to-God fluxwagon. I've read the manuals, I know the theory—theory—if only my maths had held up I'd have been in Briefing, sitting alongside the skipper as his navigator. Instead—just a lousy flux gunner, second class.

Kelly was a flux belly gunner, first class.

But he'd never wanted to be anything but a gunner.

And then there was Julie.

Julie.

The divorce papers had reached him the day he'd qualified as a tail gunner, second class.

The day Julie left him—Howard Bannerman, sauve, smooth, conceited bum—he'd been ploughed in his navigator's finals. His maths had gone, it had seemed, with Julie.

They'd been a happy crowd at nav training school, Julie,

Bannerman, Tessa and himself. Only, Bannerman and Julie clicked and a previous marriage just hadn't entered the picture. And all he had to show for his marriage was a gunner's badge on the arm of his grey coveralls. And a badge without even a star, without the star that on Kelly's badge gave him that edge of authority—flux gunner, first class.

The first class man took the belly guns, of course.

That was where the Octo interceptors would seek to strike —that was where the best man should be.

" Wait until the skipper arrives before you board, Strickland." Sorensen made it light; but the authority was there. " He likes to brief us all on the ramp."

Strickland waited.

He wondered if the others were as frightened as he was.

Of course they were. All fluxers were frightened—that's how they stayed sane.

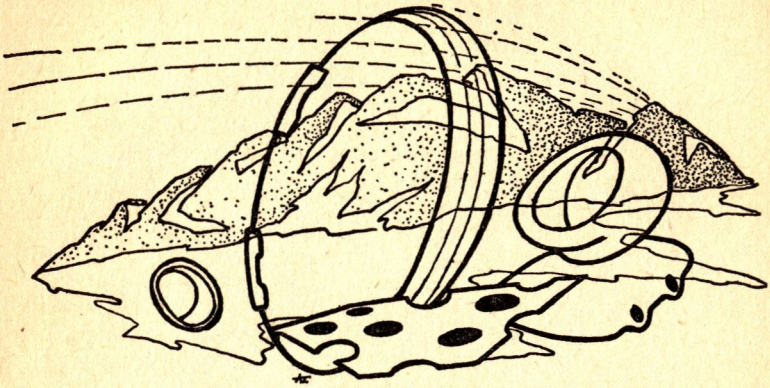
Sorensen thought: *Which one this time? Luxor? Tientsin? Dover on Eleven? That ring's sticky. Karlsbad? Cincy? Oslo? Masses of interceptor fields there. These new Greenie gunners'd sweat.* The coded Earth names unreeled like a co-ordination-memory test.

Behind that closed door of Briefing the captains and second pilots and navigators were lounging in chairs, smoking, listening, noting. Up on the platform the Briefing Officer, Leader Kurtven, was running over the proposed route. Shown as a thin red line running from the chip of light that simulated Base Ship to the fuzzy halo of Fourteen's atmosphere, the route jinked to avoid known Octo watch stations. Every mission got tougher. The Octos could smell the fluxwagons out, send their mines in blind with an uncanny direction that negated the very idea of blindness.

" . . . the notion some of you may have," Leader Kurtven was saying, his hard face swinging methodically over the rows of fluxmen, " that the Octos have a detection system that can spot us in the flux field. Scientific high brass says that is not possible. Once a fluxwagon is in the field, she cannot be detected. All the Octos are doing is to shoot in increased numbers of mines. On a purely percentage basis, they are scoring hits. But they still cannot detect a fluxwagon."

Enough mines, and detection doesn't matter any more. Captain Andrew Smithfield Daker let the thought play around

in his head for a bit. Like all experienced fluxers, fear was so familiar a friend that he no longer bothered to fight it. He just rode it along, and made it work for him.



Beside him, his second pilot, Ramon Gonzales, short, fat and never without a smile, shifted and nudged his skipper.

That means his odds have shortened.

Among the mission notes jotted on kneepads were also cryptic betting records. *Even Death gets boring.*

Kurtven was outlining a new criss-cross bombing pattern. "Thirty wagons gives us room to play a double bluff. We put the first ten in on a north-south polar axis. Then the second echelon of ten squirt on an equatorial." His hard-planed face contained eyes that were blind to the humanity of the fluxers sitting before him. *Machines.* That was how he saw them all. *Human beings indoctrinated with the impassive skill of machinery; but, being human still, with all the unpredictable judgment that machines just do not have.*

And that was how the fluxers liked to be regarded.

"What about the third echelon, Leader?" called a pilot.

"They will be riding fifteen minutes after the first two—"

"Oh, oh!" and "Here we go!" and "Switch my shroud tight, grannie!" came from the fluxers. That was the way they always played it, bigger than life, hamming up the corny business of braving sudden and unpleasant death.

Kurtven said, his voice cutting into the cheers and jeers: "I'll be leading up the third echelon. Personally. We should catch the Octos with their pants down."

" They wear pants, yet! "

Daker kept his hand steady on his kneepad. Riding that third echelon would be easy—going in.

But coming out . . .

Kurtven started detailing echelons.

" . . . M74, third."

" Oh, well," said Navigator Bannerman, sitting on the other side of Daker. " It was a good life whilst it lasted."

" We'll come out, Howard," said Ramon Gonzalez.

The glances of second pilot and navigator locked. Then they both looked at Captain Daker, and away.

" Mugs! ! " Daker said equably.

But he could feel the warm, reassuring strength in him, the strength that all fluxers needed. These men believed in him, trusted him to bring them through the bedlam of a fluxer run, through the hell of an atmosphere traject over planet. They'd flown with him before. They made up a team—these three, and Usama ibn-Munqidh, bombardier, and Shih Huang Ti and Sorensen, engineers, and Modibo Tafawa, radio officer.

Oh—and the two Greenie gunners.

" Coming in late," Kurtven was saying from the platform, " We should avoid the early hate and be able to plaster the target with precision. On Fourteen the two main targets are —as you know—Tyre and Sidon. Precision machinery, heavy-duty alloys, robot spare parts, interceptor repair and fabrications shops—a whole complex of heavy industry to be clobbered."

Suddenly Daker was beset by the scared thought. *Suppose Leader Kurtven decides to ride with M74? Well? And would that be so bad?*

two

Briefing was breaking up now in a scraping of chairs, the lighting of fresh cigarettes, the jittery sound of laughter at jokes that were green with mould.

Kurtven walked across to Captain Singh.

The problem hadn't arisen. M74 rode the flux field with her usual tightly knit crew—and two Greenies.

They went out, each fluxwagon crew a compact group, picking up the bombardier and radio officer on the way. Down in the guts of Base Ship, orbiting in real space a hundred light years from Earth, being supplied from the end

of a hyperspace run that began at Flux Base on Mars—Good old Mars!—the fluxwagons were waiting.

Engineer One, Shih Huang Ti, said in a grumble: " If that oaf Sorensen has been at the engines I'll denature him."

" He's as good as you are," chaffed the bombardier, Usama. " Or," he added thoughtfully, " Nearly as good."

The yellow man and the brown exchanged polite insults, going down to where their flux wagon waited. Everyone wrangled aboard Base Ship. Once aboard a fluxwagon, though, and they meshed up, like a machine. No—not *like* a machine.

A fluxwagon crew was a machine.

A gestalt of human minds could function on levels that machines did not know existed, let alone comprehended.

Daker halted, waiting for Ramon Gonzalez. The chubby man was carefully packing a chubby pipe, tamping the tobacco down with fingers that were as stiff as pokers. Other men did other things to still the trembles. Daker habitually walked in a lounging attitude, hands in pockets. No one minded that.

Echoing ahead of them the noise from the wagon bays reached up like a machine-shop of gnomes, busy about strange and mysterious tasks. Captain and co-pilot strode on, caught up the others, headed in a group towards bay number two and M74.

Sorensen and the two Greenies were waiting.

Gunners are nice, thought Daker. *But for my sins, two Greenies, men who think they know all the answers and haven't even found out what makes a fluxunit tick. Oh, well. Let's put them into the fluxfield and watch them being sick and get the indoctrination over with.*

Lots of skippers just went straight aboard their flux wagons. But it had become a habit with Daker to brief his crew before boarding. As the two groups joined he opened his mouth to make introductions.

What the hell's the matter with Howard Bannerman?

The navigator dropped his clipboard. Papers spilled. Automatically, Tafawa, the radioman, bent to retrieve them. Bending down that way, he missed the action.

One of the Greenie gunners—Gregory Strickland—jumped forward and struck Bannerman. He hit him on the nose. Blood ran. Bannerman lifted one arm. Strickland hit him again. Bannerman fell down.

Then Sorensen and Kelly had leaped on the gunner, dragged him off, stood holding him by the coverall collar.

Strickland looked dreadful. Far worse than any new man had a right to look on a first mission.

Bannerman lay on the decking, one hand to his face, the other half supporting himself.

" What's biting you, Greg? " Kelly was demanding.

" This ain't funny! "

" Take it easy, pal."

" Looney before he's started."

Daker wondered. There had been something personally vicious in Strickland's attack. Bannerman looked up; made no effort to rise.

" Well, Strickland." Daker made the words short and hard. " What's this about? "

" Nothing. Nothing to it— "

" Nothing to it? Are you crazy? "

Shih Huang laughed dryly. " An apt question to a fluxer, skipper."

Daker did not turn. He said: " Strickland—we have to make this run. I'll see you afterwards. Now get aboard."

Strickland closed his mouth. He did not look at Bannerman. He followed Sorensen aboard.

What a sweet note! Bannerman—navigator aboard this wagon. Well—he'd really beat the living daylights out of the swine when they got back.

Green as he was, he was enough of a fluxer to add the immediate: *If they get back.*

He knew his way around the fluxwagon. First there'd been the dummy, a hardboard and wooden affair. Then they'd practised aboard a worn-out old hulk lying forlornly on the red desert sand of Mars. As someone had said, jokingly: " They don't make these babies to be got out of in a hurry."

As a joke it had fallen flat on its face.

But they'd all got the idea.

To board you had to climb up the vertical steel ladder and push through the round manhole into the lock. No—you wouldn't blast neatly free of a fluxwagon in a tidy little escape capsule.

Strickland stood up in the fluxer. The smells were all about him—the warm, exciting, stomach-fluttering odours of a fluxwagon. He ticked them off. Flat oil smell from machinery.

The throat-catching stink from rocket fuel. Canned air. Rubber, plastics, varnish, oxygen lines—everything in the warm womb of a fluxwagon gave off a small portion of its own identity, and the coalescing whole formed an aroma peculiar to and part of a fluxwagon.

Bannerman.

He'd have to remember to ask after Julie.

There was not time now for niceties from his past; the squawk box was crackling and Captain Daker's calm and reassuring voice came over, calling up the positions. Back came the responses.

" Second pilot, checking. Bombardier checking. Navigator checking." *Bannerman's voice; sauve and cocky and, a trifle puffy?* " Radio Officer checking. Engineer One Checking. Engineer Two checking."

" Very good—" Daker's voice was saying, as another voice came over the intercom.

" Belly gunner checking."

" Oh—sure." Daker made it a laugh. " Passengers, this trip."

After the little ripple of laughter, there was a pause.

Then: " This is the captain. Tail gunner. Do you hear? "

Strickland swallowed. He was stuck still halfway down the tunnel leading aft. He hurried. Again the squawk box snuffled.

" Worn himself out prize-fighting."

" Hey, Strickland! You having pups? "

Then, blessedly, Kelly's strong Irish voice: " Tail turret's a tidy way down aft, fellows."

" Sure," Daker said. " Check when you're there, Strickland and make it snappy."

Strickland fell into the little cubby near the tail that was his sanctum and grabbed the mike. " Tail gunner, checking," he said. *Damned if I'll apologise!*

Only then could he set about pre-flighting his turret.

Even as he did so the vision rose of himself pre-flighting the navigator's cubby. That was where he should be; not stuck down here in the duck's back of the ship, *no, sorry, fluxwagons were never ships—only wagons.*

He was left severely alone in his tail turret. Not because it was a long trip aft, he guessed. New men aboard usually received a bit of jollying along from the old hands just before a mission, during this period of waiting, when the tension

mounted and throats dried and hands grew clammy. He'd been left alone because he was a pariah—he'd made a false move. A fluxwagon crew was a unit; one man didn't strike battle that activated the archaic breasts of men like Kelly and Sorensen, men from nations that enjoyed a fight for the sheer pleasure of fighting. Especially when they fought a friend.

He shrugged that off. Went on pre-flighting the turret.

Up in the front office now the two pilots would be seated on their thrones surrounded by instruments and dials. Just to their rear the nav cubby was lit and shadowed as the navigator worked on the course. Strickland knew what his job would be. Until the moment they struck hostile atmosphere, he was the most important man aboard.

Up there he—*Bannerman*—was computing their flight course into the flux field so that they would come out right on the edge of the hostile planet's atmosphere. He couldn't afford to fumble. Octo watch stations were spreading mines into the field as the Terran ships came through—they couldn't be seen; but Strickland had heard stories of the percentage of hits that had been mounting lately.

Bannerman had a man-sized job on up there.

A job that Strickland would have been doing if it hadn't been for Bannerman—and Julie.

Was he scared? Yes, of course. But not in the way that the rest of the fluxwagon's crew—excepting Kelly—was scared. They'd all been on missions before. Captain Daker, he'd learned, was on his eighty seventh mission. Old hand. His fear was the contained, turned, used fear. One day, if he lasted, Strickland would be like that.

The minutes ticked by. Noises fined down. They were a part of a striking force, one wagon out of thirty. Around him in Base Ship now two hundred and seventy men were going through the same agonised waiting—plus Leader Kurtven.

Over the intercom Daker told them the mission—Tyre and Sidon on Fourteen. Strickland tried to remember what he knew of them. *A tough one? Or a milk run*?

He just didn't know.

The Octos commanded all the inner rings of planets around the big sun called Gideon, and men were fighting their way in from the perimeter. There were a lot of planets in there, a lot of bases. Some were tough, some not so tough.

There were no milk runs.

The ten minute buzzer sounded.

He had a vivid image—sight, sound, scent, tactile—of Julie, standing with her yellow dress blowing in the wind off the Marsbase airplant, laughing at him, enticing, seductive, exciting—*hell, man, wake up! That was buried as deep as the cities of Earth the targets this mission was aimed for. Tyre and Sidon. As blasphemous as the love Julie had proclaimed. And just how many missions had Howard Bannerman navigated through the fluxfield?*

Strickland checked his equipment again. Never could check equipment on a fluxwagon too often. The metal and plastic of the twin guns was warm in Base Ship, warm and with the faintest of trembles from internal machinery. He let his fingers stroke down the cover over the big plastic-grained screen, press the reflector bubble-sight.

Empathy—no, not that—kinship with the tools of his trade.

Five minutes.

The rest of them were a long way off, up there through the tunnel. Eight other men, six of them clustered up front with their focal point the pilot's chair, and the two engineers further aft, fussing with the fluxfield engines. Presently Sorenson, engineer two, would come back aft to ride herd on the rockets.

That's when they'd be trajecting atmosphere.

Three minutes.

Another image jumped into his mind. Nav training school. Of himself on the pseudo course plot, muffing an approach so that he would have brought the wagon out deep inside the planet, of his frustrated anger, and of Bannerman, head back, laughing at him. But friendly laughter. That had been before he and Julie—*damn it all—I'm a flux gunner, now, tail man—second class.*

Why did cultures fight so fiercely in the depths of space? Why did they tangle over a huddle of planets, sending out their young men to snarl and shoot and kill over planets the gaining of which demanded almost as much in effort?

Could there be no possible contact between alien races?

The Friendship Lodges back home thought so. But they carried out their do-goodings in ways that sought to seduce a man from his allegiance to the human race. Who of the Lodges had ever met an Octo face to face?

If the Octos had faces, that was.

Captain Daker spoke to the crew, quietly, gently, a droning voice that reassured and calmed.

Two minutes.

Strickland opened up his direct view port, looked out on the vaulting arch of the wagon bay. He'd seen the sight a fluxfield gave—a grey nothing—and felt the old horror swoop on him.

Suppose a fluxwagon gave out, went inoperative, became forever lost in the endless expansion and contraction of the fluxfield? Would the crew become immortal? How long would they live? No one knew—and no one was volunteering to find out.

One minute.

The flaring drama of the countdown was strictly for the deep space boys. Let them tighten up into knots of apprehension at merely shoving off into space. Fluxers just pushed off from base ship in a shower, scuttled into the fluxfield like old women running to shelter from rain.

And, just like that, they were in space.

Strapped into his harness as he was he hadn't even been aware of the launching shock.

Tyre and Sidon—here we come.

three

As he had been trained, he settled down for the run in. About sixteen hours. Long enough for tension to drain, to get a little sleep, to begin to unwind. As their instructor had said —relax like a floppy rubber band when you come out into atmosphere. That way you traject ready for what may happen.

The instructor, he'd found out afterwards, had completed fifteen missions and then been taken off operations. Battle fatigue, the report had said. Another mission and the instructor would have had no mind left at all.

Good fluxmen were hard to come by.

During the run in Strickland checked his armament a few times, dozed, brooded on Bannerman, drank with gratitude the cup of coffee that was brought by Kelly. He did not venture forward, even though Kelly issued a sidelong invite; he knew he wouldn't be welcome up in the forward compartments.

And he'd most likely belt Bannerman again, anyway.

The hatred he felt for the sauve man was almost a friend-

ship; a kinship of black and white, a force on which he fed.

Surprisingly, Sorensen came aft. He'd left Shih Huang to crouch over the engines, conducting the build-up and collapse of the flux field. That field caught and held for what could only be a fraction of a time unit the force of the billions of neutrinos pouring out from the interiors of stars. They swarmed through all of space, able to punch their way through an imagined fifty light years of solid lead—imagined? —who could grasp that concept?

Like grasping the tail of a comet and then letting go, the field pulsated through the wagon, the sheer impudence of it bringing the fluxwagon along in train. Shrouded in that cloak of invisibility for one neutrino wide slice of time and then free, and then caught again — the fluxwagons shuttled through space. Bloated one instant, shrunken the next, they covered the distances, invisible, undetectable, hidden.

Until they came out over the atmosphere of a planet and began their traject . . .

Sorensen's face held nothing in it for Strickland to grasp. He checked over the rockets, preflighting the control gear and reporting back to the front office. Then, with a sudden brilliant smile to Strickland and a thumbs up sign, he ambled off up the tunnel. Strickland watched him go.

Under orders—Daker hasn't forgotten.

Strickland chuckled suddenly.

Lucky for Daker that the trouble-maker was the tail man. A conveniently solitary position.

The fear cycles that beset fluxers were known in theory to Strickland. He knew, too, that men had had to go back to performing mechanical functions in this fantastic battle in space because machines just could not keep up with the

dazzlement equipment used against them. You could design a robot to do a job and it could outshoot a man every time. But then you give the man a camouflage and a radar interference rig and the robot becomes a moron. So you design fresh robotic equipment to take care of the man—and he swops camouflage, changes his tricks.

No robot can be programmed in a limited space to handle a single man's ingenuity.

So men had had to go back into space, to handle their own guns and rocket bombs, to take their weapons directly to the heartland of the hostiles.

Men had had to out-machine machines.

And they could do it, every time.

But it was hard on the nerves—so hard that fear itself became merely another factor to add into the equation.

Along about then Strickland lost colour and was violently sick. When he recovered, Captain Daker over the squawk box said: " Right, tail gunner. You're a fluxer now. Check your position again and report."

Strickland checked.

" Tail gunner checking," he said.

After that the instructions he had received about relaxing seemed, in retrospect, just so much hogwash.

" Ready for traject in fifteen minutes."

Up in the front office they would be concentrating on last minute touches. The navigator's job was done, now. He'd brought the fluxwagon from Base through the invisible shield of the flux field. Now, when they hit real space again and swept over the planet, he'd take a gun position along with the radioman and the other gunners.

Bannerman was always efficient. You could say that for the bum.

" A nice easy ride," Daker said. " Just about now the first and second echelons are hitting the Octos. We'll have it nice and jammy."

No one said anything about how sticky that jam would be when they'd trajected and were on their way out.

" Clear gun positions."

Obediently, Strickland swung his sights free, aligned them on the range dummy. He slid back the direct vision port. He didn't look out.

He settled the harness about himself, checked its comfort

and freedom of movement. He swung the guns about, checking.

Real space came up with an almighty wallop.

One minute he'd been swinging the guns, the next Daker's voice had yelled: " This is it! " and the sunshine poured in.

Filters clicked down. Almost immediately up front a turret began firing, shaking the fabric of the wagon.

Across all the horizon extended a sickle of green and brown, flecked with white. That was Fourteen. He had no time to admire the scenery.

" I thought this third echelon was supposed to be—" someone was yelling.

" They're everywhere! " He thought that was Kelly.

The whole wagon shook. For a long moment he could do nothing. Whipped aft, the stink of burning came to him. Already?

Then he saw the long, beautiful curves of vapour trails and rocket exhausts, rising from the planetary surface. They arched up like penny rockets. Glints of sunlight speared from the apex of the trail. He aligned the bubble sight, his mind blank, pressed the triggers.

He was missing. He deflected a fraction—and the glint of steel mushroomed into red destruction.

All about him now missiles were fleeting, criss-crossing. Any guidance systems would be left in the shambles, fogged by the scramble stuff filling everything with insane chatter.

More interceptors streaked up. The wagon jumped and jerked. The stink of burning had lessened; but the hiss of escaping air rose shockingly. Someone was yelling about patches, and the captain's voice, held and contained in a box of restraint, said: " Don't worry about patches. Keep them off us until Usama lets his bricks go."

" Got him! " That was certainly Kelly.

Strickland aligned the sights again, pressed the triggers. Something burst with a roar up front. He had no time to wonder what it was.

The interceptors were streaking in from every angle.

He tried to pick them off methodically. Out of a wedge formation of five he took three. The other two curved away above. Up there the spine armament, manned by Tafawa, the radioman, hammered insanely.

A blast of air sighed from the turret. He heard a loud

click and knew an automatic patch had slapped across a shell hole. The wagon was jumping like a salmon on the end of a line.

He couldn't feel his feet. Coldness was crushing down.

They'd been hit.

Well, of course! What else did you expect?

" Get those bombs away!"

" For crying—"

" I'm hit! I'm hit! "

The squawk box was a bedlam.

He fired again and again. Fractionally, his focal area was clear of hostiles. Then they came again. Below, the flank of the planet fled past. Weren't those bombs ever going to go?

Riding a traject to the left rear he could see a fluxwagon. She smoked with an ominous drift of dirty grey, streaming aft in the thin atmosphere. He swung his sights away, picked off a zooming interceptor. When he swung back again he could see the limb of the planet appearing above the other fluxwagon. In the fraction of time that he watched, the planetary slice swelled above the fluxwagon.

She was going down. Slowly, majestically, trailing her plume of smoke, she was sliding down into deeper atmosphere and burnt-out destruction.

The wagon shook and shook again. The stink of burning had vanished now and Strickland, remembering his training, guessed that the wagon was empty of air. The squawk box hitched to a bracket was silent; over his phones he could hear the babble of talk, quick orders, curses, prayers, shrieks of anguish as—coinciding with a metalling jangle through the metal walls—the wagon was hit again.

The flying fishleap when the bombs went were like a plunge into fresh air from a dank cavern.

Usama was yelling: " Awaay!"

The rockets picked up now, able to fling the wagon forward and out of this madhouse without concern for niceties of course computation. Looking around his sector and feeling the hair-fine trigger reaction in him, Strickland could see no Octo interceptors.

His phones crackled. Daker said: " Tail gunner. Up forward. Fast."

Unhitching all the impedimenta was a nightmare of slow

fumbling fingers. Unstrap harness. Unplug phone lines. Unplug oxy lines and reconnect to the portable bottle. Drag his feet from the stirrups and haul up and out of the turret. Then a stumbling progress along a wildly gyrating tunnel to the forward compartments. On the way he passed the engine room and saw Shih Huang bundled in a plastic grab bag, hideously stained with red, and Sorensen working like a maniac on fluxdrive engines. Strickland swallowed.

Up front he found the radio officer, Tafawa, black face ashimmer with sweat, slapping patches on rents in the hull. Gonzalez, the second pilot, was sitting on the decking, looking stupidly at his broken left arm. The whole place looked as though a fragmentation bomb had been let off in the confined space.

As one probably had.

Daker didn't look round. He was sitting crouched in the pilot's throne and Strickland could see the bunching of his shoulders as he fought to keep the fluxwagon on course, up and away out of atmosphere.

The captain said: " Check Usama. He's hit."

Usama. He was the bombardier. Obediently, Strickland dropped down, crabbed forward through the tunnel under the flight section.

Usama was sprayed in red gore around his bombing plot.

Strickland edged back.

" No good, skipper. Gone."

" Hell!"

Strickland unplugged his phone line, anticipating an order to return to his tail turret. In the silence he felt the characteristic jerk as the wagon re-entered the flux field. *Late. Trouble with the engines. Now they'd be a lame duck, flying back at the rear of the formation.*

In confirmation of that the wagon shuddered. Mines. Octo watch stations, dotted about the planet, flinging in mines with a wholesale bounty. Any one of those big balls of sudden death could de-gut the wagon like ripping open the belly of a fish.

Strickland paused halfway back and looked down the ventral hatch to the catwalk. Down there Kelly was hunched against his turret. Redness stained his right shoulder.

Strickland plugged his phones into the nearest point, said: " Kelly! Are you all right?"

No answer.

He unplugged, dropped down on to the catwalk. Kelly's eyes were closed; but he was breathing still behind his mask.

Pulling the big man out from his turret was a tricky job. At last he had the Irishman laid out on the catwalk, found a first aid kit and went to work on his shoulder and arm.

Bannerman found him still working.

The patches Tafawa had been applying had taken effect, and the forward sections were filling once more with air. Bannerman's voice was thin in the thin air.

" Not like that, idiot! Like this!"

Yes, Bannerman had always been efficient. He had Kelly's arm and shoulder strapped up and the gunner lashed down to a skeleton in seconds. He looked up, glaring at Strickland.

" We're in a mess, Greg."

Greg.

He'd ceased to think of Bannerman as Howard months ago.

The rage in him was a violent force, urgently seeking outlet. He half cocked a fist. Bannerman saw that.

" Save it, Greg! We've a job to do. The skipper can pull us through this."

Strickland interrupted. " Just keep out of my way, Bannerman—"

The wagon shook. Strickland was still wearing his mask, plugged through to the bottle in its sling around his shoulders. Bannerman, trusting the patch repairs, wore no mask.

A section of hull plating disappeared. Air whooped out.

Bannerman's scream thinned and gargled and died.

Strickland took a deep, tremendous breath. His ears sang. Then there was no sensation in him at all. He whipped off his mask, slapped it hard over Bannerman's face, turned the oxy tap on full.

Then he was crazily clawing up, one handed, hauling the navigator up with the other. Tafawa appeared beside him. The radio officer punched the two men upwards with one gigantic black palm, dropped down and clambered catwise to a hull patch in its beckets. Sparks shot before Strickland's eyes.

Tafawa swivelled the hull patch, cracked it hard against the rent. Seconds trembled. Then the air built up again and Strickland could release his pent up breath and tenatively

taste the atmosphere. Thin, but breathable. White hot skewers pierced his chest. He was gasping like an old man.

Daker said: "Tail gunner—get to—" and then stopped.

In an altered voice, he said: "What's the matter with Howard?"

"Anoxia. I think he's been hit, too—"

"Well, strap him up. Hell—we'll have no one left soon. Jump to it, man!"

Strickland jumped. With Tafawa's aid he strapped up Bannerman. The navigator was breathing shallowly, face pumice grey. Blood stained his chest when they ripped away the coverall.

The wagon bucked again and the lights quivered and died. When the emergencies came on Strickland saw that Tafawa was in the last stages of fear—most fluxers went through the first stages of fear as part of living.

He understood that this was his first mission. When he'd done another one he'd more readily comprehend the type of fear that could let a man live and function smoothly as a machine, using his fear as a clearing for over-choked circuits—but right now he thought he was going to flake out.

Tafawa said: "We're in flux field, skipper. But they're still shooting—"

"Blind!" Daker said fiercely. "They're spraying the flux field with mines as we leave—"

And, after that, came peace and quietness. They had fled beyond the range of the mines hurled by Octo watch stations. They were out in space, heading home in the comfortable security of the flux field. Safe. And with a wagon-load of corpses and casualties.

Daker took the tally. Two killed. Three wounded. And four still alive—just.

Sorensen came forward. His big face was ghastly.

"Skipper—the flux engines are in a hell of a state."

"Will they hold up?"

"I just don't know. We daren't overdrive them—"

"We won't. We'll take it nice and easy from now on."

four

The hours ticked by. Deep in the enfolding flux field the wagon bore for home.

At last Daker said cheerily: "This is it! We're coming out now."

Strickland had remained up front, caring as best he could for the wounded. Tafawa had been working on the ruined radios, trying to coax life into them, trying to re-establish contact with the waiting welcome aboard Base Ship.

The wagon leaped and re-entered real space. For a moment no one said anything. Looking up through the hatch, Strickland could just glimpse a corner of the main screen. The screen showed stars.

Just stars.

Incredulously, he stood up and went into the pilot's section unasked. He stood with his hand on the backrest of the second pilot's throne, looking at the screens. He rotated his head like a marionette. Every screen showed stars.

No Base Ship.

"Where are we?" he said. His voice was a choked croak.

Daker sat, hunched up, peering intently into the screens. At last he moved. He wiped a hand down his face.

"I don't know. We're lost."

Lost.

The bubble burst in Strickland's head.

"We can't be lost!" he was screaming. "You've got to know where we are! You've got to take us back to Base. You've got to. It's your job. I'm only a gunner—I'm one of the stupid ones—you're the big brains! 'You have to take us home!!"

The reaction from immediate fear over target engulfed them all. Daker's response was a tired shake of the head.

"I follow the course co-ordinates set up on the board, tail gunner," he said. "The navigator computes the flight path and I fly along the red line he sets up. Look—there see for yourself."

It was right. *We've followed the red line. And it's taken us out into space. Light years from anywhere.*

"What do we do?"

"What can we do? Is Howard conscious?"

"No."

"See if you can bring him round." Daker switched to his mike. "Tafawa. How are your radios?"

Tafawa's voice shook. "Shot, skipper. I might raise a single receiver in an hour or so; but—"

"All right. Do that."

Daker turned to Strickland. "Well? What are you waiting for? See if you can get Howard to figure out a course—" Then he paused.

"I—see."

Evenly, Strickland said: "I slugged the slimy bastard once. Then I saved his life. Now I'll go and see if I can knock some sense into him for you."

"Not just for me, Strickland," Daker said gently. "For us all. We're all dependent on Howard now to find the way home for us. Don't forget that."

"As if I could."

Strickland dropped down on to the main decking, went aft to the navigator's cubby opening off the pilot section. Here Bannerman had been laid on the scrap of open decking between instruments. He was still unconscious. He looked in a bad way.

What to do? The skipper at the controls. Tafawa struggling despairingly with broken radios, Sorensen labouring with equal despair and urgency over patched flux drive engines that could not be relied on to provide even enough power to take them home—providing Bannerman could figure out a way home.

I know what's happened, of course. That red line by which the skipper so confidingly sets his course has been a will o' the wisp. Octo punishment has knocked the nav instruments haywire. Bannerman fed in the right calculations but the resultant set up on the pilot's course was wholly wrong! In Nav School they called it the Ghost Track.

He sat looking at the instruments, once so familiar, now frightening in their strangeness and implications. He picked up a flight correction log and put it down again as though it were red hot.

Well, could I?

"How's he coming along, Strickland?"

He jumped. "Still out, skipper."

Over the squawk box the alarm in the skipper was washed out, so that he spoke with a contained confidence. "Tafawa? How's the radio? Can you go down and take a look at Howard?"

"The single receiver ought to be working in about ten minutes. Give me that long, skipper."

"Okay."

Strickland lugged out a fresh first aid box, broke it open, and set to work on Bannerman. He was still working when Tafawa dropped down from the radio shack.

"Still out? Let me see."

But Tafawa, too, could do little.

Between them they revived a flickering spark of consciousness to the navigator.

Tafawa said: "He's in great pain, Strickland." Then, gently, to Bannerman: "Howard. Can you hear me?"

The navigator's voice was a bloody whisper, choked, strangled in the pain wracking his body. "I hear."

The radio officer told him the score. Bannerman's bloodless lips moved feebly. "Sorry—about—that. Ghost Track."

"Yes. We know." Strickland could not keep the hatred out of his voice. "So you figure the right course, hey?"

He ignored the glare from Tafawa.

Bannerman's face drooped, the eyes closing wearily and the lips fluttering. "Nothing to do. Instruments shot. We'll never figure a course back—from—from—wherever we are."

"But we've got to!!" Tafawa said urgently. "You have to figure a course, Howard . . ."

"No—good. Just let me lie in peace—I—hurt." The man's face contracted in a spasmodic rick. He opened his mouth, trying to say something. There was only a whisper of sound. Tafawa bent closer.

"What is it, Howard? What are you trying to say?"

"Emrel . . ."

"Emrel?"

"Only chance." A cough, blood staining the bandages over the chest. "Tell Greg to go to hell."

Strickland started as though shot.

Despite any feelings he still possessed that were not numbed and that dictated his actions to a wounded man, he could not stop saying savagely: "You can talk, Bannerman! You slimy swine. You and Julie. Behind my back—"

"Cut it out, Strickland!" Tafawa's black face blazed.

"Well, hell," Strickland said sullenly, their position forgotten in his remembered wrong. "He ran off with my wife."

"Is that all? You should feel lucky."

"What's going on down there?" That was Daker, alone in the pilots' section, growing frantic at the delay and the tenuous hold on life. That hold was slipping every minute.

Air first. After that, what else mattered?

All the food and all the drink in the universe wouldn't help if you didn't have air.

At this distance out from Gideon, the sun was just a star like all the others—to human sight. Instruments could pick it up, could tell them which way to head for home. But most of the delicate instruments had been ruined, even coated in their protective wrappings during that fierce Octo bombardment as they'd come out of atmosphere traject and re-entered the flux field.

You need more that just instruments. You need a navigator.

And his navigator, Howard Bannerman, was gripping casually to consciousness through the power of drugs.

The captain alone in his pilots' section caught up with what they'd been saying down there in the nav cubby. *Howard —run off with this half-cocked tail gunner's wife? Would that be Susan? Hardly—she was too young.*

Daker flicked his sweat band out of his helmet and put in a fresh one. He sat up there, alone, cloaked with responsibility for these men—dead, wounded and alive—around him. His hands were not shaking; but his eyelids were drooping, obscuring his vision. They were granulated. He had a raging thirst.

The old joke among the fluxers was that everything should be duplicated— two pilots, two bombardiers, two navigators. That way, you could afford a fifty per cent casualty list.

Not now.

He spoke into his microphone. Hard, stony words, without feeling, without remorse, and without real hope.

"Tafawa. Pump Howard full of dope. Bring him around. Get his brain working. We must have a course plot home."

Tafawa said tightly: "That'll kill him, skip."

"Maybe. Yes, Tafawa, you're right. It'll kill him. But what else can we do?"

Down on the deck Bannerman's head lolled. "Emrel-track," he said, distinctly.

Was it imagination—or was the air really fouler?

"Emrel track," Captain Daker said, like a prayer. "That's

our way home, Tafawa. You have a receiver working. Get the Emreltrack frequency from the locked strongbox in the nav cubby. It's security tight—just in case we'd dropped down on Fourteen in one piece The high brass don't want the Octos to know all our secrets."

Hope surged. Tafawa moved with urgency.

Strickland, failed navigator, knew what Emreltrack was. Aboard a fluxwagon only the captain and the navigator knew of the existence of the Emergency Relay Track system. The radio officer was obeying orders, hoping for a miracle.

Strickland hoped, too. aboard Base Ship operators were standing a continuous watch, sending out broadcast pulses of hyper-radio waves, spreading them out around the Ship so that lost and wandering fluxwagons could pick them up and home in on them. No one would want Octos to pick up that frequency.

Emreltrack frequency—top security.

Strickland heard Tafawa over the squawk box.

The black man's voice was quite steady.

" Strongbox blown to pieces skipper. Nothing left."

Emreltrack—useless. Goodbye, Base Ship. Goodbye—everything.

" Very well," Daker punched the words over, hating them. " Get to work on Howard. And make it fast."

Tafawa swung down from the nav cubby and went forward. Strickland heard the click as the squawk box was switched off.

He thought greyly: *" Tafawa won't shake him. The skipper's slipping. He should have thought of Emreltrack.* And then the betraying thought sneaked once more into the forefront of his mind. *Well, could I do it?*

With the squawk box dead and the skipper and radioman up front trying to hammer out agreement, with Sorensen nursing his engines, Strickland was alone. The aloneness hurt. He swung back to the nav cubby, stood surveying the shattered mess. On the decking, Bannerman's eyes opened.

" Greg."

He looked down. The aloneness receded. " What?"

" About—Julie. She was no good, Greg. I swear to you. No—good." The navigator's face showed the agony through which he was going, an agony that the drugs kept barely below the threshold of bearability. In a few seconds he'd be

unconscious again, falling back into that safe black world of nothing. If they tried to revive him they'd kill him as surely as if they'd dropped him overside.

Strickland said: "That's a lie, Bannerman."

"No." The weak voice faltered, then picked up. "No, Greg. No lie. She played me along as she played you. Then she left me—I'm married now—Susan—Susan . . ."

Looking down on him, Strickland thought: "*So what if he is right? What difference does it make?*

"Greg—Julie was just a tramp. Forget her. Snap out of it, man . . ."

Bannerman's head fell back. The tautness went out of him. *His worries are over,* Strickland thought, savagely.

He clenched his hands, feeling the damp slickness of them. Then he began to burrow among the litter like a Paris trash-can hunter; his mind ticked over like a chronometer, like the four clocks that measured out the different time rates.

The day he'd entered nav school, young, confident, eager, full of the frightening buoyancy of the innocent. The days of work, hard, unremitting; but rewarding, infinitely rewarding. All the scientific marvels of an interstellar civilisation deployed just to train young men to take a bombing machine through the invisible fluxfield and bring it out at the exact co-ordinates in space and time selected. Tricky maths—maths—and Julie, laughing and gay, there all the time as helpmeet and companion.

All the time?

Hell, no!

The computer under his seeking hands became again a reality. He focussed strained eyes once again on the mess of litter he had collected, and saw without great surprise that equipment enough still survived to chart a very rough course using the Ghost Track and the leg out as bases for the calculations. But the values involved were complex and not to be trusted one hundred per cent. He'd have to joggle the old brain cells to sort this lot out . . . *now, let me see* . . .

He was right in the middle of it when the squawk box crackled back into life and Captain Daker said: "Tail gunner! Tafawa is coming back to the nav cubby. It's all we can do."

Strickland—trainee navigator engaged on a sticky problem—ignored the squawk box.

Tafawa came in. He looked defeated.

Staring down on the unconscious form of Bannerman, he said softly: "I'm sorry, Howard. But it's all we can do. We have to revive you, torture you, and make you figure us an orbit home. Then you can die."

Strickland looked up blankly. The idea had only just sunk in—past that tiny knot of personality that was still the trainee navigator.

I failed on the finals—that's all. I know it all in theory. All of it. Right to the nav badge I never wore.

But now he saw what the other side of the score was.

Let Bannerman figure the course, and let the womaniser die afterwards.

Let him die and rot in hell.

Julie would've liked that.

Damn Julie, anyway!

That was the first time he'd allowed that thought to form.

"Tafawa," he said slowly. "Let Bannerman lie in peace. I'm figuring the course now."

"You're what?"

But Strickland had turned his back and was bent once more over the navigator's instrument.

In the background of the universe—which was the metal bulkheads of the nav cubby—he was aware of meaningless noises, of clattering sounds that could be men running on metal treads, that could be men blaspheming and praying. He kept his mind on the task. He had a job, dammit! A job he could do.

A job I've been trained to do. So let me do it in peace.

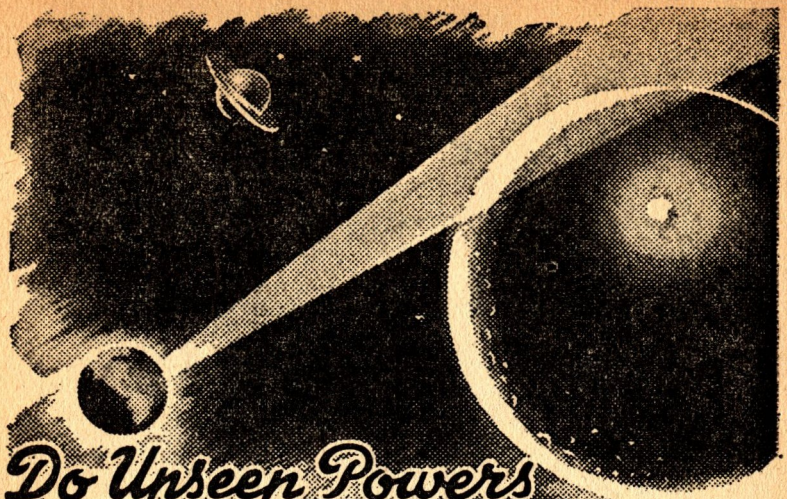
When at last he had a course figured, he punched it through on the computer and set it up on the pilots' board in the front office. Up there, shining serenely on the screen, the red line wove a course through space, a red line that the pilot would set the fluxwagon to follow, a line he could trust . . .

Trust?

Now it was Captain Daker's turn.

A greenie tail gunner, turning out to be a failed navigator. That's one for the book. Failed. Failed. That's the sticky one, the one with death as the answer. But what else is there to do? Radio picking up nothing but gibberish from Octo prowlers. Air running out. Can't stay here. That's certain.

Continued on Page 122



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It's up to you, Daker, me lad. It's your pigeon.

For my sins.

" Sorensen," Daker said into the mike. " Give me all the engines have got. I think we're going home."

" Thank God for that." Sorensen's voice was steady; but the thrilling overtones shrieked of imminent collapse. " They'll hold out—they'll just damned well have to."

Tafawa, recovering, said: " Shih Huang always said you were a lousy engineer, Sorensen."

" And I'll second that," said a voice from the grave.

They all jumped.

It was Kelly. He was conscious, strapped up to the skeleton. He was conscious, and aware of the situation and ready at once to inject some of his Irish first-mission cockiness.

Strickland went down on to the catwalk.

" You've missed all the fun, Kelly."

" You're breaking my heart. I need a cigarette."

" We might not have enough air for the run home."

" Oh."

Will he act like this after a dozen missions? Probably. Some guys don't know what fear means. In this game, they're the lucky ones. Normally, they miss out—but not now, not now.

The fluxwagon gave her characteristic heart-jolting plunge as she went into the fluxfield.

Strickland went aft to see Sorensen. He was calm. He was composed. As he passed along the catwalk under Tafawa's radio shack he heard a strange, eerie, unworldly skirling. He changed course and climbed the ladder.

" What the hell's that, Tafawa?"

Tafawa's looking at me damned oddly.

" Octos." Tafawa made it brief. He twirled dials. The gibberish keened, changing in volume and direction; but remaining constant in sheer menace.

" Well, Tafawa?"

" You figured the course, Strickland. You're a Greenie gunner. You may be a failed navigator; but you *failed.*"

" So?"

" So where the hell are we?"

Weariness was blurring the edges of his mind. His arms and legs were leaden weights. "When the Octos tossed their last mines in—or before, for that matter—they sent the red course line spiralling—"

"Spiralling!" That was Captain Daker, up front.

"That's what I said. We've been running in expanding circles out of Fourteen."

"Good God!"

"There are plenty of Octos around. No mines. You figure it."

Daker had figured it. *Leader Kurtven was right. The damned Octos don't know where we are in the flux field. They do shoot blind. There goes another bogey.*

The news affected the crew survivors differently. Over target the frantic fear boiling up was a live, vicious force. Now they faced a fear that crept, lurking, waiting for them. Two needles mattered. The time ticking away before they made rendezvous and the meter that indicated the air reserves.

"I'm shutting down the ship-air," Captain Daker said. "Wear masks and carry bottles. And crack the valves as though they contained drops of your blood."

"Gonzalez can manage a mask, and so can Kelly," said Tafawa. "What about Bannerman?"

Well—I need the guy, don't I? thought Strickland.

He took the mask and bottle, fitted the unconscious man carefully, and then sat crouched beside him, as the hours slipped away, easing the oxy mixture in under a steady control.

"Well, I'll be damned," said Daker.

"I thought you hated the guy's guts?" asked Tafawa.

Strickland couldn't think straight. His eyes blurred. His own bottle and Bannerman's was suddenly one bottle, and they were each breathing from the same life source.

"Sure," he said, not quite sure of the question. "Sure. But he ran off with my wife, said she was a tramp. I have to find out, don't I? I have to know!"

Like that, fluxwagon M74 crept back to Base Ship.

The corpses were carried out, the wounded hobbled and flopped on to stretchers. The four functioning members fell out, dazed, ashen, gargling clean air in the fluxwagon bay.

Strickland ignored the congratulations. He watched as smart medicos took Bannerman away.

"You can probably take your finals again, Strickland." Captain Daker was back to his poise, his crack fluxer attitude. "You can be a navigator, if you like."

Strickland didn't bother to answer.

He could see why, now. *Julie shook me badly; like an overloaded circuit. And I blew a fuse. My maths went dead. All fluxers are machines—that's the idea. A man can outfox a machine every time. And just as much as the fear is a catharsis and a circuit clearance device, so my divorce acted as a clogged line.*

That means Bannerman must be right.

Daker said: "You were shouting at one point that you needed Howard, Strickland. How's that?"

"Sure I need him. As soon as he comes out of hospital I'm going to give him the biggest damn thrashing . . . And after that we'll shake hands and flux out together."

"Clearing circuits?"

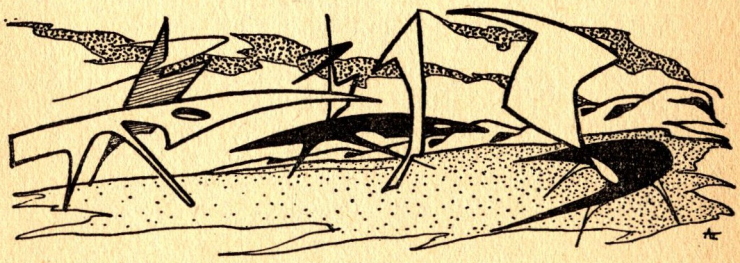
"Yeah. And readying the machinery for the next ninety-nine missions."

"You'll make a fluxer," said the skipper.

They walked out of the fluxwagon bay, a small, compact group, their wounded carried before them.

They were a fluxer crew—now.

Kenneth Bulmer



British—Hard Cover

A new writer's first novel, **Moonlight Red** by Dighton Morel (Secker and Warburg, 16/-) begins in a manner worthy of John Wyndham to whose work it bears a strong resemblance. All the ingredients for a good ' catastrophe ' story are there—the immediate establishment of a handful of characters closely connected with an influenza epidemic in a fictitious small English town; the sinister secondary symptoms and the gradual building of suspense as the victims develop encephalitis and become dangerous, raving maniacs ; the local military operation (part of a wider emergency plan coded " Moonlight Red ") to maintain survival of the few remaining sane. Unfortunately the theme does not survive the treatment because the author has not, unlike Mr. Wyndham, the wit, ingenuity and writing skill to execute this type of novel with more than a moderate degree of success.

He wisely avoids the wider ramifications of the world-wide breakdown, beyond a few cursory references to London and Europe, concentrating the action in a microcosm of English country life, where there are moments of genuine excitement, but on the whole the shock tactics are ineffective, particularly when the menace from a band of juvenile delinquents, aided by a religious fanatic, is dealt with by the military commander; his deviation from a previously established coolheadedness and strength of character is peculiarly frustrating. The ending, too, of sudden violence, subduing to a note of vague religious salvation, is rather negative—an inconclusive echo of an excursion into " what might be if . . ." that started out so promisingly.

Charles Chilton's earlier two chronicles of the adventures of Captain Jet Morgan and spaceship-crew have evidently established a satisfactory readership because they are back again in **The World in Peril** (Herbert Jenkins, 12/6) the story of which will already be familiar to those who listened to the BBC

serial of it some time ago. The Martian plot to invade Earth is foiled of course, and the last Martian takes off for Proxima Centauri with his renegade earthmen, leaving, I guess, an opening for yet another sequel some time ? Not to my taste, I am afraid, as the plotting and execrable dialogue is too stereotyped.

I can envisage with pleasure however the possibilities of a new series of anthologies if, as is apparently so, **Out of This World 1,** edited by Amabel Williams-Ellis and Mably Owen (Blackie, 12/6) is the first collection. Attractively priced, printed and presented, suitable for but not obviously slanted at the younger reader, and with a " safe " foreword by Bertrand Russell, it contains an equally " safe," albeit somewhat familiar octet of stories by Arthur C. Clarke (" Breaking Strain "), John Wyndham (" No Place Like Earth "), Fredric Brown (" Placet is a Crazy Place "), Jack Vance (" Men of the Ten Books "), Arthur Porges (" The Ruum "), Murray Leinster (" The Middle of the Week after Next "), John Kippax (" Friday "— very good), and Ian Williamson (" Chemical Plant ")—including, as you see, no less than three from *New Worlds*. An ideal gift for a casual science fiction reader not yet hooked.

The publishers' blurb inside the dust-jacket of Henry Wards' **Hell's Above Us** (Sidgwick and Jackson, 15/-) is an absolute masterpiece (yes, I know, but this one even more so !). Having read this " novel " and not knowing whether to laugh, cry or remain silent in awe, I am sorely tempted to quote this blurb and leave it at that. But I am intrigued. Is this unknown Mr. Wade (whose " name is destined to become a household word, at once a hero of illimitable resource and a voice crying in the wilderness ") another Henry Millar living in exile in Paris (this is an English translation by Allan Neame from the original " L'enfer est dans le Ciel ") ? An enormous hoax a la Shaver ? Or a farrago of science fiction perpetrated by a writer determined to get in every s-f gimmick including the kitchen sink ? Written in the so-called contemporary-graphic style in the first person (as by Henry Ward—a kind of scientific James Bond) with an indigestible plethora of facts (?), names, places, organisations, the plot is thickened into an unholy brew of American v. Sino-Russian space projects, espionage, danger to mankind from " transalpha rays," an incredible Hollywood mock-up of a spaceship manned by a crew of lunatics—ingeniously fitted into the action—and a Martian entity.

Quote from page 298 :—". . . Several tens of millions of years have gone by and this organic-inert symbiosis, this cephalo-crystalline organism, has developed to planetary proportions. Beneath the surface of Mars, encased in its unbreakable leaden brainbox, a brain has evolved . . . What the fools *down there* think they can see on Mars, aren't lichens and mosses . . . but arms that don't look like arms, six thousand miles long, legs that don't look like legs, nine thousand miles long . . . canals are gigantic veins, twenty four miles wide, feeding absolute intellect the transalpha it needs to think on a universal scale, and manifest its will by nervous impulses of sufficient magnetic force to push rockets like ours off course." Plenty of excitement for indulgent readers, but you've been warned !

Leslie Flood.

American—Hard Cover

Editing a yearly anthology of *good* science fiction requires great diligence and perseverance if the standard is to be regularly maintained and each edition to be acknowledged a true definition of the genre. To edit a *best* yearly collection is to ask for the slings and arrows of outraged reviewers, for no two people will ever quite agree. However, Judith Merril's Fifth Annual **The Year's Best SF** (Simon and Schuster, $3.95) is even better than her previous four for 1956-1959 and will put to shame any adverse criticism that it is not possible to regularly maintain such a high standard.

In actual fact, after the first two yearly *Best's* Miss Merril's choice began to range far and wide in the literary field and by 1959 her annual selection was beginning to look like a cross-section of most of the leading journals rather than a sampling of the recognised science fiction magazines. In the 1960 edition this trend is even more noticeable and, conversely, the literary standard is even higher than before.

Once again twenty stories comprise Judith Merril's top choice, plus two fascinating articles, a survey of the year by herself, and the usual tantalising list of Honorable Mentions which didn't quite lift themselves into the top bracket. But just look at the range of magazines from which the top twenty were chosen ! *Playboy*, *Rogue*, *Saturday Evening Post*, *Gent*, *The New York Times*, *Monocle*, *Star S-F*, as well as the leading s-f magazines. Once again and for the fifth year running, our own *Science Fantasy* has a story included—J. G. Ballard's

"The Sound Sweep," which makes two *Bests*' for author Ballard—while *New Worlds* only managed three Honorable Mentions.

Space is too short to summarise the contents of each story (and it would be unfair to pick out personal selections for this is a too-good collection.) Get it !

Paperback—American

The British distribution by Transworld (2/6) of Harry Harrison's **Death World** (Bantam, 35c) coincided with the author's arrival for a few days in London from Copenhagen, Denmark, where he now resides, and I was able to catch up a little on the breathtaking speed with which this book hit *Analog* as a serial and then was published as a paperback on two continents within the space of a few weeks. Usually there is some sort of time lag between different editions but in USA the gap is getting smaller.

Nevertheless, this is a good futuristic story in any and all editions, depicting an alien killer planet where a small community of human beings are born, live and die combating the encroaching flora.

For several years Brian Aldiss has been writing certain short stories which fit into a cosmic pattern rather like a Stapledonian complex. Eight future tomorrows make up the far-flung possible destiny of Mankind in Signet's **Galaxies Like Grains Of Sand** (35¢) and their edition has the original intersticial sequences Aldiss intended should be included, making more logical connections than the original British Faber edition which appeared as *The Canopy Of Time* last year. There is a refreshing breath of Stapledon in the vastness of Aldiss's canvas too.

John Carnell.

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