NEW WORLDS SCIENCE FICTION

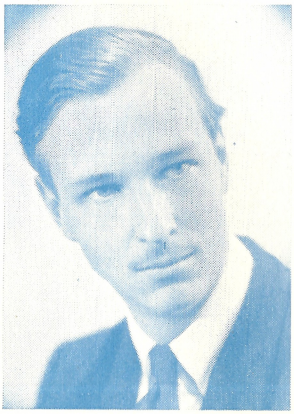
No. 66
VOLUME 22
2/-

★ THRESHOLD OF ETERNITY by JOHN BRUNNER ★

NEW WORLDS
PROFILES

John Brunner

London



"Editor John Carnell tells me that he considers *Threshold Of Eternity* one of the most "advanced" science fiction stories he has ever selected for publication in *New Worlds*. I think that's rather a dangerous statement.

"For, basically, all I've tried to do in it is to write an adventure story which reflects in its development a few unprovable but to my mind stimulating speculations about the nature of the universe—particularly time—and the place of human thought in the whole scheme (In passing, I suppose one would have good grounds for saying that this makes it not a science fiction story at all, but a super-science fantasy).

"This undertaking is not a new idea. The grand master of the form used to be A. E. van Vogt, before he stopped writing for the science fiction magazines. I'm not trying to invite comparison between my story and anything of van Vogt's; however, I feel that he tapped a worthwhile vein of writing with his tremendously fertile crop of imaginative assertions about the cosmos. He mingled philosophy and metaphysics with his science, and this seems to be a commendable practice within limits, for to declare that science is nothing but the truth and the key to the whole truth smacks unpleasantly of dogma

"So what I've tried to do is to write on two levels: and I hope that the result can likewise be read on two levels—superficially for entertainment, and also to provoke the flow of some fresh ideas. The nature of science fiction is speculation, after all, and it doesn't matter if some of our fantasies appear rather wild. Who in the nineteenth century imagined anything as improbable as our cockeyed modern world?"

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VOLUME 22

No. 66

MONTHLY

DECEMBER 1957

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Editor : JOHN CARNELL

Cover Painting by LEWIS from "Threshold Of Eternity"

TWO SHILLINGS

Subscription Rates

Great Britain and the Commonwealth, 12 issues 28/- post free

United States of America 12 issues $5.00 post free

Published on the last Friday of each month by

NOVA PUBLICATIONS LTD.,

Maclaren House, 131 Great Suffolk Street, London, S.E.1.

Sole Distributors in New Zealand :
MESSRS. P. B. FISHER, 564 Colombo Street, Christchurch, N.Z.

Printed in England by The Rugby Advertiser Ltd., Albert Street, Rugby

Superman – What Now?

During the past fifteen years many fine stories have been written about Homo Superior—the next evolutionary stage in Man's development—and authors have freely speculated as to the attributes this new superman would possibly have. Would he be a telepath? Have an enlarged brain and atrophied body? Develop other senses and even additional limbs? Do without sleep? Eat less? Adapt to extra-terrestrial conditions? Most writers, for the sake of their stories, have assumed that such a change from *homo sapiens* to *homo superior* would be brought about by a rapid change of environment—the detonation of the first atom bombs and resultant radio-active fallout triggered off a whole host of stories dealing with hypothetical mutations within the cell structure of the human body. Was this the manner in which *homo superior* was to be born?

It seems that *homo superior* is with us today. Has in fact always been with us, or rather within us, ever since Man stood erect on two feet and looked his world squarely in the face. But what is not apparent is that *we* shall be directly responsible for his arrival. Undoubtedly the rapid advance in medical knowledge during the last fifty years or so and the vast strides made in conquering the 'killer' diseases—diptheria, smallpox, tubercolosis, and other epidemic diseases—is primarily the reason for today's Man being a whole lot different to his great-grandfather. He is taller, is living longer, thinks faster, and is more imaginative. Both his physical and mental capabilities have changed. And will continue to change.

Yet this change in the human body is becoming more and more complex. As one disease is conquered another arises to take its place. It seems that Nature is determined to keep one jump ahead of us. For instance, smallpox, once the greatest of all killers, is now statistically non-existent, while deaths from tuberculosis are only one quarter what they were in 1946. Against this is offset the startling rise in poliomyelitis and to a less serious degree the current epidemic of "asian" influenza. The germs themselves are mutating or it may be

that the human body structure has altered sufficiently to enable germs to work in a different manner. Even in the animal kingdom our attacks are causing changes—the rabbit, almost exterminated by myxomatosis, is now virtually immune, while the common house fly, once prone to DDT, now requires stronger germicides to kill.

Minor ailments amongst the human race are rapidly on the increase—the expression " one degree under," which is still good for a laugh with any comedian, is becoming a serious expression in the medical profession as more and more working hours are lost per year through the inability of the body to withstand the inroads of mutating germ cells. Arthritis, rheumatic pains, lumbago, sciatica and colds are all near the top of the list of minor ailments—last year alone rheumatism accounted for 7.75 million lost working days for men and 3.89 million for women ; colds cost 3.56 million working days ; sciatica 687,000, and migraine 63,000. Higher still on the list is *sleeplessness* !

The general expression for this invasion of the body is " the strain of modern living " and most doctors agree that the problem will increase as our brains are exercised more while our bodies are called upon to do less and less work. The psychiatrists' answer to the problem apparently lies in creating new interests to replace the lost ' job interest ' due to mechanisation. Both are only offering a theoretical temporary respite from what is undoubtedly a world-wide change in the bodily structure of Man. A balance may eventually be reached but as it hasn't been halted for hundreds of thousands of years as *homo sapiens* has progressed onward it isn't very likely to reach a static position in the near future despite our successes with new drugs and anti-biotics.

If this is the stepping stone to *homo superior* it is going to be a long and painful one and not in the least like the way in which the science fiction writers envisage the change taking place.

John Carnell

John Brunner's first book-length novel, which begins here as a three-part serial, is one packed with action and movement, but basically it concerns the losing battle being fought by future Earthmen against an invading force from the stars. The battle area, however, spreads through Time as well as Space — and involves two presentday humans, Red Hawkins and a French girl, Chantal Vareze. The implications (and complications) are tremendous.

THRESHOLD OF ETERNITY

By John Brunner

Part One of Three Parts

I

Tonight the sky was velvet black, and a ripe white moon hung over the hill. Red Hawkins hesitated a moment in the doorway, and then limped down the path towards the gate, glancing at the lawn which he had populated with fantastic birds in metal and stone.

With him went the noise which he could never get away from—the tiny, almost imperceptible click of the joints in his aluminium leg.

It stopped when he halted at the gate, and he listened to the silence. The road, which ran from Orris Peak on his right to Three Waters on his left, lay still and cold in the pale moonlight. There was no sign of a movement as far as he could see.

Just as he was turning to go back, it happened.

There was a sudden dazzling flash of light, which hit him like a blow. Instinctively he flung up his hands, but it was over before he could cover his eyes. Stumbling blindly back, he lost his footing and sprawled on the soft grass.

The after-image burned painfully blue and red on his retinae. It was somehow localised, as if a tiny sun had winked into existence on the road, but it was long seconds before he could bear to look round.

When he did, he saw that the yellow tongue of light which had licked down the garden after him from the open door had disappeared.

He started to get up, feeling annoyed, but something made him freeze in incredulous bewilderment. From no more than a few yards away, he heard a girl's voice speak loudly and with a hint of anger.

" *Merde* ! *De quoi s'agit-il, alors* ? "

But that was impossible. Barely seconds ago he had seen that there was no one on the road for half a mile either way.

Cursing the patch which had now shaded to green behind his eyes, he got to his feet and called out uncertainly, " Hello ! Is someone there ?"

" Hello," the girl's voice came back tremulously. " What happened to the lights ?" She had a marked French accent.

Lights be damned, thought Red; *where did you spring from* ? Without answering, he went to the gate and made out her shape moving dimly on the roadway.

" Power failure, I guess," he said after a long pause. Now that he paid attention, he could no longer hear the hum from the small electricity generator behind the house.

" Oh no ! This fog is bad enough without—" The girl's foot touched something lying in the shadow cast by a tree, and she broke off to look at it. *Fog* ? Red repeated under his breath. *Where does she think she is* ? *Los Angeles* ?

Then her voice came again, full of horror. " There's a man lying here ! He's hurt !"

Red pushed the gate open and swiftly covered the ten paces separating them. As he came up, the girl spoke in a crisp tone. "A light, quick. He must have been run over."

Feeling as if he was having a nightmare, Red cupped his hand round the small flame of his lighter. *Run over* ? *No car has been past in four hours* . . .

But sure enough, there was a man here: his right arm twisted and outflung, a thin line of blood creeping over his brown, almost Oriental face.

The girl took the stranger's wrist with competent fingers and went on without looking up. " Go and tell the hospital, will you ? He needs immediate attention."

" There isn't a hospital nearer than Walton," said Red sharply. " That's twenty-five miles away. Are you crazy ?"

The girl turned to face him. She was extremely pretty; she had short brown hair, dark shining eyes and a tip-tilted nose. With forced patience she answered, " The hospital is just round the corner—I should know. I work there."

" God damn it, woman !" Red spoke more bluntly than he had intended. " There's nothing round the corner. There isn't a corner. There isn't even a doctor nearer than Three Waters."

As if she was taking stock of her surroundings for the first time, the girl slowly looked around. Her eyes widened in terror and her mouth opened to shape a scream. Red made to catch her, thinking she might faint, but she recovered herself and shook her head.

" I'm all right," she said with an effort. " I—I—Where is this place ?"

" You're about six miles from Three Waters," Red told her. She still looked blank. " Pulman County, Northwest California."

" But I can't be !" she burst out. " I'm in London ! I—Oh, *seigneur Dieu* !"

Red waited patiently while she struggled to get a grip on herself. " All right," she said after a pause. " If you say so, it must be right. Is that your house over there ? I think we ought to get this man off the road."

Silently, Red watched her feel the stranger's injured arm and lay it carefully on his chest. Then she ran her hands over his body, searching for other damage. Finding none, she got up and took his legs. Between them, they carried him awkwardly up the path and into the front room.

When they had laid him on a couch, Red crossed to the light switch and flicked it, knowing it was useless. He found candles and lit one with the last flame of his lighter.

As if she was trying to drive something else out of her head, the girl eased the stranger's arm out of his sleeve. He wore a coverall of unusual design, with nothing under it but a pair of shorts. The cloth of which both were made was very fine.

Red brought bandages, hot water a clean towel and some disinfectant, together with a piece of board to serve as a

splint for the man's arm. Then, seeing that the girl appeared competent to handle things, he went out to the shed behind the house to see if he could find the trouble in his generator.

The air was foul with scorched rubber. A single glance informed him that it would take a mechanic to repair the set—it looked as if lightning had struck it. Something impelled him to look at the motor of the car garaged alongside, and he found he had to pinch out smouldering insulation there, too.

Swearing, he returned to the house, pausing on his way to drape a wet cloth round the clay sculpture he had been working on. He would get no further work done tonight—the flow of inspiration was broken.

He found the girl dabbing away blood from the wound on the stranger's scalp from which the trickle had run across his face. "Shallow," she muttered as he entered. "Could you call a doctor?"

"No phone," said Red shortly. "And my car's wrecked. I just looked. Wiring's burnt out—somehow."

He didn't want to seem as displeased as he felt, so he added with an effort, "Doesn't look as if he needs any more help than he's getting. Are you a nurse?"

The girl nodded, and applied band-aid to the scalp cut.

Absently, Red picked up the coverall. He found something weighing down a small pocket on its chest, and took it out. It was a cylinder of dull metal, some five or six inches long, and astonishingly heavy for its size—too heavy even to be lead.

He hefted it a second and put it back.

Wiping her hands, the girl turned to him. "That's all I can do for him," she said. "Have you a cigarette, please?"

He shook one from a pack and took one himself, then held a candle for her to light hers. The flame cast odd shadows across the body of the injured man. He was slender, but well muscled; erect, Red judged, he would have stood about five feet two, and his features were of an odd, unplaceable cast.

The girl's hand trembled so much that she could hardly keep the cigarette in the flame, and the plume of smoke she breathed came in jerks, as though she was fighting to control herself.

After the second drag, she dropped it incontinently and collapsed into a nearby chair, her shoulders heaving with sobs that racked her body.

Embarrassed, Red retrieved the cigarette before it burnt into the carpet and waited, watching helplessly, while the fit passed off. Finally she raised her head, her cheeks tear-stained.

"I'm sorry," she said wanly. "It's just—I think I must have *amnesie*—lost the memory. Until I found I was talking to you outside, I thought I was in London, where I have been working. How—how long have I been that way?"

"It's the fourteenth of March," said Red slowly.

"Oh no! A whole *year*?" the girl whispered.

"It's 1957—"

"*Mais—c'est ridicule, ca*!" She sat up sharply and began to feel in a sling bag she carried on her shoulder. "Look! Look at these!"

She brought out a pack of English cigarettes, a flimsy white paper bus ticket priced at tenpence, a booklet of stamps bearing the head of Queen Elizabeth II, and a couple of letters addressed to Mlle Chantal Vareze, St. Peter's Hospital, London, W.1. With shaking fingers she indicated the post-mark on the last—March 13th, 1957.

"The fourteenth of March—that was *yesterday*! Not today!" she insisted.

"What do you last remember before you found yourself here?" asked Red after a while.

"I was coming off night duty. It was about—oh, half past seven. It was very cold. There was a lot of mist—not quite thick enough to call fog. The streets were very quiet. But it was March the fifteenth, I'm sure!"

Red didn't want to have to believe her. And yet he had seen for himself that she appeared from thin air on a bare, cold road . . .

"You say it was half past seven in the morning of the fifteenth of March. That's Greenwich time. About eight hours ahead of Pacific Standard. It's now"—he glanced at his watch—" about five to midnight, March fourteenth. Here, that's to say."

She watched with horrified eyes, waiting for him to go on, and—conscious of the grimness of the humour behind his remark—he did so.

"In fact," he finished deliberately, "it looks as if you have just covered about six thousand miles in literally *less than no time*."

II

Defence fleet (co-ordinates 406513924)—*speaking : Two enemy raiders detected and destroyed subject to* 41% *losses. Request reinforcements. (In passing : this one must have hurt ! Look out for trouble).*

Anchor team (AD 4070)—*speaking: triple red emergency : We've been shifted four years by this one and there's more to come ! Confirm anachronistic exchanges this peak, that at* 4828.

Centre to all units, triple red emergency : Prepare for violent temporal surge.

Magwareet was in space less than a thousand miles from the milling lights which indicated the anchor team's position, when the temporal surge hit.

It was spectacular, and yet there was almost nothing to see. In fact, there was literally *nothing* to see. The lights of the anchor team were suddenly not there. That was all.

But it threw Magwareet into instant action—not panicky, because controlled, but seeming random in its violence. He slapped open his time map to make sure that the anchor team, and not himself, had been struck, pushed open the lever controlling his defensive screen, and reversed his progress with a shuddering blast on the drive unit.

After that, he had time to be afraid.

When he came to himself again a few seconds later, he found he was mouthing curses, damning the sheer waste involved. There had been sixty men in that anchor team : each a brilliant, highly trained specialist. Now—if one could say such a thing—they were scattered across history, to recover—perhaps—and fight their way back to bring news of yet another peak of the temporal surge . . .

He clamped a firm control on his mind. It was no good railing against the universe.

Finding his voice, he spoke into his communication unit, asking for Artesha Wong. In a moment, her hard, familiar voice was in his ears.

"Have you tracked that one?" he asked, and received a counter-question.

"Have they really gone?"

He remembered then that Burma had been with that team, and rage threatened to boil up in him again. Poor Artesha—

that two people who meant so much to each other should be torn apart by insensate violence was shameful ! He replied as calmly as he could.

" Yes, I'm afraid I saw them go. I'm sorry, Artesha—but out of all of them, at least, Burma is the most likely to find his way back. He'll make it if he has to train the Being to bridle and saddle."

" You can't train a creature maddened with pain," said Artesha. Her voice was always flat—inevitably—but it seemed even more dispassionate than usual now. " I'll have a ship out to pick you up in just a moment."

Switching off the communicator, Magwareet sighed and closed his eyes with a twinge of guilt. It was marvellous to be able to relax on the ultimate softness of space. Mostly, there was not enough time to relax.

Not enough : the words burned into his brain. It was always *not enough*—not enough time to rest, or space to move around in. Most ironical of all, there was not enough of *anything* to make maximum use of the potential of the human race.

He was turning slowly relative to the stars. Raising his head, he stared up at them, wondering which—if any—of those in sight had shone on the implacable enemy.

" Do you realise you're beating us ?" he whispered into nowhere. " Do you know that you're wearing us down ? And yet it's not you alone, damn it ! If it was only you we had to face, we'd wipe the sky with you, and I'd lay bets on our chances. But we're trying to carry a ton weight and fight at the same time. We're doing our best, and it's not good enough."

Where had Burma been tossed to ? he wondered. Had he found himself alone, perhaps injured, in the vastness of space beyond Pluto ? He was driftwood on a surge of—movement —that reached clear across the Solar System and a thousand, or a million, years through time. The agony of a living thing —that was what it must be, all it could be. And yet often it was hard to remember that. Then it became an impersonal cosmic phenomenon: a storm, a wheel of fortune spinning through eternity and playing diabolical games of chance with human beings as the stake.

" Did they bring you ? Are you a weapon of the enemy's ?" he whispered to the Being. He was inside it here. Throughout the Solar System he was inside it. And yet to it he was no

more than the film of oil on one of his blood corpuscles to himself: broad in three dimensions and very short in time.

But the Being was enormous in time. Literally and precisely, it had four dimensions. And it could suffer pain. Every time the defending fleet released its sunfuls of energy to destroy an invader, the Being suffered. Sometimes the anchor teams trying desperately to find a way of repairing its injuries and returning it whence it came failed to control its writhing —and the problem was doubled.

Magwareet felt that he had been hunting a solution to it all his life, and he was infinitely tired. But he knew he could not rest—that no one dared to rest, or the human race was finished.

He opened his communicator again as he noticed mass approaching on his proximity detectors. " Were those raiders just destroyed the ones that intercepted the city from 129 Lyrae ? I didn't hear what happened."

" Yes, they were the same," Artesha informed him as if sparing him only a little attention. " They'd lost the city though—a long way out. Apparently whoever was piloting simply outflew them. I don't know who he is, but he must be brilliant. Sounds as though he might be made for co-ordination."

" Is that the city coming in now ?" Magwareet reeled off co-ordinates swiftly to identify what he was talking about.

" That's it," agreed Artesha. " Your ship's coming, Magwareet. I'll see you back here at Centre."

Magwareet turned and saw the lights of an unpressurised vessel heaving up towards him from the direction of Spica. The pilot, fastened into his control frame by magnets on his spacesuit, threw out a line and started back the way he had come before Magwareet had done more than catch hold.

There remained a few minutes before he needed to fall again into his role of co-ordinator—one of the chosen few who formed a multiple brain for the concerted efforts of the entire race. He tried to use them to continue his brief rest, but it was no good. It was equally useless to feel angry that he should be a co-ordinator; he was qualified for the job the only way he could be—by doing it well.

He looked down at his proximity detector again, and began to frown. " Artesha !" he said. " That city from 129 Lyrae —there's something wrong with its mass !"

A moment of checking; he waited. Then Artesha answered, alarm showing only in the speed of her words. " It's carrying spin ! Vantchuk—get in touch with them."

Straining his nerves, Magwareet listened. At this distance, it was useless to try amd make out details of the flying city, but he could distinctly see it: yellow, where no star or planet ought to be visible. It was not one of the complex web of spaceships ringing Sol; he knew their pattern by heart. Vantchuk's voice interrupted his thoughts; he knew that, too.

" There's no reply, Artesha. Something's wrong."

" Turn towards it," Magwareet directed his pilot, and the stars swirled giddily. Anxious voices continued in his communicator.

" They're spinning like a top. No answer from them. The rim of the city must be under about ten gravities, and it's out of control.

" Magwareet !" said Artesha levelly, and his trained mind took over.

" Kill that spin first," he directed. " Their population is about four million, if I remember. We'll need two hundred hospital craft—"

Mechanically, he detailed the supplies they would need, the probable order in which they would use them, and the time it would take. At Centre, his orders were interpreted into concrete terms; equipment was loaded, men detailed to report, a computer programmed to double-check Magwareet's proposals—but that was probably not necessary.

Chafing at the comparative slowness of the ship he was aboard, he watched the energy tankers close in on the city. The kinetic energy released when the billions of tons of matter were braked against the very fabric of space was too valuable to waste. The operation involved perhaps twenty thousand persons, directly or indirectly, and yet it was only an incident in the gigantic undertaking of mankind: survival . . .

The dizzying whirl of the city was already visibly slowing when Magwareet told his pilot to match velocities. A possibility was irritating him as he watched the rescue ships line up nearby, and he called Artesha again.

" Didn't you say that the pilot outflew those enemy raiders ? Yet there was no report of an accident or damage from him, was there ? A man that good doesn't just let things get out of control."

Artesha spoke soberly. " What are you getting at, Magwareet ?"

" I think we'd better hold off the rescue ships for a while. What's the gravity at the rim down to now ?"

" About two and a half. It'll take some time to kill it completely."

" Right," said Magwareet, detaching himself from the frame of the ship. " I want a team of troubleshooters—about fifty —to come in with me ahead of the rescue party."

They did not question his decision. When he clawed at and caught the personnel ropes floating stiffly out from the nearest airlock in the globe enclosing the city, men were waiting.

" Inassul, sir," the commander of the detachment at this lock identified himself.

" All right, Inassul. Let's take a look."

Passing the lock, Magwareet came out on a small platform and steadied himself to get used to the high g, looking about him. He caught his breath at the sight.

This city from another star was—fantastic. It sprouted like a forest of beautiful ferns into light bridges of synthetics and tall impossible buildings having nothing in common with Terrestrial architecture. Of course, its people had never been shackled by gravity; they had been able to build from the start with antigrav.

And they had torn this city up by the roots; they had closed it in with a plastic sheath and mounted it on an interstellar drive. They had loaded it with four million people, of whom one perhaps might be indispensable. They had sunk thousands of man-hours and desperate energy into bringing it where its resources could be utilised—and at the moment of success, disaster awaited.

Here and there the symmetrical beauty was marred by ugly gashes, showing where generators driven to the limit had failed to stand the force of the spin. Arches and walls had tumbled, not downwards towards what had been the ground, but *outwards*.

What kind of disaster ? The men in the troubleshooting team moved forward apprehensively. Staggering a little, Inassul made his way along the broad road facing the lock. Weapon ready for anything he might meet, he pushed at the door-switch of the nearest house and went inside.

Moments later, he reappeared. There was a tremor in his voice when he spoke to Magwareet.

"They're—spread all over the walls," he said. Looking at him, Magwareet saw that his right gauntlet, with which he must have steadied himself, was wet and red.

"Shall I call the rescue party in?" Inassul went on. Magwareet cut him short.

"No! We daren't risk more personnel than are already here until we know what the trouble was. Follow me."

His order was relayed to the parties at the other locks of the city. As they moved together towards the control centre, in the middle of the city, he gave directions. "See if you can find signs of mechanical failure. They've put up the power lines and the drive generators in plain view. If you can spot any damage not due to the spin, let me know."

But no one reported any until the parties came together in the grand plaza of the city. Here the control room for their multi-lightyear flight had been dropped down like a child's building block. Inassul stepped aside, waiting for Magwareet to go on, and he did.

Inside the control room—a hall a hundred feet long—there were men and women lying dead: some at their places opposite panels of signal lamps which still flickered, and others dashed against the walls and roof. A gigantic gap loomed in the makeshift outer wall on the side opposite the entrance Magwareet had used.

Sickly, he turned his eyes from the broken bodies, and studied the emergency signal system. It was one outdated on Earth, but other cities had been flown using it, and he knew it was reliable. It indicated only damage from the spin.

Then facts fell together in Magwareet's brain, and he whirled on the men who had joined him, interrupting their horrified staring at the carnage.

"Why are these people dead?" he exploded. "We're at the centre of the city! The acceleration should have been negligible here. Feel it! We came in under two and a half g, but here the pseudograv is still running, and we're normal weight."

"An enemy shot—" began Inassul.

"Use your head. How did it get through without breaking the plastic sheath and losing the city's air? And look at *that*!"

He threw up an arm and pointed to the gap torn in the wall facing them. Someone called out.

" I saw some pavement torn up while we were coming in—and not far from here ! There are several walls broken like that, too."

" That's it," said Magwareet. " Something deliberately killed these people—smashed them, threw them around."

He felt his words drop into a sudden chilly silence. He ended, " And it may—even now—be loose in the city !"

III

This year (said the Turkish Spy) *there came to Paris a man by the name of Michoo Ader, claiming to be the Wandering Jew—condemned to walk the earth until the Second Coming because he would not let Jesus rest on his doorstep.*

The first sailors ever to see a sea-serpent and bring in proof (reported Reuters) were the crew of the Panamanian trader Hargreaves Halliday *who docked at Capetown today with a strange animal found floating in the Indian Ocean. Scientists say it resembles a prehistoric dinosaur, but are at a loss to understand how an air-breathing creature in freshly killed condition . . .*

Los Angeles Mirror : *Disappearance of well-known Angelo . . .*

Red waited for the moment of calmness to pass. It lasted only seconds. After that, reason insisted that this whole affair was stupid and he became resentful that a wild vision should break into his life and disrupt it. And yet—he could not convince himself.

" I've heard about things like this," said Chantal slowly. " But you never believe them. You class them with ghosts, and you never expect to find yourself involved—"

" You're damned right you don't," said Red, with sudden force. " I'm not going to accept this till I have to. Some explanation *must* exist—"

He broke off. " Would you like some coffee ?" he said rather ungraciously. Chantal nodded; he waited as she got together the things she had used to make the injured stranger comfortable and then led her into the kitchen.

In the routine of brewing the coffee, he lost some of his tenseness. As he handed a cup to Chantal, he said, " And—

him—the guy with the broken arm. What do you make of that?"

"That he'd been hit by a car." Chantal sipped from her cup, and Red noticed with a stir of repulsion that her lip left a red smear.

"He wasn't. No cars go past here. There's a truck which goes up to the logging camp at Firhill Point with supplies and mail, but no one else lives this way at all. And I was watching when you—arrived. Both of you."

And I don't really give a damn how, his mind ran on. *I just wish you hadn't.*

He felt suddenly certain that his careful defences were going to crumble. If his isolation could be disturbed by this fantastic intrusion, he could never feel safe again.

He moved, and the joints of his artificial leg gave their inescapable tiny scarping sound.

"Oh, hell!" he burst out, and Chantal's eyes widened. "All right—it's not your fault."

She put her cup down and turned to face him. "What's not my fault? I didn't ask to be thrown halfway round the world! I don't know how I came to be here, but I know this—I'd give anything to be back where I came from. I'm sorry if I'm in the way. If you like, I'll start walking home!"

They faced each other, meaningless tension mounting between them. A sound between a sob and a shout from the other room punctured it.

After an instant's hesitation, Chantal got up and ran through the door. Red limped after her, to find the man with the broken arm writhing on the couch where they had laid him. Sweat was streaming from his face, making it glisten like a fresh bronze, and Red wanted intensely to be able to capture those strange features some time.

"Have you a thermometer?" Chantal asked, her anger vanishing. Red nodded, and brought one in a moment from the bathroom, but the girl's attempt to set it under the man's tongue failed because his jaw clenched and unclenched in agony.

"Fever?" Red inquired in a low tone. She nodded, and took up a throw cover from a nearby armchair to spread across the trembling body. "I don't know why. He seemed perfectly all right when I left him—" She bit her lip in anxiety.

Suddenly the man uttered a short sing-song phrase, full of strange off-key arpeggio intervals. His voice appeared to cover the range from treble to baritone. What he—said? wondered Red, and immediately knew it had to be speech, because it had an air of deliberateness and careful articulation —what he said, then, bore no resemblance to anything in any language either of them had heard.

He picked up the coverall again, hoping for some clue to the man's nature from it, but all he found was the same impossibly heavy cylinder of metal which he had seen before. Chantal rested her fingers lightly on the unconscious man's pulse, looking worried.

After a while, the writhing was replaced by an even more frightening stillness. It was as if the man was visibly gathering his strength, disciplining his body into rest. Eyes closed, he licked his lips and said something musical and interrogative.

" What can he mean ?" Chantal asked helplessly, and at the words the man's eyelids flickered open.

He looked at them without expression, barely turning his head. Then he shifted his gaze to the Indian matting hung against the wall, and shut his eyes again.

" *Habla usted espanol* ?" he said in a flat tenor voice.

" We speak English," said Red slowly, and the brown-faced man used a four-letter word which startled him and made Chantal turn her face to hide a smile. " Never so far before !' He struggled to sit up, and found the injury to his arm. The sight of it seemed to dishearten him still further. He stared up, pleading.

" It is broken ? And you have used splinters to mend it ?"

That's an odd mistake, Red realised suddenly. A simple foreigner would probably not know the word this man was trying to find—but equally probably, he would not know the one that had been substituted. *Who*— ?

Chantal nodded, trying to soothe him into lying back calmly, but the man continued with intense determination, " Tell me ! Tell me when I am !"

" Lie still," said Chantal comfortingly. " You'll be all right. You've been hurt, and—"

It was then that the exact meaning of the question struck home.

Not " Where am I ?" Instead—

" *When* am I ?"

Red felt the last of his protective barriers go down. His isolation was forever at an end. He was naked against the world, and his aluminium leg creaked. And squeaked.

"You're in nineteen fifty-seven," he said, and his body began suddenly to tremble with terror.

"Further than ever," said the brown-faced man. "I—I feel ill. I am not immune to your diseases, sir and madam. Please, have you an illness?"

Staring, Chantal shook her head. "N-no. We are quite well, I think."

The man put his hand up to his heart, and felt its pounding for a moment. Then he realised he was not wearing his coverall, and again struggled frantically to sit up.

"Have I lost it? Did I not have anything with me?"

Chantal reached for the garment and held it as the man rummaged in the pockets. Sinking back, he shook his head. "So it is lost. So they will not know."

"You want this?" said Red sourly, holding up the heavy metal cylinder, and the man seemed to go limp with relief.

"Yes, that is it. Please, hold it up above me with your hands on the ends, and turn them oppositely. It is important."

Red hesitated, but Chantal appealed to him with her eyes. Feeling foolish, he extended his arms and did as the man had said. The hard metal felt as if it was running like water, and it suddenly began to *grow*, pushing his hands apart. With an oath, he let go in amazement, but the thing did not fall. It remained in position, stretching until it was three feet long, and the moment it stopped growing it began to glow.

After a second, the whole room was alight with the luminance of brilliant green bands apparently within the substance of the cylinder.

Chantal drew back. "What—?" Her voice held a sob.

Seeming suddenly light-hearted, the man answered as he studied the shifting patterns of greenness. "It floats because it is not all here, so to say. It exists, after a fashion, for thousands of years both ways." His voice was more certain and his English better now. "You could not understand how," he added.

"What made it so big?" Red demanded.

"It was compressed." The man seemed to hunt for words. "Solid is not really solid. Is mostly empty space. The matter of the map is pushed together—"

" You mean the atoms are packed closer," said Red sharply. He resented the stranger's assumption that he knew nothing.

Startled, the man glanced from the glowing cylinder to the candles burning round the room. " But you—" he began, and then seemed to see the electric lights. " Oh. You do know more than I had remembered at this time."

" What we want to know is who you are and where you came from !" said Red harshly. " And why !"

The man closed his eyes wearily. " You could not pronounce my name. Your language has no tonal values. You could call me Burma, for that is where I was born, as you might call someone Frenchie or Tex."

He glanced up. " And who are you ?"

" Red Hawkins," said Red sullenly. Chantal spoke her name also in answer to a piercing stare.

" Please, then, Red," Burma went on, " place your hands on the map, at the brightest of the green places."

Red turned away with finality. " I've had enough of this lunacy," he muttered and Burma sighed.

" You could not know, poor man." He lifted his broken arm towards the cylinder, setting his teeth, but the pain and his fevered weakness overcame him. Slumping back, he spoke in a queer, rhythmic manner.

" Red Hawkins ! Do what I tell you."

Astonished, Red found himself turning and lifting his hands towards a patch of green on the cylinder that shone like a cold sun. Angrily, he fought back, and when his arms fell to his sides, his teeth were chattering.

" Nearly," said Burma with detachment, and repeated, "Do what I tell you !"

This time, Red could not stop himself.

There was chaos.

But there was form in the chaos. There was a sense of slow ages unrolling as they existed in total silence and total darkness, and through and beyond it there was an awareness of Being.

Then ground suddenly slammed Red under the soles of his feet, knocking him instantly *upwards* half an inch, and pitiless yellow sunlight was blazing out of a blue sky. They were on a bare hillside, between bare brown rocks. A few paces from him lay Burma, as if he had been twisted in falling and landed awkwardly, and behind him Chantal moved with a sound of shoes crunching in grey sand.

When he turned his head, he saw that she had fallen forward, trying to crush the solidity and reality of stone into her hands. She whimpered a little.

Red whirled on Burma. " God damn you, man ! What is this insanity ? Are you satisfied with what you've done ? Look at this poor woman !"

Burma had his eyes shut against the glare. His good hand clutched the cylinder in its original closed form. He looked very ill.

" You must not waste time," he whispered. " A few miles from here you will find men working. Go and bring them here."

Red clenched his fist and bent so that he was able to strike Burma in the face with it. " Stop your babbling ! Where are we ? How did we come here ?"

" You're in my time," said Burma, more faintly still. "You have come three thousand years. Go quickly, Red. I have no resistance to the disease I caught in your era, and I need help."

" Get us back where we came from," said Red passionately. " You're no concern of mine. Attend to your damned business yourself."

Chantal came down the slope from behind him, very pale, and walking as if in pain. A little blood came from a cut on her temple, and her hands were filthy with sharp sand. She spoke quietly.

" Burma is very sick, Red. He needs help, and we can't give it to him."

" Be damned to that ! Why didn't he *ask* before ? I don't know how he made me do what he wanted, but he forced me, I know, and I won't be ordered around. I didn't ask to come here, and I don't want to stay another minute."

He finished, " If you're so eager to help him, go your self."

" I—don't think I could." Chantal swayed. " But I'll try, if he says so." She put her hands to her head and brought them away bloodstained; she looked at the redness wonderingly.

" Red," said Burma very softly, " I could make you go—I don't like to, but I can. And I am important to the human race, very important."

" And I'm not, I suppose !" exploded Red.

" Oh, *Red* !" said Chantal pleadingly, and turned to Burma. " How far is it to where your friends are ?"

" About two miles," said Burma weakly. " It is not far. I think Chantal is hurt, and cannot go."

" Hurt ! My God !" said Red with bitterness. " Two miles not far ! Look ! Look at this !"

He made a violent gesture, and pulled up the leg of his trousers. The sun glinted blindingly on a shaft of polished metal.

Chantal fell silent. Burma, screwing up his eyes against the light, stared at the prosthetic leg for a long while.

" I'm very sorry, Red," he said at length. " I did not know. But I am too ill to undo what has been done. I promise that —if you still so wish—you will be returned to your time the moment I am safe and well."

He opened his eyes full and gazed at Red. " You cannot understand the importance of what is happening, but I give you my word that I must reach help if a terrible disaster is to be avoided. I throw myself on your mercy. I will not command you to go."

As Red stood hesitant, his anger fading, a flash of incredible light made the sunshine turn to shadow, and after a moment was followed by a sound like a million claps of thunder rolled into one.

" What—what is happening ?" Red asked. Burma looked at him steadily.

" We are losing a war," he said. " The human race is losing a war."

IV

There was a ship. She was found silent and abandoned in mid-ocean—fires burning, tables laid, but crewless and adrift. Her name was the Marie Celeste.

Scientists in Capetown (reported Reuters) *were forced to admit that the beast brought in by the* Hargreaves Halliday *was a prehistoric trachodontid in freshly killed condition. This raises the possibility of an isolated island in the Indian Ocean where . . .*

Geelong, Australia : Found wandering near here today, a man claims to be prominent Los Angeles businessman Willis D. Wright, reported missing two days ago from his home . . .

Magwareet looked at the suddenly drawn faces of the men with him. Apprehensively, they half-turned to keep the surrounding area in view.

" What could it be ?" said Inassul.

" I don't know. Is the communication equipment in order, somebody ?"

A tall man standing near that panel gave a swift glance at the dials and flicked down a bank of switches. The sound of Centre's never-ceasing random scramble broadcast filled the air for a moment. " It's working," he said.

Magwareet shouldered his way over and pressed the call button to bring in Artesha. " Have we an expert on the biology of 129 Lyrae ?" he demanded.

" I'll find out. What do you want one for ?"

Magwareet explained briefly. " We'll have to get rid of—whatever it was—before we dare risk the rescue crews coming in."

" Magwareet !" she said sharply. " You aren't thinking of going after it yourself ?"

" Don't be silly, Artesha. Without accurate data, there will have to be a co-ordinator directing the search." He tried to deny to himself that his real reason was a desire for action that he himself could see the result of.

Artesha went on, arguing against it, but there was a sigh from the circle of men, and in the silence when she stopped speaking for a moment, a heavy scratching sound came to them. They waited. Inassul moved to look through the gap torn in the wall. Excitedly, he beckoned.

" Only we won't have to go in search of it," countered Magwareet softly. " It's coming to look for us . . ."

They drew back, their weapons in their hands. Someone said something when the tension grew intolerable and at once the scratching sound changed—was *here* !

Something gigantic and powerful smashed down the wall at a different point, bringing the panels of the roof falling in a welter of plastic and a tangle of wiring. A man screamed, and sprawled with his scalp cut across. They had a glimpse of a creature slate-blue and glistening. Then a weapon hissed, and a bolt of energy seared the edge of the gap.

As they flinched from the brilliance, a stench filled the air like something rotting, and the beast tossed in agony. It turned and crashed away through a nearby building.

" I got it !" yelled the man who had fired. Magwareet snapped into action.

" Got it be damned ! It's hurt, and gone wild ! We must get after it before it does more damage. Inassul, tell Centre what's happened, and the rest of you follow me."

There was no chance of losing the beast's trail. It had blundered against a building at the corner of one of the streets joining the plaza, and then continued along the roadway, striking at anything and everything in frenzy. Power lines were torn down, walls dented, signs tossed in the air and lighting broken.

They went after it at a dead run.

What kind of a beast is this? Magwareet found himself wondering. It was gigantic, and incredibly strong. Had it been picked up when they rooted out the city's foundations, lain dormant until driven crazy by the strain of the interstellar drive?

He wished that the spin on the city hadn't thrown everything not fastened down aside, and thus wrecked all the cars which were littered against the buildings. He had no way of telling whether they were losing to or gaining on their quarry.

"It's probably heading for home!" he shouted to encourage his companions. "It won't be far now."

"We passed a park where the ground had been torn up," panted someone alongside him. "We took it for where something had been installed underground. I think it might have come from underground!"

"They wouldn't have brought it in the zoo," Magwareet yelled in answer. "Far from here?"

"Another half mile!" the man told him.

And in another few minutes they found themselves on the outskirts of an open space, where stacks of supplies that might be useful here in the Solar System had been piled. The track of the beast through them was twenty feet wide.

There, in a patch of broken trees, they found a burrow that slanted downwards steeply; the earth around it was freshly turned. From its mouth the stench of putrefaction poured like steam.

"Find out if the park is walled off below the surface!" Magwareet rapped, and men broke away to check. The chances were good that the park was a miniature ecological unit, set in a basin of concrete, but there was no telling whether the beast might not be strong enough to break through.

In a while, the men returned, and reported that though there was a subsoil barrier, it extended only as far as the heavy bed of clay a couple of hundred feet under them. But one of them had passed a stack of subsonic detectors on his way, and had brought one of the instruments back with him.

Handling it with skill, he turned around to let the stream of pulses from its generator filter into the ground. In an astonished tone, he said, " The ground's riddled with tunnels ! Look here—you can see them showing up when the sound bounces off the walls. This hole leads into a maze."

Magwareet weighed the chances of finding the beast in its warren against the risk of having it recover and break out to wreak fresh havoc. There was only one possible decision—so he made it.

" Disperse through the park !" he rapped, hoping that the beast would not burrow up and come out somewhere else—but it was stupid to think of guarding the whole city with the few men he had. " But I want a volunteer to come down with me and see if we can find the thing !"

There were shouts, and several men stepped forward grimly, but Magwareet chose the man who had had the intelligence to realise a subsonic detector would be of use. He asked his name, and was told Tifara.

" Well, Tifara, this is a damnfool thing to do—but it has to be done. If we flush the beast," he added, looking round, " and it breaks out again, kill it. Immediately ! And let me know as quickly as possible. All right, Tifara—let's go."

They stepped over the edge of the huge burrow and began to walk gingerly down.

The going was difficult, and the stench overpowering. After a little way, Magwareet closed the helmet of his spacesuit and breathed his canned air to escape it. Their lights made the rough walls crawl with eerie shadows.

" I think the beast must be bleeding," said Tifara after a while. " Look—the ground is smeared with something slimy. That's why it's slippery."

" Good," nodded Magwareet. " That'll weaken it. I hope it hasn't gone too far . . . This must be its only burrow to the surface. I expect it was driven out by fear when the interstellar drive started up."

They went on in silence. Magwareet had to force himself not to slow down automatically through over-caution—time was running out, and they did not know how badly the beast was hurt.

They were sixty-odd feet below the surface when they came to the first parting of the ways. They looked for signs of the

slimy ichor the creature was losing, and found them in only one of the two tunnels, so they followed it.

" It's bleeding less heavily," said Magwareet. " I only hope it doesn't stop altogether."

But the trail thinned and grew more scattered, until they sometimes had to go five or ten yards before coming across another drop. The next time the ways parted, they had seen no ichor for some distance.

Flashing his light down each passage in turn, Magwareet could make out no obvious sign of which to choose. " Go a few yards along that one," he instructed Tifara. " If you find any spoor, come back at once. I'll try this way."

Tifara nodded, and went out of sight. Magwareet stepped boldly forward, and discovered that after ten yards his branch of the tunnel bent sharply. The roof got lower, too, and then dropped abruptly to meet the floor.

Puzzled, he flashed his light up and down, wondering why the dead end.

Stones and earth rattled about his ears; he flinched and turned to run, fearing a roof-fall, and . . .

For an instant he knew pure, paralysing fear. There was no longer a tunnel before him. Instead, a flat slate-blue surface glistened wetly in the light of his lamp.

So, like it or not, he had found the beast.

But it did not move again, and when he swung his lamp over it, he saw that there was a gash in one of its thick, flexible limbs where the earlier shot had struck home. It had simply fallen in the tunnel, and writhed with its last strength to cut off his exit.

There was a simple way out, at least. He felt for the weapon at his side and turned the power control over to violent preparatory to cutting a hole through its body. If it moved anything like a Terrestrial creature, he was facing its belly; the soil smeared over most of its skin accounted for his not having noticed it at once.

A cry came from the other side. " Magwareet ! Are you there ?"

" I'm here," Magwareet shouted back. " Stand clear—I may have to burn a way through."

" Is it dead ?"

" It soon will be if it isn't," Magwareet answered grimly. It was not until the words were uttered that he realised the

speaker was not Tifara. Faint, excited words filtered through to him.

Then someone cried in a passionate tone, " Don't shoot, Magwareet ! Don't shoot !"

" What— ? "

" Don't shoot," the speaker insisted. " This isn't an animal from 129 Lyrae !"

" Who are you ?"

" Kepthin ! I'm a biologist. Somebody sent for me. This isn't from 129 Lyrae, don't you understand ?"

" What's that got to do with it. Am I to stay here for good ?"

" We'll get you out in a moment," came the faint reply. Then there was buzzing in which he could hear no meaning. Fuming, Magwareet paced the little area he had, wondering what was going on. After half an hour, his patience could hold out no longer.

He walked rapidly to the beast's body and was filling his lungs to yell at the people he could still hear moving beyond, when he noticed something he had not realised before.

What he had taken for a chitinous carapace on the animal was torn around the great wound in its limb, and in the lamplight he could see the shiny gleam of metal.

Astonished, he rapped tentatively on the slate-blue surface. It sounded hollow at several places. A fantastic suspicion filled his mind.

Rasping and scraping broke in on his thoughts, and over the prone body of the beast a power shovel tore away the roof of the tunnel. As soon as the gap was wide enough for Magwareet to pass, the operator withdrew it to let him scramble through.

On the far side he found Inassul, Tifara, and a small man with excited eyes whom he knew must be Kepthin, with a group of other people, all violently agitated.

" Glad you're safe !" said Tifara. " Magwareet, you've no idea what's happened ! This is incredbile—"

" As soon as I realised this animal wasn't Lyran, I had all work stopped," Kepthin broke in. "But I didn't suspect what we would discover. It's alive, too, as far as we can tell at least, it has a circulatory system and that's still going. But we never suspected—"

" Suspected what ?" said Magwareet in a deflating tone, an extreme contrast to Kepthin's enthusiasm. " That this damned

thing is wearing a spacesuit, and therefore is probably the first living specimen of the Enemy to enter the Solar System ?"

" Well—yes," said Kepthin, disappointed. " But isn't it wonderful ?"

" No. It's terrifying. If one could get in this way, why not others ? Are our defences no good ? Are we going to find millions of these things suddenly among us ?" Magwareet felt sweat break out all over him.

Then his communicator came on, and he heard Artesha's voice. " Magwareet ! They've found Burma—he made it back."

" I'm so glad," said Magwareet sincerely. *Poor Artesha*, he thought—*she must have suffered hell for a while.*

" Come back to Centre at once. What he tells us is awful. He's been clear back to the twentieth century, and he says from back there the continuum looks as if temporal surges are breaking out everywhere. If this goes on, the Being is liable to tear itself out of this period altogether and start disturbing the whole history of Earth !"

V

There was a toy horse. It was the only plaything of a boy who could not talk, but who knew his name, which was Kaspar Hauser.

Centre to all units, triple red emergency : New peaks developing (twenty-one dates further back in history than ever before).

Mogak, Lord of the Plains, Son of the Running Horse, Paramount Chief under the Supreme Ruler of the Mertchakulun Bands, to His Most Sublime Omnipotence the Emperor of the Croceraunian Empire which stretches from dawn even unto nightfall (by courier): Miracles are abroad in the land !

After the first few minutes, the journey took on the air of a sort of challenge to Red. He had not attempted such a walk since he lost his leg as a child. At that time, he had counted it a triumph to be able to walk a level street and appear only to have a sprained ankle. But this was different.

The heat made sweat crawl in rivulets out of his hair, and the coarse dry sand found its way into his shoes until his good foot felt as if the bottom was being scraped with hot needles. The glare blinded him, the dust choked him, the

irregular rocky surface made him lose his footing, but he got up again, cursing, and carried on.

Then the socket of his prosthetic limb started to chafe, and grew unbearable. After nearly a mile, he stopped to take it off and line it with his handkerchief, but the relief that gave lasted only a short distance, and he set his jaw against the agony.

It felt like an eternity before he stood up on a rocky outcrop and looked down across a valley alive with men.

There was a—building? Not quite. It had a naked appearance, as though it was all functional and purposive, without decorative cover. About it, huge shining machines went very quietly about their business, and men in coveralls, seeming not to mind the heat and light, attended to them.

Staggering, he started to descend the slope, shouting.

His call attracted attention at once. Two men working not far away broke off and answered in the same incomprehensible language Burma had used in delirium.

"Help!" Red called. "Here! Come here!"

After momentary hesitation, one of them did. Approaching, he studied Red's clothes with astonishment, waiting.

"Do you speak English?" Red demanded. The man nodded.

"Little," he said. "You—from somewhere else?"

"I'm from 1957!" said Red, feeling suddenly worn out.

"You un'erstan' time move?" the man said in astonishment. "You know how?"

"Two miles back that way there's a guy called Burma. He's one of your people. He brought me here. He's ill. He wants help."

The other shook his head in dismay. By this time, they had attracted more notice, and to the accompaniment of a faint hum an aircraft of some sort hovering above the valley turned towards where they stood. Its pilot, though, seemed to see something while dropping, and hesitated fifty feet up before bringing the craft swiftly to earth.

A door slid back and a stout woman got out. She rapped two short sentences at Red's companion, received an answer, and then looked at Red.

"You know you're not in your own time," she said in English that was fluent but badly accented. "How?"

Red sat down on a rock at hand and waved back the way he had come. "Ask a guy called Burma. He knows all the answers. You'll find him two miles back there."

The woman nodded, spoke again in her own language, and without more ado took her aircraft away in the direction Red indicated. As it rose, Red grew suddenly aware that the man remaining behind had drawn a snub-nosed weapon and was levelling it at him.

"What—" he began, but a spray of mist from the muzzle enveloped him, stinging his eyes and nose. He cried out. Before he had time to get furious, he saw that the man had turned it on himself also.

"Is to make clean," the man explained haltingly. "You from other time, have other—"

As the man hunted for the word, Red felt the stinging die down, and with it a dozen unnoticed aches and pains, and a mild catarrh which had bothered him for several days. He nodded to show he understood, and wondered what incredible brew of medicaments could be in that fine spray.

"Have you any water?" he asked, and pantomimed drinking. The man nodded, and gave him a flask from a side pocket in his coverall; the movement stretched the fabric and revealed the outline of a short cylinder lumping the man's side.

Red drank deeply and returned the flask with a word of thanks. After that, he just sat silently, watching the business of the valley go ahead; the machines were building an addition to the existing installation, that much was clear, but he could not guess how or why.

The aircraft buzzed quietly and with amazing swiftness overhead, coming to rest on the opposite slope. Red could just make out that it disembarked two people—presumably Burma and Chantal—before it returned to where he sat.

The stout woman got to the ground and looked Red over with interest. "Burma told me what happened," she said. "We thank you much. Brings important information. Wish you please to come with me."

Tiredly, Red got up. *Burma made a promise*, he thought. *I hope to hell he does something about it soon.*

He noticed the woman's eyes on his curiously as he got stiffly through the door into the cabin of the aircraft; it was no larger than that of twentieth-century planes, though he could see no controls except a glowing plate set below the forward windscreen. The woman followed.

Without noise or vibration, they rose smoothly and flew across the valley, landed, got out, and crossed a patch of

scraped ground to enter a metal building shaped like an enormous penny—a hundred feet across but barely eight high. Inside the entrance, the woman spoke sharply to a waiting man, and the door shut behind them.

A few yards along a softly lit corridor, and they came into a room where Chantal sat with a calm-faced girl beside her. She looked pale and apprehensive, but someone had already dressed the cut on her temple and her hands were covered with some flexible transparent material, protecting the grazes.

"I am Maelor," said the stout woman, suddenly relaxing. She pronounced it with a drop of a quarter tone on the second syllable. "I know you are called Red because Burma said to me. Please sit, Red, and be comfortable. You limp. Are you hurt?"

Red nodded a little, and the calm-faced girl took a box of what must be medical equipment and knelt before him as he sat down in a plump chair. She made to remove the shoe on his metal foot.

Red half-stopped her, and then leant back with a grim expression. What the hell was the use of trying to hide it here and now? This was no concern of his; in a little while they would be away from here, and able to forget it.

The girl's face changed startlingly when she found the prosthetic limb, but she recovered at once and carefully rolled up his trouser leg to remove it. Something soothing went on the stump and quieted the fiery pain.

Red looked across at Chantal. "Are you all right?" he said. Under the impact of what had happened, a need for friendship had asserted itself. Chantal, after all, was a stranger like himself in this fantastic world.

She nodded and stirred a little. "They have some wonderful things here, Red," she said. "I know that medicine in our time could never have done this for us. It's hard to believe that we've really come three thousand years, but that convinces me."

Red felt startled. He had not seriously questioned the fact himself. He had merely accepted it as something to resent. In a way, it was wonderful—

Abstract art, he found himself thinking. *Did it live? What have three thousand years done to the work of people I know? Three thousand years!*

Why—it was as if a Minoan or an Etruscan had walked into one of the logging camps around his home. But such a creature could not have found anyone to understand him . .

So they speak a little English—well, in Elizabethan England educated people spoke fluent Latin, and the Roman Empire was a thousand years dead. But it's not talking that matters—it's thinking.

Looking down at the girl intent on dressing his sores, he felt a chilly void open between them, and he was suddenly very lonely. *We're outcasts—*

He turned to Maelor, still standing nearby. " How soon are you going to send us home ?" he said harshly.

Maelor hesitated oddly. " It will take a little time," she said reluctantly. " Is your leg all right now ?"

" Yes, thank you. Burma told us that as soon as possible we would be sent home. How soon is that ?"

" Perhaps longer than Burma hoped," admitted Maelor reluctantly. Red scented the dullness of obstinacy in her sing-song voice, and reached for his leg.

" All right," he said, strapping it on. " I think Chantal and I might like to look around for a bit and enjoy the sun while we're waiting. After all " he continued with bitter irony, " we don't often get a summer holiday in midwinter. Coming, Chantal ?"

She seemed completely overwhelmed; nodding, she got to her feet and approached him. Together they started for the door, only to find Maelor in front of it.

" I'm sorry," said the stout woman. " It's impossible at the moment." Then, reading rebellion in Red's eyes, she put her hand on a switch set in the wall. " You wish proof, then. Prepare for a shock, please."

Part of the wall folded away.

It took Red's eyes a long time to adjust to what he saw. At first he could make out only blackness; then a flash of sunlike brilliance took his point of focus out beyond the window—for that was what it was—and he was abruptly staring into infinity.

He gasped, and clutched at Chantal, who opened her mouth, said nothing, and turned away.

He rounded on Maelor, standing impassively by. " Where are you taking us ?" he insisted.

" To Centre. That is in space. We are not on Earth. I do not know what you know of the universe from your time—"

" Enough," Red told her harshly. " What's the idea of all this ?"

" Earth is—not very safe. Burma said, I think, we are at war, against species from another star. They have often attacked Earth, so we—I think I know how to say it—Earth has been evacuated."

The memory of that gigantic thunderclap and the flash which had drowned the sunlight leapt to Red's mind, and he felt a sudden terrifying awe at the picture of so much power. The fear disgusted him, but he could not lose it; he had to mask it with rage.

" I want to see Burma !" he said. *The size of the job ! Evacuating—how many ? Thousands of millions of people—?* " Bring him here ! We want a few explanations. You have no right to drag us away like this—"

Into the middle of a conflict that might crush us . . .

" Burma is busy," began Maelor, and Red cut her short.

" *Get him here* ! "

Maelor gave a little sigh. She pressed the switch which shut out the stars, and Red and Chantal felt a load off their minds. Then she went out.

" Don't worry," said Red grimly. " I'll soon fix this guy Burma when he shows up."

He wondered as the minutes passed whether he was going to appear after all, but after interminable waiting the door opened again, and Burma stood expressionlessly in the entrance. Red strode forward.

" Now listen to me—" he began.

" I dare not spare you more than a few minutes," said Burma flatly. " You'll get more benefit out of it if you let me speak."

Red stumbletongued; Burma continued in the hiatus.

" I'm afraid I hadn't realised how big a job it would be to return you to your own period. Listen: when I was hurled back to 1957 I went a thousand years further into the past than anyone has ever been before. We do not possess the equipment—we do not have the sheer power—to repeat it." He hesitated, as if making a calculation, and finished, " It would take the whole output of the sun for over a year to achieve it."

Shaken, Red said slowly, " Then—how was it you—?"

" It was not our doing. But Maelor can spare the time to make it clear to you."

" Where are we going ?" demanded Chantal, and Red shook his head.

" It would mean very little to you if I explained. We are going to Centre, but Centre is all over the Solar System. You will be taken to a woman call Artesha "—a softening of his voice accompanied the name—" who knows what we may be able to do."

He turned to Maelor and uttered a brief command in his own language before starting towards the door. " I'm sorry," he said with a hint of a sad smile as he left, " but we are desperately short of time."

" Who is that man ?" said Chantal as soon as he had gone. Maelor frowned.

" It is hard to tell you," she began, and Red cut her short.

" We aren't complete savages," he said bitterly.

" I know. Well then, he is expert in putting together knowledge about the thing which moved him far in time. He is chief of anchor team, trying to stop temporal surges."

" And what are they ?"

Haltingly, Maelor tried to explain. Gradually the picture of the age to which they had come built up in their minds, bringing with it a sense of reality and immediacy which frightened them. The immensity of the job—!

But afterwards Maelor started to question them in turn, and Red was startled.

" You speak English—it's common among you," he pointed out. " Don't you have the history of our time ?"

" I'm afraid not," said Maelor soberly. " You see, there was a war."

They thought that over in silence.

" Our language is based on English, though," Maelor went on. " It is compressed, and more complex, but by slowing down and thinking all the time about what to say, most of us can make ourselves understood to you."

" After three thousand years ?" said Chantal.

" There has been world-wide communication since only a century after your time. When everyone could hear everyone else speak—even people of the past, recorded—the language changed very slowly compared to before."

" This war—" Chantal pressed.

Maelor shook her head. " How much I can tell you I do not know. I cannot let you know something you could use on your return."

Somehow the prospect of return didn't excite Red quite so much this time—but what place was there for him or Chantal in a world like this ?

VI

Centre—speaking, to all units : Emergency. Enemy found to have penetrated defence.

Washington, DC, Friday : The President announced today that radioactive measurements revealed the explosion of a bomb of. . . This gives the lie to Soviet pretensions of peacefulness . . .

Conyul, Astrologer Imperial to the Court of the Croceraunian Empire : (incomprehensible).

Tired, dirty and hungry, Magwareet hauled himself out of the lock at the entrance to the city. The rescue teams drew aside to let him pass, without wasting their attention on him —and that was as it should be.

Now what kind of a mess is the human race in?

The oxygen salvage vessels suckled up like gigantic leeches and sucked the air out of the plastic sheath as soon as the survivors were safe; before Magwareet had finished his report to Artesha they had begun to break the city up for invaluable scrap.

Hanging in space, he watched the job, wondering what Burma would have to say when he got in.

At length they brought up a gigantic bundle of girders from the heart of the city, strapped a drive unit on the tail end and launched it into space. Magwareet thumbed the forward stud on his suit and swung down to face the man making up the package.

" Where's it for ?" he said.

The man told him, and Magwareet clamped himself on. " Okay, I'll take it," he said, and without another word his gauntlet jammed the drive control over to full.

Space was crowded with things like this. From inside Mercury's orbit clear to the frigid path of Pluto the human race had stored what might be useful one day—and always was: stacks and bundles of metal, organics, synthetics, chained with a spiral deformation of space which could be generated as a by-product of the spacedrive without wasting more precious material, and driven at maximum speed to be hung up, another planetoid, until wanted.

And if you wanted some of it—you asked Artesha. It was as impossibly simple as that.

Acceleration jamming him against the back of his suit, Magwareet watched the skeleton of the city vanish. He had

never flown one of these bundles before, but he had to make the trip and he dared not waste the time it involved.

Time ! he thought. So little of it—and yet it stretched for aeons back and forward, every instant of it a riddle. *Why have we men so little of it to play with—when the Being has Eternity* ?

He cast off from the bundle of girders and left it to circle for days, months, or years, and made the last few miles to the nearest part of Centre on his suit power.

Exactly where he was, he didn't know. It mattered not at all. Every part of Centre—distributed across millions of miles in thousands of sections—was exactly the same distance from all the others in what was important : time. He stepped through the lock, stripped off and hung up his suit, and walked through a door.

It led into Artesha's presence.

For a few moments he stood under her calm, unvarying gaze. Then he inquired, " How about this Enemy, Artesha ?'

" I'll know when Kepthin has his team together. I've had to pull off half a dozen of the top remaining men on the anchor teams—the chance of finding a weakness in the Enemy is worth risking losing more personnel to a temporal surge. *Just* worth it."

Magwareet had never heard so much despondency in Artesha's tone—not even at that moment, so long ago, when she thought the end was approaching, before she became what she was.

" But that's being attended to," Artesha went on; the words should have been accompanied by a wave of her hand. "Magwareet, we're facing trouble from the Being, too."

Unconsciously, Magwareet looked about him, wondering if the Being could hear and understand with whatever part of it co-existed with them in this time and space. He said, " I know Burma went further than ever before—"

" That much we could cope with—just. He brought two Twentieth Century people back with him. They were in the field of his time map when it operated. Also he needed help. He was ill."

" Which means—?"

" The structure of the continuum has been weakened along their worldlines. There have been anachronistic exchanges before—but this has opened the way for them to happen now.

Artesha paused to absorb and comment on incoming information. " I'm having them brought here now. I wanted you because you're about the best co-ordinator the race has got other than myself, and I'm unique. Maybe you'll see something."

There was a click from the door through which Magwareet had previously come, and he turned to look at the visitors from the past.

Red did not know what he expected to see when Burma nodded at him to pass through the doorway. A larger room, certainly; this was only fifteen feet by twenty, lit with softly glowing panels like the one he had seen in the aircraft back on Earth.

Back on Earth—

He thrust it out of his mind and watched Burma. Chantal likewise waited, although he could see she had begun to ask something. Burma's attitude had changed subtly, and he walked forward with the air of a lover towards his loved one. Yet there was no one in sight except a tall, rather ugly man in blue.

Red had a brief shock from that, but when Burma spoke he was answered not by the man in blue, but by a voice from all around them. He guessed at a radio link.

After a moment Burma turned towards them, smiling. " I want you to meet friends of mine," he said. " This is Magwareet, who is a co-ordinator—a director of work. He will be supervising the control of the new temporal project."

The man in blue nodded stiffly, and Red fancied he saw superiority over these barbarians from the past mirrored in his eyes. He said sharply, " Tell him we'd be glad if you'd hurry up !"

Magwareet asked a question of Burma in their language. The answer came as an interruption in the same unlocalised voice as before. Burma nodded as if at an order, and went on, " And this—is Artesha . . ."

" What—where—?" Red looked around him, and Chantal shook her head in puzzlement.

" Here," said Artesha. " All around you."

" Not a machine," said Magwareet suddenly in a resonant voice. " Artesha was badly injured in an Enemy attack—so badly, that we could not rebuild her body. But because she was very important, we made a record of her mind. We

can do that. After that, people gave her a home in the circuits of Centre. Now she runs it."

He looked for understanding on Red's face; this senseless antagonism had to be overcome. The girl Chantal was not permanently warped as he was—only shocked and shaken. But Red's mind bore a deformation as real as his artificial leg.

"Is it working?" he demanded of Artesha.

"I think so."

Indeed, the pride which was plain in Burma's face had struck Red forcibly. "And—you, Burma?" he asked with difficulty.

"I'm her husband," said Burma, without a flicker.

To have lost not a leg, but a body—! The thought terrified Red; it had figured in nightmares since he was a child—imagination had painted the picture of him losing the rest of his leg, his other leg, his arms: being cased forever in metal and unable to die.

"Now," said Artesha levelly, and Burma leaned forward.

"Red, we need knowledge of your time which only you can give us. We need your help."

"It's no business of mine!" Red answered savagely. "I should have been three thousand years dead—not here, in this crazy world."

"So you won't help us?"

"No!" Red felt sweat crawl on his forehead.

"*Not even if we give you back your leg*?"

There was a moment of almost complete silence. Then Chantal gave a little cry.

"You— can do —that?" said Red in a strangled voice.

"I do assure you—we can do that," said Burma.

In an instant the conflict in Red's mind had resolved. Blind chance had taken away his leg, but it was people who were going to give it back. His barrier against mankind broke down, and he was suddenly conscious of his one-ness with even these inhabitants of a distant age.

"I'll do anything you want," he said, and was content.

When they had taken Red and Chantal away, Magwareet remained silent for a while, to let Burma and Artesha talk as they wanted. When they had spoken together, he raised his head.

"Artesha, why are these two so important?"

"I don't really know," said Artesha frankly. "But—I

don't think I could explain it even to you Magwareet. I've been part of Centre now for almost fourteen years, and I'm so absorbed in it now that I'm becoming able to put together information. You might say I get hunches, that's all. And even aside from the obvious point that those two represent the first anachronistic exchange with our own ' now,' I believe they are going to play an important part in events."

Magwareet accepted that. " Burma, I've only heard sketchily from Artesha what happened."

Burma gave a quick summary, ending, " But from back there, Magwareet, the time map looked as if it was on fire ! The surge which threw me up in 1957 wasn't the furthest back by several hundred years. I suspect that there are surges running possibly as far back as the creation of the world."

" What caused the sudden violence of yours, though ?"

" I can't tell you. The only man who could would be Wymarin. Is there any news of him ?"

" No," said Artesha after a fractional pause to search her gigantic memory. " What was he doing ?"

" I believe it was some of his work which stimulated the Being. Not the destruction of the Enemy raiders. You see what that means ?"

" If he can stimulate the Being deliberately, he's half way to controlling it," said Magwareet flatly.

" Exactly. And so we shall have to find him or one of his aides. We haven't a hope of tracing the computer memory he was using to record his data—the temporal surge will have wiped it clean with overlaid energy."

" But how could we find him, if he's been thrown anything like as far back as you were ? If he was in a position to operate his time map, he'd be back. His is anchored to the same now as yours, surely."

" I've been thinking about that," Burma answered. " Beloved, have we any data on co-existence within a temporal surge ?"

" You mean—could you use the same temporal surge again ?" Magwareet suggested. Burma nodded.

Artesha answered slowly. " No one has ever tried it. But you could go back to the moment when it struck with no difficulty. Short-range displacement is simple. It would be risky—"

" It's my job, Burma," said Magwareet, " and not yours. You're needed here and now with an anchor team. You're a specialist. Agreed, Artesha ?"

Artesha did not reply for a second. Then she said with relief, " Agreed. Magwareet, it won't be so risky after all. That surge has four secondary peaks—two at each end. One of them is due to come up in empty space in about four hours from now. You'll only—"

Another pause. " They've stepped up the power of a map past the safety limit, and it seems that there's been anachronistic exchange between several of the peaks in the far past."

" Dangerous ? "

" Probably. Magwareet, get up a team quickly and go look for Wymarin. Burma, take over what you think is the most promising remaining anchor team and try to duplicate his work, in case we don't find him."

" Are you saying that to keep me out of harm ?" said Burma.

" I love you," said Artesha. Sincerity formed the words. " But I could not do anything which I thought was not the best course for the human race."

Burma bowed his head and went out, leaving Magwareet to look thoughtful.

" How about this specimen of the Enemy ?" he said. " It worries me—"

" Kepthin is coming up to see us now," Artesha reported, and almost as she spoke the little biologist entered.

" We've got our Enemy alive," he said proudly. " His metabolism is oxygen-using, fortunately, so he didn't stifle when his spacesuit was punctured. We think we've figured out how he got into the city—when the pilot reported he had outflown the Enemy scouts, someone checked back and noticed that one of them was somewhere missing.

" Vantchuk had been over the information, and he thinks that the Enemy abandoned his scout, boarded the city through the sheath holding its foundations, and made his way up to the control centre to destroy the communication equipment. Unfortunately for him, someone realised what was happening and sent the city deliberately out of control. The Enemy seems to have lost his temper at that, and killed the survivors."

" What did he hope to gain ?" asked Magwareet.

" We haven't begun to communicate with him yet. Vantchuk points out, though, that he could have turned on the star-drive and crashed billions of tons of matter either into the atmosphere of Earth or even, possibly, into the sun. And that much might—possibly—have unstabled the nova balance.

If you hadn't spotted that its mass was too great, Magwareet."

"This presupposes that they're capable of suicide to gain an advantage," Magwareet pointed out. "Artesha, how does that tie in with our theory of their psychology?"

"It doesn't," said Artesha bluntly. "It's either all wrong, or there was another reason for the Enemy's action. As we have it figured, the Enemy is capable of desperate action only out of desperation." She sounded cheerful.

"And that," supplied Magwareet, "implies that we are doing them more damage than we believed!"

The relief was amazing. He set his shoulders back. "All right, Artesha. I'll go assemble my team—I'll be taking Red and Chantal, of course—and we'll ride that same temporal surge that Burma was thrown out on. Wymarin must have surfaced at one of the secondary peaks, surely."

"If his time map isn't operating, you're going to have to find him by using only trace instability. Admitted, it will be strong if he's been thrown three thousand years—but there'll be a lot of interference from your instruments, after they've done the same distance."

"If necessary, we'll land and make up fresh ones with native materials," Magwareet answered. "Keep us posted if you can about the Enemy."

"Good luck," said Artesha. Magwareet thought she sounded wistful, and wondered why.

VII

A few of the people who walked into history were famous, and came to be notorious. They were called Ambrose Bierce, Benjamin Bathurst, or—

And there were others, of course: no one remembered them except their acquaintances and maybe the file clerk in the missing persons department of the local police force—if there was one.

Contrariwise, there were people who seemed to have an odd knowledge of the future—that is to say, of the future as it existed when they made statements about it. If a person who knew a little about history, but had forgotten most of the detail he had learnt in school, had to put down a complete record of the past, it would strangely resemble the prophecies of—for example—Nostradamus.

The organisation of his project presented Magwareet with small difficulty—except lack of resources. Fresh possibilities came to him even as he was issuing orders.

Essentially, the plan was simple. The temporal surges tended to break—like waves—into two or more branches at either end of their millennium-long sweep. Anything absorbed at either end was transposed by a mechanism no one quite understood to the opposite one. Limited time travel had been one of the first by-products of the study of the Being, but it took tremendous power. They could afford enough to return Magwareet's team to one of the peaks of the temporal surge which had tossed Burma and his team far into the past. They would break out at one of the other earlier peaks.

And it was not so difficult to pick one stranded time-traveller out of Earth's teeming millions, because any matter displaced in time acquired a certain characteristic surplus of energy which could be detected over a range of millions of miles, looking on a time map like a tiny whirlpool.

Of course, the instruments with which this energy was detected would be carrying a similar charge, but it was a peculiar aspect of the temporal surges that they affected organic matter more readily than inorganic, and even human beings more readily than animals. It was one of the million unanswered problems which had been shelved as not so urgent as others.

It would take a while to make the expedition ready, and he would not have to supervise everything. In accordance with the precept that it was a co-ordinator's business to know all he could, he went to see what was happening to the Enemy.

They had placed him in what they estimated to be ideal conditions for him, in a large open room somewhere in Centre's sprawling complex. Then they had collected every available spare man or woman who might contribute to the effort, and gone ahead studying the captive.

When Magwareet entered, he was shaken to find the result so impressive. *It's fantastic how much the human race has learned* ! he reflected. *Surely we don't deserve to go under.*

The Enemy was large, he already knew, but stripped of his bulky spacesuit he appeared somehow more impressive. His five-limbed, pale golden bulk lay on a specially designed support; artificial feeding devices poured hastily synthesised nourishment into his body; people milling about him were studying the wound left by the blaster shot and carefully repairing it.

But there were strong bands holding down those five thick limbs, and the edge of an orifice at the creature's forward end (Magwareet presumed) writhed as if in rage.

He mingled with the crowd and sought out Kepthin to ask about progress.

" He's unwilling to communicate, of course, but we're working on something to relax the higher nervous centres. They're trying hypnosis over there, you notice ?"

" How's that possible ?" said Magwareet, staring. " You don't know that much about its brain yet, do you ?"

" Brain !" Kepthin chuckled. " This thing has a mixture of memory-devices that beats even Regulan life-forms ! It's not a matter of a brain; its cells handle their own memory and the whole thing is linked together by analogue exchange involving transfer of individual molecular signal-forms—that's what we're calling them; they're like viruses—which are motile in themselves through a secondary circulatory system."

Magwareet looked puzzled. Kepthin amplified, " Instead of using electro-chemical signals along nerves as we do, the Enemy has actual physical transfer of ' printed ' molecules between all points of its body. It's remarkably efficient, though you mightn't think it."

" What is there to hypnotise, then ?"

" Hypnosis is only a way of confusing someone's interpretation of external reality. If we can find characteristic rhythm in the Enemy's metabolism, we can heterodyne them. Failing that, we'll just have to synthesise the right kind of ' printed ' molecules to make it obey our wishes."

Excusing himself, he hurried off, but his last remark sounded so confident and matter-of-fact that Magwareet remained gazing after him, observing to the air, " I wonder if the Enemy could have found out so much about us in so short a time if the situation had been reversed !"

Red hardly dared to believe what he had been promised, but he went eagerly with a silent guide through corridors and into a clean, light place that could only be a hospital. Here a smiling young woman in blue came to meet them.

" Welcome !" she said. "I hear you want your leg replaced."

That was enough to make it seem real.

The woman informed them that her name was Teula, and that she ought to apologise for the fact that very few people were paying attention to them despite their uniqueness, but

that nowadays almost literally nobody had any spare time at all—the race had organised its efforts so thoroughly. She expanded the apology with a flashing smile to include Chantal, who seemed to have been brought along merely because everyone associated Red and her in their minds.

" Teula, how long has this war been going on ?" she asked.

" Well, I believe the first contacts with the Enemy were made about a hundred and fifty years ago, but it didn't develop into a life-and-death struggle until less than a century back. I can't give you the details, though—it was before I was born."

" Naturally," Red started to say, and then caught himself. " How old are you, then ?"

" Sixty-four." Teula seemed quite unconcerned that she appeared thirty or less. " That's a by-product of the war. We had to keep our valuable people alive as long as possible, and then we found it was quite as easy to keep everybody alive. We used to think a life of a hundred-odd years was enough. I think we're going to get used to living over a thousand, eventually."

All this talking had not prevented her from getting on with her job. She had deftly removed Red's prosthetic leg—with an approving remark about its workmanship—cut away the end of the stump with a scalpel that did not hurt and apparently froze the blood before it could run, and then fitted a sealed box over the end. Into the box ran tubes carrying suspensions of organic material.

Then she slipped his good leg into a long cylinder from which depended many cables explaining that an electronic brain would scan it and ensure that the replacement was an exact mirror image of it.

" And that is all," she stated, in less than half an hour. " But there is one further thing. You won't get far if you don't catch up on our language. English is all right—"

" You speak it excellently," said Red.

" But I talk very fast—notice ? I'm trying to talk at the speed I'm accustomed to. You'll see what I mean when you learn Speech. That's what we generally use." She uttered three fluctuating phrases and added, " That was the whole of what I've just been saying in a quarter the time."

A quick step across the room, and she was bringing unrecognisable items from a cupboard. " If you're expecting a teacher, by the way, or a recorded language course, you aren't

getting either. We can't waste time like that nowadays. Chantal, would you lie down?" She indicated a flat soft surface built out from the wall.

Chantal obeyed. Humming, Teula arranged her gadgets. "Your leg should take about eight hours, Red, and this course in Speech about six. I'll wake you up together, though."

"Wake us up? What—?" began Red, but with a smile full of—mischief?—Teula shook her head.

"Go to sleep!" she said in the odd sing-song way which had enabled Burma to command Red earlier. And they did.

There was a sense of time having passed, but not of intervening awareness, when he woke. For a few moments he simply lay still, wondering what had happened in his head.

"So you're conscious," said Teula's voice from behind him.

"What did you do to us?" asked Red, and was interrupted by a cry from Chantal.

"Red! You're talking Speech!"

"So are you!" They gazed at each other in amazement for a moment, and then he turned to Teula. "Is it hypnosis?"

"Partly."

"But—no, damn it, you can't teach a language in six hours!"

"True. But Speech is developed from English according to certain very flexible rules. You've been taught those rules so thoroughly that you automatically use Speech. It's similar to the process involved in learning shorthand. A few weeks will be needed for you to acquire a full working vocabulary, just as you'd need to learn how best to combine the symbols of a shorthand system. But you can make yourselves understood anywhere from now on. Excuse me—I must notify Magwareet that you're ready to see him."

She left them alone. Turning to Chantal, Red found himself at a loss for words.

"I'm sorry," he said at length. "I was very rude to you, and inconsiderate—"

"I understand why," Chantal answered softly, and it was astonishing how much more complete and precise her meaning was in this new tongue. "How's your leg?"

"Why—why, I—I'd forgotten about it . . ."

Delightedly, Red swung his *legs*—for the first time since childhood he could think that—to the floor, and walked up

and down staring at a pair of living feet. After a moment, Chantal spoke again.

" Red, I was scared for a while. I was afraid of what people might be like in this age. But if they could make you *forget* something which had obsessed you and blinded you for years—just like that—" She gained assurance and spoke up boldly. " I have never dreamed that anyone could be cured so swiftly !"

And I was ill, thought Red. *I was crippled more in my mind than in my body, and I wouldn't admit it.*

Now, though, he could admit it without pain, and he was very glad.

A panel slid back, and Magwareet appeared in the gap. He looked tired, but there was confidence in his bearing.

" Congratulations on your new leg, Red," he said. " Maybe you'd like to give it its first try-out on the way to the observation room. I don't know if you've been told, but you're already aboard the ship which is taking us back to your time."

Chantal blinked, and he chuckled. " No, we are not going to return you summarily ! You are going to be useful, both of you." He beckoned, and they followed him from the room.

" We're headed for the nearest peak of the same temporal surge which threw Burma into your time," Magwareet explained as they went along. " There was a man working with the same team—called Wymarin—who had achieved the best results so far on understanding the nature of the Being. We've got to look for him—it may be futile, but it's a chance, at least."

At that point they came into the observation room. It was small, but it had a view on to infinity.

This time, they could enjoy looking at the stars.

There was only one other person in the room—a young-looking man before a group of lighted control panels whom Magwareet presented as their pilot, Arafan. At the moment he was studying a plate which shone with the same green as the time map they had seen in Burma's possession.

" This surge peaked awfully far out," he said worriedly. " I should have said it was better for us to make for the other peak—further back though it may be."

" Artesha says not," answered Magwareet, and Arafan nodded acceptance. " I must admit, though, we're a long way from Sol . . ."

" There it is," Arafan pointed out. " We'll be hitting it in less than twenty minutes. I'd better match times now."

Red looked questioningly at Magwareet.

" The peak of the surge is about twenty hours earlier than our ' now," was the reply. " We shall have to make a short hop in time—nothing to worry about—"

Even as he finished speaking the pattern of lights in space altered infinitesimally, and they had a brief sensation of chaos.

And at the same instant a loudspeaker on the wall came to frantic life.

" Magwareet ! Magwareet ! Artesha here ! There's an Enemy raider—a big one—heading for you at top speed !"

To be continued

THE LITERARY LINE-UP

Mining by remote control is the theme of Kenneth Bulmer's lead novelette " Never Trust a Robot," next month. The remote control in this case being operated over a distance of thousands of miles to a heavy gravity planet where human beings couldn't possibly survive. Some interesting and complex situations take place down on the surface—and somehow a man has to get down there. Brian Aldiss returns with another " different " story approach in " The Pit My Parish " —the taboos this writer successfully breaks become more amazing with each new story !

There will also be the welcome return of Peter Phillips after too long an absence, plus other stories, articles and features *and* the second instalment of John Brunner's complex "Threshold Of Eternity " which *really* begins to move next month.

Story ratings for No. 62 were :

1. The Uninhibited (Part One) - - - Dan Morgan
2. Native Law - - - - - - Kenneth Bulmer
3. The Underlings - - - - - - - John Kippax
4. The Book Of Power - - - Bertram Chandler
5. Manhunter - - - - - - - John Boland
6. Buried Talent - - - - - - Philip E. High
7. According To Hoyle - - - Paul McClelland

A SENSE OF VALUE

The following story is particularly topical at the present moment when rising prices are still in an inflationary spiral. The simple solution would apprarently be to take out an insurance premium and then go into "suspended animation" for fifty years or so while the insurance pyramids into a fortune.

By D. M. Parks

I knew before I ever got to the office that it was going to be a bad day. Any day that starts off with a row at home is bound to be bad. People nodded to me as usual as I walked through the foyer of the Terran Insurance Company building and stepped into the elevator. I returned the greetings in a preoccupied manner. I was still thinking of the look Marion had given me as she said: "You're a mean, tight-fisted little upstart and I'm sorry I ever married you!" Her blue eyes were filled with tears and having delivered this conjugal bombshell she dashed into the bedroom, slamming the door behind her.

I had no time to stay and argue the point, I was due at the roof copter terminal in under three minutes, so I walked out of the apartment. I was not annoyed, of course, a Peinture System conditioned executive never allows his emotions to conquer him, but I was hurt. The insurance business is tough and I have pushed my way up from the very bottom by sheer hard work and brains. Of course I'm careful with

money, when you've had to work for it like I have it's natural that you should be.

Marion, on the other hand, comes of a moderately well-to-do family. She has never known what it is to go short of a meal, or to be forced to stay indoors whilst your only decent suit is repaired and pressed.

We'd had misunderstandings about money before, but they always got cleared up somehow, in the way things do between man and wife. She had never before lost her temper and slandered me in this way. *Mean* ! No, as long as I live, however much I earn, I shall never have her careless attitude towards money. Quite apart from seeming to me blasphemous in some obscure way, any person who would lose a five pound note and then try to pass it off with a gay laugh shows an imbecilic disregard for material matters which I cannot tolerate. Surely I had a right to speak to her firmly on the subject without being made the target of such abuse ?

My secretary, Blanche, looked up as I entered the outer office. " Good morning, Mr. Ryding. The mail is on your desk."

" Thank you," I nodded. She was a pleasant enough person, despite her sharp features and severely swept back hair. Certainly, most practical and efficient, with PSC training she would probably make an executive some day. I couldn't imagine *her* ever mislaying anything of value. " What appointments have I for this morning ?" I asked.

She consulted her desk pad. " The first one is at ten o'clock; a Mr. Crowther for settlement of an endowment policy, type S.A. You'll find the file in the top right hand drawer of your desk."

Admirable efficiency. I walked through into my office and was soon at work checking through the mail. Despite the fact that I tried to put the events of the early morning out of my mind, my eyes kept straying towards the phone. It would be so easy to call Marion and clear up the whole thing. That would mean climbing down, but then a quiet life is worth some amount of humiliation. On the other hand, I was right; although that never seems to make much difference in an argument with a woman.

I glanced up at the clock. Nine-fifty. No, I would let it lie for a bit longer. Perhaps if I held out *she* would phone me. I thrust the mail to one side and pulled the file on Crowther

out of the drawer. I checked through the policy; it was the usual routine thing, £15,000 with profits, payable in seventy-five years from the date of the original premium.

The cheque was attached, all ready for my signature. Although the true amount was nearer to £14,798 according to a rough check on my desk calculator, the company had made it up to the round £15,000 as a gesture of goodwill. I'm not at all sure that this sort of thing should be encouraged, and I decided to bring the matter up at the next planning meeting. After all, if we dropped over £200 on every policy we paid out the company would soon be in the red.

I signed the cheque, then sat for a minute or two, musing on the type of mentality that made people take out this kind of policy. The intercom buzzed. Mr. Crowther had arrived. I told Blanche to send him in.

He was a thin little man with greyish hair and a small moustache. He looked like a small, bewildered mole behind his old-fashioned, rimless spectacles. I shook his hand with the approved Peinture system grip, which conveys firmness and benevolence, and motioned him to the chair opposite.

" Nice to see you, Mr. Crowther. The company is always glad to pay out on this type of policy. I trust they treated you well at the clinic ?"

" Oh, yes, they were most kind." His head had a slight tremor, which showed also in his rather high pitched voice. Possibly a nervous condition; a certain amount of shock is inevitable in these S.A. cases, but on the whole he looked pretty fit.

" How are you finding things ?" I asked pleasantly. It was often interesting to get the reactions of these people to the present day world.

He moved a pale, almost transparent hand up to his moustache. " Changed . . . very much changed," he said.

" Ah, progress ! Yes, I expect a lot of things that you never expected have happened in the last fifty years," I said. " We who have lived through them cannot appreciate such events in the same way, of course. It must be a truly wonderful experience for you." I glanced at the date on the policy. " Let me see . . . nineteen seventy-five. You must have gone into the clinic just after the turn of the century, isn't that right ? "

Crowther's eyes moved swiftly behind the misted spectacles. " Yes, I was fifty years old then. My wife would have been forty-five, if she had lived. We had arranged to go in together"

I kicked myself mentally for not having gone through the file more carefully. Loneliness was often a problem with these old people. After fifty years in the suspended animation vaults, during which they did not age more than six months, the shock of coming into a new world with all the old friends and relationships gone was sometimes too much for them.

" That was how I came to have the larger policy," continued Crowther. " It had taken us all our time to keep up the premiums for both of us, what with the cost of living and everything, but when she died I was able to withdraw hers and increase my own coverage." He hunched his shoulders in the old-fashioned jacket. " We were never rich, you see, but after going on for so long it seemed the only thing to do. Bella made me promise that I would go through with it before she passed on. She hoped that at least one of us would live to enjoy the benefits of the wonderful future science promised mankind." His voice faltered. " She always was such a grand, unselfish companion, was Bella. If only . . ."

" Admirable foresight," I said hurriedly. " And now, there must be a thousand things you want to do and see. I mustn't detain you here talking." I was thinking of Marion. She called *me* mean, but I had never entered into such a scheme as this harmless looking old man and hundreds of others like him.

I wondered what extraordinary mental outlook had motivated these people to work like beavers, denying themselves all luxuries for twenty-five years, in order to pay their premiums. How had Crowther felt, for instance, on the day he had submitted himself to a clinic for the Mortisone treatment which would keep him in suspended animation for the next fifty years whilst his policy matured ?

It was just routine business as far as the company was concerned, but it is a strange reflection on our world, or rather the world of the turn of the century, that people should have been prepared to make such sacrifices in order to obtain security for themselves in their old age. One of the triggering factors was probably the incident of the government finally coming to its senses and abolishing all that Welfare State nonsense which was so popular about the middle of the last century.

I think that the Premium Ceasing S.A. policy appealed to the 'something for nothing' attitude which is common amongst a certain type of people. They were fascinated by

the idea that their money would be working for them whilst they slept. I have always disapproved of that kind of approach to life's problems. There is no such thing as something for nothing; work has its own rewards, as has slothfulness.

Crowther was still mumbling away. Extraordinary person . . . he actually seemed to be complaining about the fact that the world had not stood still, which only goes to demonstrate the intolerably selfish attitude of some of these S.A. people.

I thrust the cheque across the desk towards him. "There we are, Mr. Crowther," I said, forcing an insincere smile. "Your investment plus profits, fifteen thousand pounds. A handsome return indeed. And now, if you would like to sign the claim receipt." I didn't mention about the goodwill bonus, that would have taken time to explain to him in his present frame of mind.

I looked up at the clock. Marion should have called by now. As soon as I had got rid of Crowther I must phone her. No sense in leaving such a foolish quarrel unsettled. Even if I did have to climb down a bit it would be worthwhile in peace and quiet in the long run. I can't stand living in an unsettled atmosphere, it interferes with my Peinture system efficiency quotient.

Crowther picked up the pen and scrawled a spidery signature

I stood up, holding out my hand. "Well, Mr. Crowther, it's been a pleasure to do business with you. Don't hesitate to call again, the company will be pleased to help you at any time in your new life."

He looked at my hand for a moment as if it was a poisonous snake, then his eyes moved up to my face. The sparse grey moustache writhed above his mouth as he began to curse. The torrent of obscenity grew, directed not so much against me personally—it always helps to remember that—but against the company and the world in general.

I pressed the intercom button. It was no use to try and reason with an S.A. client at this stage, as I had found out to my kind-heart cost years before.

Blanche, the admirable, efficient creature, must have had the security guards ready and waiting. Mere seconds later they walked into the room. Crowther seemed further stimulated by the sight of their uniforms. He started to shout now.

The security men moved in on him swiftly. He started to rain blows at them with his feeble old arms, but they picked

him up bodily between them with gentle firmness and carried him out.

I sighed with relief, pleased that the episode was over. Now I would be able to call Marion and patch things up between us. After all, what was the sense in making both our lives miserable because of a small incident like the loss of a five-pound note? I decided to take a firm but forgiving line. I would make her understand that my disapproval of her carelessness was not a matter of meanness, but rather one of principle.

For my own part, I had already consoled myself by looking at the matter from a business point of view. Five pounds was far less than the legitimate shrinkage on her weekly housekeeping allowance of ten thousand pounds. These days five pounds would buy very little in worldly goods. A box of matches, perhaps. Last year it would have paid for a phone call, but the rates have been increased three times since then. The cost of living seems to grow day by day.

As I reached over for the phone I noticed that Crowther's cheque was still on my desk. Careless old man! I called Blanche and told her to send it down to the Psyche department where the guards would have taken him for orientation therapy. Really, some people have no respect for the value of money.

Dan Morgan

6th Australian S-F Convention

Australia's 1958 science fiction Convention will again be held in the Richmond Town Hall at Melbourne where their fifth conference was so highly successful in 1956. The date is Easter, April 5th to 7th. Programme details are not yet available but most of the highlights are to be concentrated on Saturday the 5th.

Australian readers should write for further details to the Convention Secretary, R. J. McCubbin, 90 Lilydale Grove, Hawthorn, Victoria. Europeans who wish to take out Convention membership and obtain reports and a souvenir programme should send 8/- to Mr. McCubbin. North American readers, $1.00.

Here is light entertainment in a different type of story by Lan Wright although it has a similar style of background to most of his recent stories. This time, however, he tells the narrative entirely from the alien viewpoint—with odd and humorous repercussions.

CONQUEST DEFERRED

By Lan Wright

Jellarn of Korbiri moved uneasily in the harness of his cradle as the shuttle globe bore him nearer to the planet. Already the greater gravity—half as much again as he was used to—was making itself felt upon the muscles of his willowy body, and the prospect of a lengthy stay under such conditions did not improve his state of mind.

It was even more annoying to know that the planet's atmosphere contained argon, a small percentage, true, but probably enough to increase his physical discomfort even more. He wondered, not for the first time, what could be so important as to make conquest of the system necessary. Probably it was a case of conquest for the sake of conquest; certainly he could not imagine Korbiri immigrants condescending to set foot on a world with such disadvantages as this one possessed.

On the fact of conquest his instructions had been implicit but not explicit. The subjugation of the main planet—the third from the parent sun—was taking far too long, and local reports of progress had been vague in the extreme. The Sector Commander and his aides had complained of unforeseen difficulties, of unexpected obstacles, of occupation but

not co-operation. From all the welter of excuses and prevarication not one concrete reason had emerged that could explain the delay.

The planet's inhabitants had been tractable after the first overwhelming display of force, but—and that 'but' represented the reason for Jellarn's presence. He was an alien expert, a specialist in extra-Korbiri cultures, and, as such, was high in the Korbiri hierarchy. The situation here needed specialist handling, and Jellarn had been dragged from a comfortable post as Sector Head in the Myra Group to act as trouble-shooter in an unknown, troublesome corner of the Galaxy that he had never even heard of before his orders had been given him by the High Council. It was not a position which appealed to him. It was one of those instances when to be labelled 'expert' had distinct disadvantages. If he sorted the mess out then it would be no more than was expected of him. If he failed— !

He squirmed again, trying to ease his long, slender limbs, and peered at the blue-green globe of the approaching planet through the view screen. He felt a tide of resentment against the incompetents in the expeditionary force who were responsible for his position. He promised himself darkly that heads would roll rapidly if he found out who had blundered.

The planetary globe swung nearer and blotted out the heavens. It filled the view screen, and then, slowly, the land masses became clearer through fleecy streaks of vapour. Jellarn eyed the white, fluffy cloud formations with increased misgiving. That meant that the sun would be obscured for long periods during the daylight hours. It meant, too, that there would be heavenly cascades of water at intervals, or else his experience of such worlds was very wrong. Such a prospect was backed and made more unpleasant by the obvious disparity between the land masses and the oceans. This, he knew, would be a wet, moist, marshy world with few comfortable, dry areas.

His mood grew blacker, and by the time the shuttle globe landed at the main Korbiri base, Jellarn was eagerly looking for trouble to relieve his feelings.

The base had been established in the dry, sandy region to the south of a large inland sea, and to the north of the planet's equator. At least the local commander had shown some degree of intelligence in his choice of the site. The prospects

of excess moisture from the sky were remote, and the use of the area meant that the occupying forces had little direct contact with the more populous lands to the north and south.

The local commander, Kleebor. was a stranger to Jellarn, but Jellarn's own reputation and instructions had clearly preceded him, for Kleebor greeted with a wary coldness as he left the shuttle globe. He choked slightly as the foul taint of argon tickled his olfactory organs, and Kleebor's satisfaction at his discomfort was all too evident. It did nothing to improve Jellarn's temper.

" We will talk in private," he announced sourly.

Kleebor eyed him with surprise. " Now ?" he queried.

" At once," snapped Jellarn. "The sooner I clear this mess up and get off this pest hole of a world the better I'll be pleased."

" Of course." Kleebor showed his anger by leading the way across the landing field at a pace which was calculated to cause Jellarn no little discomfort as he laboured under the unaccustomed gravity.

Both of them were breathing heavily by the time they reached the privacy of Kleebor's office, and the local commander had a glint of malicious pleasure in his large, green eyes as he watched Jellarn plump his frail form into the chair to which Kleebor invited him.

" I trust your journey was a good one," Kleebor began.

" You're a liar," snapped Jellarn, " and it wasn't."

" But—"

" I didn't come here to talk about my health, Kleebor. Now, what's all this nonsense you've been sending back to Korbiri about this wretched world ? You should have it under control by this time."

Kleebor put a wealth of meaning into his sarcastic sneer. " Wait till you've been here a little while, Jellarn. I'll be glad to see what measures you advise for taking control and retaining a hold here. The things we're up against are past belief. Why, right from the first moment we set foot here something's gone wrong."

" Such as ?"

Kleebor shrugged. " Militarily everything went as we expected. A small show of force, the destruction of a couple of small islands in one of their oceans, a flight around the globe by three squadrons of heavy cruisers, and we landed

without any opposition whatever. And then the trouble started."

Jellarn shifted ominously in his seat. " Get to the point, Kleebor. What trouble ?"

" Well, we landed in the northern of the two continents to the west of where we are now. It appeared to be the most thickly populated area and the most advanced technically. We established contact with the local authorities. We set up our cerebro-translators based upon local language patterns, and inside no time at all we'd made it plain that we were going to take over the planet, that the people would be well treated and would enjoy all the benefits of belonging to the Korbiri group of worlds—that is, provided they co-operated."

" And ? "

" They didn't like it, but the destruction of two small towns convinced them. Then we went into Stage Two, you know—trade goods, medical advice, drugs to cure their local ailments, growths, wasting diseases, virus plagues. By then they were eating out of our hands, so we went into Stage Three and asked local representatives to accompany us to other parts of the planet to spread the good news."

Kleebor paused, and studied the desk top before him.

Jellarn eyed him balefully. " Get on with it, then."

" They wouldn't come," Kleebor told him. " They said, in effect, that the people of that area were a bunch of lying, ugly, mistrustful, heathen hypocrites, and they didn't deserve the benefits which we could give."

Jellarn's eyes popped in disbelief.

" Then," continued Kleebor, " they went on to suggest that in their opinion it would be a fine idea if we went over this region in force, and wiped out every last-living creature in it. That way, they said, we could guarantee peace on earth and good will to all men—whatever that meant under the circumstances."

There was a blank silence while Jellarn digested the information. That he found it unpalatable was clear from his expression. At last, he enquired, " What did you do ?"

Kleebor shrugged. " We figured we'd landed in the midst of an area reserved for the mentally sick, so we broke base and headed for the far western continent. And when we got there we couldn't understand a word they were saying."

" What," asked Jellarn crossly, " does that mean ?"

" Just what I said." Kleebor grinned maliciously. " They spoke an entirely different language, and every one of our cerebro-translators was useless since it had been set up for the language we'd met up with in the first instance. It took us a while to get further supplies from Korbiri, and all we could do in the meantime was sit tight. Eventually we established contact and went into Stage Two just as we had done on the first continent."

" And then ?" prompted Jellarn.

" The same thing happened. These people, they call themselves Russki, demanded that we go back to the first continent and kill off all the people there. By this time the local scout groups were reporting back their observations from the remainder of the planet, and we gradually built up a picture of chaos such as you've never dreamed of, Jellarn. So far we have discovered four different racial groups—white, yellow, brown and black. These are subdivided into over a hundred groups and subsections, each of which regards itself as superior to all the others. Nearly every one of these groups speaks a different language or, at best, a different dialectical branch of the same language. And on top of all that, nearly every group has its own ideas on the proper form of government that would be beneficial to the entire planet."

Kleebor smiled coldly at Jellarn's ever growing astonishment.

" And you ask what the trouble is all about," he remarked caustically.

There was a blank silence, and then Jellarn said, shakily, " It's unbelievable !"

" Oh, that's not all by a long way," went on Kleebor airily. " Two hundred of their years ago—that's about four Galactic periods—they hadn't even invented a simple internal combustion engine. When we landed they'd been on the threshold of space flight for about a decade."

" Impossible."

" Maybe, but true. If we'd left them alone for another couple of periods they would have been discovering us, instead of us discovering them."

Kleebor sat back in his chair. " That's the overall picture as clearly as I can give it. Oh, it's not the whole story by a long way, but it will give you some idea of what we're up against. I ask you, Jellarn, how can you properly subjugate a world where there are so many groups, and where each group

is fully occupied in doing nasty things to each other. I tell you, we've fallen on an ecological mystery—a race of geniuses who are also psychopathic maniacs."

Jellarn's only comment was a painful sniffle as the argon-tainted air tickled his organs.

"You have a file of reports on the planet?" he asked at last.

"Of course."

"I wish to study them privately."

Kleebor nodded and stood up. "Your quarters are already prepared. I will have the reports sent to you at once."

Jellarn bowed in ritual farewell, and, as he left Kleebor's office, he felt something greater than just the planet's gravity pressing heavily upon him.

After he had spent some time going through the records and the reports Jellarn felt worse than ever. Here was no easy task from which he could extract any personal glory. Any thoughts he might have entertained about clearing the mess up quickly and getting back to his nice, easy post in the Myra Group were rapidly dispelled. The whole planet was a hotch potch of racial differences and regional taboos. Not only in the field of political life and thought was it a mess, but there was something even more disturbing which Kleebor had never even mentioned.

It appeared that, although politics caused bitter internecine strife, religion and local superstitions were responsible for positively fanatical excesses of murder, violence and bloodshed. Every religion was the 'right' one, and any act committed in support of that religion was always a guarantee of heavenly paradise after death no matter how morally wrong the act concerned might be.

Murder during warfare was never wrong if the cause for which the protagonists fought was right, and of course the 'cause' was never wrong. The very idea of making war for gain was frowned upon, although gain was never very far in the back ground.

And these people were on the threshold of space travel!

Jellarn's head buzzed as he laid the reports aside. Truly, as Kleebor had said, they were in the midst of a race of madmen. No reasonably intelligent creatures could possibly act as did these people unless they were mentally incompetent.

Jellarn ate and rested through the planetary night, digesting the unwelcome fact that he had a mess of trouble dumped right in his lap.

The next morning he rose wearily from his bed. He had spent the greater part of the night in acute discomfort. When he lay down the excessive gravity made breathing difficult, as if he had a large weight strapped across his chest. The quarters to which he had been shown were air-conditioned, but even that refinement of Korbiri civilisation could not completely eliminate the foul taint of argon. Such sleep as had come to him had been disturbed by claustrophobic dreams, and his state of mind, when dawn finally came, was as ill tempered and gloomy as it had ever been in his life before.

The only good things to emerge from the long night were thoughts and ideas about the situation which had sifted through his tired and restless brain. Many of them were ridiculous, some impracticable—but at least one was worthy of further consideration as he went slowly about his morning toilet. He breakfasted off dull and tasteless synthetics, and then he went in search of Kleebor.

He found the expedition's commander in his office with two other Korbiri.

Kleebor rose and bowed in ritual greeting. " I trust you have rested well, Jellarn. These are Armon and Kenill, two of our scientific complement."

Jellarn acknowledged the two Korbiri, and then remarked sourly, " I see that you have not managed to find out what is edible on this confounded world. The synthetics were as tasteless as ever."

Armon looked hastily at Kleebor and then replied, " The flora and fauna of this planet have one distressing fact common to all that we have so far examined. Large amounts of the chemical compound H_20 are to be found in all of them."

Jellarn grunted and remembered the fluffy clouds of water vapour he had seen as the shuttle globe came in to land. In truth he had not known that there was so much liquid in the entire Universe.

" I assume," he said, changing the subject, " that no further progress has been made during the night which has passed ?"

" None at all," agreed Kleebor amiably. " Unless, of course, you yourself—?" he left the question hanging tantalisingly.

Jellarn noted the sarcasm in Kleebor's tone, and also the supercilious humour of Armon's quiet smirk, then he replied with some relish, " As a matter of fact an idea did occur to me. Quite a simple one really. I expect you people have already thought of it ?"

Silence greeted him.

" I thought it might be of value if we brought two specimens of this race here, to the base, for study. But I expect that has been done ?"

Wordlessly Kleebor shook his head.

" Then," went on Jellarn, " I suggest that you get two—ah —specimens as near to the prime of life as can be judged. One from each of the two areas which you first investigated since they seem to be the most progressive technologically."

Armon sniffled slightly. " I don't quite see what useful purpose—"

" Neither do I yet," snapped Jellarn. " Nevertheless we will try it. Kleebor, send orders to the local commanders in those areas. I want those specimens here today."

" But—"

" Today," insisted Jellarn.

" Why from different areas ?" asked Kenill. " Surely—"

" Because I want to see if the antagonism between the two groups is of an individual or a mass nature," shouted Jellarn. " I should have thought scientific study of the species was something which the scientific staff of this expedition would have engaged upon long ago."

He stalked angrily from the office, leaving a cowed and angry trio behind him.

He spent the rest of the day sitting under the warm rays of the alien sun. It was not as warm as he was used to back home on Korbiri, nor was it as warm as the small backwater world in the Myra Group from which he had so recently come. Still, it was bright, and the warm, dry sandy soil beneath his feet went some way to offsetting the other discomforts which he had to endure. His brown flesh, which had been overmoist since the moment of his arrival, felt pleasingly dry as the day wore on and the sun mounted to its zenith. Not once did he see a sign of the white, vaporous cloud formations; the sky remained a brilliant, overall blue in which the sun swam in golden splendour. At least, Jellarn

admitted grudgingly, Kleebor had chosen a good spot for his main base.

By evening when the sun was poised on the horizon, a coolness had developed, and Jellarn returned to his quarters for another unappetising meal. He was almost glad when a messenger interrupted him with the news that the two specimens for which he had asked, had arrived and were waiting investigation in Kleebor's office.

He found Kleebor and four guards waiting for him. Standing between each pair of guards on opposite sides of the room, were the two aliens.

Jellarn studied them in turn. Each was short and stubby, barely reaching to the shoulders of the guards, and there were subtle differences between them which, thought Jellarn, must indicate the fact that they come from different parts of the planet. The taller of the two was a brawny individual with a heavily muscled torso bulging through a tight upper garment. The nether limbs were clad in ill fitting and rather dirty trousers and there were leather foot coverings on the feet. The hair was close-cropped, and its facial expression was rather one of anger than fear.

The second specimen, Jellarn noticed, was subtly different. The hair was worn long, and the facial features were softer and more pleasing. The repulsively heavy muscles of the first specimen were not so evident. It was shorter by several inches than the other, and the clothing, though rough was cleaner. An odd feature, Jellarn noted, were two unsightly bulges on the front of the upper torso. In place of the trousers was a single skirt garment which reached to just below the lower joints of the creatures legs.

" There appear to be some differences," Jellarn remarked at last.

" They will be fully investigated," promised Kleebor stiffly.

Jellarn noticed that two cerebro-translators had been installed but he would not allow himself to go so far as to compliment Kleebor on his foresight.

" Let us proceed with the questioning," he said abruptly.

Kleebor switched on the translators as Jellarn took his seat beside the desk. The guards handed each of the aliens a hand talker and made it clear that they should be held close to the mouths.

Jellarn turned his attention to the larger of the two, and asked, " What is your name ?"

" Kirby, you skinny-gutted baboon. John Kirby."

Jellarn frowned and switched off his own hand talker.

" What is—ah—a skinny-gutted baboon ?" he asked Kleebor.

The Commander shook his head. " I do not know. Probably it is some form of ritual greeting."

" I see. Yes, that is possible." Jellarn switched his talker on and replied in kind. " I see, your name is Jonkirby, you skinny-gutted baboon."

The alien gaped at him wordlessly for a second, and then dissolved into a howl of amusement accompanied by some muscular contortion of the torso. The laughter was stopped by a cry of, " Silence," from the other alien, who then continued, " Only an ignorant bourgeois of the American capitalists would see humour in a situation such as this."

Kirby stopped laughing and stared, open mouthed at the speaker.

" Hey," he said at last. " Get her, will you. She's a Rusky, dammit."

" Ah, quite," interrupted Jellarn. He had a feeling that the interview was not proceeding as he had intended. True, the antagonism which he had anticipated was there, but that was merely confirmation of his original deduction. " I presume you have a name, also ?" he enquired of the Rusky.

" Of course," was the terse reply. " Nina Morosilova."

" Nina Moro—what ?" asked Jellarn.

" Call her Nina for short," the other alien told him. " I'm Kirby, brother. It's easier that way."

" My name is Jellarn—not Brother."

" Well, okay ! "

Jellarn switched his attention back to the other. " Tell me, Nina, I notice there are differences in your attire. Why is that ?"

Once again Kirby dissolved into a howl of merriment while the blue eyes of Nina studied him with obvious distaste.

" It is because I am a woman, and he is a man."

" But I thought you were a Russki and he was an American?'

" That is also true."

" Oh." Jellarn digested the information, then said quietly to Kleebor. " Obviously these are subdivisions of the individual groups."

Kleebor nodded his agreement and added to his notes.

" Is this also why your cranial decoration differs ?" asked Jellarn.

" Naturally."

" And the two bulges on your upper torso ? These, too, are indicative of differing status ?"

Once again Kirby's roar of mirth rang through the room. " Oh, brother," he croaked between laughs, " are you from the sticks !"

" Brother ?" queried Jellarn. He looked questioningly at Kleebor who looked away and wrote copiously.

Jellarn turned his attention back to Nina whose every line and every tremor indicated extreme anger. Jellarn couldn't think why. He concluded that he was trespassing on some absurd local taboo, and decided to drop the question of the bulges. He decided on a different approach.

" Tell me, Kirby, why do you hate Nina ?"

" Hate her ? I don't even know her," protested Kirby. " I don't hate her. Why should I ? In fact, she looks pretty good to me. You know, someone to curl up with on a cold dark night."

" You ignorant, nasty-minded, decadent son of a degraded democrat," shouted Nina.

" Do I understand from that, that you hate Kirby ?" inquired Jellarn with clinical care.

" Of course I hate him. It is my duty to hate all who obstruct the coming of the peoples' democracy." The blue eyes blazed with the intensity of Nina's emotion, but Kirby merely laughed again and emitted a loud, trilling, two-toned whistle which seemed to annoy Nina even more.

Jellarn felt even more confused as he tried to make sense out of the conflicting statements. The more he thought about it the less he understood it, and after a long pause, he decided that the best course would be a physical examination of the specimens. That at least might bring forth some concrete information instead of the chaos and confusion that had greeted him so far.

He switched off the hand talker, and said to Kleebor, " I think we will leave them until tomorrow, and then let Kenill and Armon look them over."

Kleebor nodded. " All right. Do you wish to be present at the examinations ?"

"No, but keep me informed of what progress is made."

Jellarn retreated to his quarters, suddenly aware that his head ached alarmingly.

The night passed much as had the previous one, and the only relief Jellarn had was when he was able to sit once more beneath the alien sun and feel its dry, warm rays reviving his tired and over-moist body. Even that comfort was not left to him long. He dozed lightly for a while, trying to make up for two nights lost sleep, and then Kleebor came hurrying from the building where the two aliens were housed. One hand was clasped tightly over his left eye.

"They are mad," he announced breathlessly.

"Who?" asked Jellarn sleepily.

"The aliens. The one called Kirby—he hit me—with his rolled up hand." Kleebor took his hand away and revealed a swollen and discoloured eye. It was a bright shade of purple, and as good a wound as Jellarn had ever seen—even in the head butting contests back on Korbiri.

"Kirby did that?" he asked, astonished. "With his hand? But there must have been a reason?"

"There was none," protested Kleebor with an angry wail. "Armon and Kenill examined him in detail and he reacted with great good will and intelligence, despite some unkind remarks from the other one, Nina."

"So?"

"When they had finished with Kirby, Armon requested Nina to remove her garments likewise so that they could carry out a similar examination."

"Well?"

"Nina refused," gulped Kleebor.

"And then what happened?"

"Armon tried to remove a garment to show that we meant no harm and she hit his face with her open hand."

"Great stars above!"

"Then Kenill tried to help Armon, and Kirby said that we should leave Nina alone. I told Kirby not to be ridiculous and went to help Armon and Kenill—and then it happened. Kirby went mad. He hit me first, and then threw Kenill into a corner."

"What about Armon?"

"He left hurriedly to call the guards."

"Then what did you do?"

" We decided to postpone the examination, and when we left Kirby and Nina were close together with their arms about each other, not quite as one would expect from persons who hate each other."

Jellarn relaxed. At least there was no immediate danger. It simply meant that some other approach to the problem would have to be made, one which did not arouse some unrecognisable and primitive racial instinct in either of the specimens.

" My eye," remarked Kleebor plaintively, interrupting his reverie.

" Eh ? Oh, yes. Go and have it fixed."

" What about the aliens ?"

" Leave them alone for the time being. Keep them fed and exercised until we decide what further action should be taken."

When Kleebor had gone Jellarn carefully considered the facts. There seemed little doubt that the planet's entire race was either utterly alien or, by Korbiri standards, pathologically insane. The trouble was to decide which. A race which had moved from a simple combustion engine to space travel in less than four Galactic periods surely had something to commend them ? Or were they merely erratic geniuses who lacked in other directions what they made up for in technological development ? Whatever decisions he arrived at ultimately Jellarn still could not see why the Korbiri hierarchy wanted to colonise the planet. It was, generally speaking, a cold, wet, unhealthy place, peopled by a savage and uncooperative race who did nothing but make an unpleasant world even more unpleasant. He supposed that any recommendations he might make regarding the planet would be approved by the Central Government—after all, his orders had been worded loosely enough to give him considerable latitude.

The only trouble was that anything short of successful colonisation would be taken as failure, and his unprepossessing out-of-the-way post in the Myra Group would seem like paradise to the one he might expect if such failure was the final result.

Jellarn groaned inwardly and turned his seat more directly to the sun. The more he thought about it the worse it became.

Day succeeded day with slight progress in many directions. None of these brought final success any nearer, in fact, things only became more complicated.

The alien, Nina, was successfully examined while unconscious—a process rendered possible by taking advantage of their nightly slumbers, so that neither of them had any knowledge that the examination had taken place. Kleebor who thought up the idea, was inordinately pleased with himself—until the results of the examination were produced next day.

He and Jellarn met Armon and Kenill after the morning meal to study the results. Both Armon and Kenill were tired after their night's work, and Jellarn was tired anyway, that being his tenth night without proper sleep.

"We don't understand it," said Armon, by way of an opening gambit.

"But they appear to be two entirely different species."

"Don't talk rubbish," snapped Jellarn. "Whoever heard of such an outrageous thing."

"Nevertheless," interposed Kenill, "as you will see from these photographic sketches, there are physiological differences which are very hard to explain. The bulges on Nina's upper torso, for example. They are not ornamentation as you supposed, Jellarn, they are part of the actual body, and are not duplicated to anything like such a degree on the torso of Kirby. Similarly, on Kirby's torso—"

He went into a long, detailed account of other physical differences interspersed with his own ideas and comments, which made Jellarn feel even more tired. By the time he had finished Jellarn's head was reeling, and when Armon tried to elaborate on his own account, Jellarn broke in with an angry, "Stop it, stop it. Great stars above! The whole thing is obvious without any more of your blatherings. We have stumbled upon a world in which there are two different species, hence the antagonism which one part of the world shows to the other."

With growing conviction he went on, "The race to which Kirby belongs must obviously clash with that of Nina—they are so clearly different to one another—"

Kleebor laughed hollowly.

"And what's so funny?" demanded Jellarn with a squeak of anger.

"We thought of that first thing this morning, and I had a talk with our area commanders at the points from which Nina and Kirby were taken."

"Well?"

"The population of each part of the planet—indeed of all parts of the planet—is made up of a rough fifty per cent Kirby-type and fifty per cent Nina-type species."

Jellarn felt ill. The silence which enveloped the room was positively deathly, and it was broken only by a sniffle from Armon.

"Why wasn't this reported before?" snapped Jellarn at last.

"No one thought it important until we did an individual examination," replied Kleebor gloomily.

Jellarn wondered idly when he had last been without a headache. . It seemed ages ago. What with that, what with the argon, the gravity . . . He broke up the meeting in disgust, and went out to assimilate more of the alien sunshine.

The four of them had three more meetings, each more inconclusive than the last, and finally all their questions were answered, most unexpectedly by the aliens themselves.

Kleebor and Armon disturbed Jellarn's sun basking late in the afternoon of the sixteenth day after the two aliens had been brought in.

"We have solved everything," announced Kleebor with pompous delight.

"Everything," agreed Armon, clearly not wishing to be ignored.

Jellarn sighed wearily. After past experiences he doubted that even one small question had been solved. Still— !

"Well?" he demanded.

"This morning on my usual visit of inspection," said Kleebor, "Kirby asked me if we could arrange for a priest to come and see them."

"A priest?" repeated Jellarn in utter bewilderment.

"An official of one of their religious organisations," explained Kleebor.

"Confound it, I know what a priest is," shouted Jellarn. "I am supposed to be an expert on alien culture."

"Of course," interposed Kleebor hurriedly. "They want a priest to join them in wedlock."

"In what?"

"Apparently," put in Armon, "some form of religious ceremony is necessary to enable them to live together."

"But they've been living together ever since they've been here."

"It isn't quite the same thing," Kleebor told him. "They have to be joined together officially in some way that escapes my understanding, in order that they can produce young."

"What?"

Kleebor looked embarrassed. "They do not produce offspring by the normal parthenogenetic means. It would appear that one of each type is necessary for the continuation of the species."

"Barbaric," spluttered Jellarn.

"I do not understand all the details involved, but the fact appears to be that Nina and Kirby have, to quote their own phrase, 'fallen in love.' This appears to indicate a mutual desire to propogate the species."

Jellarn's headache became suddenly worse. "I—I've never heard anything like it," he gasped. "They hate each other. They said so."

"Nina said so," corrected Kleebor.

"But Nina's race hates Kirby's race," insisted Jellarn. "They can't want to—to—to do whatever they intend! It's ridiculous."

"Nevertheless," said Armon, "it is so."

Jellarn relaxed in his seat, shaken, baffled, and utterly at a loss to explain the latest turn ef events. The chaotic bewilderment of his mind gave forth only one concrete thought—such things couldn't happen in the normal order of the Universe. In all his long experience he had never known such a world as this. It existed in complete opposition to all the natural laws of universal creation. To be sure, other races, in their early history had wars and disputes, but these rarely existed on a planetary basis once true realisation of their uselessness was reached. But here—?

Jellarn felt panic stricken at the thought of the Korbiri having to deal with inter-racial strife when they were trying only for peaceful colonisation. It wasn't only the threat of warfare. There was the question of the ridiculous number of languages, creeds, religions, political ideologies—the list was endless.

The only thing these people had in common with each other was the ability to live in abounding dampness and breath argon tainted air without being sick.

He was dimly aware that one of Kleebor's subordinates had come up hurriedly to join the group, and was talking urgently

to his superior. He was startled into full awareness by Kleebor's horror stricken, " Oh, no. It can't happen."

The officer assured Kleebor that it could, handed over a written report, and departed to a discreet distance. Kleebor studied the printed sheet with obvious distress, while Armon violated all ethics by peering over his shoulder.

" What is it now ?" demanded Jellarn as his impatience got the better of him.

" This is a joint report from our sector commanders," Kleebor told him grimly. " Each of them has been visited by a representative of the local administrative government, and each of them had been given an identically worded ultimatum."

" Eh ?" Jellarn seized on the last phrase. An identically worded ultimatum pointed to united action based on common agreement. But that wasn't possible—not the way things were conducted on this planet.

" It says," went on Kleebor, " that if we do not remove ourselves from their planet within two of their days they will unite in a joint campaign to drive us off by force."

" By force ?" squeaked Armon.

Jellarn snorted. " Preposterous. Don't they know that we could decimate their entire planet if we so desired ?"

" That point has been realised," Kleebor told him. " They go on to say that if such decimation took place then the planet would not be fit for colonisation anyway. They are confident, too, that they could inflict sufficient damage on our forces to make our stay here an uneconomical proposition."

" They're optimists, anyway," retorted Jellarn.

" But they hate each other," put in Armon. " They said so."

" Be quiet," snapped Jellarn.

" There's more yet," went on Kleebor. " They say they have large stocks of cobalt bombs which they are prepared to use if we do not leave within the time allowed."

" But they—they would destroy the planet."

" And us with it," added Kleebor grimly.

Jellarn put his head in his hands and groaned out loud. This, he decided was the final idiocy. Whoever heard of racial suicide ? It just wasn't logical. It was ridiculous ! But then, everything about the whole wretched planet was illogical and ridiculous. If he refused to accept the ultimatum there was a very great possibility that he would be left the possessor and

conqueror of a desolate, useless globe. There was no future in that. If he accepted the ultimatum . . .

" What are you going to do ?" Kleebor's apprehensive voice broke his train of thought, and even under the stress of his emotions Jellarn wasn't slow to notice the accent on the ' you.' Kleebor was passing the buck in no uncertain manner.

He didn't reply at once. There was too much to think about. If they stayed they could conquer the planet. But the cost ? The Central Government wouldn't be very pleased if they were handed a battered useless world which had cost half the conquering force—and that was a very real possibility. The alternative ? The Central Government would be even less pleased with that unless there was a very good explanation.

The population were naturally antagonistic from group to group, but why should they suddenly combine ? And how long would such a combination last ? Presumably, only as long as the Korbiri remained. And then— ?

Jellarn sat up suddenly as a way out flashed into his mind.

" We will evacuate," he announced.

" What ? "

" You heard me. Now. This instant. Send out the necessary orders to withdraw your area forces, and then inform the—the whatever they call themselves—that we will leave within the time stipulated."

" But—the Central—"

"—Government won't like it. I know." Jellarn smiled thinly. " But they will if we convince them that we have done the right thing."

" And how will you do that ?" demanded Kleebor.

" Once we have left this world what will happen ?" Jellarn asked smugly.

Kleebor looked bewildered. " How do I know ?"

" I will tell you. Once we go these people will have nothing on which to vent their natural hatred and desire to destroy. Their antagonistic propensities, which have been channelled towards us, will resume the normal course."

" So ? "

" So they will go back to hating one another again. They will start making war on each other as they have done in the past, and they will do their very best to destroy each other by every means in their power."

" I still don't see—"

"Idiot," snapped Jellarn. "Which would you rather have —assuming you are the Central Government—a world laid low by our own forces? Or one which has been slightly damaged by the local population?"

Kleebor's face brightened.

"I think," went on Jellarn, "that if we come back in one, or at the most two Galactic periods we shall find a world incapable of resistance—a ripe fruit waiting to fall into our grasp."

Jellarn felt happier than he had done for a long time. His pleasure was increased by the obvious admiration with which Kleebor greeted his judgment. It wasn't a desirable solution, he knew, but at least it was one which the Central Government was likely to accept. The prospects of a damaged career receded slightly, and the pleasant indolence of his happy little world in the Myra Group loomed larger—a haven after the storms of the immediate past.

"You may issue the orders for the evacuation now, Kleebor," he told the Sector Commander happily.

Only one small point marred the hurried but orderly evacuation so far as Jellarn was concerned. He and Kleebor travelled in the same shuttle globe to the ship that was to take them back to Korbiri. They sat side by side, each in his own harness, and watched the hazy globe of the planet grow smaller on the view screen.

Jellarn was still basking in the glow of a job well done, when Kleebor remarked with academic interest, "What will happen, Jellarn, if they do not destroy themselves as you anticipate?"

The possibility shattered Jellarn's carefully erected castles.

"If they don't," continued Kleebor grimly, "they'll be far more dangerous next time we meet up with them. Why, we might not be able to handle them. Don't you think?"

Jellarn did—but he wasn't in a position to say so.

Lan Wright

The space satellites, despite their dominance in the news of late, are only a small part of the overall investigation by I.G.Y. scientists of the nearer reaches of space including our atmosphere. This concluding article by Kenneth Johns brings in numerous other experiments already taking place.

PROGRESS OF I.G.Y.

By Kenneth Johns

Conclusion

2. Look To The Sky

One of the odd things about the IGY is that in this exciting period of intense scrutiny of the Earth, everyone seems more wrought up about getting off it.

More than that; this current of interest in exploring *off* the Earth, in a period devoted *to* the Earth, is surely psychologically explicable only in terms of Man's growing realisation that he must expand to live.

But there are other, more cogent, less tenuous reasons why scientists are today looking at the sky with new respect. For, in scientific circles, it is realised that the air above us and the whole tenuous atmosphere of the Solar System moulds our Sun, planet and lives far more than was formerly believed possible. The exploration of this frontier is involving a tremendous amount of research and development, most of it going into instruments and vehicles for the instruments. Whilst we can obtain a large amount of information from

surface-based instruments, much essential knowledge is unavailable because of the sheer distance and efficient shielding of the upper atmosphere.

Jet planes, ram-jets and balloons all depend upon the availability of some atmosphere; anti-gravity is still a dream of the future (although active research is being carried out in Canada and the USA) so we are left with rockets. Fifteen years ago rockets were toys to most; with great delight they had been fired off on Guy Fawkes' Nights. Thirteen years ago I saw the first long-range rocket used in warfare fall upon a back street of Chiswick.

That was when rockets reached adolescence.

They have come a long way in the last twelve years. More money and effort has gone into improving them than ever was swallowed in the Manhattan District, mainly because of their military value. Any nation of moderate size has its rocket development programme. The stigma of destruction attaching to rockets has not worn off yet. It is one job of scientists to show that rockets have their peaceful uses, too.

Apart from the firms manufacturing motors and electronic components (shares of rocket-motor firms in the USA have doubled in value in the last year) the main groups currently benefitting from the increasing effectiveness of rockets are research teams who have at last a means of physically, by an extension of their tools, reaching the lesser known reaches of the Earth.

The development of upper air research vehicles for use in the IGY has made good headway in most countries. The Australians have produced a balloon-borne, solid-fuel rocket similar to the Rockoon, which should enable inexpensive flights of up to 100 miles to be made frequently from Woomera and Mawson in the Antarctic. The Americans have shown that their versatile Rockoon combination can be set to float near its ceiling—balloon height—and be fired by a radio signal when a flare or solar disturbance suddenly occurs on the Sun, as shown by radio fade-out or visual observations. In this way the problem of the slow rise of the balloon has been surmounted; if it was released as soon as the flare was seen the effects would have finished by the time the rocket reached the ionosphere. If no flare has occurred before sunset, the rocket is fired anyway to help build up a picture of the normal state of the atmosphere.

The modern solid-fuel propellants are not the old compressed powder type, they are synthetic rubbers mixed with an oxidising agent. The Russian rockets are capable of lifting a half ton of instruments to 900 miles, a fantastic achievement, whilst the new Japanese solid-fuel rocket only reaches 30 miles and its maximum height is expected to increase to 50 and 75 miles by the addition of a second and third stage.

The emphasis on cheapness has created the British Skylark research rocket, another solid fuel type. Powered by the Raven motor, the Mark I should reach 93 miles and the addition of a booster extends that to 130 miles with a 65 lb. payload. Twenty-five feet long and seventeen inches in diameter, the Skylark has a top speed of 3,500 m.p.h., and is the main upper air research vehicle for six British teams during IGY. The first test at Woomera on 13th February, 1957, was along a flat trajectory extending only eight miles up and for twenty miles.

Firings are planned from both Woomera and Aberporth in Wales. Temperature measurements up to its ceiling will be performed by the ingenious use of grenades, a launcher in the Skylark will lob a grenade every two seconds ; eighteen per flight; and the moment of each explosion will be accurately recorded by a ground-based ballistic camera photographing the flash and smoke. Combined with sound-ranging equipment, the fact that the speed of sound is proportional to the square root of the air temperature will enable the temperature of the air layers between explosion points to be calculated.

Aluminium foil exploded free of the Skylark at heights of thirty and fifty miles will give drifting targets for standard radar units and so measure the high-speed upper winds. There is far too little air above fifty miles to deflect the fall of the foil, so sodium atoms will be used instead.

There is only about a ton of atomic sodium in all Earth's atmosphere; but that is enough to blanket the globe with the nocturnal airglow. Skylarks loaded with several pounds of a mixture of sodium and thermite will discharge the vapourised metal as a softly glowing yellow cloud.

The original British idea has already been successfully tested in the USA with Aerobee rockets and a wider use of the method will enable both wind drift and temperatures at high altitudes to be easily estimated, from the movements and spectra of the clouds. Potassium metal, which gives a rich red glow, will probably also be used. IGY will be a colourful time !

Other information on the airglow will be obtained from night firings of Skylarks carrying photo-cells covered by filters to allow only light of a special wavelength to be measured. Batteries of photo-cells will check each of the higher air levels for the types of glowing atoms, such as oxygen, nitrogen, that contribute to the general glow.

Early attempts by US teams to analyse the active atoms and ions of the ionosphere by means of electronic probes from rockets failed due to the interference from the rocket body. To counteract this, the Skylark has a nose that can be jettisoned after it has sliced through the lower thick air levels. Then the revealed probes will project well forward of the main body and, it is hoped, give direct readings of free electrons and ions in the ionosphere.

In addition, some Skylarks will act as robot radio sources to beam selected wavelengths and receive ground-based signals *through* the ionosphere—so far we have had to rely on waves reflected from its various layers, leaving the regions between the layers as places of mystery.

Further data on ions in the air will be telemetered from an automatic mass spectograph using a strong magnetic field to sort out the mass and charge of ions. Tossed free of a Skylark, it will give instantaneous analyses of the air during its long fall to Earth.

A vast rocket site has been built in the Northern auroral region of Canada at Churchill, Manitoba, and the first firings of Aerobees and Nike Cajuns took place from there in October, 1956. Kept operating all the year round, even when heavy snowfall and 60 m.p.h. and up gales lash the site, the rockets are launched from giant enclosed towers which protect them on that first unsteady tremble as they take off.

Project Vanguard, the US artificial satellite scheme, is making good headway and difficulties met with in the development of the final rocket stage have mostly been overcome. The second stage turns out to be the trickiest of the lot as, with only a small mass to spare for control and guidance systems it has to orientate itself with respect to the Earth and its own motion when it has reached its maximum height. Then it must fire the solid-fuel final stage, which has to start spinning like a bullet to gain stability before it separates from the second stage, to give the horizontal boost that will put stage three and the satellite into the optimum orbit. An error

of only two degrees in direction will reduce the life of the satellite by weeks. A holdup in the launching of the first satellite, reported to Congress as being due to a lag in the building of the twelve satellite tracking stations in the USA, could conceivably have been a ruse to mislead the Soviets in this race for space. Anyway, officially there will be no US satellite in 1957. Recently it was announced that a maximum of twelve moons will be launched in 1958, but if the first are successful the number may well be less than this.

The first American satellite proper is a 20-inch diameter sphere built of 4 lbs. of magnesium. Army engineers took the gold-plated magnesium ball and chromium-plated it in a vacuum chamber. Then they coated it with glassy silicon monoxide and put the reflecting aluminium coat over that. A final coat of silicone monoxide finished it off. This will keep the interior down to 120°F in full sunlight—the aluminium reflecting the greater part of the incident sunlight whilst the silicon monoxide, transparent to visible light, is an extremely good radiator of infrared, ridding the sphere of the heat of the little light that is absorbed.

All three rocket motors have been ground-tested satisfactorily, although one first stage motor was rejected and there have been a number of field tests. The final stage was carried to 120 miles high, after reaching a maximum speed of 3,500 m.p.h., by a Viking rocket, and the final stage launched to test the spinning mechanism. This was in April, 1957. Previous to this, the concrete launching pad and the special derrick at Cape Canaveral were tested by firing a main stage rocket. Carrying a 13 oz., 4,000-mile range miniature satellite-radio-transmitter in its nose cone, the rocket reached a height of 125 miles, coasting there after attaining a speed of 4,000 m.p.h. on the 8th of December, 1956.

More recently, a Navy Aerobee-Hi took the electronic systems of a satellite up to 126 miles, and these operated as they will when installed in a moon. Project Vanguard has already claimed one victim, a scientist who was working in a rocket-fuel plant when it exploded.

Instrument data will be stored in a miniature tape-recorder and played back to Earth via radio in 10-second bursts. When the satellite skims the denser atmosphere and glows incandescent, calculations show the surface should reach 1,100°C,

well above the melting point of magnesium but below that of the new alloys developed for gas turbine blades. The later moons may be tougher and recoverable and bring back photographs.

It is also likely that at least one sub-satellite, a 10½ oz., .0025-inch thick plastic balloon covered with .0006-inch aluminium foil will accompany the main moon. Blown up by compressed nitrogen, the foil will prevent collapse if meteor punctured. The sub-satellite's value lies in that its mass is so different whilst its size will be exactly the same as the satellite's. Thus air drag will more rapidly slow down the lighter satellite and the differing speeds will lead to more accurate calculation of the density of the upper air. The final rocket stage will orbit as a third satellite; but its cone-like shape will destroy much of its value.

Out of the thirty-one reasonable suggestions for the experimental use of the satellites, twenty-four have been accepted. Of these, eight will be attempted with the first moon. They are : Measurement of the temperature and density of the upper air, measurement of meteor and meteorite collision by loss of pressurised gas and diminishing of the surface by erosion, measurement of cosmic ray, and ultraviolet radiation, X-ray and meteoric bombardment of the Earth.

Little information has been released on the ISZ, the Russian satellite. It was most likely put in orbit by conventional liquid-fuel rockets; but the Russians have published a suggestion that turbojets be used to lift a three stage unit to 15 miles and 1,200 m.p.h. When the turbojets are dropped, ram jets take over to reach 3,000 m.p.h. and a height of 25 miles. Finally, a liquid-fuel rocket places the ISZ in its orbit.

Both the Russians and Americans have agreed on the wavelength of 10-megacycles for telemetering data from their satellites and both are to use the same radio-tracking systems.

Trained observer teams, co-ordinated under Operation Moonwatch, will track the satellites. Two hundred teams will be ready in the USA when the first real moons fly. Their observations will be particularly useful during beginning of orbit and when the moons make their final fiery descent into the atmosphere. American moonwatchers practice on ' Flybys,' high flying jets at night carrying a single light equal in apparent magnitude to a satellite seen in the early morning or late evening.

Once the satellites have settled into orbit, the expensive high-precision Minitrack I radio system will check path and transmitter. Then the cheaper Minitrack II's, which can be made in an amateur's workshop, will take over the tracking task.

Twelve stations equipped with 31-inch mirror Schmidt cameras and clocks accurate to one ten thousandth of a second will photographically measure each orbit.

Then the whole satellite pattern will be fitted into the gigantic jig-saw puzzle of facts and figures that will be built up into one coherent three-dimensional picture of the Earth and its environments. All the parts hinge together. No-one can say that one job is more important than another. The men working out the nature of the Earth's core and the men tramping across the frozen wastes at the bottom of the world, the men in research stations all over the globe and the men groping into the lightless depths of the sea, all these workers tie into the final picture with those analysing and recording the phenomena of the upper atmosphere and of space.

But perhaps we can be forgiven if we look with quickened breath and uplifted hearts at the men forging into space—for there we know lies Man's destiny.

Kenneth Johns

SWAP SHOP

Long before coinage or paper money was thought of as a purchasing medium it was customary to exchange goods. Bartering is still a useful habit today. It can well be more than useful in the future, especially on another planet where there would be a shortage of Earth-type commodities.

By Bertram Chandler

There's one thing about service in the Epsilon Class tramps —you visit all sorts of odd little worlds at which the proud Alpha and Beta Class liners would never deign to call, and at which the Gamma and Delta Class vessels, with their huge cargo capacities, call only when the tonnage of freight to be lifted or delivered makes it worth their while. Galactic errand boys, that's what we are in the Epsilon ships, picking up a parcel of cargo here, a couple or three passengers there, weaving, as our Old Man is apt to say after one drink too many, the web of Interstellar Commerce. For myself, I'd sooner do my weaving in a big ship on a regular run and see my share of the bright lights in the process, and I'm sure that most of the others are like-minded.

We passed through one phase in *Epsilon Draconis*—known to her crew as the *Eupeptic Dragon*—during which we never availed ourselves of our opportunities for planet leave but just stayed on board and sulked. We'd been out from Earth too long—and these minor colonies are so deadly dull and the entertainment facilities are so limited. Too, on a regular trade you get the chance to meet people and to make friends,

but in the *Eupeptic Dragon* we were never in any one port long enough and never knew when, if ever, we should return there.

It was during this period of depression that we had a two-day stay on Van Diemen's Planet, and Van Diemen's Planet can not be recommended as a cure for that browned-off feeling. It's a cold world, and wet, all mist-shrouded mountains and grey, sullen seas. The towns are small and primitive, even the capital, Port Van Diemen, is by Terran standards little more than a village. The people—the planet was colonised five generations ago—think that their world is marvellous and just can't see why we big city slickers from the stars can't agree with them. It is, I suppose, the sort of planet that one would like if one had only two recreational ambitions—to watch football matches in the rain and then to breast a bar and talk about them.

None of us was going ashore that first evening at Port Van Diemen. Those of us not on duty—with the exception of the Old Man, who was sulking in his own accommodation—were gathered in the little smoking room, moodily drinking beer, trying to raise interest in various games of chance or skill and listening to the rain beating on the metal skin of the ship.

Every now and again there would be a squeal from the big TV set in the corner where Dick Travers, our Radio Officer, was trying to pick up the local station. The set, in theory, was supposed to be capable of being used on any human colonised world in the Galaxy, but there was often a wide gulf between theory and practice, especially since so many of the smaller colonies had broadcasting systems that conformed to no standards but their own.

" Got it !" I heard Travers shout.

I laid my cards down—I was playing a not very enthusiastic game of bridge with Bill Taylor, the Mate, Sue Perkins, the Catering Officer, and Joe Kendall, Chief Reaction Engineer—and looked to see what sort of programme Travers had picked up. The others, too, showed interest.

It was the sort of programme that one would expect on a world like Van Diemen's Planet. It was, as Taylor put it, as homespun as all hell. It showed, said Kendall, the depths to which the Van Diemenites had sunk, a regression from civilised commerce to primitive bartering. We all thoroughly enjoyed our hearty sneering session.

Swap Shop was the name of it. It was all very simple—the Master of Ceremonies, a tall, gangling, rustic looking character in old-fashioned clothes, had a list of articles which his clients considered surplus to their requirements and which they wished to exchange for some other specified item. In some cases the article to be swapped was actually in the studio to be displayed to viewers and prospective customers, in other cases we had to be content with the M.C.'s description.

It was all, said Sue Perkins, rather like that odd Twentieth Century school of art . . . What did they call it? Super Realism? Anyhow, those pictures in which all sorts of utterly incongruous articles were grouped together . . .

We agreed with her, especially after we had heard that the proud owner of a spacesuit helmet wanted to exchange it for a tortoiseshell cat.

" I wish that somebody *wanted* a spacesuit helmet," said Taylor. " There's that suit that the Surveyor condemned last time on New Brooklyn still loafiing around on board . . ."

" There may be a bargain yet," said Sue Perkins.

" Always the woman, aren't you, Sue?" grumbled Kendall. " You come half way across the Galaxy, and all you think of is bargains."

" What else is there to think about aboard this rust bucket?" she demanded.

" A better balanced diet for a start," put in Doctor Moore, our Surgeon. " I keep telling you that there's too much starch in what you give us."

" I never notice *you* missing out on the fried bread with your breakfast of eggs and bacon," she replied tartly. " And you made sure that you got the biggest baked potato on the dish at dinner tonight."

" Come to that," said Taylor, " I know that you're always growling about having to do the Bio-Chemist's duties as well as your own in this ship, but I think you might devote more tank space to fresh salads, Doc."

" Oh, shut up, all of you," growled Kendall. " We're none of us starved in this vessel and nobody's suffering from vitamin deficiency that I've noticed. Give Sue a chance to see if she can pick up a bargain."

None of us expected that she would do so, least of all herself. There were, of course, sundry items of kitchen equipment offered for barter, but *Epsilon Draconis*' galley was better fitted than the kitchen of the finest mansion on Van Diemen's Planet. Then, suddenly, Sue stiffened to rapt attention.

" Here," the announcer was saying, " is a bargain for somebody. Mr. Calder, of 139 Linisfarne Avenue, offers a dress of genuine Altairian crystal silk, only worn once, for . . ." he paused, ". . . a dressed duck. I suppose that if he had a duck of his own he'd dress it in the dress, and it'd be the best dressed duck on the whole of Van Diemen's Planet. Anyhow, housewives, here's your big chance. If any of you have a dressed duck in your deep freeze ring Mr. Calder, DOU2107 . . ."

" He must be mad," said Sue.

" Why ?" I asked. " *He* can't wear a dress, but he can eat a duck . . ."

" But Altairian crystal silk . . . For a duck !"

" You've got ducks in your stores, haven't you ?" asked Taylor.

" Yes, but . . ."

" But nothing. Get on the phone right away and tell this Calder character you'll be right out."

" There must be a catch in it," she said.

" And so what ? What if there is ? The Interstellar Transport Commission is poorer to the extent of one duck, ex ship's stores. Or, if you're going to be exceptionally honest, you're poorer by the price of one duck."

" Do they have ducks on this world ?" asked the Doctor.

" I suppose that ducks were included when the planet was stocked with Terran flora and fauna," replied Taylor, " but they may have died out. Come to that, I was here once before, years ago, and we had a consignment of assorted deep frozen poultry in our cargo . . ."

The ship's telephone system was hooked up to the Port Van Diemen exchange. I went to the phone on the inboard bulkhead of the smoking room, dialled the number. The screen lit up, and the face of a middle-aged man appeared, deeply lined features and worried grey eyes beneath almost white hair.

" Calder here," he said.

" I'm the Purser of the cargo liner *Epsilon Draconis*," I told him. " If you'll hang on a minute, our Catering Officer would like to talk to you."

" But there must be a catch in it," Sue was still saying. " I've never seen Altairian crystal silk, but I've heard about it. It's fabulous !"

" Come to the phone !" I called to her. " I've Mr. Calder here waiting for you . . . Mr. Calder, this is Miss Sue Perkins, our Catering Officer. She heard about your proposed swap just now. She has a duck . . ."

" You have a duck ?" Calder's gloomy face brightened in a near smile. " Excellent, Miss Perkins ! If you will bring it out the dress is yours."

The screen went blank.

" But it's crazy," Sue was saying.

" Crazy or not, my girl," said Taylor, " jump right in. Nip down to your stores and get that duck. Pete'll order a taxi for you."

" I'll do that," I said.

While Sue was away we discussed the odd business. Like Sue, we had all of us heard of Altairian crystal silk, and knew vaguely that its price, even on the planet of its origin, put it well out of the financial reach of any spaceman or spacewoman. Ducks, we decided, must be an imported luxury on Van Diemen's Planet. Even so . . .

By the time that Sue had the duck ready the taxi was waiting outside the airlock. Taylor, Kendall and myself put on raincoats over our uniforms and accompanied Sue. It was a vile night, a bitter wind was blowing and had the rain been one degree colder it would have been hail. In the short walk from ship to helicopter our shoes and the lower part of our legs were soaked.

It was warm in the little cabin of the helicopter, for which we were grateful. We told the pilot our destination, watched through the streaming windows as the bright lights of the spaceport and the tall, gleaming shape of the ship fell away beneath us. Ahead of us were the sparse, dim lights of the city.

It was a short flight. It seemed that we were scarcely airborne before we dropped to a jolting landing on the wide, tree-lined road. We paid the driver, clambered out into the rain and walked to the tall, dark house that stood well back from the thoroughfare. The trees that had made landing any closer impossible creaked and rasped dismally in the wind.

The door opened before we could ring the bell. A man stood there, silhouetted against the light behind him. I recognised his voice as Calder's when he asked us to come in. Hospitably, he helped us to remove our wet outer clothing,

ushered us into a cosy lounge room warmed by that old-fashioned luxury, a blazing log fire. He saw to it that we were all comfortably seated, poured us drinks of the locally made, quite palatable whisky.

He sat back in his chair, his glass in his hand, looking us over.

"Miss Perkins I have met," he said, "even though it was only over the telephone. And you, sir," he went on, nodding to me. "Might I have the pleasure of being introduced to the other gentlemen? And might I have the pleasure of your name, sir?"

"Wilkins," I told him. "Purser. And this is Mr. Taylor, our Chief Officer . . . And Mr. Kendall, our Chief Reaction Engineer."

"I suppose you're wondering what all this is about," said Calder.

"Here is your duck," said Sue, offering him the parcel.

"Oh, yes. The duck. I knew, of course, that the only likely place to find a duck would be aboard a visiting space-ship . . ."

"Mr. Calder," Sue said. "I know that no duck could possibly be worth even six inches of Altairian crystal silk. Even so, we answered your advertisement in good faith. We left our ship and came here, at some inconvenience and discomfort to ourselves . . ."

"Oh, yes," murmured Calder. "The dress. You shall have it, my dear."

Taylor, who had ambitions as far as Sue was concerned, glared his disapproval of the endearment.

"You still haven't told us what all this is about," he said.

"You know," replied Calder. "I advertised an Altairian crystal silk dress, and I named my price. It is my desire that the dress, once it leaves my possession, be taken from this planet. I could have sold it locally—and at a price far in excess of what Miss Perkins is paying. Put it this way—once I part from it I want never to see it again."

"Sentimental reasons?" I asked.

"That's as good a way of putting it as any."

Sue got to her feet.

"You can keep the duck, Mr. Calder," she said, "but I'll not be wanting the dress. I'm not a . . . a grave robber."

"But you won't be, Miss Perkins," said Calder. "So far as I know, my wife is in the best of health."

"She left you," said Kendall.

"Yes," said our host flatly, "she left me. I don't know where she is, and I don't care. I've been getting rid of everything that could remind me of her. Most of her clothing I burned—but the crystal silk I could not burn. As you may know, it is virtually indestructable . . ."

"You could have weighted it," suggested Kendall, "and thrown it into the sea."

"I did," said Calder. "They're honest people, here on Van Diemen's Planet. The thing was washed up on one of the beaches, and the finder, knowing that it was the only Altairian crystal silk in the world—my wife was a well-known public entertainer—brought it straight to me."

"Fantastic," commented Taylor.

"I don't want it now," said Sue.

"You can try it on," Calder told her. "It's on the bed, in what used to be *her* bedroom. I'll show you the way."

"All right," she said suddenly. "I'll try it on."

The three of us had no time to discuss matters while Calder was absent, he was back in a very short time. We made desultory conversation until Sue's return—and the conversation died suddenly.

She was wearing the dress.

In uniform she was a handsome enough girl, with her weight well enough distributed, and that was all. In the dress she was . . . She was . . . How shall I put it? The crystal silk is not showy stuff; it's white, shining with a subdued lustre in the right light, but could be, superficially, no more than one of the two dozen or so Terran synthetic fabrics. But—and this is the 'but' that makes it so fabulously expensive—it will do things for the right woman. It brings out, somehow, the full richness of hair colouring and texture, the full beauty of eyes and lips and complexion. It accentuates those lines of the figure that should be accentuated and suppresses—no, that's not quite the right word, but it will have to do—those that should be suppressed. The Sue we had known was, as I have said, a handsome enough girl—this new Sue could have given Helen of Troy points and a beating.

"Mr. Calder," she said, "are you sure that you were serious when you advertised."

I don't know how that dress did things to her voice—but it did.

"Perfectly serious," said Calder.

"Then I'll take it," she said. "I'll take the dress."

"You must," he told her. "It likes you."

"What do you mean?" asked Taylor.

"Just that, Mr. Taylor. The crystal silk is, somehow, alive—although not, of course, life as we know it. If it didn't like Miss Perkins she might just as well wear white calico as it. But it does like her . . ."

"Something like pearls back on Earth," said Kendall.

"What do you mean?" asked Calder.

"Pearls," Kendall told him, "are stones secreted by a mollusc called the oyster, prized as jewellry. On some people they go sick and lose their lustre. Other people can wear them, and they regain their health."

"Merely a matter of the chemical composition of the perspiration of the wearer," said Taylor.

"All very interesting," said Calder, in a tone that implied that it wasn't. "We do have oysters on this world, you know. And pearls, although I've never heard of a sick one. But I am sure that you people would like to be getting back to your ship. Shall I call you a taxi?"

"Thanks," I said.

"Changing, Sue?" asked Taylor.

"No, Bill. I'll just nip back to the bedroom to make a bundle of my uniform, but I'll wear the dress back to the ship. The others will want to see it."

Calder gave us a last drink while we were waiting for the cab, then showed us to the door. It was still raining outside, still cold, but Sue informed us that the dress, *the* dress, was keeping her delightfully warm and snug. This much I do know, it made her uniform raincoat look, somehow, like something straight from Paris or New York.

The next leg of our voyage was a long one—from Van Diemen's Planet to Nova Caledon, all of six weeks in Deep Space. Luckily we had one event to break the monotony in mid passage—Sue's birthday. We were all of us looking forward to it, all of us having either made surreptitious purchases of presents for the girl or, as was the case of those with the necessary skill and equipment, such as the Interstellar Drive and Reaction Engineers, manufactured them with our own fair hands. The Surgeon, proving that he was not such a poor Bio-Chemist and ship's gardener as the Mate was

always alleging, had managed to persuade his hydroponics tanks to produce a huge bouquet of red roses.

On the big day itself Sue was debarred from her storerooms and galley, whilst various officers demonstrated their culinery skill. The Third Mate and myself turned out a not too bad breakfast, and the Psionic Radio Officer joined forces with his traditional enemy, the Radio Officer, to produce lunch. The Mate baked a huge birthday cake, and the two Chief Engineers, aided by a couple of the cadets, coped with dinner, the main course of which—not counting the cake—was to be roast duck.

It was a special occasion, and we were all making the most of it. Sue—after all, it was her birthday—decided to make the most of it too, and asked the Old Man if she could wear the dress, *the* dress, to dinner instead of uniform. The Old Man, of course, gave his permission.

I was in my cabin, which was next to Sue's, getting dressed for dinner when I heard her cry out. I could tell that there was something very much wrong, ran straight out into the alley-way and into her room without the formality of knocking.

She was sitting huddled on her bunk, clad only in her underthings. Scattered on the bed cover and on the deck were fragments of what looked like a white, papery ash. She raised her tear-stained face from her hands, saw me standing there and said, in a dull voice. "The dress . . ."

"What about it?" I asked stupidly.

A drooping hand indicated the scattering of ashes.

"I got it out of my wardrobe," she said. "I was putting it on. And . . . Oh, it felt wrong to my touch. I should have known. It felt . . . dead. It *is* dead."

And that was that. Sue's birthday ruined, and the fabulous dress no more than a memory. It was not until we got to Nova Caledon that the pieces of the puzzle began to fall into place. It was not until we had access to the reference books held by a large library that we were able to dope out what had happened—and why.

We read about the Altairian crystal silk, and its strange near-life. We read about the way in which it flatters a wearer whom it likes. We read too, that when it is exported from its planet of origin it is shipped in lead-lined containers—it is far more sensitive to the radiations of Deep Space than any organic life form.

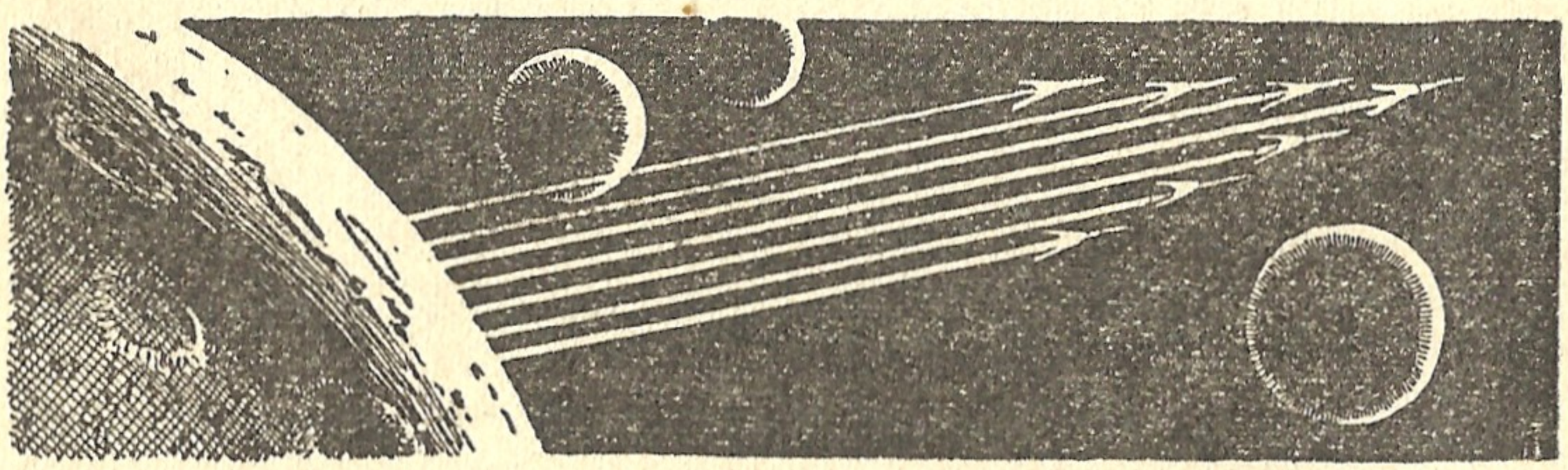
He must have hated his wife, must Calder. He must have hated even the clothes she wore. He must have hated with an especial hatred the dress that must have been her favourite, the dress that almost became part of her.

The Swap Shop gave him his chance. The Swap Shop made it possible for him to send that piece of crystal silk into an environment where, with the correct precautionary measures not taken, it must surely perish. The Swap Shop made it possible for him, too, to revenge himself in some measure on the entire female sex, as represented by our Sue.

Yes, he got the best of the swap.

Revenge, and a prime duck, in exchange for a handful of ashes.

Bertram Chandler



One of the most fascinating aspects in astronomy is the study of stars that have gone 'nova'—become unstable and literally blown up. There is little chance of such an event taking place within the immediate vicinity of our own Solar System, so our astronomers must be content with studying distant phenomena. It is a most complex jigsaw puzzle, but some interesting clues have been found right here on earth.

CRABS AND CALIFORNIUM

By John Newman

Offered the chance of a holiday via a time machine, most astronomers would choose to take their temporal leave in the month of July, 1054 A.D.—provided that they could take their instruments with them.

For, on the 4th of July of that year, the light from the greatest stellar explosion ever to be seen so far by mankind reached the Earth. Continuing for three weeks, a once insignificant little star blazed its destruction across the daytime sky, challenging the Sun as the prime giver of light.

Japanese and Chinese astrologers were much concerned over the new bright star, and made notes and drew sky maps accurately enough for us to pinpoint exactly where the star lay. Yet, forming one of the enigmas of history, in all the surviving manuscripts from Mediaeval Europe there is not one mention of this strange and ominous light in the sky.

With all their wealth of giant instruments, modern astronomers have never had a close-up view of such a Class-1 super-

nova. Our circumscribed knowledge of them comes from their detection in other galaxies, their brilliance weakened by the millions of light years of inter-galactic space traversed before their light is trapped in spectroscopes.

Just one Class-1 supernova close at hand could advance the ideas of astronomy by a hundred years. In that one frightful outpouring of energy, a supernova bares its interior to our curious gaze and prying, light-analysing instruments.

Cosmology would benefit from accurate knowledge of what atoms are poured into space, nuclear physics from information on atomic nuclei at ultra-high temperatures and the effects of magnetic fields on the emitted high-speed particles, astronomers would like to compare before and after photographs of the spectre from a nova star, and theoretical physicists would be highly interested in the close study of the cosmic synchroton that results from a supernova.

But, alas for these sciences if not for any possible inhabitants of possible planets, there is little chance of a supernova occurring in our backyard. We must continue to study the examples we have. Almost a millenium later, astronomers are still salvaging information from the remnants of the 1054 A.D. explosion which, even now, has not settled down to a peaceful old age.

At the place in our Galaxy where this stellar catastrophe occurred there is a strange cloud of gas six light years in diameter. This is the famous Crab Nebula, still driving outwards at 680 miles a second, and no cloud in the Milky Way has provided so many puzzles. There is only one other cloud known in the Universe comparable in shape and structure. At the heart of the Crab lies a double star and one component is believed to be the core of the exploded star.

From the Crab pours forth a strange mixture of radiation and particles. It is the strongest source of radio waves in the sky, their energy being greater than the visible light. And even this visible light is peculiar.

Most of the light in the Universe comes from hot atoms, each type of atom radiating at fixed wavelengths that show up as lines in spectra. As the greater part of the Universe is built up of hydrogen and helium, their lines predominate in starlight. Sure enough, much of the Crab light consists of hydrogen and helium lines. But when this is filtered out the remaining light contains no special wavelengths. It is con-

tinuous radiation and photographs of the Crab Nebula through filters show that there is a nebulous haze due to this radiation.

The only similar light in the Universe comes from near the centre of a distant galaxy where a cloud of gas one thousand times the size of the Crab emits both continuous light and radio waves. If this is also a supernova, the explosion must have been of stupendous supra-galactic proportions of a star with 100,000 times the mass of our Sun and at its peak of brilliance pouring out as much light as a whole family of galaxies, for even the smaller, known supernova outshine the combined stars of a galaxy for a short time.

The only reasonable idea so far advanced to account for this strange light is that it comes from a different source entirely. It has been suggested that it comes from electrons being forced into curved paths by magnetic fields—in exactly the same way as modern particles-accelerators such as the synchroton operate. Low speed electrons generate radio waves whilst high speed electrons emit light.

Recently, this theory was strengthened by the discovery by astronomers of the U.S.S.R. that the continuous light from the Crab was polarised, light from different parts of the nebula vibrating only in special planes. As the synchroton light is polarised at right angles to the magnetic field creating it, measurement of the polarisation of light from different places in the Crab enables an accurate map of the magnetic fields to be built up.

For the synchroton theory to hold good, there must be a source of high speed electrons, and this source is believed to be the star remnant at the centre. Still ferociously active, four times a year a ripple of light moves out through the nebula, expanding as a shell at a tenth of the speed of light. These bursts can only be surges of electrons from the super-nova's core.

Whilst we can recognise the after effects of a supernova easily enough, we have no way of telling beforehand if a star is about to explode. Nor do we have a first class theory to explain why it should explode. Astronomers agree only that the energy must come from a nuclear reaction.

A reasonable explanation recently proposed is that the internal temperature and composition of a star reach a critical stage, when it begins to synthesise unstable elements. The resulting energy emission is explosive at first ; but, after

100 days, it has been found that Class-1 supernova decrease in brightness in a strictly mathematical manner, halving their output of energy every 55 days. This is exactly the same fashion in which radio-active materials decay ; the corresponding time period being the half-life of a known element.

The one element with a half-life of 55-days that could cause this effect is californium-254. It would require only one twenty thousandth part of the mass of our Sun to be converted into californium to agree with estimates of the energy of supernovae. This amount, in effect, constitutes a supernova.

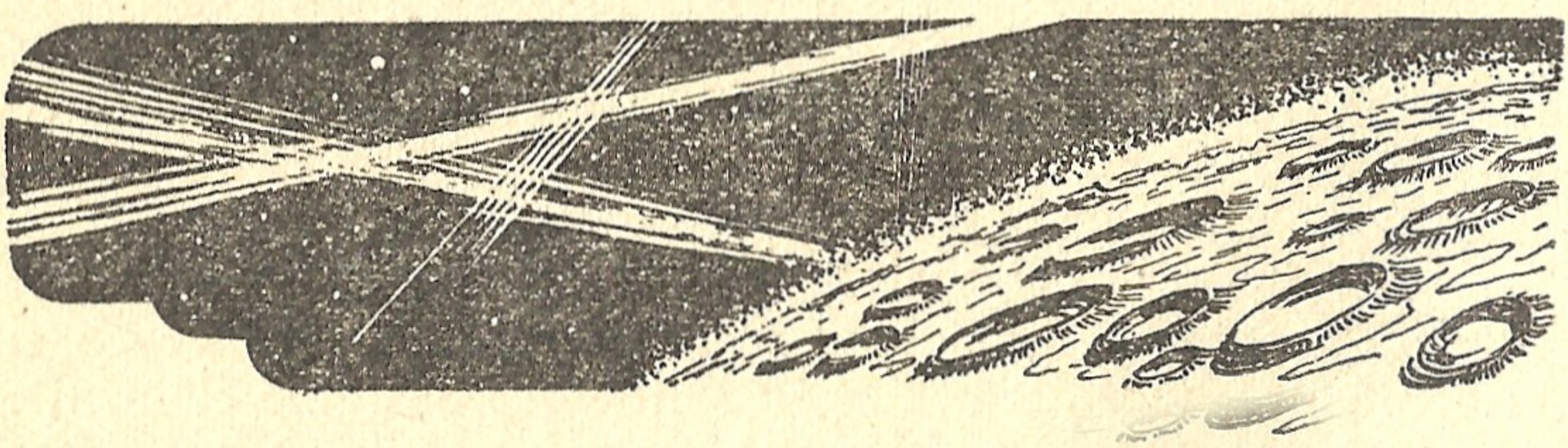
It is also known that at very high temperatures a process of nuclear synthesis can take place by the absorbtion of neutrons by nuclei—the basis of the modern theories of the origin of the heavy elements—and californium was detected in the debris from the 1952 thermonuclear explosion at Bikini.

Because californium disintegrates by fission, a relatively small mass, a mass small by stellar standards that is, can liberate star smashing power.

But all this lavish outpouring of energy is not completely wasted. From the atoms synthesised in pre-nova and nova stars and spewed into space come the elements from which our Solar System and the myriad other systems that are certainly plentiful in the Galaxy were created.

When a novaed star flames in the sky, there is not in this frightful thermonuclear holocaust just the death of a star but the conception pangs of new material from which future stars and planets will one day be born.

John Newman



Brian Aldiss can always be expected to produce something novel in the way of an idea, be it brief herewith, or lengthy. Regarding the latter, Faber & Faber will be publishing his first book-length novel Non-Stop *next spring; based partly on the novelette of that name which appeared in* Science Fantasy *No. 17, it has so many additional ideas packed into it that there is very little resemblance to the original story.*

THE ICE MASS COMETH

By Brian W. Aldiss

My bags are packed, my family issued with iron rations. We have acquired an ex-W.D. amphibious vehicle and bought shotguns in St. Ebbes. We are all fixed up with fuel and penicillin and filter-tipped cigarettes. In short, one crack out of that ice and we take to the hills or oceans, as the case may be. What beats me is the way the rest of you are managing to keep so calm, so unprepared, so British. You are flirting with death, don't you realise?

Or did you just not read about the ice in the papers? Truth to tell, I nearly did not. Newspaper men are an odd lot: they have the worst, most exciting news since Suez and then they hide it on a back page. So if you missed it—I don't want to worry you, but I think you ought to know. We are a continent short.

To be frank, friends, the Antarctic has gone. This great land mass, to which we have so long been accustomed, is no longer with us. There it was, something solid and substantial, something like pay day, which we rely on and take for granted: till now. Now it is no more. And who did this thing? It was the Russians.

Yet no questions are being asked about it in Parliament, nobody is up and fighting mad in the U.N., even Cuba is not protesting, Nehru is keeping quiet. To my way of thinking, there is only one answer to this crazy state of affairs: everyone is too blinded by science to dare to say a word. Except me. I'm saying 900 words here, and much good may it do me.

Here are the facts. Under the auspices of the International Geophysical Year, some Russians, heavily disguised as a glaciological expedition, have been poking about with the South Polar ice. They have discovered that there is no land underneath it; the whole thing is a monstrous fraud. Then this Professor G. A. Avsyuk, who is described as Head of Soviet Glaciological Researches, declares—presumably to cover himself—that there was land there once, but that it has been pushed down under the earth's crust.

There you have it: I haven't minced matters. Consider this: there may be twice as much ice on the globe as we previously thought. Now consider this: the Antractic is just a big iceberg. Rub these two considerations together. It is the only way to keep warm. You cannot convince me that the matter is going to be allowed to rest there. Look at it this way.

This ice could be towed. It just needs a couple of resourceful Russian destroyers and some strong towline; in January, when the South East trades are blowing, you could slip that great chunk into the Benguela Current as easily as anything, and before we knew where we were, bingo, there it would be, jammed from one side of the North Atlantic to the other.

Shipping would be finished. Air travel would fare little better; blizzard, fog, polar conditions, would see to that. And in all the atmospheric turmoil which would follow, radio would be equally a dead loss. No, your only contact with the New World will be by the New York-Penzance Sledge Service. If I were you, I'd start getting my mink out of mothballs.

I have already been in contact with the Government to ask them how they intend to cope with the catastrophe. They assure me that H-bombs will be dropped and the bank rate raised again. But a lot of bombs will have to be dropped to disperse that ice. It is anything up to two miles thick in places; the most shattering bank rate will hardly shatter that ! And maybe *you* can suggest what we are going to do with

that terrific volume of water when the ice is melted. We cannot all live on the top of Snowdon.

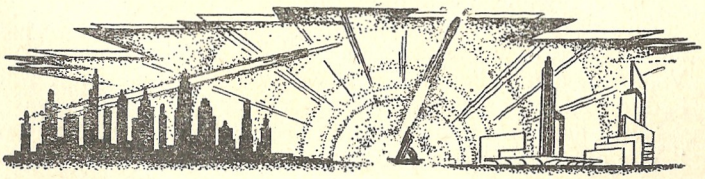
As I say, my family is already prepared for every eventuality. We have stockpiled more frostbite and anti-drowning lotion that you can shake a hot water bottle at. All the same, I am not optimistic; things are going to be worse before they are better and pretty bad before they are worse. It seems to me the only true hope for us British is for a party of native (and therefore presumably friendly) glaciologists to do a really thorough investigation of this island. Perhaps the foundations have gone here, too. Perhaps we can float away as the Antarctic floats up. There is room in the Med if Cyprus does not object to us next door.

The world will never be the same again; in fact, I have already cashed my National Savings. The movement of this ocean-wide raft of ice is going to affect not only the earth's tilt but its axial revolution. I can see it all: Hudson's Bay is the Carribbean of tomorrow; spring in future will be at 3 a.m. every alternate Sunday morning. British Boxing will also suffer a grave blow.

You think you have now heard the worst? Not by half! This Antarctic business, terrible though it is, is only the very first result of the researches of the International Geophysical Year. Now you see what we have let ourselves in for; as it says at the end of most science fiction films, ' There are secrets in Nature with which Man was never intended to Meddle.'

To the hills, men !—And don't forget your swimming trunks and balaclavas.

Brian W. Aldiss



CRITICAL THRESHOLD

It is now possible to predict that the first landing on Mars will not be many years away—but man will need to take an Earth-type environment with him if he hopes to survive upon arrival. The atmosphere on the Red Planet is going to be the critical factor that will decide whether human beings can remain there or not.

By Robert Silverberg

I.

The interplanetary ferry *Bernadotte* quivered in space and began the long, slow turnover motion that was bringing it inexorably closer to the cold, slumbering, oxidized wastes of Mars. Aboard the ship, UN man Michael Aherne, making his first trip to the red planet, stared anxiously through the rear viewer, searching for some sign of life.

There was none. The Dome that housed the Mars Colony was not in sight, and all Aherne could see was the bleak, barren sand. He was nervous—as, indeed, a spy whose ostensibly secret mission was known openly to everyone should be. He had been pitchforked into a nasty job, and he knew a stern test lay ahead of him.

Aherne heard a noise somewhere in the back of the cabin, and whirled to see the captain of the little vessel enter—Juri Valoinen, a tall, balding, annoyingly bantersome Finn who had logged more hours in space than any other living man.

"Just another hundred minutes or so," Valoinen told him. "You ought to be able to see our dome pretty soon—we'll be

coming down right next to it, practically. I'm always afraid we're going to land right *on* it one of these days, and that'll shoot the UN budget completely to blazes."

Aherne forced himself to grin, and turned away from the viewer to walk toward the captain. Aherne was a man of middle height, stocky, sandy-haired; as Special Attache-at-Large for the United Nations, he had been on a number of far-flung investigations, but this was about as far as he had ever been flung in the name of the UN—forty million miles, across the gulf of space—to spy on the Mars Colony. *Spy*.

Some spy, he thought bitterly.

He looked at his watch. They were right on schedule.

"They know I'm coming, don't they?" Aherne asked, voicing his fears.

The Finn nodded, smiling knowingly. "Indeed they do. And what's more, they know *why* you're coming. I don't doubt they'll have the plush carpet rolled out for you for sure. They're going to want to make a good impression on you."

"That's what I was afraid of," said Aherne. "I'd have preferred to go among them cold and take a look around. That way my report would be genuine."

"Who needs genuine reports?" Voloinen demanded sardonically. "My friend, it's time you learned that our organization thrives on misconception and blunder. Facts are its deadly enemies."

Instantly Aherne's face darkened. "Let's not be flippant, Valoinen. The UN is responsible for a good many things we ought to be thankful for—including the preservation of your own insignificant country," he snapped. "Not to mention the handsome salary you get for ferrying this boat back and forth between Mars and Earth."

The space captain backed off, holding up a hand to check the flow of Aherne's anger. "Take it easy, son. I think it's a wonderful organization too. But I'm old enough not to take it as seriously as all that."

"Well, maybe when you're even a little older you'll learn that the UN *has* to be taken seriously," Aherne grunted, and turned his attention back to the viewer. He narrowed his eyes, staring into the blackness at the dim, coppery globe half-visible below.

After a moment he turned once again; Valoinen was still standing behind him, arms folded, thin lips twisted in a wry grin. "Well?"

"I think I see the Dome," Aherne said.

"I congratulate you."

"No, don't joke." Aherne frowned, glanced back for a moment to verify what he had seen, and scratched his head. "But—why are there *two* domes? There seems to be another one, about ten miles from the first. How come? I'm sure the UN only built one."

Valoinen showed white, even teeth in a derisive smile. "Exactly right, my friend. Only one of those is the UN dome."

"But the other?"

"You'll find out soon enough. I don't want to—ah—prejudice you. I want your report to be—ah—*genuine*." He spun on his heels and moved toward the door. "And now, if you'll excuse me."

The bulkhead door clanged closed, and Aherne was left alone—staring out in bewilderment at the twin domes.

"Put the gyroscopes over there," Valoinen ordered, and three members of his crew hove to, dragging the crates to the designated spot.

"There—that finishes it," the captain said. The cargo crates were arranged in a neat semicircle outside the ship, awaiting pickup. Valoinen glanced over at Aherne, who was standing idly to one side. Aherne was feeling exceedingly uncomfortable, partly because he was bundled up in the unfamiliar bulkiness of a spacesuit and partly because he had had nothing at all to do during the unloading.

"You all right, Aherne?"

The UN man nodded, moving the helmet of his suit stiffly up and down. "Just fine," he said. The portable air generator was a dead weight hanging down his back, seemingly at the point of ripping his deltoid muscles out bodily. He felt anything but fine, though he had no intention of telling the captain that.

"They'll be here to get you any minute," said Valoinen. "I've radioed the colony that there's a cargo pickup, and they're sending a fleet of sand-crawlers out. They said they're very anxious to meet you."

Aherne tensed. It was going to be a difficult, tricky mission. Sent here to determine if the tremendous expense necessary for continuance of the Mars Colony was justified by the results produced so far, Aherne was going to have to remain

dispassionate, aloof to the very last. He was here to pass a sentence of life or death on the Colony.

The UN would rely on his report. They always did. Aherne had proved his impartiality time and again. He knew just one loyalty: to the corporate, many-headed creature known as the United Nations. A second generation UN man, Aherne was the ideal observer.

But yet he hoped the colonists wouldn't make his task any more difficult than it already was. Aherne recognized the fact that he had a considerable natural sympathy for the Martian pioneers, a personal desire to see the Colony continue and prosper. It was part of his deepest body of beliefs that man should go out, conquer the other planets.

Still—if the Colony were inefficient, badly directed, poorly designed, it would be Aherne's duty to report it. If the Colony were barely clinging to survival, if further progress seemed completely out of the question, Aherne would have to say that, too—and, saying so, kill the Colony.

He hoped the colonists would not play on his sympathies and urge him to whitewash any of their deficiencies; it would set up a painful inner conflict in him. He could not falsify his report—but he was anxious to see the Colony survive.

And a man like Aherne—monolithic, unswervingly loyal, firm in his beliefs—would fall apart completely in a situation of immediate inner stress of that sort. Aherne knew that—and, as the low-slung fleet of sandcrawlers purred along the desert toward him, he felt a tiny pulse of fear starting to thud in his chest.

He watched the steady approach of the crawlers. The air was cold and clear—his suit-thermometer, embedded in the heel of his left glove, showed a comparatively mild temperature of Minus Twenty-two Centigrade, and the external-pressure needle was wavering at about six pounds per square inch; internal pressure, he noted reassuringly, was maintained at a comfortable sea-level fourteen pounds.

Valoinen and his men were sitting on the unpacked crates, waiting patiently. Aherne walked over to join them.

"The Dome's out that way," Valoinen told him, pointing in the direction from which the crawlers were coming. An upthrust, jagged range of dark mountains cut off vision about four miles in the distance. "Behind those hills," Valoinen said. "The Dome's right back there."

" And the other one ?"

" That's a little further on," said Valoinen.

They fell silent—Aherne felt unwilling to prod for information about the second dome—and waited for the colonists to arrive. The sun, a sickly, pale green object, was high overhead, and the tailstanding *Bernadotte* cast a long, straggling shadow over the levelled, heat-fused sand of the landing clearing.

The crawlers were getting larger now, and Aherne could make them out clearly. They were long, ground-hugging vehicles with caterpillar treads spread out over a lengthwise grid, with room for a couple of passengers in a plastic bubble up front, and a cargo hold aft. There were six of them, rocking gently from side to side as they undulated through the shifting red sand.

Aherne could hear the grating, feathery sound of their treads sliding over the sand toward him. At length, the convoy breasted the final dune and pulled up in front of the *Bernadotte*.

A figure dropped lightly from the leading crawler and trotted toward them. Aherne could just barely see the man's face behind his helmet, blonde hair swept back over a high forehead and piercing blue eyes. His body, concealed by the spacesuit, seemed long and rangy.

" I'm Sully Roberts," he announced. " Hello, Skipper."

" Here's your cargo, Sully," Valoinen stretched forth his arm in an expansive gesture. " You'll find it all recorded on these invoices as usual."

Roberts reached out and took the sheaf of invoices, carefully avoiding looking at Aherne. The colonist riffled quickly through them.

" Hmm. Well, at least the externals match. I can't guarantee that you've actually got gyros in those boxes, and not toy teddy bears, but it won't do to open 'em now, I guess."

" Don't you trust me ?" Valoinen asked sharply.

" Of course," said Roberts. " But this is the UN's money we're spending, and we don't want to waste any of it. We have to be very careful with our appropriation, of course."

" Of course," said the captain lightly.

That was for my benefit, Aherne thought. *They're so terribly anxious to show me what good little boys they are.*

" Oh," Valoinen said. " Silly of me—I clean forgot to introduce you. Sully, this is Michael Aherne of the United Nations. He's come to stay with you for a while."

Roberts took a couple of steps forward and shook Aherne's hand. " How d'ye do ! I'm Sullivan Roberts, District Overchief for the Colony. I'm very glad to meet you, Mr. Aherne, and I hope to be seeing a lot of you while you're here."

" Glad to meet you, Roberts," Aherne replied. He was determined to remain detached at all costs.

Roberts waved an arm and his men dismounted from their crawlers. Assisted by Valoinen's crew, they quickly loaded the crates into the cargo holds.

" You can ride with me, Mr. Aherne," Roberts said.

" Fine." Aherne clambered up into the fore bubble of the sandcrawler, and Roberts got in beside him. Slowly, without any perceptible gradation between motionless and motion, the crawler began to move.

Aherne saw Valoinen grin and wave as he pulled out. Then, as the crawler started to surmount the hill, Valoinen climbed the catwalk of the *Bernadotte* and disappeared inside. His men followed, carrying the mail pouches from the Mars Colony, and the lock of the small space ship slowly closed.

Aherne was on his own now, with no contacts with Earth. He was here, and he had a job to do.

II

The shining surface of the Dome loomed up before them like a yellow bubble extruded from the desert. Within the gleaming, high-arched curve of plastic, Aherne could make out a dim but busy world of buildings and people. The Dome rose to a peak height of nearly five hundred feet. Within, the artificial atmosphere was warm and breathable; outside, the cold, nitrogenous air of Mars offered little to Terran lungs.

" We go in this way," Roberts said, pointing to an airlock at the base of the Dome. The lock opened at the approach of the sandcrawler, and they rode in. The other crawlers followed and the lock swung slowly shut behind the last one. Air came hissing in.

At Robert's signal, Aherne got down from the cab of the crawler and stretched his legs. The journey across the sand had been slow and racking. The crawler had spun through the desert like a refactory camel, and Aherne found himself woozy at the end of the ride. Still, he admitted. it was the only efficient way of covering that sort of terrain.

He saw busy, efficient-looking men bustling around the crawlers, unpacking the cargo holds, carrying the crates through the lock inside. Following Roberts, Aherne moved through the inner door.

Mars Colony was spread out before him.

Aherne felt a warm sensation of pride, of admiration, run through him, but he squelched it. It was a forbidden emotion; much as he admired the hardy men and women who had erected this dome and built a city on inhospitable Mars, he was there as their judge now, and would have to put those feelings aside.

"There's a committee waiting to see you," Roberts said. "We've been looking forward to your visit ever since we found out you were coming."

"Lead on," Aherne told him.

The committee that was waiting was assembled in a squat, unfancy corrugated-steel hut located at a crossroad near the centre of the Colony. Most of the buildings, Aherne noticed were constructed of this cheap, unattractive material. The accent was on economy in Mars Colony, not esthetic appeal.

The committee consisted of six. Sully Roberts introduced them hurriedly.

There were three District Overchiefs, and Roberts was the fourth. Aherne shook hands with them in turn—Martelli from the North Quadrant, Richardson from the East, Fournier from the West. Roberts represented the Southern sector of the Colony. Judging from their names and physical appearance, Aherne concluded that they each represented, not only a geographical district of the Colony, but one of the major population blocs as well. For the Colony, despite all talk of assimilation, was very much the product of a group of loosely federated nations rather than of a unified world. Each country, clinging to the last remnants of its sovereignty, had insisted on representation in the Colony, and so Mars was populated by a curious racial hodgepodge which only the passage of time and the succession of generations would efface.

If, Aherne thought, there *were* any succeeding generations on Mars.

The fifth member of the committee was Dr. Raymond Carter, General Co-ordinator of the Colony—a forty-ish, bespectacled man whose name had been in the headlines often before the Colony had actually been planted, five years before.

He had been the guiding spirit in the long crusade to build the Colony on Mars.

The sixth was Katherine Greer, introduced as a delegate-at-large, chosen by popular vote of the colonists to serve on the welcoming committee. She was a young, slender girl in her middle twenties.

"Well, Mr. Aherne," Carter said—and the tone of his voice was unmistakable—"what do you think of the progress we've made?"

Aherne paced edgily up and back in the little room, darting nervous glances at the six colonists who hung, poised, on every word.

"I'd prefer to reserve judgment on such a sweeping statement, Dr. Carter. After all, it's to determine the extent of your progress that I'm here—and I'd rather not be required to state my final conclusions ten minutes after my arrival."

"Of course not," Carter said, apologizing hastily. "I didn't mean to imply—"

"Don't worry about it," Aherne said. He was surprised and relieved to find that these people were, if possible, even more tense than he. They were desperately anxious to make a good impression on him.

"We've arranged for your quarters to be set up in my district," said Richardson, the East District Overchief. Richardson was a slim, lithe Negro whose precise British accent hinted at a West Indian ancestry.

"Fine," Aherne said.

"I suppose you'd like to rest for a while now," Dr. Carter continued. "You must have had a long, trying trip."

"Excellent idea. I am pretty beat."

"Mr. Richardson will conduct you to your quarters, and your meals will be taken care of. We've made considerable strides in developing synthetics—until the Martian soil is sufficiently re-nitrogenized to be capable of harbouring vegetables, of course."

"Of course," Aherne said wearily. He foresaw several weeks of uneasy verbal fencing, and decided that the eagerness of these colonists to impress him was going to become tiring.

"After you've rested," Carter said, "we've scheduled a tour of the Colony for you. Miss Greer has been assigned to you as your guide."

He glanced at Miss Greer. She was dressed in the utilitarian, unattractive singleton tunic that all the Colonists

seemed to adopt, but her face was bright-eyed and interesting, and beneath the shapeless garment Aherne's critical eye detected what probably was a much more than passable figure.

He felt himself relax. This survey trip wasn't going to be as much of an ordeal for his conscience as he had been expecting.

His room was comfortable, if hardly luxurious, and he made himself at home immediately. He noticed several Colony tunics hanging in the clothes-closet, and he stripped his rumpled business-suit off and slid easily into one of the soft, clinging uniforms.

And then, just as he was beginning to loosen, to wriggle out of the tensions that had gripped him since the Security Council had given him the assignment, he remembered the Other Dome.

What was it? Who had built it? Everyone connected with the Colony here carefully avoided all mention of it, as if it were something shameful, something to hide from sight.

Aherne knew that he'd have to find out all the details before he committed himself on any final decision about Mars Colony. No matter how promising the Colony seemed, and no matter how many Miss Greers they threw in his way, he'd have to be in control of every information-factor before he could allow himself to file his report.

The Colonists had given him a pleasant room, with a soft-looking bed and attractive furnishings. There was a book-case, in which half a dozen scarlet-bound volumes leaned at an angle against one wall, and when he drew the first out he saw it was a novel by a colonist, published there in the Colony.

They don't miss a bet, he thought, feeling another forbidden tingle of pride go through him. It wouldn't be hard to recommend continuation of a colony that showed such enterprise and such drive—provided everything else held up. So far, so good.

Aherne slept soundly that night for the first time in weeks.

He expected the guided tour first thing in the morning—in fact, was positively looking forward to it. And so, when he heard a soft, gentle rapping at his door the next morning, he rolled out of bed and tried to look wide awake. He was almost positive that it was Miss Greer at the door.

He was wrong. He threw the door open and was confronted by a small, swarthy, almost copper-coloured man, with deep-set eyes and jet-black hair.

"Good morning, *senor*," the stranger said blandly.

"Good morning," Aherne replied, somewhat taken aback.

"I have been sent to get you," the small man said. Aherne noticed, as the other stepped into the room, that he had an enormous barrel of a chest—the chest of a six-footer, not a man barely five-two in height. He spoke with a distinct Spanish accent.

"To get me?"

"*Si.* Please come quickly."

Too puzzled to protest, Aherne dressed, washed—the colonial plumbing, he noted, was none too good—and followed the small man out on the street. It was still early in the morning, and few of the colonists were to be seen.

"Where are we going?" Aherne asked.

"With me," the other said noncommittally.

Aherne wondered vaguely just where he was being taken, but decided to follow without argument. It was just possible that he might find out something about the Colony that he might not have known otherwise, had he limited himself to the official guided tour.

He patted the cold butt of the Webley blaster, nestling safely in its shoulder-holster. He could hold his own with that, in case of trouble.

The little man seemed to be in a considerable hurry. He led Aherne speedily through the streets toward the outer edge of the Dome—toward the airlock.

Several of the colonists he passed on his way smiled at him, but no one seemed to want to stop him, to find out where he was going. It was just as well, Aherne thought.

They came to the airlock, and Aherne saw a sandcrawler parked outside. The little man had not said a word during the entire walk.

Now he indicated a rack of spacesuits hanging invitingly at the entrance to the airlock. "Take one," he said. "Put it on."

Obediently, Aherne did so, and his strange guide climbed into one of the smaller suits. Together, they passed through the airlock and outside the Dome.

"We go in this," the other grunted, and got into the sandcrawler. Aherne, suspecting at last where he was being taken,

got in also, and the vehicle rocked smoothly to life and started to undulate away.

The crawler slid through a gap in the hills, and followed a twisting, sharply-banked sand path in the desert. An hour later, they arrived at their destination—the second Dome.

It seemed to be constructed along the lines of the other. Aherne stared around curiously as he and his silent companion went through the by-now familiar process of passing through the airlocks. At last, he was out of his suit, and within the second Dome. It looked much like the first, inside and out.

But after a few steps, Aherne found himself panting for breath, and a few more and he could sense his pulse quickening. There *was* a difference: the air-pressure here was considerably lower than earth-normal. He felt his body gasping to take in the quantity of oxygen to which it was accustomed, and he swallowed hard to relieve the pressure on his eardrums.

As he stood there, reeling slightly from the change in pressure, he saw another, more familiar face approaching. It was another small, swarthy, Spanish-looking man, but this time it was one that Aherne knew well.

" You'll get used to the low pressure soon, Aherne," the newcomer said as he drew near. " We maintain it here for the benefit of our colonists." He extended a box of tablets. " Here," he said. " Aspirin. It'll relieve the reaction a little bit."

Aherne took the box, fumbled out one of the white tablets and swallowed it, dry. He waited a moment while the pounding in his head subsided a little, and then looked at the other.

" I'm in better shape now. I think," he said. " But what are *you* doing here, Echavarra ?"

" You haven't missed me, Aherne ? You haven't noticed that I've not been expounding my crackpot ideas at the United Nations these past three years ?"

" No," Aherne said slowly. " Ever since the defeat of your proposal, I'd assumed you were off doing private research somewhere."

The man addressed as Echavarra grinned broadly. "Exactly right. I *have* been doing private research." He put an arm around Aherne's shoulder. " Come," he said. " Let us go to my home. The pressure is easier to take there."

As they walked into the heart of the colony, Aherne discovered it was populated almost exclusively by the small

swarthy men, none of whom seemed at all bothered by the low pressure. The picture was starting to take shape.

Jose Echavarra had been a storm-centre at the United Nations Headquarters during the days of the hot debate over who should build the Mars Colony, and how, Echavarra, a Peruvian geneticist, had bitterly opposed the American, Carter, who seemed to have the inside track on the coveted UN appropriation.

Carter had favoured building pressurized domes on Mars, in which Earthmen could live in comparative comfort. Echavarra, raging, had declared that this was the wrong way to go about it—that man should adapt himself to fit the planet, not adapt the planet to fit himself.

He put forth as an example Andean miners who had been studied by Peruvian scientists. These miners lived all their lives at altitudes of 10,000 to 15,000 feet above sea-level, where the air was thin and the air-pressure low—and they had *adapted.* They were capable of existing comfortably with a pressure of only eight pounds per square inch. Echavarra had proposed to establish a colony composed of these hardy Peruvians, and gradually to breed them further along the lines they were already heading, until they were capable of living comfortably in the thin air of Mars.

Aherne remembered clearly what had happened. The volatile Dr. Echavarra had spent long hours explaining his plan, and then it had been turned down flat. After all, one delegate remarked, the Echavarra plan meant that only one nation—Peru—could send men to Mars. Other peoples, raised on the customary 14-pounds-per-square-inch pressure air, would be incapable of surviving.

That ended the discussion. Echavarra was rejected firmly, and Raymond Carter had been chosen to head the pioneer expedition that would build the pressure-dome and establish the UN colony, with the colonists, of course, to be chosen from all nations.

Echavarra had disappeared from sight. Now, here he was—complete with his colony of Peruvians, after all. And the air pressure was low, all right. Aherne, weakening, dragged one leg after the other painfully as he followed Echavarra through the streets.

III

"In here," the Peruvian said. Aherne stumbled ahead as he was told, and entered a small, austerely-furnished room whose warm, rich atmosphere struck his lungs with jarring force.

"I like to keep one room at normal pressure," Echavarra explained. "I'm still not completely used to the stuff these Andeans breathe myself, and I like to relax in here from time to time."

Aherne flung himself down on a hammock stretched tautly from wall to wall, and waited for his metabolism to return to normal.

"Whew !" he managed to say after a moment. "I'm not built for these pressure changes."

"You're suffering from anoxia," Echavarra said. "Lack of oxygen. The decreased pressure in this dome makes it harder for your lungs to get oxygen, and the quantity of red cells in your blood increases to compensate. It's rough for a while, but you'll adjust."

Aherne nodded. "I'll say it's rough."

"I'd say you'd passed into the second threshold of anoxia," the Peruvian commented, bustling around nervously. "Which is about what I expected would happen."

"What do you mean ?"

"We grade the levels of oxygen need on three thresholds," Echavarra explained. "The first is the *reaction threshold.* On Earth, it's generally encountered above 6,000 feet altitude. Pulse quickens; capillaries relax, allowing more blood to reach the cells. Some dizziness. And then comes stage two, as you go a little higher—*disturbance threshold.* You were just passing over that level when I got you in here. Characteristics are fuzziness of sight, dulling of the senses, slowness of muscle reaction. You know what it's like. It's unpleasant, but not dangerous."

"I see," said Aherne. He was still recovering his strength, and lay there unmoving. "Is there a third stage ?"

"There is," Echavarra said. "*Critical threshold.* It's encountered when the pressure gets down to about one-half atmosphere. Loss of vision, pounding of heart, nosebleed, loss of muscular co-ordination. blackout of consciousness. Possibly convulsions. The ultimate crisis is death. Men just aren't built to take low pressure. Mars is a critical-threshold area at all times; on Earth, it's generally encountered only

above 16,000 feet—such as in the Peruvian Andes," Echavarra concluded pointedly.

Aherne was feeling much better now. He swung himself to a sitting position and glared sharply at the Peruvian, who was toying with his stiff, black moustache.

" All very interesting, Echavarra, though I suspect you didn't smuggle me out here just to lecture me on high altitude conditions. How about the information I want to hear ?"

Echavarra smiled urbanely. " Just what would you like to know ?"

" First: what are you doing here ? Who financed you ?"

The small man's countenance darkened. " It is a sad story. After my unhappy rejection at the hands of the General Assembly, I travelled from country to country, seeking backers for my project. Finally I raised the necessary minimum, with the generous help of my own countrymen. Naturally we could not work on the scale Dr. Carter did, but we did manage to get together enough cash to transport several hundred Andean families here and build a fair-sized dome."

" Why ?"

The other smiled. " I disagreed with the basic premise of Carter's project, and I wanted a chance to try it my way. My men are already acclimated to one-half atmosphere. They work and play happily in an environment that would kill a normal man. They've been living that way for generations. Genetically, they've been bred to survive in thin-air conditions.

" I'm reducing the pressure in this dome, ever so gradually. They don't notice it—but their bodies adapt to the slight changes. Eventually I hope to get it down to where it approximates that of Mars. I won't be here to see it. It won't be with these people, nor with their children—but somewhere along the line it'll happen. And then—poof ! No more domes !"

" Interesting," said Aherne coldly. " Just why did you pull this little trick this morning and spirit me away, then ?"

The Peruvian spread his dark-skinned hands. " You're here to decide on the fate of the Carter colony, are you not ?"

Aherne nodded. " What if I am ?"

Echavarra brought his bright-eyed, eager face close. Aherne noticed that it was lined with a fine purple network of exploded capillaries. " I brought you here to show you how I'm succeeding with my genetics programme. I want you to vote against Carter—and transfer the appropriation to me !"

Aherne recoiled instantly. "Impossible! The UN has already voted to support Carter. I can't see any reason to countermand their decision. Your work has some curiosity value, I suppose, but we can hardly give serious—"

"Not so fast," Echavarra said. "Don't leap off so blindly. You're here for a while. Take your time; consider the relative merits of the two colonies. See for yourself which one is fitter to work and live on Mars."

Aherne shook his head. "I'm willing to abide by the decision of the General Assembly," he said. "Thanks for the offer, but I think I'd better get back to the UN colony now, Echavarra."

"Stay a little longer," the Peruvian urged.

Aherne started to say no, but suddenly there was a noise of scuffling outside, and the sound of loud, angry shouting. And then the door burst open, and Sully Roberts, wearing a plastic oxygen-mask, strode into the room, half a dozen men behind him.

"You'll pay for this, Echavarra!" Roberts snapped angrily. His men formed a ring around Aherne; in the background, Aherne could see two or three puzzled-looking Peruvians standing on tiptoe trying to see into the room.

"What do you mean, Mr. Roberts?"

"I mean you've kidnapped this man!" Roberts turned solicitously to Aherne. "They haven't harmed you at all, have they?"

Aherne shook his head. "No, I've—"

"There seems to be some misunderstanding," Echavarra said mildly. "Mr. Aherne was not *kidnapped*. He came here voluntarily, earlier this morning, to inspect our colony. Is this not correct, Mr. Aherne?"

The UN man saw the faces of the six men from Carter's colony go tense. They were worried now; perhaps Echavarra had succeeded in seducing him over to his side? Aherne decided to remain noncommital for the moment.

"I wouldn't say I was kidnapped," he replied, smiling. "I did, indeed. come here voluntarily."

"You see?" Echavarra said.

Roberts' face was a mask of anguish and turmoil; apparently Echavarra's intentions were known to all.

"But—"

Roberts was almost in tears, and on a man that size his facial expression was remarkably incongruous.

"I want to assure you that Mr. Aherne has not been harmed," Echavarra said. "And now, if you'll excuse us while we finish our discussion—"

"We're expecting him to take part in some functions at our Dome," Roberts said. "We'd be very disappointed if he remained here with you."

Careful use of the third person in speaking about me, Aherne noted. *They're afraid of seeming to be controlling me.*

"I think they're right, Senor Echavarra," Aherne said. "I do have a responsibility to the Carter Colony at the moment."

"I hope you'll give careful consideration to the matter I mentioned, Mr. Aherne."

"I'll think about it," Aherne promised. It was the diplomatic thing to say. "But as of now, I intend to rely on the earlier decision of the Assembly."

"Very well," Echavarra said, half-frowning and bowing politely. "But I do hope to see you again before you leave Mars—and perhaps you'll have changed your mind."

"Perhaps," Aherne said. He turned to Roberts. "I think it's time to go back now," he said.

When they were outside, walking briskly through the thin air of the Peruvian colony on their way to the airlock, Roberts allowed some of his anxiety to escape.

"We were sure worried there, Mr. Aherne. As soon as we found out you'd been seen leaving the colony in the company of one of these little Indians, we lit out after you."

"How come you were worried?" Aherne asked, trying to be conversational, as they reached the airlock. He flicked off the oxygen mask Roberts had given him, and climbed into a suit as quickly as he could, anxious to avoid a repetition of his previous experience with the low pressure of the Peruvian Dome.

"Well, sir, you didn't leave any message, and we were sure you were kidnapped. Of course, we didn't know you had decided to visit the Peruvians without telling us," Roberts said.

Implied in that, thought Aherne, *is veiled criticism. What he's hinting at is that I had no business running off like that—or that perhaps I really was kidnapped, and won't admit it.*

" Echavarra and I are old acquaintances," Aherne said. " I had a good deal of contact with him in the days before his project was turned down by the UN."

" He's a crackpot, of course," Roberts asserted quickly. The big man boosted Aherne lightly up into the sandcrawler and followed him in. " This idea of breeding people to breathe Martian air can't possibly work, can it ?"

" I'm not so sure of that," said Aherne. He saw the immediate expression of despair reflected on Roberts' open face, and rejoiced just a little in his own wickedness. He was baiting Roberts, taking advantage of the colonist's desperate desire to win Aherne's approval, and while he knew it was unfair it was also a little enjoyable.

After a long silence, during which both men had kept eyes fixed firmly and uncomfortably on the trackless wastes ahead, Roberts said, " You don't mean you'll consider giving them our appropriation, will you ?"

The question was a blunt and direct one. Roberts was obviously not much good at diplomatic indirection, despite his earlier shyness in the encounter with Valoinen over the invoices. Roberts wanted to get straight to the heart of the problem that so disturbed him.

Aherne considered possible answers for a moment or two —and then, seeing no real justification for allowing Roberts to worry over the possibility of an outcome that Aherne himself had already rejected, said, " No of course not. The UN's already voted to support the Carter Colony, and I don't see any reason for bringing Echavarra back into the picture."

Anxious faces greeted him as he clambered through the airlock of the UN Dome and re-entered the colony. He spotted the remaining members of the committee of six, and a handful of other worried-looking colonists.

Dr. Raymond Carter was the first to come up to him. But before anything could be said, Roberts interposed himself and explained where Aherene had been, and why.

" Visiting Echavarra, eh ?" Carter said. " That crank ? Did he have anything interesting to say ? Last I heard, he was working on some plan for making those Indians of his survive on Jupiter—or was it the photosphere of the sun ?"

Aherne smiled at the exaggeration, but ignored the comment. " I'm sorry for the delay," he said. " I felt it was necessary to examine the Peruvian colony as well as yours— as a sort of control to use in judging your own Dome."

Carter eyed him uneasily. "You weren't taken in by Echavarra, were you?"

"No," Aherne said. "At least, I see no reason to reverse the decision of the General Assembly in regard the appropriation." He saw Carter relax visibly, and immediately added, "I do, of course, want to examine your own colony in detail before reaching any decision of your progress and future potentialities."

"Naturally," Carter said uneasily. He turned and gestured to Miss Greer. "You can proceed with your tour of the Colony at once, if you wish. Miss Greer will be happy to accompany you wherever you would like to go."

Carter appeared almost absurdly grateful that Aherne had not deserted to the camp of the Peruvian geneticist. As he walked away toward the heart of the Colony with the voluble Miss Greer, Aherne found himself wishing he could be in a position to be honest with these people—to tell them how much he admired their accomplishments, to tell them how badly he was hoping to be able to put through a positive recommendation for continuation of the colony.

But he had to be sure, first. An emotional identification with these pioneers was dangerous, threatening to undermine his judgment. Aherne knew his appraisal would have to be cold, rational, and remorseless. The outcome was still in doubt, so far as Special Attache Michael Aherne was concerned.

IV

Miss Greer was tall, slim, attractive, and ready to do almost anything to win Aherne's approval. Aherne wondered, in a detached sort of way, just how far that attitude could be carried. He had no serious intentions, of course; UN men on special assignments have various strict prohibitions designed to keep them more efficiently at work.

"You're unmarried?" Aherne asked, wondering why such a handsome girl would have felt any urge to uproot herself from Earth and join the Colony.

She lowered her eyes. "My husband's dead," she said. "I've resumed my maiden name. It's the custom here."

"Oh. Sorry to hear that," Aherne said lamely, as they turned down the long row of low-lying little houses that were situated between the airlock and the school building, which was their first stop.

"He was killed during the building of the Dome," she said. "There were eleven casualties during the time we cast it. He was one of them. I came here because of him—but I'm staying now for myself. I feel I belong here; I have work to do. Doing something important—not just for myself, but for the world."

Aherne grunted something unintelligible; he wanted to keep the discussion away from sentiment, pinned down on a level of fact. "You say there were eleven killed during the building of the Dome?"

She nodded. "A section fell on them. It's the only major accident we've had."

"The Colony has a low hospital record, then?"

"Fairly low. We've had plenty of minor troubles, though. Before we started posting guards at the airlock, we'd have children wandering through and outside the Dome—but we stopped that quick enough. And then we had a spell of ptomaine last year; no deaths, but we were all pretty sick for a while. And there's been a lot of gravity sickness—that's our biggest problem."

"How so?" Aherne asked.

"Well, of course you know the gravity here is only about 40 per cent of Earth's, and it takes a little while to get adjusted to it. Some people had digestion problems—the food wouldn't go down properly. And one problem we haven't licked yet is pregnancy. Women just aren't built to deliver children in less than one-half grav. The muscles can't manage it."

That was one factor Aherne hadn't considered. "But children are born here, aren't they?"

"Oh, yes!" Miss Greer said, her face brightening. "Wait till you see our schoolroom! But it's risky, of course. We've built a small grav chamber in which all our deliveries are made. The problem is to keep a close check on all expecting mothers, and make sure they're within reach of the grav chamber when labour begins. Occasionally someone will premature, and there's no time to get her to the chamber. It's very complicated then."

Aherne nodded. He was noting all these things carefully. Miss Greer, he reflected, was an ideal guide. Not only was she attractive to be with, she was neither as self-conscious nor as tight-lipped as the men seemed to be, and she was revealing all sorts of facts about the Colony that Aherne might never have found out otherwise.

Facts which needed to be evaluated, to be fitted into the problem of, *Is the Mars Colony promising enough to be worth continuing* ?

The schoolroom was a delight. Aherne saw two dozen scrubbed, sprightly youngsters go through drills in arithmetic and spelling with about as much accuracy as could be expected, and then, at dismissal, go tumbling out of the classroom with an appealingly coltish agility. There didn't seem to be an unhappy child in the lot, nor a selfconscious one, nor a homely one. The psychologists who had chosen the colonists for the trip had chosen well.

The children ranged from three to ten years in age, with a big gap in the five-to-seven group. That was easily explainable, of course ; the colony had been planted five years ago, and no pregnant women nor children under two had been allowed to go. So there was a definite hiatus in the procession of age ; children who had gone on the original ship were now eight and above, while those born in the Colony were no older than four.

The youngsters moved with more assurance and poise than their parents, Aherne noticed. It made sense ; they had been bred in the Martian gravity ; their muscles were not previously trained by a lifetime spent on Earth, and so they were able to cope with Mars' light pull more easily. *They are adapting,* Aherne thought.

He moved on, from the schoolroom to the local library, from the library to the printshop where Mars' one daily newssheet was turned out. There, he was shown with pride the unfinished, unbound copy of Dr. Carter's history of the Mars Colony from its inception right through to the conclusion of its fifth year of activity. Aherne, looking at the contents page, noticed that the book was inscribed, *Volume One.*

Carter was anticipating a long series of further volumes.

Miss Greer was a pleasant and affable companion, and she never failed to be a source of diverting and informative conversation, as they moved on. She showed him the central telephone switchboard, then the building that housed the atmosphere-generator, and then the small theatre in which a band of amateurs were rehearsing a performance of *Twelfth Night* to be given that evening.

Shakespeare on Mars ? Why not, Aherne thought, as he watched the rehearsal unfold for a while. The Colonists were

capturing the Bard's smoothly-flowing poetry with rare skill and insight. Aherne sat entranced in the small, cushionless-seated theatre for over an hour, and asked to meet the director afterward.

It turned out that the director was also the tall, deep-voiced man who had played Malvolio. His name was Patchford. Aherne complimented him both on his performance and on his directing.

"Thank you, sir," the colonist said. "You're planning to attend our performance, aren't you?"

"Certainly," Aherne said. "Have you been doing much Shakespeare?"

"No, unfortunately," Patchford said sadly. "Our Complete Shakespeare was destroyed somehow in transit, and we haven't been able to get a replacement from Earth yet. It was sheer luck that I had appeared in a small stock-company that was doing *Twelfth Night*, not long before I left Earth. I copied all the parts from memory, and that's the version we're doing."

"It sounded accurate enough to me," Aherne said.

"I hope so," said the other, grinning. "Until the UN gets around to microfilming another Shakespeare for us, it's the best we can offer."

"I'll be looking forward to seeing it tonight," Aherne said sincerely, and he and Miss Greer moved on.

The next stop was the town hall, a rugged-looking, half-finished auditorium. From there, it was over to the hydroponics plant, where Aherne talked learnedly with a couple of the boys working there. He saw that his 'ponics-talk made a tremendous impression on Miss Greer, and he didn't care to disturb her belief in his omniscience by telling her that he had been a hydroponics technician himself for a while before entering UN service.

Aherne noted that the 'ponics plant was admirably set up, and he sampled some of its products—radishes, which seemed just a little underfurnished, and tomatoes, which tasted fine.

And then, at last, Miss Greer decided that Aherne had seen enough of the colony for one day. She accompanied him to Carter's house, where they were scheduled to eat dinner, with a visit to Patchford's Shakespeare production slated for later in the evening. Aherne felt tired, excited, pleased, and very much less in doubt about his eventual decision.

V

Busy days followed as Aherne, always the centre of interest, was given a thoroughgoing look at life in the Colony. The colonists were all unfailingly polite and helpful ; they were aware that they were on trial, and they were trying to live up to whatever standards Aherne could possibly set for them.

Life under the low gravity was awkward, at times, and the artificial atmosphere's faint staleness made Aherne long for the fresh air of Earth. But otherwise, the technical end of the Colony seemed to be well under control.

They were far from being self-sufficient, of course ; food shipments from Earth were still of vital importance, to supplement the diet turned out by the hydroponics and the budding synthetics factory. The plan was to convert Mars' arid land into fertile soil once again, but that would take years, perhaps centuries.

Psychologically, the Colony seemed beautifully balanced. The men who had chosen the colonists had chosen wisely, despite the handicap of having to follow a prearranged nationalistic plan of choice, and the eleven hundred inhabitants of the UN Dome were as sane an assortment of people as Aherne had ever seen gathered together in one place.

The Colony had, in general, lived up to expectations. And, on the morning when Jose Echavarra came to visit him, Aherne had just about made up his mind about the sort of report he was going to turn in.

The little Peruvian appeared suddenly, unexpectedly, while Aherne, enjoying a moment of relaxation, was reading a reasonably good novel written by Roy Clellan, a colonist, and published at the Colony printshop.

He looked up in surprise as Echavarra entered.

" Hello, Aherne."

" Echavarra ! How'd you get past the airlock guard ?"

The geneticist shrugged. " There is no law against my coming here, is there ? Besides, I told the guard outside that if he didn't let me through, I'd simply radio over from my Dome and tell you that I'd been turned away. He was in a cleft stick, and all he could do was let me in."

" So here you are," Aherne said. " What do you want ?"

Echavarra took a seat on the edge of Aherne's bed, and folded his thin, dark fingers into a complex pattern. "You remember our earlier conversation?"

"I do," Aherne said. "What of it?"

"Are you still of your former opinion?"

"If what you mean is, do I intend to squash Carter's colony and turn the appropriation over to you, the answer is no."

Echavarra frowned. "Still no, eh? That means you must have been impressed with this little colony here."

"I was," said Aherne. "Very highly."

The small man scowled expressively. "You still do not understand," he said. "These people here—they are only guests on Mars! They are temporary visitors, staying here by sufference of their Dome. But they will always be outsiders always be dependent on artificial atmosphere!"

"I told you I don't care to discuss it," Aherne said stiffly. "These people have set up a truly wonderful social organization. Can you say the same of your high-altitude Andeans?"

"No," the other replied. "Not yet. But we will be able to breathe the air of Mars, one day. The social organization can come later, once the physical handicaps are overcome."

"I don't agree," said Aherne. "You've taken men acclimated to high altitudes, low air pressure—but what kind of men are they? Do they represent the best of humanity. No. They're just ignorant, primitive people who happen to have developed a certain kind of physical endurance. You can't build a world out of them."

"You can't build a world out of people who must hide beneath a dome," Echavarra retorted. "But I see I will get nowhere with you. I trust you'll have the kindness to inform the United Nations of my whereabouts, though, and of the success of my project?"

"I'll do that," Aherne said. "For what it's worth."

Echavarra dropped a thick sheaf of papers on the bed. "Here's my report. I've analysed the tolerance of my men to low pressure, discussed the integrated adaptations that will be necessary to produce a fully Marsworthy race, and included some details of the biochemical analyses of muscular tissues that my associates have been making. One of them has been studying myoglobin, a form of hemoglobin which is particularly useful in governing the rate of oxygen-unloading in—but there's no point in telling this to you, is there? If you see fit, turn these papers over to the interested parties."

"I'll do that," Aherne said. "Look, Echavarra—I'm not trying to be deliberately cruel about this. I'm not here to decide whether your setup is more worthy of development than Carter's; so far as I'm concerned, that's been decided long ago. All I wanted to do was to see if the Carter colony is working. And it is. I'm satisfied."

"You're filing the report, then?"

"I am," Aherne said. It was the first time he had voiced the decision aloud, and now he was more certain than ever that it was the proper decision.

"Very good," Echavarra snapped. "I won't attempt to persuade you any further."

"It won't help," Aherne said. He felt genuinely sympathetic toward Echavarra, but as things stood there was nothing he could do. Carter's colony deserved support. Even discounting the fact that they were probably putting on a special demonstration for Aherne's benefit the colony seemed to be the first true example of co-operation between human beings on every level Aherne had ever seen.

Aherne picked up Echavarra's papers and tidied them into a neat stack. "I'll take care of these," he said.

"Thank you," the Peruvian said simply. He stared searchingly at Aherne for a moment and then turned and left.

Aherne made his decision known publicly later that day. In a short, tersely-worded statement which he handed silently to Dr. Carter, he told of his great delight in seeing how the Colony functioned, and stated definitely that he planned to support continuation of the appropriation on an indefinite basis.

Carter read the statement through and looked up at Aherne. "Thanks," he said bluntly.

"Don't thank me," said Aherne. "It's your own hard work that's done this. I'm one-hundred-per cent sold on your colony here, Dr. Carter."

"I'm glad to hear that," the greying leader said. "For a while, at the beginning, you seemed very dubious about the way things were doing here."

"It was just a pose," Aherne confessed.

"That was obvious. I could tell how much you really liked the things you were seeing. Miss Greer reported that you were just bubbling with enthusiasm."

"I was," said Aherne, privately annoyed that he had not

managed to conceal his feelings better. " I'm firmly convinced that you're on the right track here."

" I'll go announce this to the Colony at large," Carter said. " They'll be glad to know our life's been extended a while longer."

Aherne watched him leave, and pictured the jubilation there would be when the news got around that the strain was over, that the test had been passed.

My work is done, Aherne thought. It would be good to get back to Earth, to the UN, now that the pressure of decision was ended.

He felt relieved that he had been able to square his decision with his conscience. It was a good feeling.

He turned to his desk, and began to make some tentative notes toward the final report he would have to file. He started sketching out a preliminary outline of Colony life.

After two sentences, he halted, disturbed. Echavarra's harsh words were echoing in his head, seeming to mock him and stamp him for a fool. " *These people—they are only guests on Mars* !" he heard once again. And : " *You can't build a world out of people who must hide beneath a dome.*"

The Peruvian's dry, incisive voice needled into his brain, and refused to be forgotten. Aherne chewed the end of his stylo reflectively for a moment or two, while the tenor of his mind swayed. He pictured Echavarra, punctuating each word with a jab of his forefinger against the air—the artificial air of the Dome.

Am I right ? *Who knows* ? Aherne asked himself, and slowly, with not as much inner conviction as he had felt a moment before, he began to fill out his report.

VI

Deep in the cold, frozen ground, a long, fine line cut through the desert—a fault-line, far below the surface. A dark slit that indicated the end of one geological formation and the beginning of the next.

Along the fault-line was exerted the pressure of the tons of sand and mountain above. Gradually, slowly, over a period of centuries, that fault began to slip. One side depressed ; the other inexorably raised. The process continued imperceptibly, until the day when the ground shivered, the

final barriers broke and a pit yawned where no pit had been before.

An entire geological formation—a block of granite some hundreds of miles square—went rearing up like a singed stallion. The broken desert shuddered. And catastrophe struck the unsuspecting Domes planted square athwart the fault-line.

Aherne had been planning to leave that day. Valoinen and his ship were scheduled to make their regular appearance the following morning, and Aherne was in the process of saying his goodbyes when it happened. The ground seemed to scream in pain, and then everything tipped sideways. The moorings of the Dome broke loose from the land, stresses that had not been planned for rippled through the Dome, and a jagged split ran through the gleaming plastic from end to end.

Aherne felt the cold come rushing in. The atmosphere, so carefully generated, fled in an instant, and the harsh, nitrogen-laden air of Mars came swooping down.

" Spacesuits !" someone screamed, and the panic was on. Eleven hundred people, dashing for spacesuits at the same moment. Children underfoot, screaming adults, frightened women.

Aherne gasped for breath; his head spun, and his eyes bugged wide. What had the Peruvian said ? This was *critical threshold*—this was the moment from which there was no escape. The faint glimmer of the sun drifted mockingly through the rent Dome. This was it, now: the air of Mars. The unbreathable, cold, biting air of Mars. Critical threshold.

Somehow he found a spacesuit, and somehow he made his leaden fingers go through the motions that would get him inside the suit. He could barely see ; his cold-nipped hands would not respond. But finally he was inside it, with air—real air—surging up around him.

Aherne leaned against the cold, corrugated-steel wall of a building for a moment, dazed, unable to understand what had happened. One moment he had been chatting amiably with Kate Greer and Sully Roberts ; a moment later the sky had split, and he was fumbling to safety in the dark.

He sucked in air, gulped it down and let it warm his lungs, while his body slowly returned to normal. And then he looked around.

The scene was frightful. Wherever he looked, there were colonists. Most had managed to find spacesuits ; those who

hadn't, and that included a handful of children, were huddled in unconsciousness on the ground, blue-faced from oxygen loss.

Sully Roberts was next to him, folded up in a heap along the wall near the open chest where the emergency spacesuits were stored. Roberts had managed to get himself inside a suit in time, but passing the critical threshold of anoxia had been too much for him ; the big man was unconscious.

" Sully ! Sully ! "

After a moment, Roberts looked up. He struggled to his feet, shook his head tentatively, and clawed for his balance. Aherne steadied him.

It was like moving in a nightmare world.

Roberts pointed to a body lying a hundred yards away. A colonist who hadn't made it.

" Let's get going," Roberts said hoarsely. " Maybe we can save some of them."

Later, when everything was calm and a measure of order had been restored, the shattered colony tried to take stock. A general meeting was ordered in the central auditorium, and slowly the dazed, spacesuited figures filtered in.

Aherne took his seat at the side. It was only now that the reaction was starting to hit him. He felt overwhelming bitterness, anger at this cosmic joke—for now they knew that the Marsquake had wrecked the Dome. The report was written, the future of the Colony assured—and now, this.

He heard Carter's voice dully calling the roll.

" Anderson, Leroy and Joan."

" Here."

" Antonelli, Leo, Marie and Helen."

" Here."

And then the dead silence after a name, and the repetition, and then the checkmark made on the long sheet that told of the dead. The toll-taking continued through the day, until finally the extent of the damage was known.

There were sixty-three dead, Carter announced, and fifty-seven in critical condition. The backlash of the quake had shattered the Dome beyond repair. Otherwise, the Colony had not been harmed badly—but it would have to start from the beginning, now. If there was to be any starting over at all.

Sully Roberts was despatched to the Peruvian Dome to find out how things were there. Aherne watched the big man go, out through the useless airlock and into his sandcrawler.

It was a tragic situation, Aherne thought. And then, slowly, he came to see that it was not. The quake could have happened at any time—but, as if some Power were guiding it, it had burst at the very moment of Aherne's decision. It had waited until the returns were in, and then had unleashed its fury to show Aherne the fatal weakness in the entire Dome setup.

They had planned and planned—and yet not figured on an upheaval of the ground a hundred miles away. They could never have planned on it.

Now, and only now, was Aherne sure of what had to be done.

They remained in the meeting hall, sitting quietly, waiting for Roberts to return. Aherne studied the faces of the men near him—faces that reflected the dream that had turned into a nightmare in a sudden single unforeseen moment.

Abruptly the door opened and Sully Roberts burst in, hardly ten minutes after he had left.

"What's the matter, Sully?" Carter called from the dais. "Didn't get there?"

"No need to," Roberts said. "I met the whole batch of them on the way. Their Dome was smashed too, but they got things under control quicker than we did and the whole Peruvian colony set out *en masse* to see if we needed help.."

Roberts stepped to one side and Echavarra entered the hall, clad in a brightly-coloured spacesuit that looked oddly out of place in the drab assembly. Behind him, Aherne could see a swarm of small, spacesuited figures—the Andeans.

"We've come to see what we could do," Echavarra said. "The quake got our Dome too—but naturally my people didn't feel the effects of the sudden change in air as much as yours did, since we were conditioned to something almost as bad."

Of course, Aherne thought. The Peruvians would simply have moved in a leisurely fashion toward the nearest spacesuits. No panic, no casualties.

Aherne stood up. "Dr. Carter?"

"Yes, Mr. Aherne?"

"Would you mind calling a recess of the meeting for a while? I'd like to speak to you and Dr. Echavarra privately."

Aherne felt as if he held the future of Mars in his hands as he looked across the table, flicking anxious glances from sad-eyed Carter to Echavarra and back.

" I'll put it bluntly," Aherne said to Carter. " I'm going to have to rescind my earlier report. Your colony is definitely not suited for continuation."

Carter went white. " But we can rebuild the Dome ! You said—"

" I know what I said," Aherne cut in smoothly. " But it's all been voided by this quake. Dr. Echavarra put it very nicely for me during one of our meetings : you and your colony are only guests here. You're subject to the whims of the landscape for survival. It can't work on any long-range basis. You can't pin all your hopes on a fragile dome, and expect to build a lasting colony."

Carter seemed to shrink in on himself. He bowed his head. " Then I was wrong," he said. " The quake proved it."

Echavarra's beady eyes lit up. " Does that mean you're shifting to my side, Mr. Aherne ?"

" Not quite," Aherne said. " You have part of the right answer : your men were adapted enough to be able to ride with the blow when the Dome was destroyed, and in a couple of generations they won't even need the Dome. But they're not material for building a new world with. They're ignorant, primitive men with low cultural possibilities, coupled with high survival quotients."

He turned to face Carter, sensing now that the situation was completely in his grasp for the first time since he'd left Earth. Now he understood the entire picture, and now he knew what his report would say.

" Dr. Carter, you've got the other side of the coin. High cultural level, low survival factor. Everything about your colony was marvellous—except the fact that it would fold up like a paper bag at the first crack in the Dome."

Carter nodded grimly. " So we've discovered."

Aherne leaned forward. " Now—does what I've just said suggest a solution ?"

" Could we—build one big Dome for both colonies ?" Carter asked hesitantly.

" Exactly. One Dome. Assimilate. Mingle. Combine the hardiness of your Peruvians, Dr. Echavarra, with the all-around ability of your men, Dr. Carter. Breed a new race from the two stocks," Aherne said triumphantly. " A new race—capable of living on Mars and *belonging* there !"

" The pressure—" Echavarra said.

"Keep it at ten pounds for a while. It'll be uncomfortable for both groups, but not for long. Eventually Dr. Carter's group will develop the same kind of strength Dr. Echavarra's men have. It may take a couple of generations, but it'll work —eventually."

The two leaders were glowing. "You'll recommend this to the UN?" Carter asked.

"If you're both agreed," said Aherne.

They nodded as one.

"Let's go back inside and announce the decision, then," Aherne said. "Because you'll have to get right to work building the new Dome. You can't live in space suits for long, you know."

"Right," Carter said. He rose and led the way back to the meeting-hall, where the colonists were waiting impatiently for word on what was happening.

Aherne took his seat at the side again. This was strictly Carter's and Echavarra's show, and he intended to remain completely detached.

As Carter began to speak, outlining the new plan, Aherne let his eyes wander around the auditorium. It was crowded—crowded with the tense-faced UN colonists, and with the Peruvian men as well, garbed in their bright-coloured space-suits.

Aherne saw his report taking shape now—the memo that would set the pattern for man's future conquest of the planets. Thankful that he had seen the right way in time, he sat back, relaxing at last, and listened to Carter's enthusiastic voice as it rolled out majestically.

Then he looked down. Almost at his feet, he saw a Peruvian boy of about nine, round and awkward in his lemon-yellow spacesuit, and one of the UN colonist children, a pretty blonde girl of four. They were staring shyly at each other in mutual curiosity.

Aherne watched them. They were the forerunners, the founders of the race of the future, the new men.

No. Not men, Aherne thought. Men are creatures who belong on Earth. Not men.

Martians.

Robert Silverberg

Fiction

The recent B.B.C. serialised radio dramatisation of the *Day of the Triffids* added yet another leaf to the laurels of John Wyndham—doyen of contemporary English science fiction novelists. It again emphasised the towering excellence of what was, under the "Wyndham" label, a first novel, and which has consistently overshadowed his subsequent attempts to repeat the miracle. However, apparently undismayed, Mr. Wyndham continues in his usual elegant style and with a delightfully astringent humour to depict the results of improbable (yet frighteningly possible) catastrophes on his fellow beings. In **The Midwich Cuckoos** (Michael Joseph, 13/6d) the cataclysm is in a minor key—albeit an extra-terrestrial invasion of sinister if at first obscure import—wherein a sleepy and miniscule English village suffers a physical indignity of Rabelaisian propensity.

The immensely likable narrator of the story, Richard Gayford, and his wife Janet, were luckily away from home when the dome of impenetrable unconsciousness blanketed the hamlet of Midwich one late summer's day, but they became closely involved in the investigation of the queer incident. The ominousness of the event was not even fully realised when, after a standard gestatory period, all the females of child-bearing age living in the village became—some without benefit of clergy or even inclination, let alone opportunity—host-mothers to sixty-one golden-eyed, not quite normal babies, each identical to the others in their respective sexes. The problem of withholding the news of this situation from the rest of the world is made easier by the proximity of a scientific research establishment and a pardonably worried authority. But it is nothing to the problems of self-preservation for *homo sapiens* faced with a rapidly maturing community of *homo* (?) *superior*. The solution is somewhat trite, and one is left with a sense of anti-climax, absolved by the pleasure of having read a book full of delightful characterisation, excellent

writing and charming incident, which once more points the desirability of considering John Wyndham as the H. G. Wells of postwar novelists.

Likewise, the American author James Blish has, I think, achieved a comparable status with his latest book **Fallen Star** (Faber & Faber, 15/-). Labelled a 'contemporary' novel on its first appearance in the States under the title *The Frozen Year* some months ago, it has indeed the subtle distinction of a novel of science rather than a science-fiction novel. Unlike his previous five novels, the scientific thought and research involved is within the confines of, and closely identified with, the current International Geophysical Year during which the action, an expedition to the North Pole, takes place. And this despite the fact that the story is a flashback from the 1960's when the first Martian expedition may reveal the truth of the fantastic climax to the polar adventure which has been deliberately undetermined to the reader.

Sponsored, among others, by the I.G.Y. committee, the original purpose of the survey is overshadowed by the personal objective of the commander to find meteoric evidence to prove that the asteroid belt was once an inhabited planet. On this solid scientific foundation, convincingly detailed with Blish's customary skilled research, the author has laid overtones of adventure, sex and sadism, which may invite cynical comparison with some of the less lurid specimens of " modern " novel trends. From a detached viewpoint the assortment of characters comprising the expedition is most unlikely and their behaviour most surprising. But, of course, such vivid characterisation adds spice to the science loaf, and I found the combination of the two story levels eminently successful, providing an absorbing and very stimulating science fiction novel of the highest quality.

In **High Vacuum** (Hodder & Stoughton, 12/6d) Charles Eric Maine has attempted to dramatise the first Moonwreck, but the results are somewhat disappointing, particularly when one remembers J. W. Campbell's definitive *The Moon Is Hell.* Didactically similar, Maine's strongly and interestingly emphasizes the vacuum hazards, but as the story collapses into formula melodrama, the interest is hard to sustain. All the stock cliches—some I have not seen for years—are used, such as . . . the first spaceship to the moon crashing because of a

woman stowaway . . . who is the girl-friend of one of the crew . . . actually secretly married to him . . . but he dies in the crash . . . and she's pregnant . . . conflict with the others in survival tactics . . . shortage of oxygen . . . a crew-member dying of gangrene . . . murder . . . rape . . . final survival of the fittest (guess who ?) . . . the Russian rocket there at the end . . . a dream glimpse into the future of the moon-base involving the stowaway's spaceman son—immediately belied by the child being stillborn ! The story has pace and a certain excitement but lacks atmosphere (no pun intended !) mainly because the characters remain coldly impersonal, and some of the plot hooks are weak.

Juveniles

If you are wondering which books to give the youngsters as presents for Christmas this year let me urge you to consider two new Adprint House titles before desperately buying one or another of the usual comic-type annuals—you will find that easy-to-learn technical books will be top favourites long after the fiction titles have gone for waste paper.

Wonderama (Adprint, Ltd., 7/6) by Angela Croome and edited by Eamonn Andrews is well sub-titled " A Book Of Modern Marvels." Based upon Mr. Andrews' two B.B.C. T.V. programmes *Playbox* and *Crackerjack*, it is divided into six profusely illustrated chapters dealing with the Atom, Outer Space, Radio Astronomy, Automation, Underwater Exploration, and the Electron Microscope. These can be extremely dull subjects if not handled properly but in *Wonderama* they come to life in such a fascinating manner that even adults will wish to read the book for pleasure.

Fifth in the " Wonderful World " titles is **Men, Missiles and Machines** (Rathbone Books, 17/6) by Lancelot Hogben who previously had *Man Must Measure* in this series. It is a great pity that production costs put this book in the more expensive range but if you feel that you can afford the price, the book is well worth every penny. As in the previous titles the latest book is profusely illustrated in colour, has a great deal of historical fact written into its educative chapters, and sets out to teach older children the facts about Power sources from the windmill to the nuclear power station.

Leslie Flood