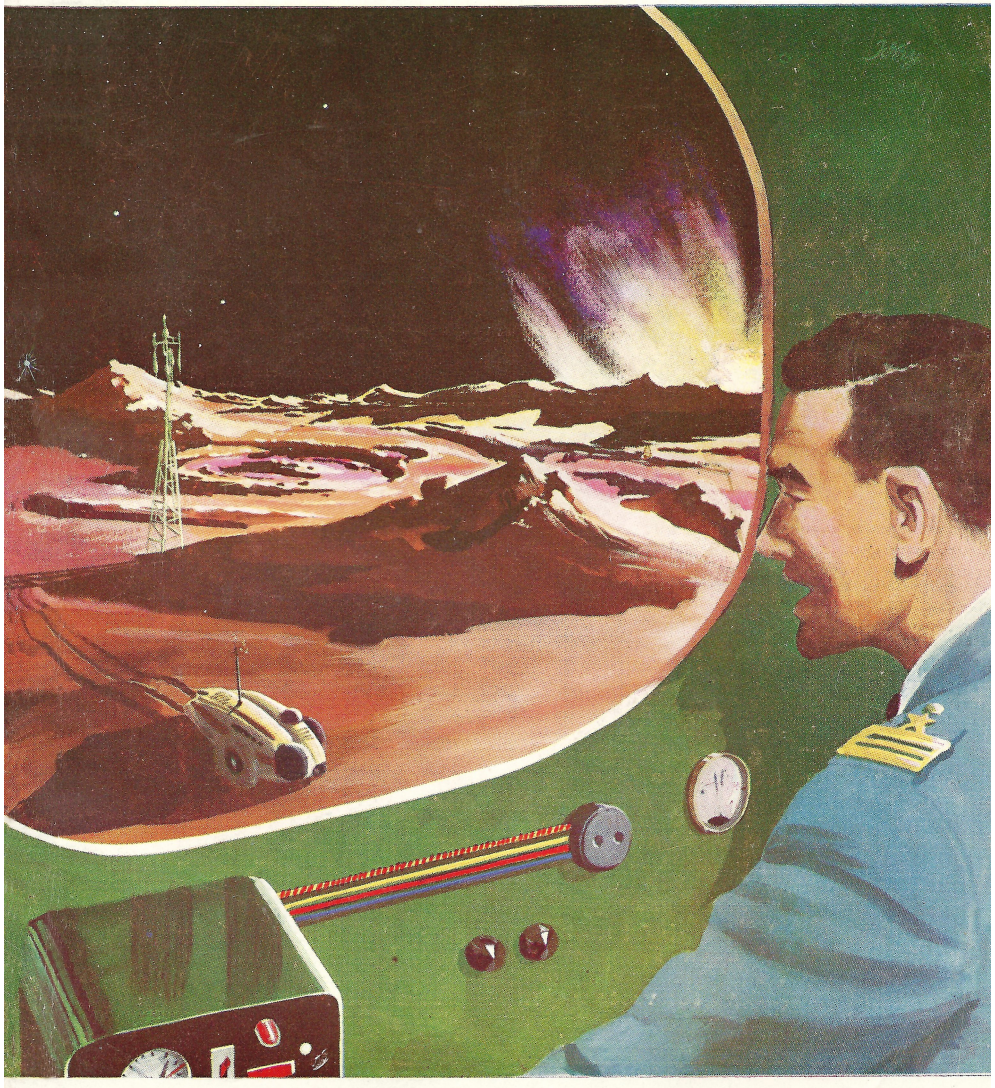
NEW WORLDS
SCIENCE FICTION

No. 60
VOLUME 20
2/-



BARCLAY ★ SILVERBERG ★ BOLAND ★ BRUNNER

NEW WORLDS
PROFILES

John Boland

London

You have to meet John Boland in person to fully appreciate his personality and deep witticisms although the biting satire of his second novel, *No Refuge*, **(Michael Joseph) will be missing from the conversation. As with many another writer forging steadily to the forefront of his chosen career, he has had a widely varied existence, having been a deck hand, farm labourer, lumberjack, railroad worker, factory hand, commercial traveller, manufacturers' agent and even an imitation soldier (by courtesy of the War Office), having lived and worked in the United States, Canada and Alaska as well as having travelled extensively throughout Europe.**

Following the publication of his first novel *White August*, **he says, "I had never thought of writing science fiction short stories until I met the editor of** *New Worlds*, **who asked 'Why not ?'. This to a man who had already sold over a hundred short stories in other fields, and had a score broadcast in addition, was a pertinent question. Since that meeting a number of shorts in the s-f field have come from my pen, as well as** *No Refuge*"

A year ago he moved to London from Birmingham, where he had five times been Chairman of the Birmingham Writers' Group, and has just organised the first annual Conference of the Crime Writers' Association being held in London during May. He is also Vice-Chairman of the Writers' Summer School held annually at Swanwick, Derbyshire.

"Of doubtful sanity," he states, "as evidenced by the fact that I gave up a lucrative business to become a fulltime writer some three years ago, but as I am still alive the venture cannot be said to have been fatal."

NEW WORLDS SCIENCE FICTION

VOLUME 20

No. 60

MONTHLY

JUNE 1957

CONTENTS

Editor : JOHN CARNELL

Cover : TERRY Interiors : HARRY

Cover painting from " Sunrise On Mercury "

TWO SHILLINGS

Subcription Rates

Great Britain and the Commonwealth, 12 issues 26/- post free

United States of America 12 issues $4.00 post free

Published on the last Friday of each month by

NOVA PUBLICATIONS LTD., 2 Arundel Street, Strand, London, W.C.2.

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

More Convention News

Interest in the 15th World Science Fiction Convention to be held in London this coming September is beginning to quicken in pace, not only amongst the regular readers of science fiction to whom this four-day get-together will be a national event, but amongst a wide variety of people in other fields for whom the Convention itself will be a double link with their own professions. Film companies for instance.

In this respect, author John Brunner who is one of the Convention's representatives liaising with the major film distributors has interested the nearest cinema to the Convention hotel in a special science fiction film fortnight at the beginning of September; another West End cinema will probably show fantasy cartoons only; furthermore it may be possible that a West End premier of a new science fiction film will be arranged at which Convention delegates will have an exclusive preview. This still doesn't exhaust the possibilities as one of the prize-winning films from last year's Cannes Film Festival is also under consideration for private showing to the delegates.

On the book front it is highly probable that London publishers will revive the International Fantasy Award for presentation during the Convention for the best novel or individual short-story collection published during 1955-56. In conjunction with this the Convention Society will be donating three additional Achievement Award trophies for the best American and British science fiction magazines, and the best amateur magazine devoted to the genre. Voting on these latter three categories will be done entirely by Convention Society members in a postal ballot now being distributed to them.

Meanwhile, the Convention Committee in London have now issued their second *Journal* to members, containing a wide variety of interesting items concerning the Convention. Information has been released that the American charter plane flight from New York will be an accomplished fact by the time this editorial is published—a 55-seater KLM DC-4 has been nominally reserved, but if additional reservations are received at the World Science Fiction Society's headquarters in New York before the end of May, the plane may be a 70-seater.

Apart from the charter plane flight, which covers 20-days in Europe and will enable the American delegates to travel to Amsterdam, Brussels and Paris before arriving in London for

the Convention itself, a number of American delegates are travelling independently, and I understand that the following authors have already reserved hotel accommodation—Robert Silverberg, John Victor Peterson, H. Beam Piper, Edmond Hamilton and his wife Leigh Brackett, and Mack Reynolds. Reservations have also been made by a number of Swedish and German groups and delegates will also be coming from France, Belgium, Holland, and Denmark.

Two other important items of interest are likely to occur in conjunction with the World Convention—the Institute of Contemporary Art are planning a four-week exhibition to coincide with the conference dealing exclusively with science fiction and fantasy art from books, magazines and films; and Britain's first Planetarium now being erected in Marylebone will be nearing completion if not already open. Both will be additional items of interest for both delegates and visitors to London.

Some little confusion has arisen recently as to the cost of attending this year's Convention and I feel that this is a good opportunity to clarify the point for all those readers who are contemplating attending. First, only members of the World Science Fiction Society (the sponsoring body for all World Conventions) are eligible to attend the Convention proper or receive any of the Society's *Journal's* and participate in any of the ballots. It is, however, a simple procedure to join the Society—send your membership fee of 7/6d to the Convention Secretary at the address listed elsewhere in this issue. Even if you live too far away from London to be able to attend the Convention you will at least be lending active support and at the same time be able to enjoy the activities arranged for non-attending delegates as well as obtain first-hand accounts of what is happening.

Secondly, should you also plan to attend the Convention for one or more of the four days there is an *additional* charge of 7/6d to cover your entrance fee. In other words, if you cannot attend the Convention but wish to be a Member of the Society, the cost is 7/6d; if you will be attending the Convention the total cost will be 15/-. No other Society expenses are incurred, but if you register at the hotel for accommodation for one or more nights then the hotel tariff naturally applies. All arrangements for such accommodation, by the way, must also be made through the Convention Secretary and *not* direct with the hotel.

John Carnell

MISFIT

In any kind of warfare the invaders can usually obtain a footing upon their enemy's territory. Thereafter it is a case of consolidation and exploitation—providing vital supply lines of food and ammunition are kept open. But transport that problem of invasion to an entire planet and the supply problem becomes impracticable; the invaders would have to live off the land. Which presents further problems.

By Alan Barclay

I

The descent of thirty-five big space transports simultaneously and in formation was quite a unique sight—or would have been a unique sight had there been anyone within range to enjoy it—but as the operation was carried out by night in a remote part of the Martian desert, it is probable that it happened unobserved by any spectator except perhaps some wandering native.

The ships set themselves down on their tails in an irregular clump spaced about a mile apart from each other. They looked like a collection of giant nine-pins.

For a while after the mass touch-down nothing happened. Nothing very much could happen until the ground around each ship cooled off. But radiation was rapid on Mars. An hour after the touch-down the ships' ports opened and long spidery

ladders slid out. Men began to pour from the interiors. Following the men came the stores, vomited from the bellies of the transports in a tumbling stream. Marshalled by N.C.O.'s the men formed into long lines. The crates and packages of stores, carefully sized to be of convenient weight in Martian gravity, flowed along the lines of men out onto the desert beyond the ships. At the far end of the human transport line, the side of a sand dune was dug away and crates and bundles and packages began to disappear into this cache.

An intelligent observer—had there been one—might have noted that the members of the expedition were strangers on Mars. They wore heavy close-fitting breathing masks instead of the light simple device used by the home-bred Martian, and they moved clumsily. There was a great deal of stumbling and falling against each other and bumping together of packages. Nevertheless the work proceeded swiftly enough.

Within a couple of hours the big transport ships had taken off and gone screaming up into the dark sky on their pillars of blue flame. Before the light was half-way through the great mound of stores had disappeared into the hole dug for it in the sand-dune and the sand had been raked over it. As the small distant sun of Mars popped over the horizon the personnel of the expedition—approximately three thousand of them—were erecting and inflating clusters of small low dirt-coloured tents, each of which had a simple hand-operated air-pump to boost the air-pressure inside.

The expedition lay there all day. No jet-plane passing overhead, and no observer passing along the horizon could have detected any sign of it. Admittedly there was plenty of evidence to be seen closer at hand, but anyone passing so near would not have escaped to tell what he had seen.

This day of rest was an essential part of the scheme. Those who planned the expedition knew that it would be folly to require men hurriedly ejected from crowded ships after weeks in space to begin at once to march and to fight in the thin atmosphere and light gravity of Mars.

When the next night came the encampment swarmed. The tents were deflated and folded away. Loads of food, water and ammunition—bundles which were surprisingly easy to lift—were shouldered, and a force set off up the slope of the sand-dune and out across the desert.

The constellations of the stars—the Great Bear, Cassiopaeia, Leo and Orion shone down on the marching men just as they

had done back on Earth. The bright stars Capella, Vega and Regulus burned with a white almost incandescent light in this thin clear atmosphere.

As the night passed and the force tramped on across the desert it was seen that the Pole Star was not above the pole of Mars, for it moved in a wide arc across the northern sky.

They marched for two nights and for part of another night. Early on the third night they reached the edge of a great cliff from which they looked out across one of the Martian rift valleys. The valley was about ten miles wide at this point, and half way across it was a town.

The town was of middling size and consisted of a cluster of domes linked together by passageways. Beyond the town, against the far cliff, was a huddle of buildings, hoisting-gear and other impedimenta of mining and ore-smelting activities. The place was clearly a mining and steel-working community. Further down the valley there was a native village set in the middle of an extensive area of cultivation.

The expedition got down the cliff onto the plain during the night, worked its way round the town, and attacked the three entrance locks simultaneously just before sunrise. Within an hour the troops had occupied the town administrative building, the air plant and the water works. There was no resistance, and nobody was killed. Indeed, the majority of the townspeople seemed ready to welcome the arrival of the force.

The town—it had the uninspired name of Jonesville—boasted an internal wired television network, and the leader of the newly arrived forces used the system to talk to the inhabitants.

On their screens the townspeople saw a thick-set massive man of about fifty. The face was square-jawed, with an expression of firmness and determination ; a soldierly face, lacking perhaps in humour, but certainly not one to inspire fear.

" My name is General Knowles," he announced. " I am in command of a United Nations force which reached Mars two days ago, and which occupied this town today. Although our arrival here must be a surprise to you, I suppose you don't find it hard to guess why we have come. You in Jonesville are a mining community, so you must know that some people on Mars resent the activities of the mining companies. They themselves prefer to live in the desert like natives, which perhaps doesn't matter much, but in addition they demand that natives shall not be employed in mining or metallurgical work." The

general permitted himself a short smile. " However, I am a soldier pure and simple ; it isn't my business to express political opinions ; I am solely concerned with the fact that those who favour the simple native life have been trying to impose their wishes by force. They have compelled the mining companies to close down workings. They have induced native tribes to transfer themselves away from the neighbourhood of mines. More serious still, they have during the past two years been destroying mining plant and hindering the opening up of new workings by ambushing convoys of equipment and supplies passing across the desert.

" My orders are therefore to put a stop to desert ambushes, destruction of property and sabotage, and I shall carry out these orders without fear or favour." He paused, then resumed in less forbidding tones : " Due to the enormous difficulty in shipping equipment out here to Mars, my force is short of transport. I know there's a large number of desert vehicles here in Jonesville—indeed, that's why we chose it as our first point of contact. The majority of these vehicles belong to the Mars Mining Corporation, though some of them are actually on hire to subsidiary undertakings, and a few may be privately owned. I am requisitioning them all—every one." He stated this uncompromisingly to the screen. " Compensation will be paid, of course, and advice about making claims may be had from my executive officers." He paused again, then continued: " I have made this explanation carefully so that you will understand my purpose ; and I hope no difficulties will be made, and that no one will attempt to obstruct us in our duty."

His conclusion was all the more effective because he did not accompany it by any threat. As he switched off he reflected that the not entirely accidental concentration of long-range vehicles in Jonesville might be described either as a shrewd move, or as a dirty piece of business by the Mining Corporation, depending on which side you looked at it from.

While his troops worked like beavers to overhaul and refuel the commandeered desert tractors, General Knowles held a conference with his officers. For his headquarters in Jonesville he had taken over a room in the offices of the Mining Corporation whose broad window looked out from a height of three storeys across the rift valley to the cliff which marked the edge of the desert.

" Well, gentlemen," he began abruptly, " we've completed stage one of the operation. Three days ago we were landed in the open desert, with nothing but hand weapons, very little food, and no transport. Now we have food, transport and supplies. We're ready to move on to our main objective."

He produced a cigarette-case, gave himself a cigarette and passed the case around the group, making this gesture an opportunity to study the men and their attitude to him. He was an ambitious man and this expedition was a wonderful chance to make a name for himself. During the idle moments of the long voyage he had sometimes even dreamed of becoming governor of Mars at the end of a successful military operation—but he wanted also to be popular with his men. He wanted popularity for its own sake, but also because it was via his officers that accounts of his personality would reach the public. Anecdotes, whether endearing and affectionate or the reverse, always originated with them and filtered outwards to the public and the press.

" You know our next objective is Mars City," he told them, " but perhaps you don't know why. Our expedition is something new in military history. It raises the problem of maintaining supplies over interplanetary distances. Staff officers in military academies have discussed this problem for generations now and they've invariably come up with the same answer—that it's insoluble. Until a matter transmitter or some similar form of magic is invented, it's entirely impossible to keep up a flow of several tons of arms, fuel and food per man per day across interplanetary space. But no sooner is any problem seen to be insoluble than someone finds a way around it. In this case the solution is a small expedition of well-trained tough men, who will land with the minimum of stores and arms and will proceed to capture what they need. Well, we've got our transport and enough food and fuel to last for a little while. The guns and ammunition we buried out there in the desert will be picked up tomorrow. So far so good—but not enough. This job's going to last a year or more. We'll certainly have to take some towns by force. We'll have desert convoys to protect—we'll have to pursue and deal with raiders who attack convoys. We'll have rebel hideouts to wipe out.

" Only one weapon will do these jobs—artillery. Without guns we can patrol the whole surface of Mars, pursue the rebels from one pole to the other, and sit around their hideouts till we grow long beards without achieving anything. With them

we can shell the raiders before they show their noses over the horizon, split their towns and their hideouts wide open. Guns—Guns—that's the answer." He struck the table with his clenched fist.

" Well, we brought the guns but we need ammunition. Not just a ton of ammunition, or a thousand rounds of ammunition, but a continuous steady flow of it, and we've got to find it here, on Mars." He paused and looked around his audience. ' There's a small munitions factory at Mars City," he told them quietly. " That's why it's our next objective. If we get it we're fixed to operate here on Mars without any help from Earth for as long as necessary. Without it, we'll be like an old dog without teeth. That's the picture," he concluded, leaning back. " I know this light artillery we've got is old-fashioned stuff but it's far better than anything on Mars. Our guns can reach out right over the horizon and hit 'em hard, and they've nothing to hit back with. But we've got to get to Mars City first."

" Sir ? " a young officer asked.

" Well ? "

" How come there's a munitions factory on Mars ? It seems about as useful as an icecream factory in hell."

General Knowles allowed himself a grin.

" That story goes back about ten years," he replied. " The official reason for its existence is the obvious fact that sooner or later, as Mars becomes more and more heavily populated, some kind of planetary police-force will inevitably be required. This factory is designed to turn out weapons suitable for police purposes. The U.N. Government approved its construction, of course, and even ten years ago a number of hot-heads on Mars approved it also because they might some day oppose U.N. policies by force, in which case a munitions factory would be real handy. We," the General almost grinned again, " that's to say, the U.N. military staff have realised for generations that no military operation is possible on Mars unless it's self-supported. So we approved the scheme likewise."

" But it isn't in our hands yet," another officer protested, " and presumably the rebels know we're here now."

" I've not the slightest doubt they do," General Knowles conceded. " But note this—although there's a munitions factory at Mars City, nobody ever got around to setting up a weapons plant. The only artillery on Mars is the stuff we've brought with us."

II

Next day the expedition moved from Jonesville out over the floor of the valley, and snaked its way up the face of the cliff and onto the dry dusty-brown desert.

They had with them fifty big desert transporter vehicles, loaded with fuel and stores. The men marched ahead of and behind the file of vehicles, and there were flanking parties out on either side, but this time the troops were not burdened with packs.

They travelled back along the route they had come to the cache where their guns were hidden. The detachment which had been left to guard the cache had been unmolested. No-one had passed within miles of the spot.

The cache was opened. The guns were uncrated, de-greased and assembled. Towing brackets were welded to the transporters and ammunition was stowed.

After a day of feverish activity General Knowles made a detailed inspection of the situation, and at the end of it inwardly heaved a sigh of relief. Another milestone had been passed. His force was now mobile, outfitted, supplied—and well armed. Armed with weapons better than anything on the planet. Admittedly his stock of ammunition was the very minimum at present, but—a fast march across the desert during which very little organised resistance was likely, the seizure of Mars City, and then the whole planet was his. He allowed himself to think this for the first time.

He went across to the transporter which had been fitted to serve as Command Post.

"You can break silence now, Peters," he told his radio op. "Key into Mars City, and get me the Police Chief."

Peters did a number of things with his equipment which made it hum and sizzle gently. After an instant a female voice was heard, faintly at first, but increasing in volume.

". . . Mars City Teleradio reception," the voice said.

"Link me through to your city Police Chief, Miss." Peters requested.

Though the call was coming from a new unregistered station, the operator asked no questions. It almost appeared that she had been standing by waiting for it.

"And set it up for vision," the General said over his shoulder.

"Very good, sir."

An instant later the small screen above Peters' equipment came to life. Knowles got a glimpse of the interior of an office room, then a man walked across towards the viewer and sat down at his desk in front of it.

" Good morning," the General began abruptly. " You're the Chief of Police, I believe ? I am General Knowles, commanding the military force from Earth. I expect you've had instructions concerning me."

" Yes, General, I have," the other replied. He likewise showed no great surprise. " I had confidential information two months ago that an expedition was being planned, and ever since you landed there have been the wildest rumours circulating about an attack on Jonesville."

" We've made no attack on anything," Knowles told him. He was not at all happy to learn how little of a secret his arrival was. " The simple fact is we touched down near Jonesville, occupied the town and commandeered some vehicles. Not a soul was hurt. I don't suppose anyone there even has a grouse against us. By the way, you may circulate that news."

" I'm glad to know it," the Police Chief nodded. " So what now, General ? "

" We're now fully equipped, armed, and ready to roll," Knowles told him. " We'll be with you within a few days. You know what you must do meantime ? "

" Prevent the rebels from occupying the town." The Police Chief agreed cautiously. " Nothing more than that."

" Can you do it ? "

" Certainly. There's never been any trouble within this town, as you know. All the strong-arm stuff has been against the desert convoys and mining communities, and even if something is attempted, I've got a good force of experienced police, and a supply of small arms. The townsfolk are mostly government servants or employees of mining corporations, so I'll have no difficulty enrolling them in a civic guard."

" You're sure you can hold out against any sort of attack ? "

" Against any sort of attack the desert folk can make," the other agreed. " Any Martian domed town could be destroyed in two minutes by artillery, of course."

" I know," the General agreed briefly. " But don't worry. The only artillery on Mars is right here in my possession. Do you think these desert people know of my arrival ? Are there signs of preparations to oppose me ? "

The Police Chief hesitated. "You'd be wise to assume that they know every single thing that happens here on Mars, General. Rumours about your arrival have been circulating here for the last twenty-four hours, and there's a steady flow of desert people and natives through the city. Some have relatives and girl-friends and even wives living here, and they get to know all that goes on. The first hint I got myself of your arrival on Mars came from one of the girl typists in my office here."

"All the more reason for keeping silence. Very well," the General concluded, "you've been given emergency powers to arm your police, and to enrol additional forces. You know your job. Keep control of Mars City till I get there. You're sure you can do it?"

"Rely on me, General," the other assured him.

The screen went blank.

"Switch off, Peters," the General said. "No need to keep listening watch. There's no-one else on this planet who will want to talk to us, and I don't mean to talk to Mars City again except in emergency."

"But there is, sir," Peters objected. He pointed to the red light that had begun to blink rapidly on the top of the set. "Someone's spotted our beam."

"But that isn't possible—with the tight beam we're using."

"Could be our caller's squatting right on line between us and Mars City, sir."

"Bring him in," the General said. "Let's find out what he wants."

Peters twiddled the dials expertly.

"It's Mars City again, sir," he exclaimed.

"He should know the radio must be used as little as possible," the General muttered. "Bring him in."

But instead of the face of the Police Chief, there blossomed into view the features of a charming little red-head. Her background had the functional appearance of a teleradio exchange.

"A caller asked for you just as you finished with the Chief of Police, sir," the red-head told him pertly.

"How did you manage to locate me?"

"I noted the keying-in signal of your transmitter when you spoke first, General Knowles—shall I link your caller in?"

"Yes, please," he growled.

The screen blurred; the colours swirled and glowed, then re-assembled themselves to show another face, masculine this time.

Now the background was a group of people, and part of the interior of some kind of tent.

" Welcome to Mars, General," the voice said pleasantly. " Remember me ? "

The General saw a man of forty-five, on the smallish side, with thin dark features and a pleasant humourous face. There was something familiar about mouth and eyes.

" I'm Tony Shorefield—remember ? " the man continued. " Remember those courses we used to attend ? "

For a moment the anxieties and tensions and pressures of his present life were forgotten, and General Knowles felt himself to be as he had been twenty years ago, a junior officer, free from responsibility, free from financial worry. Why, he reminded himself, Tony Shorefield ! That was just before he got married; that was a time when he never doubted that his forthcoming marriage would be happy, whereas as it turned out . . . he checked himself.

" Why, Tony ! " he exclaimed with genuine pleasure. " How are you ? How did you find out I'd come to Mars ? "

" I'm very well, Joe," Tony said. " As to how I knew you were here . . . Well, the fact is I know most everything that happens out here on Mars. You see, I'm Commander of the Martian Home Forces, and I've just received the go-ahead from the Federation of Martian Communities to attack and destroy your group of toy-soldiers ! "

The friendly smile—it had been rather an over-friendly smile on the General's face—disappeared as if wiped off with a sponge.

" So you're a rebel, Tony," he exclaimed formally. " Well, it's my duty to hunt you down and fight you and capture you and finally hang you if you persist Don't be a fool, man. A trained soldier like yourself must know that a handful of discontented out-of-work miners and tramps and a horde of uneducated natives can't oppose a disciplined and heavily armed force like mine. It might be possible occasionally in the jungles back home, but not out in the open desert."

" You're wrong, Joe," Tony interrupted mildly. " We've got a very powerful ally on our side—an ally you don't understand —Mars. It's flat, bare, uninteresting at first. Thin air, cold nights, black sky. But different, Joe, and dangerous to people like you who live shut up in tents and air bags and domed towns and can't travel across the desert without tractors and air pumps and stores and heaps of paraphernalia."

Knowles was almost provoked to retort that he had one thing that really mattered—guns—but he was too good a soldier to give such information away. He closed his mouth firmly over the word. The rebels would learn before long. The guns would speak for themselves soon enough.

"It beats me what you and your associates think you're getting out of this," he asked instead. "What can you possibly have against the development work on Mars?"

"I'll tell you, Joe," Tony replied. "The Mining Companies are tearing the guts out of Mars. They're teaching the natives to become craftsmen and miners and metal-workers. They're feeding them synthetic foods. They're making them forget their old ways of living. They're interfering with the old ways of agriculture. They're . . ."

"And what's the matter with that?" Knowles interrupted. "They're better off."

"For the present. But the Mining Companies are still subsidised even today, Joe. They're not paying their way, and never will. Has anyone ever told you how much it takes to keep one man, that is to say one *modern* man, who needs a breathing mask, canned air, domed city, furniture, food, television, Earth-style feeding and a pension back home on Earth when his time here is finished? Well, it takes far more than he can produce, or ever will. In short, out here on Mars, man is an artificial creature. The moment Earth stops subsidising him, he'll collapse and disappear off the surface of this planet. And what's worse, the natives who have been made to forget their old skills and their former way of living may vanish too."

"Things seem to be going all right at present," Knowles commented briefly. He had already lost much of his interest in Shorefield and his notions. The man was obviously degenerated into a woolly-minded back-to-nature type of romantic. He refrained from cutting the conversation short simply because it was possible that Shorefield might give away some information of military value.

"Our policy is to adapt ourselves to the planet rather than to try to adapt it to our Earth-like way of life," Shorefield continued pleasantly.

"You mean go native?" Knowles asked sarcastically.

"Not entirely," Shorefield smiled. "It's true we've learned a lot about living on Mars from the natives—but the natives have learned from us. The way of life for the future lies somewhere between."

Knowles became suddenly impatient with this conversation. He had plans to make, instructions to give, details of his plans to work out. He had a campaign to conduct, a whole planet to reduce to peace and order with his small force.

" My advice to you, Tony, is to stop being a fool, and get out from among those no-goods you've got mixed up with before we catch up with you. I'll have your so-called native party smashed and scattered in a week, and anyone opposing me by force of arms will be subjected to the severest penalties."

" You're wrong, you know," Tony smiled. " Remember what I told you ? We've got an ally. Mars itself is on our side."

Knowles reached forward and switched off.

" Peters ? " he ordered. " Get through to Mars City again. Tell the Police Chief about this conversation. Ask him to find out how a rebel group, presumably somewhere out in the desert, discovered how to get a teleradio call through to me."

But nothing came to light about this occurrence ; the red-head telephone operator had disappeared.

III

Many great men, commanders and statesmen, have been able to do their work by day, then go to bed at night and sleep like children. General Knowles was not one of these. Beneath his unruffled decisive exterior he was a worrier.

On this occasion, while he sat in the high turret of his tractor as it rolled across the desert, part of his mind took note of his forces marching ahead of and behind him, the parties out on either flank, and the scouts on light vehicles beyond them still ; a very satisfactory sight to any military eye. But another part of his mind devoted itself to worrying about Tony Shorefield.

Of course, he had quite recently classified Shorefield as a degenerate, a waster. But the fellow had not been a waster in his youth, and did not resemble one now. He had appeared alert, clear-eyed, humourous, young-looking for his years—and he had prophesied that General Knowles would be defeated. " Mars itself is our ally," he had said. " You cannot beat Mars."

Knowles once again reviewed his situation. It seemed simple and satisfactory enough. He had a well equipped force of active tough men. He had transport, supplies and guns. The sole weak link in his armour was shortage of ammunition. He had only the barest minimum with him, but across the desert, five days' march away, lay Mars City, where there was a factory that could turn out an inexhaustible supply.

So they—the rebels, Tony Shorefield and his gang—must try to stop him before he got there. He wondered once more whether it would not have been wiser to disembark his troops in the neighbourhood of Mars City.

He recalled the objections to this scheme. The neighbourhood of Mars City was swarming with desert runners, out-of-work miners and tribal communities, part-native part-human in membership. These could have surrounded and overwhelmed his troops during the first dangerous hours after landing, when they were stumbling around, sick and ill-at-ease after their voyage. As things were, his men were now rested, acclimatised to some extent to the gravity, armed and alert, ready to meet anything that came against them.

He looked around at the circle of the horizon. The horizon lay close, like a tight ring, and close to it the sky was blue rather than black—and beyond that tight ring that hemmed him in lay the enemy ; men whose fathers had been born on this planet; tough men with big deep chests who could get around easily and live indefinitely in this seemingly empty cold desert ; small dark natives with inexpressive faces, artful, intelligent and civilised in their own way—and Tony Shorefield their leader, or perhaps he was called General Shorefield.

He looked at the horizon again, wondering what troops were assembling beyond it to oppose him.

In a moment of more than usual mental clarity he realised that Shorefield's rather purposeless teleradio conversation had been designed expressly to start him worrying in this fashion, but as this was evidence that Shorefield's mind was still as lively and as subtle as ever, the thought did not do much to ease his worry.

He took a grip on himself. He told himself that campaigns were won, not by suggestions and conversations, but by guns. He reminded himself again of these long black guns of his. For ten minutes he concentrated on immediate problems like fuel supplies, rest periods and rates of march. Then he reverted again to wondering what lay beyond the horizon.

The first night they lay out in the desert, nothing happened. The majority of the troops rested in their tents, glad to be able to breathe for a while without face masks. The guns were unlimbered from the tractors and mounted out on the perimeter. Lookouts occupied the top of every rise around the camp. Nothing happened.

Next day they made steady progress, except for a halt of an hour while the air-intake booster of one tractor was rectified. At the end of the day, however, the men were noticeably tired. It was hard to see why marching under a light gravity should be so exhausting, but this was the case ; every muscle of the body had to forget the estimates of stress and load and impact it had learned to make during a lifetime back on Earth. Breathing through a mask all day was an irritating, disconcerting experience. The men could not talk much as they marched, and when they did, their voices sounded thin and remote—and some of Knowles' own uneasiness had communicated itself to them.

During the next night, at about two in the morning, when one of the moons was sinking below the horizon, Knowles wakened to the sound of whistles blowing. He heaved himself off his bunk, seized his mask and insinuated himself through the tractor's exit valve. As he slid down to the ground he heard a burst of small arms fire.

He walked out from the deep shadow of the tractor and looked out across the star-lit plain. He stood with legs apart, head lifted. It was the business of some officer to deal with this affair, and to report about it presently. Meanwhile he himself must remain calm, unflurried, sternly unmoved.

There was more firing. He could discern a number of strange tall objects coming swiftly down a slope towards the perimeter of his encampment. What they were he had not the slightest idea. There were eight or ten of them, about thirty feet tall, rolling forward at a steady pace.

More bursts of firing. Nearer at hand the shouts of N.C.O.'s, as men were roused from their sleep and crawled from their tents and took post.

The tall swaying objects rolled inwards past the outposts. Now they were in among the tractors and guns. Knowles saw the brief red flash and heard the hard crack of exploding grenades.

The attacking vehicles—Knowles could see that the tall objects were some sort of sail—broke formation and changed direction. He saw that their present direction would carry them across a corner of the camp and out beyond it again. The firing continued as they swept on. More grenades exploded. Then there was a bright flash and an explosion. The vehicles rolled silently out beyond the perimeter, their passage accompanied by bursts of small-arms fire. They passed round the curve of a hill and out of sight. Knowles waited.

After about five minutes half-a-dozen of his officers came towards him.

"Well, Major Downs?" he asked quietly, "what's been going on?"

"Yes, sir. We were attacked by ten wheeled vehicles which were apparently driven by sails. When first sighted they were no more than a hundred yards away, coming down a slope of ground at considerable speed. The guards on our perimeter opened fire, but without any effect. The vehicles passed through the outposts. They broke formation and each one made towards a gun. As they passed near it they flung grenades. Three men have been killed, a gun-mounting damaged but repairable, and just at the last moment, sir, a stack of ammunition was blown up."

"I see," Knowles nodded. "Now let's be as precise about this as we can. Tell me how many vehicles there were, what speed they made, and how many men were managing each one, and finally what you consider their objective to be?"

"When the things came down the slope they seemed to move very fast, but that was just the effect of surprise, and moonlight, and the silence—actually they were not doing more than fifteen miles an hour, sir."

"And they were quite silent?"

"Except for a sort of rushing noise—yes, sir."

"They're just planks mounted on three huge wheels, sir," another officer added. "I don't think there were more than two men to each vehicle, and they appeared to be lying flat on the plank."

"And their objective?"

"There's no doubt about that—they were after the guns and the ammunition stacks."

"I see. I still have two questions to ask, gentlemen." He looked around them grimly from under the peak of his cap. "How did they get so close to us before being sighted? And why did none of you get the guns on them before they disappeared?"

The officers looked at each other uneasily.

"They were upon us very suddenly, sir—almost as if they had risen out of the ground. Then as they passed in among us the gun-crews began firing with their carbines. They disappeared just as suddenly."

"Very well." Knowles nodded, still unsmiling. "Five men killed out of a small force like ours is no light matter. However, we know something about our enemy now. We must expect

them to do this every night and we must make a better job of beating them off. Where's Mackenzie ? "

" Sir ? " Mackenzie asked, moving forward.

" What can you tell us about these sail-vehicles ? "

Mackenzie had lived on Mars for ten years. In addition to being the expedition's navigating officer he was adviser on Martian subjects.

" The first were built about ten years ago by some officers stationed out here. When I lived in Mars City sand-yacht racing was quite a fashionable sport. One used to see whole squadrons of them. You see, the air's pretty thin on Mars, but its speed is always high, and it never stops blowing."

" Were they like the things that attacked us last night ? "

" These seemed to have taller sails, but that isn't surprising. In this gravity it's possible to build very light and have very tall masts. They were being constantly improved and developed from the moment they were introduced."

" Did the natives use them ? "

" They took to them like ducks to water. The sand-yachts were changing the native way of life faster than any other device introduced by man. In the past each native community was pretty much anchored to its valley floor ; expeditions out across the desert were long and difficult and dangerous. Nowadays every native tribe has some sail-cars, and consequently they move around a lot more. They join up with other groups. They exchange information freely. Whole communities have moved away just because the Mining Corporation began opening up diggings in their valley."

" A risky business to cross the desert without navigational aids."

" They've got navigators, sir," Mackenzie explained. " Any human who understands navigation will always get a welcome from the natives—and there are plenty of humans living among them. Some of the communities that the government persist in calling native communities are really fifty per cent human now. There are human youngsters out there whose fathers and grandfathers have lived on Mars."

" You sound pretty indignant, Mackenzie," Knowles asked, good-humouredly. " Whose side are you on anyway ? "

" Well, sir," Mackenzie protested, " people back home talk and think as if we only reached Mars a couple of years ago, and as if the natives were dim-witted savages. There are humans

here who know nothing about Earth and care less. They'd probably die if they were taken back home."

"Perhaps so," Knowles agreed. "Thanks, Mackenzie. But now let's consider the business on hand, which is defence against a similar attack tomorrow night."

All next day the enemy, or rather the tall narrow sails of its desert cars could be seen on the horizon. As many as fifty white triangles were seen to windward at one instant, and very shortly after that an even larger number was seen up ahead on the line of march, but it was impossible to tell whether those were the same vehicles. It seemed unlikely that more than five or six men could travel on each sail-car, so that a very large number of them would be required to transport a force of effective size.

Nevertheless Knowles worried. He worried because these improbable vehicles were an entirely new factor in his problem. Fragile though they were, they could carry men swiftly and silently across the desert, and permit them to circle and re-group around him just out of sight over the horizon.

At one time he had been happy to think this campaign was to be a simple business, unmechanised except for the transport, but now he wished he had a reconnaissance helicopter which could keep watch on what was happening over the horizon. There were no helicopters or light slow-flying aircraft on Mars, for its thin atmosphere did not provide enough lift. No doubt some day effective designs for aircraft would be evolved, but at present this was just another of those factors which had not worked out according to the story-books.

Chiefly, he worried about Tony Shorefield. With Tony as their leader it was folly to regard the rebels as a pack of leaderless tribesmen hanging on his flanks like wolves, hoping for nothing better than to destroy some of his guns, or to damage one of his tractors if it fell out of line. They must surely be working to a plan.

He tried to comfort himself with the reminder that he was now only three days march from Mars City, where there was a source of unlimited ammunition.

The thought of this ammunition set his anxious thoughts off in a new direction. Getting control of the ammunition factory was the key manoeuvre in his campaign. If it failed his force would be no better equipped than the rebels—worse, in fact. He wondered what Tony Shorefield knew about the ammunition

factory. He tried very hard to convince himself that Shorefield was nothing but a down-and-out waster, but could not really believe his own assurances. Shorefield would have a plan that attacked him at his key-situation, the ammunition.

Of course, if the rebels had been a well-equipped army they might have attacked and taken over Mars City, but they had no arms ; the police reinforced by citizens could easily hold them off. Besides, a Martian City was a fragile thing to attack. If its domes were damaged during fighting the rebels' own friends and relatives would suffer.

The ammunition, he thought again, then turning to his adjutant, he said : " When you make your next contact with Mars City Police Chief, ask him to make a thorough check on the stocks of ammunition. Open some of the boxes at random and see whether the stuff has been tampered with. See that the fuses haven't been removed. Tell him to make a selection and do a firing proof of a dozen rounds selected here and there—and don't let the whole of Mars know what you're talking about; make sure you're on a tight beam. And warn him to take really adequate precautions against sabotage."

In any event, he reflected, even if some of the ammunition already manufactured has been sabotaged, that would be no irrecoverable loss, for the factory could soon turn out more. It was the productive capacity of the factory and of its machines that mattered.

He relaxed and looked out of the window of the steadily rolling tractor. He looked out across the undulating waves of soft fine shifting sand, which stretched towards the horizon.

On the horizon, white and shining against the deep dark blue of the sky there stood out a small triangle—a sail.

IV

About two in the morning, when the night was at its coldest, the enemy attacked again.

This time the expedition was ready for them—or almost ready, for the suddennes with which the sail-cars appeared at close quarters, as if materialising out of the ground, surprised them again. However the gunners managed to bring their guns to bear and opened fire without delay on the swooping, swaying sail-cars. The cars came on at a very considerable pace. In the darkness and confusion all guesses at speed were likely to be

exaggerated, but estimates and calculations made later showed that they must have reached at least twenty-five miles an hour.

They were at the perimeter within a few minutes of being sighted. The soldiers, kneeling, maintained a steady well-controlled fire against them, which seemed however to have remarkably little effect. The vehicles swerved round the perimeter, and attempted to penetrate inside among the troops. Once again Knowles heard the hard crack of grenades. The attack was being directed against the guns and ammunition.

A car changed direction suddenly and darted into the middle of the encampment. It passed quite near to Knowles. Its sail was a tall narrow triangle, towering into the sky. It made a rushing noise as it hurtled across the hard sand. The crew must have been lying flat on the platform for he did not see them except for an instant when a dark form rose to kneeling position to throw a grenade.

The grenade burst against the side of one of the tractors, tore off part of the starboard track, and cracked its dome.

Then suddenly the sail-cars were gone, rushing out into the dark, swerving this way and that.

The gunners began firing again. Shells exploded among the fleeing enemy. One was hit immediately while it was still quite near the encampment. A wheel came off and bowled away. The vehicle appeared to disintegrate, and the tall mast bowed itself and fell slowly down to the ground, with the sail billowing around it.

The fleeing sail-cars wheeled round the slope of a dune. Just before they disappeared, in fact when only the sails were visible, three shells burst among them, and it appeared certain that a number of them were hit.

Abruptly the banging of guns and the rattle of carbines ceased. The encampment became silent. There was a movement here and there where medical orderlies hustled some wounded men into the hospital tent.

General Knowles took stock of the situation. Two men only had been killed outright, but four who had been wounded had pulled off their breathing masks, or had failed to keep them working, and so had died before help reached them.

One tractor had been seriously damaged and would have to be abandoned, but no ammunition and no guns had been destroyed this time.

On the other side of the balance sheet, one sail-car had certainly been destroyed, and several damaged. In addition, a heavy and accurate fire had been directed at all the attackers and it seemed likely that a considerable number of the crews must have been hit.

General Knowles walked around the area with his officers. Some of the enemy's methods immediately became clear. Their attack had been made along a flat valley or depression in which there were patches of moss, and signs of dampness. Each night this damp sand and moss would freeze, providing a hard surface over which the sail-cars could get up a good speed. To leeward of the camp, there were dunes behind which the enemy could quickly disappear.

" Well," General Knowles growled, pulling his mask aside to speak. " We're learning their methods. Tomorrow night we'll avoid these features. Let's have a look at that car."

They walked to the other side of the encampment, where the shattered remains of a sail-car lay.

There were four bodies beside it, lying stiff and frozen in the icy cold of the morning. Three were natives, and one, still wearing a breathing-mask, was human.

" He's a third generation Martian," Mackenzie deduced. " You can tell by the big development of chest and lungs, and the growth of hair."

" They're different, then ? " Knowles asked.

" Oh yes. Some people say that sixth or seventh generation humans will be able to get around on Mars without masks. A very large number of the children born are mutated—lots of body hair, for instance, and different skin texture which makes their bodies better able to conserve heat."

But General Knowles was not very much interested in this sort of information. He turned to examine the shattered remnants of the car. Its mast was very long and slender and the material of the sail was closely woven, and almost transparent. He recognised this as a Bermuda rig, a sail-design developed back home on Earth to a very considerable pitch of perfection in racing yachts. He remembered this type of sail was tall and narrow, and had some of the aerofoil characteristics of an aircraft wing.

" There's nothing crude or makeshift about this," he commented. " The man who designed it knew what he was doing."

The car had three wheels of large diameter, very lightly constructed. The treads were fully a foot in breadth and made very skilfully of thin curved board.

An officer bent down and produced a shining object from among the wreckage.

" Look at this, sir," he held it up.

It was an annulus of quartz, twelve inches or so in diameter, its central hole being about eight inches in diameter.

" It's a wheel-bearing—seems to have been made and polished by hand. Must have taken months to make."

" No doubt," another agreed. " But once made it'll last many times the life of one of the sail-cars. You know, sir, these vehicles aren't crude devices built by ignorant natives. They're well-perfected designs. A lot of human skill and native know-how has been combined to produce them."

" So I'm beginning to realise," General Knowles admitted.

The basic structure of the vehicle was an axle between the two front wheels, and a long back-bone. The steering was by means of a tiller controlling the rear wheel. The axle and back-bone though made of native timber were complex, semi-flexible members.

A couple of fibrous planks about six inches thick and eighteen inches high were fixed to the platform of the vehicle. One of the officers demonstrated that by lying down on the platform between these planks the crew would be protected against machine-gun-bullets.

General Knowles admitted to himself that the sail-cars—or rather the fact that they were carefully designed efficient vehicles was an important new factor in his game of war. But on reflection he did not believe they would be decisive. If several hundreds of them with well-armed crews had made a mass attack upon him during the first night, the consequences might have been disastrous. But in fact, the element of surprise had been wasted. He now knew what they were, understood something of their tactics, and had definite ideas about how to oppose them.

Next day was the expedition's third day on the march.

The men were showing greater signs of fatigue than had been expected, and the need to wear breathing-masks, and to keep their little battery-operated air compressors running, was causing a curious sort of uneasiness. Some men unclipped their masks and tried to march without them, but after a hundred yards or so the effect of oxygen deficiency caused them to collapse. After two men who had collapsed had to be hustled into the medical

tractor for treatment, an order was issued making it an offence to remove masks.

The officers reported to Knowles that fantastic rumours about Mars and its inhabitants were circulating among the men ; old tales of monsters with powers of making themselves invisible; stories of a curse that fell on all humans who set foot on this planet ; some of course had seen the dead bodies of the two natives lying beside the wrecked car, and it was being whispered that these had been human once, but that life on this grim and featureless planet had made them grow smaller and turn black and grow fur.

Two hundred years after Mars had been reached by humans, and nearly a hundred after systematic colonisation had got under way, it was incredible that such nonsensical ideas could persist, but many of the soldiers were ignorant men from remote corners of the Earth. One of them, so Knowles learned, refused to believe he was on Mars at all, he said the expedition was somewhere in the middle of one of the Australian deserts. All this talk about colonisation of Mars was just government propaganda to tempt people to leave the over-crowded areas and colonise the remote deserts of Earth. Anyone could see, this man persisted, that stars were just specks of light about a couple of miles up in the sky. Anything else was just lies designed by governments to deceive the masses.

The officer who told this to Knowles showed some inclination to beat his head against the wall of the tractor, but Knowles was of a more practical mind.

" There will always be uneducated, stupid, opinionated blockheads," he commented. " But let's not fail to see the situation in proper perspective. The sail-cars are a surprise. They have inflicted losses. We may expect heavier attacks tonight and on succeeding nights. The fatigue and irritation the men feel is unexpected too, and these preposterous rumours and theories add to their uneasiness. Nevertheless, we're still intact. Our losses are small. The sail-cars have been wasted as a surprise weapon. However fatigued the men are, and however much they are disturbed by rumour, they'll still march. We've every chance of reaching Mars City, and the ammunition, and that's all that matters."

That day Knowles got a report through from Mars City. The Police Chief had met with no sort of trouble. He said that many of the native groups and half-native half-human com-

munities which usually lived in the neighbourhood of Mars City had moved away. A few young men who had ordinarily lived and worked in the city had disappeared and a surprising number of young women likewise. But within the City everything was under control. The munitions factory was being carefully guarded, and no attempts had been made to sabotage it. Like most of the workshops on Mars it was underground and consequently very easy to guard. As to the ammunition, there was plenty of it. Every case, almost every round, had been examined, and it was certain none had been tampered with. A number of rounds selected at random had been fired satisfactorily from proof barrels.

Doubts about this stock of ammunition had been gnawing continuously at Knowles' mind but now they were dispelled. His relief was so great that he almost relaxed his unapproachable manner to the extent of slapping his executive officer heartily on the back—almost, but not quite. In the last day or so he had felt an increasing urge to relax his official manner and talk to someone—to let his hair down to voice his fears and doubts and even his private hopes and ambitions. But to relieve his feelings by a spell of such natter would be fatal. As it was, he knew he was smoking more than usual, but supposed his officers had not noticed this.

Only a few minutes after he got this comforting news his radio operator called to him.

" That call you got a couple of days ago through Mars City Exchange, sir—he's calling again," the man told him.

Knowles crossed the tractor's cabin and sat down by the receiver.

" Hullo, Joe," Tony Shorefield's face smiled to him from the screen. " Everything well with you ? "

" Everything's quite well," Knowles told him calmly.

" Been checking up on that stock of ammunition in Mars City, haven't you, Joe ? " Shorefield asked.

The words were like a knife stabbing at Knowles' heart.

" You seem to get all the news, Tony," he answered, still calmly.

" I get to know every single thing that happens here on Mars," Tony assured him. " I even get to know what people think. I've got a pretty good idea what's going on in your mind, for instance, Joe old man. Been picturing yourself as Governor of Mars, haven't you ? "

" I've been thinking about my job most of the time," he answered.

" You did marry that girl, Mary—what was her name ? " Tony continued reflectively, as if following some train of thought. "Ambitious type of young woman—although I seem to remember there were times when she forgot about being ambitious." He smiled reminiscently, then he added : " But don't worry about that stock of ammunition in Mars City, Joe. There's absolutely nothing wrong with it." He cut off. The screen went dead.

Shorefield's amiable and apparently rather pointless remarks left Knowles more shaken than a sustained artillery barrage could have done.

" If that so-and-so tries to link in to us again," he shouted to the radio man, " don't touch it ! Don't touch it, do you hear ? " The man looked round at him in utter amazement, for his voice was trembling on the verge of hysteria.

" Very good, sir," he replied.

Knowles returned to his unpleasant thoughts. In a few inconsequential words Shorefield had bared the weaknesses of his soul. Shorefield knew the forces that drove him. He knew what a greedy, grasping female horse-trader his wife was. How well he knew Mary. In an agony of torment Knowles wondered exactly just how well he had come to know Mary twenty years ago. Certain incidents returned to his memory. Fiercely he pulled himself together. What Shorefield said didn't matter. Whatever had happened in the past didn't matter. Nothing mattered, except the ammunition at Mars City.

" Call up Smithson in the leading tractor," he ordered. " Tell him I want our speed pushed up a notch. We're falling behind schedule."

" But sir," his exec protested, " the men are scarcely holding the pace."

" Do as I say," he snapped.

V

They moved fast all day, and continued longer than usual, so that the complex procedure that was necessary for settling into camp at night became confused. A carefully thought-out routine had been worked out for evening camp ; the men must erect and inflate the four-man plastic tents, then as soon as air pressure had been built up inside, they were required to spend half-an-hour relaxed, recovering from the restrictive efforts and mental frustrations of a day's march in breathing masks. Later

they were fed in groups of forty inside some of the tractors. This meal hour was the only time during the day when they could really be at ease, and laugh, exchange jokes and smoke.

On this occasion the procedure was so rushed that a good deal of muddle resulted. Some men did not get their fair share of food, and many had no time for their smoke. The force spent the whole night on the alert.

Knowles was convinced that Shorefield must inevitably make an attack in force that night, otherwise the element of surprise that the sail-cars represented would be entirely wasted, so he took special care to see that his force was prepared and alert. He gave orders to his gunners to aim at the wheels of the sail-cars, and insisted that grenades should be used instead of small-arms fire, which seemed to be particularly ineffective against the tough resilient fibrous material of which the vehicles were constructed.

But no attack was made that night.

Next morning their start was decidedly ragged. Because of the disorganisation of meals the night before two tractor-mechanics had not bothered to clean the sand-filters in the air intakes, these were so clogged with sand that for some time the engines could not be made to start.

The men were put on a charge. The column got under way, setting a fast pace.

As usual, the tips of white sails could be seen here and there on the horizon.

After a couple of hours, a refuelling tractor broke down. In this case it was found that the driver had simply removed the sand-filter in order to get his engine started, and had forgotten to replace it. The fine sand of Mars had immediately begun to insinuate itself into the cylinders and bearings, and in the course of two hours had ground and scraped and chewed at them till they melted and seized.

The other tractors were refuelled to the limit of their capacity from the crippled tanker, and it was abandoned.

" Don't be too concerned, gentlemen," Knowles told his officers. " We're beginning to have a little trouble, I know, but then in any plan things happen which are not envisaged. It's our job to adjust and adapt to these incidents, to keep the situation under control and to see that the whole plan does not begin to go wrong and fall to pieces. See that there's no more trouble with these sand-filters, please."

" All very well," one of his officers said to another, " but the root cause is his own decision to step up the pace."

" Showing signs of anxiety beneath that iron frontage, don't you think ? " the other commented.

The column pressed on during the afternoon. Knowles began to think about the night that lay ahead. The force would reach Mars City very soon now, so the final all-out attack which Shorefield was bound to make must be made during the coming night. He would be glad when it happened, for he had not the slightest doubt he could beat it off and inflict very serious casualties. Then that would be that—the enemy would have done its worst and failed

As he reflected this his attention was attracted to a group of tall white objects skimming down the side of a sand-dune. At that same instant the radio intercom beside him came to life with a loud clonk.

" Sergeant Nicholls, in advance on starboard flank, sir. Enemy sail-cars moving in towards the column. They've just passed us."

" Port flank, sir," another voice followed immediately. " Twenty sail-cars attacking the rear column."

" These should have been spotted half-an-hour ago," Knowles snapped. " Why have they been allowed to get right in among us ? "

He knew already what was happening. Shorefield was attempting the almost-impossible ; he was laying on a daylight attack despite the fact that his force could be seen miles away and knocked over like nine-pins. But he was doing it late in the day when Knowles's men were tired and ragged—and the attackers were after all not miles away ; how could they have got in so close on all sides without being spotted ?

He took a swift glance out through the plastic window of the cabin and what he saw nearly made his heart stop. There were sail-cars everywhere. They were in among the tractors, in among the men. They seemed to have sprung up out of the ground. Over in the distance he saw a platoon kneeling and firing at three cars. He saw a white puff of smoke which told that a grenade had burst among the men. A sail-car hurtled past his own tractor so close that for a moment his view was obscured by its tightly stretched sail. Where had they come from ? How had so many got so close without being spotted by the scouts ?

He seized the microphone. "General Knowles speaking," he announced. "All tractors continue moving inwards towards my command car, then take up battle positions. On no account open fire until you've done so, otherwise we'll be shelling ourselves with our own guns. Move inwards, take post according to plan. We can't do much while they're among us, but prepare to teach them a hard lesson when they begin to retreat."

He looked out on a scene of wild confusion. An immense number of sail-cars were sweeping round the area. Everywhere there appeared the white puffs of exploding grenades. Over the inter-com which the radio-op left on open circuit there emerged a babble of sound—the orders of officers, the excited answers of N.C.O.'s and a lot of shouting and angry swearing.

As he looked, however, Knowles saw that the confusion of movement on the face of the desert was resolving into a pattern. His own vehicles were moving inwards; one by one he saw his guns unhitched and swung round. The movement of the sail-cars, on the other hand, was inevitably down-wind. Very soon now they would be clear of his force and unable to do any further damage—then they must turn and run.

He seized the microphone again.

"Attention! Attention! Attention! he called. "The enemy's moving down-wind. Within the next few minutes they'll have to turn and run. Be prepared to treat them to controlled accurate gun-fire."

His tractor stood on a small rise, and its cabin was fully forty feet above ground, so he had an excellent view of the battle-field.

The sail-cars were sweeping back and forward through the camp, moving steadily to lee-ward. It was a sort of ballet-dance of long, rocking and swaying triangular sails—but a very deadly sort of dance; whenever a sail-car passed near a group of soldiers, two or three small objects arched out from beneath its sail to explode among them.

Knowles saw that his soldiers were behaving admirably. He saw the long barrels of the guns swing round, seeking targets, and every so often a burst of orange flame from their muzzles. The soldiers lay around the guns firing at any sail that approached.

Quite suddenly, just as Knowles expected, the enemy began to turn and run. He noticed that to escape each one turned onto a strip of hard ground in the bottom of a depression, a strip that sloped gently away from the camp. On this they gathered

speed and swept out of sight. He signalled his gunnery officers, and at once a barrage was laid down across this spot. Some of the sail-cars were knocked over as they raced through this trap; others diverged, but were very much slowed down in consequence Almost in an instant the attack was over; the last enemy sail had vanished; the soldiers rose to their feet, the long barrels of the guns swung down.

The damage : seven tractors completely wrecked; five requiring repair; five guns unserviceable; thirty-seven men killed, twenty-five injured; a large quantity of ammunition destroyed in stacks, and a considerable quantity expended.

The enemy of course had lost far more heavily. The wreckage of thirty-five sail-cars lay scattered around the battle-field, sails spread on the ground, masts drooping, wheels smashed, and there were at least a hundred dead, of whom it seemed fifty per cent were Earth-men. But it was the ammunition state that frightened Knowles. In his mind, in which there were growing the seeds of panic, he reckoned that he could beat off only one more attack of that scale. He blew a long stream of smoke from his nostrils and looked at his officers. He did not attempt to appear urbane now, on the contrary, his tone was savage.

" Someone blundered," he told them. " There can be no excuse for the fact that these natives got among us like that. They should have been spotted as they came over the horizon. I want to know why no-one gave warning till they were right among us ? "

" There was no blunder, sir. We walked into an ambush."

" An ambush—in the open desert ? Don't talk nonsense," Knowles snorted.

" Yes, sir. They were waiting for us behind the dunes with the masts of their ships lowered. I think some of them were camouflaged or even buried in the sand, and each group lay in a spot from which they got a good starting run to sweep down on us."

" Is this true ? " Knowles demanded, looking round.

" Yes, sir. I was out on the flank and I saw ten of the cars being pushed to the top of a rise—then the masts went up and the crews jumped aboard and they swept down on us."

" That's how they managed to be so sudden with those night-attacks," another officer explained. " They push the cars forward with the masts down, till they're sufficiently close."

" I understand," Knowles admitted. He exercised the greatest restraint to stop himself biting his nails.

" Well, we know a great deal more about the enemy's tactics," he said confidently.

" They seem to have a great variety of tactics," one of his audience remarked. " First they make us believe they're only able to mount small-scale night-attacks, then when that idea's firmly planted in our heads, they lay on a much bigger day light effort—an ambush in country where no ambush seems feasible. These people must have a very clever, flexible-minded commander. I think . . " but the speaker stopped, seeing the look in the General's eye.

Knowles was not the sort of man who was at his best in defeat, or when defeat threatened. Now he felt within him a rising tide of panic. Instead of immediate success, congratulations, promotion and eventually a governor-ship, he saw himself becoming a laughing-stock, a general in command of an armoured column who let himself be defeated by a crowd of natives mounted on sand-yachts, and armed with nothing better than home-made grenades. Of course he knew his force could not correctly be called an armoured column, and he knew the enemy were being skillfully led, and that their equipment was perfectly adapted to the situation, but would the public back home on Earth ever believe this ?

He ordered changes in the marching order; he increased the rate of march; he rationed the ammunition to each gun; he scattered the small remaining stores of ammunition into smaller stacks.

During the rest of the journey the force was subject to almost continual harassing attacks, night and day. The tactics were continuously varied. Sometimes sails would approach from every direction simultaneously; occasionally a large number would swoop down in squadron formation. One night small attacks were made continuously, the next—the last—nothing happened till sunrise.

At the start of the last day's march everyone—Knowles, his officers, and the men also, were extremely tensed and anxious.

If the enemy general knew his job he must soon—today, it could not be later than today—make his last attempt to crush them, over-run them, bomb them and destroy them. Every man in the force knew this. They prepared for the decisive battle.

In the middle of the morning it seemed as if that final moment had come ; they saw the tips of masts on the sky-line ahead; others appeared on each flank; groups of the sails dipped out of sight and re-appeared.

As soon as the sails began to move forward, Knowles halted his force, and took up defensive positions, for he had no intention of being caught again in open formation. The attack never developed however. The sail-cars moved around on the sky-line, but did not close in. After half an hour he gave the order to resume the march.

In the middle of the day, a large number of sails were sighted right ahead on the line of march, grouped closely together. They remained stationary, as if awaiting the right moment to skim down upon the column. On Knowles' orders two guns unlimbered, swung round and opened fire. They found the range in the first couple of rounds, and quickly blew the sails to shreds or toppled them over.

When the column reached the spot, however, nothing more was found than the remains of a group of masts which had been planted in the sand.

Knowles realised that not another round must be fired until it was certain that the enemy was committed to his final attack.

But the rest of the day passed, the domes of Mars City eventually came in view, and the enemy kept its distance, the white sails bobbing and swaying, and skimming down the flanks of the sand-dunes.

Knowles grew cheerful, then jubilant. " The fact is, they haven't got what it takes to press home an attack," he exclaimed to his executive officer. " Shorefield can plan well and he's developed a good tactic but his people haven't got the guts to face our gun-fire again. Well ! Well ! Well ! Interesting while it lasted, don't you think ? " He actually slapped the officer on the back this time, to the latter's great amazement. " Now here's the programme," Knowles went on energetically. " We'll be outside the south entrance to the City in half an hour—get the wounded and sick inside, and send all defective tractors for overhaul; then get billets in the town for one third of the force."

" One third, sir ? "

" Yes. I intend to work a rotation scheme—one third of the force resting while the rest are out on mopping-up operations. I'm starting mopping-up at once. I want the fully serviceable tractors fuelled up, food-stocks for thirty days, and . . ." he

paused significantly, " the maximum of ammunition loaded. We're going after these rebels hard and fast without pause. We're going to blast every sail that shows itself on the horizon, and chase them back to their lairs and smash them. So get things moving."

The force halted and encamped within half a mile of the main entrance to the city. The rebel fleet of sails still moved around on the horizon. There seemed to be more of them than ever, sliding and swooping back and forth. Knowles thought he had never seen so many.

" Too late," he snorted contemptuously. " An all-out attack pressed home earlier today might have done us serious damage. Here comes our ammunition, just in time to teach them their first sharp lesson before darkness falls. We'll soon send them scuttling back over the sky-line."

A long line of loaded trolleys was coming out across the sand. Knowles returned to his command vehicle, and prepared to receive the group of civilians he saw approaching. He resumed his habitual calm, stern, unflurried demeanour; he was once more a man in complete control of events, master of every situation.

In the midst of the introductions, hand-shaking and explanations that occupied the next half-hour however, he found it impossible to restrain himself every now and again from glancing out through the perspex to see the trolleys trundling round the guns, dumping case after case beside them, and still more trolleys delivering still more identical cases into the open maws of the tractors.

" . . . and of course you know about the Mars inch, General?" This was the manager of the ordnance factory.

"I beg your pardon?" the General asked politely, indifferently.

" . . . I said, of course you've made allowance for the Mars inch, General ?" the man repeated. He smiled apologetically, knowing well this was a too-obvious point to raise with such an important officer.

" I'm afraid I don't understand," Knowles told him, raising an eyebrow.

" Oh !" the man exclaimed confusedly. " The Mars inch is slightly bigger than the Earth inch, you know . . . Some sort of mistake was made way back a hundred years ago—not that it has ever mattered much. I expect your armament officer knows."

General Knowles did not answer. He was as a matter of fact incapable of answering just at present, for his heart had missed a couple of beats, and his brain felt as if it had begun to spin round inside his head, faster and faster.

"These three-inch projectiles I'm supplying you with are really three-and-an-eighth inches in diameter by Earth standards. Unless you've brought special gun-barrels, you won't be able to fire them. I expect you've done that, though. Of course, in time, given six months or so and some equipment out from Earth, we could re-tool the factory . . ."

But Knowles did not hear this amiable anxious patter; he could not hear it for the roaring in his ears.

Outside, it was growing dark. The fleet of white sails which had been hovering, circling round, gliding back and forward all afternoon, seemed now to swirl faster as if stirred by a strong wind, The angle of the sails shifted; suddenly they all seemed to be skimming in towards the encampment.

The executive officer said something to Knowles, but he never answered; he just sat there, grimacing and biting his nails.

Alan Barclay

Following immediately after his story "Quick Freeze" in last month's issue comes another neat tale from the mind of Bob Silverberg. Once again he takes a scientific fact and weaves it into a fictional possibility with extremely interesting results.

SUNRISE ON MERCURY

By Robert Silverberg

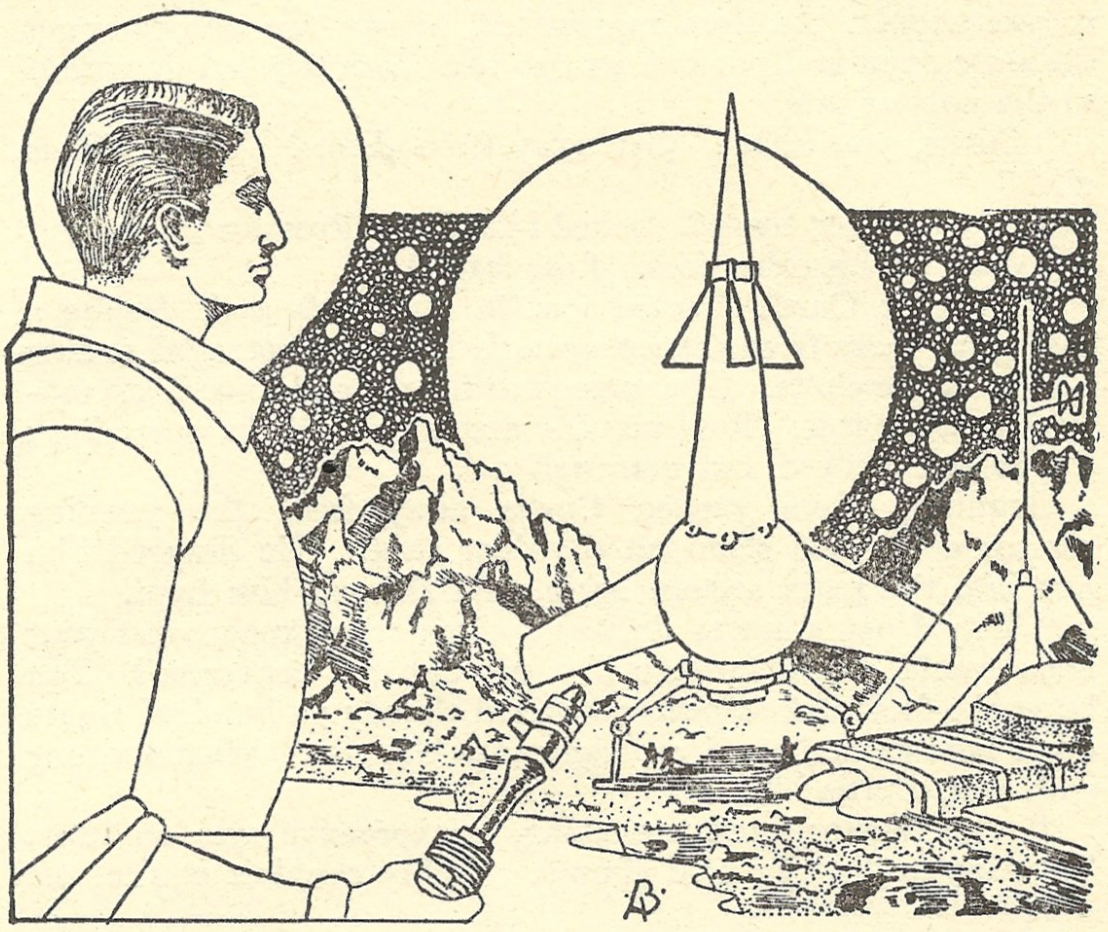
Illustrated by HARRY

Nine million miles to the sunward of Mercury, with the *Leverrier* swinging into the series of spirals that would bring it down on the Solar System's smallest world, Second Astrogator Lon Curtis decided to end his life.

Curtis had been lounging in a webfoam cradle waiting for the landing to be effected; his job in the operation was over, at least until the *Leverrier's* landing-jacks touched Mercury's blistered surface. The ship's efficient sodium-coolant system negated the efforts of the swollen sun visible through the rear screen. For Curtis and his seven shipmates, no problems presented themselves; they had only to wait while the autopilot brought the ship down for Man's second landing on Mercury.

Flight Commander Harry Ross was sitting near Curtis when he noticed the sudden momentary stiffening of the astrogator's jaws. Curtis abruptly reached for the control nozzle. From the spinnerets that had spun the webfoam, came a quick green burst of dissolving fluorochrene; the cradle vanished. Curtis stood up.

"Going somewhere?" Ross asked.



Curtis' voice was harsh. "Just—just taking a walk."

Ross returned his attention to his microbook for a moment as Curtis walked away. There was the ratchety sound of a bulkhead dog being manipulated, and Ross felt a momentary chill as the cooler air of the super-refrigerated reactor-compartment drifted in.

He punched a stud, turning the page. Then—

What the hell is he doing in the reactor compartment?

The autopilot would be controlling the fuel flow, handling it down to the milligram, in a way no human system could. The reactor was primed for the landing, the fuel was stoked, the compartment was dogged shut. No one—least of all a Second Astrogator—had any business going back there.

Ross had the foam cradle dissolved in an instant, and was on his feet in another. He dashed down the companionway and through the open bulkhead door into the coolness of the reactor compartment.

Curtis was standing by the converter door, toying with the release-tripper. As Ross approached, he saw the astrogator get the door open and put one foot to the chute that led downship to the nuclear pile.

" Curtis, you idiot ! Get away from there ! You'll kill us all ! "

The astrogator turned, looked blankly at Ross for an instant, and drew up his other foot. Ross leaped.

He caught Curtis' booted foot in his hands and, despite a barrage of kicks from the astrogator's free boot managed to drag Curtis off the chute. The astrogator tugged and pulled, attempting to break free. Ross saw the man's pale cheeks quivering ; Curtis had cracked, but thoroughly.

Grunting, Ross yanked Curtis away from the yawning reactor chute and slammed the door shut. He dragged him out into the main section again, and slapped him hard.

" Why'd you want to do that ? Don't you know what your mass would do to the ship if it got into the converter ? You know the fuel intake's been calibrated already ; a hundred eighty extra pounds and we'd arc right into the sun. What's wrong with you, Curtis ? "

The astrogator fixed unshaking, unexpressive eyes on Ross. " I want to die," he said simply. " Why couldn't you let me die ? "

He wanted to die. Ross shrugged, feeling a cold tremor run down his back. There was no guarding against this disease.

Just as aqualungers beneath the sea's surface suffered from *l'ivresse des grandes profondeurs*—rapture of the deeps—and knew no cure for the strange, depth-induced drunkenness that prompted them to remove their breathing-tubes fifty fathoms below, so did spacemen run the risk of this nameless malady, this inexplicable urge to self-destruction.

It struck anywhere. A repairman wielding a torch on a recalcitrant strut of an orbiting wheel might abruptly rip open his facemask and drink Vacuum; a radioman rigging an antenna on the skin of his ship might suddenly cut his line, fire his directional-pistol, and send himself drifting away sunward. Or a Second Astrogator might decide to climb into the converter.

Psych Officer Spangler appeared, an expression of concern fixed on his smooth pink face. " Trouble ? "

Ross nodded. " Curtis. Tried to jump into the fuelchute. He's got it, Doc."

Scowling, Spangler rubbed his cheek, then said: "They always pick the best times, dammit. It's swell having a psycho on a Mercury run."

"That's the way it is," Ross said wearily. "Better put him in stasis till we get home. I'd hate to have him running loose looking for different ways of doing himself in."

"Why can't you let me die?" Curtis asked. His face was bleak. "Why'd you have to stop me?"

"Because, you lunatic, you'd have killed all the rest of us by your fool dive into the converter. Go walk out the airlock if you want to die—but don't take us with you."

Spangler glared warningly at him. "Harry—"

"Okay," Ross said. "Take him away."

The psychman led Curtis within. The astrogator would be given a tranquilizing injection and locked in an insoluble webfoam jacket for the rest of the journey. There was a chance he could be restored to sanity, once they returned to Earth, but Ross knew that the astrogator would make a beeline for the nearest method of suicide the moment he was let loose in space.

Brooding, Ross turned away. A man spends his boyhood dreaming about space, he thought, spends four years at the Academy and two more making dummy runs. Then he finally gets up where it counts, and he cracks up. Curtis was an astrogation machine, not a normal human being; and he had just disqualified himself permanently from the only job he knew how to do.

Ross shivered, feeling chill despite the bloated bulk of the sun filling the rear screen. It could happen to anyone . . . even him. He thought of Curtis lying in a foam cradle somewhere in the back of the ship, blankly thinking over and over again *I want to die*, while Doc Spangler muttered soothing things at him. A human being was really a frail form of life, Ross reflected.

Death seemed to hang over the ship; the gloomy aura of Curtis' suicide-wish polluted the atmosphere.

Ross shook his head and punched down savagely on the signal to prepare for deceleration. The unspinning globe that was Mercury bobbed up ahead. He spotted it through the front screen.

They were approaching the tiny planet middle-on. He could see the neat division now: the brightness of Sunside, the unapproachable inferno where zinc ran in rivers, and the icy blackness of Darkside, dull with its unlit plains of frozen CO_2.

Down the heart of the planet ran the Twilight Belt, that narrow area of not-cold and not-heat where Sunside and Darkside met to provide a thin band of barely-tolerable territory, a ring nine thousand miles in circumference and ten or twenty miles wide.

The *Leverrier* plunged downward. "Downward" was actually a misnomer—space has no ups or downs—but it was the simplest way for Ross to visualize the approach. He allowed his jangled nerves to calm. The ship was in the hands of the autopilot; the orbit was precomputed and the analog banks in the drive were happily following the taped programme, bringing the ship to rest smack in the middle of—

My God!

Ross went cold from head to toe. The precomputed tape had been fed to the analog banks—had been prepared by—had been the work of—

Curtis.

A suicidal madman had worked out the *Leverrier's* landing programme.

Ross' hands began to shake. How easy it would have been, he thought, for death-bent Curtis to work out an orbit that would plant the *Leverrier* in a smoking river of molten lead—or in the mortuary chill of Darkside.

His false security vanished. There was no trusting the automatic pilot; they'd have to risk a manual landing.

Ross jabbed down on the communicator button. "I want Brainerd," he said hoarsely.

The First Astrogator appeared a few seconds later, peering in cautiously. "What goes, Captain?"

"We've just carted your assistant Curtis off to the pokey. He tried to jump into the converter."

"He—?"

Ross nodded. "Attempted suicide; I nabbed him in time. But in view of the circumstances I think we'd better discard the tape you had him prepare and bring the ship down manually, yes?"

The First Astrogator moistened his lips. "Maybe that's a good idea," he said.

"Damn right it is," Ross said, glowering.

As the ship touched down, Ross thought, *Mercury is two hells in one.*

It was the cold, ice-bound kingdom of Dante's deepest pit—and it was also the brimstone empire of another conception. The two met, fire and frost, each hemisphere its own kind of hell.

He lifted his head and flicked a quick glance at the instrument panel above his deceleration cradle. The dials all checked: weight displacement was proper, stability 100%, external temperature a manageable 108F., indicating they had made their landing a little to the sunward of the Twilight Belt's exact middle. It had been a sound landing.

He snapped on the communicator. "Brainerd?"

"All OK, Captain."

"How was the landing? You used manual, didn't you?"

"I had to," the astrogator said. "I ran a quick check on Curtis' tape and it was all cockeyed. We'd have grazed Mercury's orbit by a whisker and kept going—straight for the sun. Nice?"

"Sweet," Ross said. "But don't be too hard on the kid; it's not his fault he went psycho. Good landing, anyway. We seem to be pretty close to the centre of the Twilight Belt, give or take a mile or two."

He broke the contact and unwebbed himself. "We're here," he announced over the shipwide circuit. "All hands to fore double pronto."

The men got there quickly enough—Brainerd first, then Doc Spangler followed by Accumulator Tech Krinsky and the three crewmen. Ross waited until the entire group had assembled.

They were looking around curiously for Curtis, all but Brainerd and Spangler. Crisply, Ross said, "Astrogator Curtis won't be with us. He's aft in the psycho bin; luckily, we can shift without him on this tour."

He waited till the implications of that statement had sunk in. The men adjusted to it well, he thought, judging from the swiftness with which the horror faded from their faces.

"All right," he said. "Schedule calls for us to spend a maximum of thirty-two hours on Mercury before departure. Brainerd, how does that check with our location?"

The astrogator frowned and made some mental calculations. "Current position is a trifle to the sunward edge of the Twilight Belt; but as I figure it, the sun won't be high enough to put the Fahrenheit much above 120 for at least a week. Our suits can handle that sort of temperature with ease."

" Good. Llewellyn, you and Falbridge break out the radar inflaters and get the tower set up as far to the east as you can go without roasting. Take the crawler, but be sure to keep an eye on the thermometer. We've only got one heatsuit, and that's for Krinsky."

Llewellyn, a thin, sunken-eyed spaceman, shifted uneasily. " How far to the east do you suggest, sir ? "

" The Twilight Belt covers about a quarter of Mercury's surface," Ross said. " You've got a strip 47 degrees wide to move around in—but I don't suggest you go much more than twenty-five miles or so. It starts getting hot after that, and keeps going up."

" Yes, sir."

Ross turned to Krinsky. The Accumulator Tech was the key man of the expedition; it was his job to ckeck the readings on the pair of Solar Accumulators that had been left here by the first expedition. He was to measure the amount of stress created by solar energies here, so close to the source of radiation, study force-lines operating in the strange magnetic field of the little world, and re-prime the Accumulators for further testing at a later date.

Krinsky was a tall, powerfully-built man, the sort of man who could stand up to the crushing weight of a heat-suit almost cheerfully. The heat-suit was necessary for prolonged work in the Sunside zone, where the Accumulators were—and even a giant like Krinsky could stand the strain only for a few hours at a time.

" When Llewellyn and Falbridge have the radar tower set up, Krinsky, get into your heat-suit and be ready to move. As soon as we've got the Accumulator Station located, Dominic will drive you as far east as possible and drop you off. The rest is up to you. We'll be telemetering your readings, but we'd like to have you back alive."

" Yes, sir."

" That's about it," Ross said. " Let's get rolling."

Ross' own job was purely administrative—and, as the men of his crew moved busily about their allotted tasks, he realized unhappily that he himself was condemned to temporary idleness. His function was that of overseer; like the conductor of a symphony orchestra, he played no instrument himself, and was on hand mostly to keep the group moving in harmony toward the finish.

Now, he had only to wait.

Llewellyn and Falbridge departed, riding the segmented, thermo-resistant crawler carried in the belly of the *Leverrier*. Their job was simple : they were to erect the inflatable plastic radar tower far to sunward. The tower that had been left by the first expedition had long since librated into a Sunside zone and been liquefied; the plastic base and parabola, covered with a light reflective surface of aluminium, could hardly withstand the searing heat of Sunside.

Out there, it got up to 700 degrees when the sun was at its closest; the eccentricities of Mercury's orbit accounted for considerable Sunside temperature variations; but the thermometer never showed lower than 300 degrees on Sunside, even during aphelion. On Darkside, there was little variation; temperature hung down near absolute zero, and frozen drifts of heavy gases covered the surface of the land.

From where he stood, Ross could see neither sunside nor Darkside. The Twilight Belt was nearly a thousand miles broad, and as the planet dipped in its orbit the sun would first slide above the horizon, then dip back. For a twenty-mile strip through the heart of the belt, the heat of Sunside and the cold of Darkside cancelled out into a fairly stable temperate climate; for five hundred miles on either side, the Twilight Belt gradually tracked toward the areas of cold and raging heat.

It was a strange and forbidding planet. Humans could endure it only for short times; the sort of life that *would* be able to exist permanently on Mercury was beyond his conception. Standing outside the *Leverrier* in his spacesuit, Ross nudged the chin control that lowered a pane of optical glass He peered first toward Darkside, where he thought he saw a thin line of encroaching black—only illusion, he knew—and then toward Sunside.

In the distance, Llewellyn and Falbridge were erecting the spidery parabola that was the radar tower. He could see the clumsy shape outlined against the sky now—and behind it ? A faint line of brightness rimming the bordering peaks ? Illusion also, he knew. Brainerd had calculated that the sun's radiation would not be visible here for a week. And in a week's time they'd be back on Earth.

He turned to Krinsky. " The tower's nearly up. They'll be back with the crawler any minute. You'd better get ready to make your trip."

Krinsky nodded. " I'll suit up, sir."

As the technician swung up the handholds and into the ship, Ross' thoughts turned to Curtis. The young astrogator had prattled of seeing Mercury, all the way out—and now that they were actually here, Curtis lay in a web of foam deep within the ship, moodily demanding the right to die.

Krinsky returned, now wearing the insulating bulk of the heat-suit over his standard rebreathing outfit. He look like a small tank rather than a man. " Is the crawler approaching, sir ? "

" I'll take a look."

Ross adjusted the lensplate in his mask and narrowed his eyes. It seemed to him that the temperature had risen somewhat. Another illusion, he thought, as he squinted into the distance.

His eyes picked out the radar tower far off toward Sunside. His mouth sagged open.

" Something the matter, sir ? "

" I'll say ! " Ross squeezed his eyes tight shut and looked again. And—yes—the newly-erected radar tower was drooping soggily, and beginning to melt. He saw two tiny figures racing madly over the flat, pumice-covered ground to the silvery oblong that was the crawler. And—impossibly—the first glow of an unmistakeable brightness was beginning to shimmer on the mountains behind the tower.

The sun was rising—a week ahead of schedule !

Ross gasped and ran back into the ship, followed by the lumbering Krinsky. In the airlock, mechanical hands descended to help him out of his spacesuit; he signalled to Krinsky to remain in the heat-suit, and dashed through into the main cabin.

" Brainerd ! Brainerd ! Where in hell are you ? "

The senior astrogator appeared, looking puzzled. " Yes, Captain ? "

" Look out the screen," Ross said in a strangled voice. " Look at the radar tower !"

" It's—*melting*," Brainerd said, astonished. " But that's—that's—"

" I know. It's impossible." Ross glanced at the instrument panel. External temperature had risen to 112—a jump of four degrees. And as he watched it clicked up to 114.

It would take a heat of at least 500 degrees to melt the radar tower that way. Ross squinted at the screen, and saw the crawler come swinging dizzily toward them : Llewellyn and Falbridge were still alive, then—though they probably had had a good

cooking out there. The temperature outside the ship was up to 116. It would probably be near 200 by the time the two men returned.

Angrily, Ross faced the astrogator. "I thought you were bringing us down in the safety strip," he snapped. "Check your figures again and find out where the hell we *really* are. Then work out a blasting orbit. That's the *sun* coming up over those hills."

"I know," Brainerd said.

The temperature reached 120. The ship's cooling system would be able to keep things under control and comfortable until about 250; beyond that, there was danger of an overload. The crawler continued to draw near; it was probably hellish in the little landcar, he thought.

His mind weighed alternatives. If the external temperature went much over 250, he would run the risk of wrecking the ship's cooling system by waiting for the two in the crawler to arrive. He decided he'd give them until it hit 275 to get back and then clear out. It was foolish to try to save two lives at a cost of five. External temperature had hit 130. Its rate of increase was jumping rapidly.

The ship's crew knew what was going on now. Without direct orders from Ross, they were readying the *Leverrier* for an emergency blastoff.

The crawler inched forward. The two men weren't much more than ten miles away now; and at an average speed of forty miles an hour they'd be back within fifteen minutes. Outside it was 133. Long fingers of shimmering sunlight stretched toward them from the horizon.

Brainerd looked up from his calculations. "I can't work it. The damned figures don't come out."

"Huh?"

"I'm computing our location—and I can't do the arithmetic. My head's all foggy."

What the hell, Ross thought. This was when a captain earned his pay. "Get out of the way," he snapped. "Let me do it."

He sat down at the desk and started figuring. He saw Brainerd's hasty notations scratched out everywhere. It was as if the astrogator had totally forgotten how to do his job.

Let's see now, If we're—

His pencil flew over the pad—but as he worked he saw that it was all wrong. His mind felt bleary, strange; he couldn't seem

to handle the computations. Looking up, he said, "Tell Krinsky to get down there and be ready to help those men out of the crawler when it gets here. They're probably half-crooked."

Temperature 146. He looked back at the pad. Damn; it shouldn't be that hard to do simple trig, he thought.

Doc Spangler appeared. "I cut Curtis free," he announced. "He isn't safe during takeoff in that cradle."

From within came a steady mutter. "Just let me die . . . just let me die . . ."

"Tell him he's likely to have his wish," Ross murmured. "If I can't work out a blastoff orbit we'll all roast here."

"How come *you're* doing it? What's the matter with Brainerd?"

"Choked up. Couldn't do the figures. And come to think of it, I feel pretty funny myself."

Fingers of fog seemed to wrap around his mind. He glanced at the dial. Temperature 152 outside. That gave the boys in the crawler 123 degrees to get back here . . . or was it 321? He was confused, utterly bewildered.

Doc Spangler looked strange too. The psych officer was frowning curiously. "I feel very lethargic suddenly," Spangler declared. "I know I really should get back to Curtis, but—"

The madman was keeping up a steady babble inside. The part of Ross' mind that could still think clearly realized that if left unattended Curtis was capable of almost anything.

Temperature 158. The crawler seemed nearer. On the horizon, the radar tower was becoming a crazy shambles.

There was a shriek. "It's Curtis!" Ross yelled, his mind returning to awareness hurriedly, and peeled out from behind the desk. He ran aft, followed by Spangler, but it was too late.

Curtis lay on the floor in a bloody puddle. He had found a pair of shears somewhere.

Spangler bent. "He's dead."

"Of course. He's dead," Ross echoed. His brain felt totally clear now; at the moment of Curtis' death, the fog had lifted. Leaving Spangler to attend to the body, he returned to the desk and glanced at the computations.

With icy clarity he determined their location. They had come down better than three hundred miles to sunward of where they thought they had been. The instruments hadn't lied—but someone's eyes had. The orbit Brainerd that had so solemnly

assured him was a "safe" one was actually almost as deadly as the one Curtis had computed.

He looked outside. The crawler was almost there; temperature was 167. There was plenty of time. They would make it with a few minutes to spare, thanks to the warning they had received from the melting radar tower.

But why had it happened? There was no answer to that.

Gigantic in his heat-suit, Krinsky brought Llewellyn and Falbridge aboard. They peeled out of their spacesuits and wobbled unsteadily, then collapsed. They looked like a pair of just-boiled lobsters.

"Heat prostration," Ross said. "Krinsky, get them into takeoff cradles. Dominic, you in your suit yet?"

The spaceman appeared at the airlock entrance and nodded.

"Good. Get down there and drive the crawler into the hold. We can't afford to leave it here. Double-quick, and then we'll blast off. Brainerd, that new orbit ready?"

"Yes, sir."

The thermometer grazed 200. The cooling system was beginning to suffer—but its agonies were to be shortlived. Within minutes, the *Leverrier* had lifted from Mercury's surface—minutes ahead of the relentless advance of the sun—and swung into a temporary planet-circling orbit.

As they hung there, virtually catching their breaths, just one question rose in Ross' mind: *why*? Why did Brainerd's orbit bring them down in a danger zone instead of the safety strip? Why had both Brainerd and Ross been unable to compute a blasting-pattern, the simplest of elementary astrogation techniques? And why had Spangler's wits utterly failed him—just long enough to let the unhappy Curtis kill himself?

Ross could see the same question reflected on everyone's face: *why*?

He felt an itchy feeling at the base of his skull. And suddenly, an image forced its way across his mind in answer.

It was a great pool of molten zinc, lying shimmering between two jagged crests somewhere on Sunside. It had been there thousands of years; it would be there thousands, perhaps millions of years from now.

Its surface quivered. The sun's brightness upon the pool was intolerable even to the mind's eye.

Radiation beat down on the zinc pool—the sun's radiation, hard and unending, and then a new radiation, an electromagnetic emanation and with it a meaningful commutation:

I want to die.

The pool of zinc stirred fretfully with sudden impulses of helpfulness.

The vision passed as quickly as it came. Stunned, Ross looked up hesitantly. The expression on the six faces surrounding him told him what he wanted to know.

"You felt it too," he said.

Spangler nodded, then Krinsky and the rest of them.

"Yes," Krinsky said. "Wh t the devil was it?"

Brainerd turned to Spangler. "Are we all nuts, Doc?"

The psych officer shrugged "Mass hallucination . . collective hypnosis . . ."

"No, Doc." Ross leaned forward. "You know it as well as I do. That thing was real; it's down there, out on Sunside."

"What do you mean?"

"I mean that wasn't any hallucination we had. That's *life*—or as close to it as Mercury can come." Ross' hands shook; he forced them to subside. "We've stumbled over something very big," he said.

Spangler stirred uneasily. "Harry—"

"No, I'm not out of my head! Don't you see—that thing down there, whatever it is, is sensitive to our thoughts! It picked up Curtis' godawful caterwauling the way a radar set grabs electromagnetic waves. His were the strongest thoughts coming through; so it acted on them and did its damndest to help Curtis' wish come true."

"You mean by fogging our minds, and deluding us into thinking we were in safe territory, when actually we were right near sunrise territory?"

"But why would it go to all that trouble?" Krinsky objected. "If it wanted to help poor Curtis kill himself, why didn't it just fix it so we came down right *in* Sunside? We'd cook a lot quicker that way."

Ross shook his head. "It knew that the rest of us *didn't* want to die. The thing down there must be a multi-valued thinker. It took the conflicting emanations of Curtis and the rest of us, and fixed things so that he'd die, and we wouldn't." He shivered. "Once Curtis was out of the way, it acted to help the surviving crewmembers get off to safety. If you'll remember, we all thought and moved a lot quicker the instant Curtis was dead"

"Damned if that's not so," Spangler said. "But—"

"What I want to know is, do we go back down?" Krinsky asked. "If that thing is what you say it is, I'm not so sure I

want to go within reach of it again. Who knows what it might make us do *this* time ? "

" It wants to help us," Ross said stubbornly. " It's not hostile. You're not afraid, are you ? I was counting on you to go out and scout for it in the heat-suit."

" Not me !" Krinsky said hastily.

Ross scowled. " But this is the first intelligent life-form we've hit in the Solar System yet. We can't simply run away and hide !" To Brainerd he said, " Set up an orbit that'll take us back down again—and this time put us down where we won't melt."

" I can't do it, sir," Brainerd said flatly. " I believe the safety of the crew will be best served by returning to Earth at once."

Facing the group of them, Ross glanced quickly from one to the next. There was fear evident on the faces of all of them. He knew what each of them was thinking : *I don't want to go back to Mercury.*

Six of them; one of him. And the helpful thing below.

They had outnumbered Curtis seven to one—but unmixed by the death-wish. Ross knew he could never generate enough strength of thought to counteract the fear-ridden thoughts of the other six.

This is mutiny, he thought, but somehow he did not care to speak the thought aloud. Here was a case where a superior officer might legitimately be removed from command for the common good, and he knew it.

The creature below was ready to offer its services. But, multi-valued as it might be, there was still only one spaceship, and one of the two parties—either he or the rest of them—would have to be denied its wishes.

Yet, he thought, the pool had contrived to satisfy both the man who wished to die and whose who wished to stay alive. Now, six wanted to return—but could the voice of the seventh be ignored ? *You're not being fair to me*, Ross thought, directing his angry outburst toward the planet below. *I want to see you. I want to study you. Don't let them drag me back to Earth.*

When the *Leverrier* returned to Earth, a week later, the six survivors of the Second Mercury Expedition could all describe in detail how a fierce death-wish had overtaken Second Astrogator Curtis and caused his suicide. But not one of them could recall what had happened to Flight Commander Ross, or why the heat-suit had been left behind on Mercury.

Robert Silverberg

John Boland's contribution this month is one that is based on that excellent Scottish axiom "O wad some power the giftie gie us . . ." and is cleverly contrived to show how a specific type of invention could in fact peacefully settle one of today's world problems

FABULOUS PHOTOGRAPHER

By John Boland

———

The tall man with the golden eyes stepped out from the doorway. "Mr. Smith?"

The man spoken to came to an abrupt halt, staring round-eyed at the impressive figure before him. "Who—who are you?"

"For the moment that does not matter. I must talk with you, sir. Can we go up to your rooms?"

The thin, shabbily dressed man drew back. "Are you—"

"From Pransland?" the stranger finished the question for him. "No, sir, I am not. I come from—from quite another place. But I wish to talk with you about Pransland." The tall man smiled. "It would appear that life is not being too generous with you at the moment, Professor Proni."

The shabby man who called himself Smith, but who had been Alberto Proni, mopped the sudden sweat from his brow.

"Please do not be alarmed, Professor. I intend you no harm."

"You must forgive me," Proni said nervously. "I am not a brave man, I fear. No matter how hard I try, I am little better than a coward . . . I had hoped that my past was buried . . ."

"In this world that you call Earth, perhaps. But not to me, nor to my people." He bowed. "Allow me to introduce myself, sir. I am Allutin, Third Grand Councillor of the world of Perloos." He smiled briefly at the other's reaction. "No, I am not mad. I speak only the truth." He was suddenly grave. "It is imperative that I speak with you, concerning your country"

Proni blinked, still uncertain. Years ago he had filled the generous-waisted clothes he wore, now they bagged on him so large that he could twist his body inside the garments without causing them to move. His voice became stronger.

"Very well, sir," he replied. "If you will partake of my hospitality, I should be pleased to offer what poor fare I can."

Five minutes later the stranger was standing in the middle of the apartment's living-room, looking round with frank curiosity. "Life has indeed been unkind to you of late, sir."

Proni waved a hand in dismissal of his surroundings. "Well, what did you wish to see me about?"

"About your country, sir. I want to find a way to end the miseries your people endure."

The Professor drew himself up. "So. You're another one, eh? Another of the assassins!"

Allutin raised a hand. "I assure you, sir—"

"Don't think you're the first," Proni said bitterly. "Almost every year someone comes along to tell me of a way in which we could rid the world of the tyrant, El Supremeo Groppo."

"So?" The big man's eyebrows rose. "But El Supremeo still lives, does he not? Did your plans fail?"

Suddenly the shabby Professor was tired, his face grey in the dim light from the wall-bracket. "The plans have never been put into operation. If one kills a tyrant, then one is oneself a tyrant. Violence resolves nothing, but only breeds more violence."

Allutin nodded gravely. "You are one of us, sir. Violence is abhorrent to our creed." He explained quickly. "On Perloos, we watch the progress made by the civilisations on other planets. We are particularly concerned with those peoples that have reached the threshold of space travel. If a particular world's inhabitants have learned how to travel through space, but have not yet learned how to eradicate war from among

themselves, such a planet constitutes a threat to the peace of the universe."

"But how can you stop them, without you yourself declaring war?"

Allutin smiled. "We have our methods. During the past thousand of years they have worked on many planets. I see no reason to suppose that they will fail here . . . providing we can find someone, a citizen of the planet, to help us. This is how we work, sir. First of all we monitor a planet; examining each of its races in turn, comparing the output of all radio stations, watching TV programmes, and so on, gradually building up a complete dossier, and then deciding which among the nations is most likely to cause trouble. In the case of Earth we have decided that Pransland is the possible source of future war."

Proni sighed. "Alas, yes!"

"Very well, then. Once we have completed our studies, we devise a method of combating the menace, and then we search for a citizen of that country to help us. Now you, Professor, would be the ideal assistant. You are a Pranslandian, you have a greatly superior intelligence to the majority of world citizens; you are, in fact, the one man we need."

The shabby man moved fitfully. "If there is any way I could help . . . But I am nobody. I am an old man, discredited, thrown out of my own country. I am no longer Professor Alberto Proni; instead, I am Albert Smith, assistant librarian in a land in which I am an alien."

"However, you agree that if the dictator of Pransland were not so militant, world peace would be much more probable?"

"It would be certain."

"Then I will show you how to bring about that desirable state of affairs. You will have much to learn—and first, I shall have to teach you how to become a photographer." He smiled. "There is a rather special type of camera I shall give you . . ."

He regarded Proni steadily for several minutes. "Tell me," he said at last, softly, "tell me, my friend, how far you are prepared to take a risk in order to help your fellow human beings?" He paused. "Would you die for them?"

The Professor stared down at the toes of his scuffed boots. "I don't know" he said at last. "If I could be sure that what I was doing would help them to throw off the yoke of wars, then I might . . . But I don't want to die. . . I am a coward, nothing more."

Allutin nodded, apparently satisfied. "Permit me to be the judge of that," he said. "Very well. First, when I have finished instructing you, you will have to return to your native country."

Proni paled. "Return to Pransland? They would kill me the moment I was recognised."

"You will not be recognised."

A spark of anger glinted in the Professor's eyes. "Look here, what is all this? You expect me to risk my life, and yet you won't even confide in me *what* I'm supposed to do?" He glared up at the big man. "Unless you are prepared to confide in me completely, I think you had better go."

"Excellent!" Allutin smiled broadly. "You have passed the last test. I had feared that possibly you lacked firmness and courage. It was stupid of me; I apologise. And now my plan . . . You will take photographs of El Supremeo, that is all. You will set up in business in the capital of Pransland, and you will have a special camera. When you have taken photographs of the dictator, I assure you that he will be pleased with them. How you get him to sit for you will be your own concern, I cannot help you there."

"It sounds ridiculous. How are these photographs going to help my fellow citizens?"

"They will. You'll see. When you have learned how to take photographs with an ordinary camera, I will give you the special one."

Professor Proni shrugged. "All right. I'm probably mad, but I'm willing to offer myself. All I hope is that I don't regret my decision."

"You will have no regrets, sir."

Six months later a sweating, nervous, bearded man hurried away from the small aircraft that had just landed him, and began to walk the fifteen miles to Trantome, capital of Pransland. In a sack slung over one shoulder he carried an enormous sum of Pranslandian banknotes and a camera that was apparently expensive, but normal.

For seventy-two hours the bearded man lived in terror, sweating and trembling every time one of the armed police passed by him in the street: starting up in fear at every sound in the night, afraid of being robbed and left destitute.

But he forced himself to carry on with the plan, and at the end of the fourth day in Trantome he had a shop on one of the main thoroughfares. By the end of a week the bearded man

was open for business, and within a few hours of the sign-writer completing "*Bruni, Photographer,*" the first customer entered.

The Professor knew that it would not be long before someone on El Supremeo's staff came to see what the new photographer's business had to offer in the way of graft. Every business in the capital had to pay some sort of under-the-counter payment in order to stay open. But he had not anticipated the arrival of the gross, laughing man in the gaudy uniform of El Supremeo's personal bodyguard

"I am Captain Amat," the fat man announced.

Alberto Proni shrank into himself, bowing low and trying to keep the man from seeing his face. Captain Amat had been one of those who had persecuted him in the days when the old regime had fallen.

Amat stared hard at the photographer. "I know your face, I think."

The professor bowed lower. "No, magnificence, I have not had the delight of being in your presence before." It was difficult to keep his voice steady. Would Amat recognise him, despite the beard, the plucked eyebrows, the different glasses?

Captain Amat broke into a bellowing laugh. "If you do not already know me, dog, you soon will. You will take my photograph and give me fifty copies. If I like them, I will tell my fellow guards to patronise you ; but if I do not like them . . ."

He trotted into the studio and examined the apparatus. "By Imshalla !" he swore. "This is but a poor camera. If what it produces fails to please me, it shall be the worse for you."

"I assure you, magnificence," Proni said, trembling, "that the camera is the finest in the world—in the universe—"

"It is a Pranslandian camera ?"

"Of course, my lord. Where else could one find the best workmanship ?"

Amat smiled. "Naturally. But if it should fail to do me honour . . . then you shall die. Slowly. Unpleasantly."

When the photographs were taken, Amat flopped onto a couch in the studio. "I shall give myself the pleasure of waiting for proof that your work is worthy of Pransland."

It was the first time that Proni had actually used the camera that Allutin had given him, but its operation was no different from the others the Professor had used during the time that Allutin was teaching him how to take photographs. But when

the prints were developed, Proni felt the fingers of fear tearing at his belly. Each of the prints showed an ape-like, moronic bully. It was a good likeness, but each feature was subtly altered exaggerating the gross character of the face.

Allutin had told him to have no fear that the prints would not always meet with approval, but these . . . Amat would have him tortured to death. What should he do ? Dare he go and tell the Captain that the prints were ruined ? But there was no guarantee that the next batch would be any better. Proni shrugged : he could die only once. Better to get it over and done with.

Captain Amat stared at the still-wet prints with pleasure, holding himself slightly more erect and puffing out his chest. " Good !" he said. " I shall have one hundred, which you will send to my rooms no later than tomorrow."

When the street door had closed behind the Captain, Proni collapsed weakly, gazing in bewilderment at the prints. It was some time before he recovered sufficient strength to carry on with the work to be done on the Captain's order. Then a mood of wild optimism set in, and he got down to the job, humming under his breath as he concentrated.

He delivered the finished prints personally, tactfully forgetting to enclose a bill. Not that it would have been met, even had he done so, but the omission pleased the Captain, with the result that two days later, Colonel-General Hypmann, commanding officer of the dictator's personal bodyguard, presented himself at the studio.

The resulting photographs were, to Proni's eye, those of a man of low cunning, a bully and a braggart. But the Colonel-General was delighted, and when he was later summoned to attend one of the many parties given by El Supremeo, he took along some of the photographs to show the dictator. It was essential that El Supremeo should be made to see what a gallant soldier led his bodyguard. It was, in fact, *imperative* that El Supremeo should see this, for of late the Colonel-General had imagined that his presence no longer brought delight to the head of the State.

The atmosphere at the party was tense, as it always was until El Supremeo's mood of the moment had shown itself. Tonight the dictator was in a good mood. Earlier, three enemies of the State had paid the extreme penalty, and this evening El Supremeo could relax, certain that the enemies of the State—his enemies—

were rooted out. Not until tomorrow would he begin to consider other possible traitors.

El Supremeo's body tensed, a sudden burst of laughter from the far side of the room making him turn sharply. He was not accustomed to laughter in his presence.

" What is it ? " he snapped.

One of the men, a young man, less cautious than the others, came forward. " Magnificence, we were looking at the Colonel-General's portrait."

Colonel-General Hypmann pushed his way forward eagerly, holding out several of the photographs. " If you would deign to glance, magnificence . . . ? "

The dictator studied the treacherous, murdering pig of a man shown on the prints. " You are pleased with these pictures, Hypmann ? "

" They do me full justice, magnificence "

El Supremeo looked down. Odd that Hypmann should enjoy such a caricature of himself. Every pore of the revolting face, every trait of the Colonel-General's treacherous character was displayed. " Who is the photographer ? "

" A man named Bruni, excellence. Newly come to the city."

The dictator beckoned to his Minister of Finance. " You will go to Bruni tomorrow and have your photograph taken."

The Minister bowed. " It shall be as you decree, magnificence."

When the Minister of Finance handed over his photographs, El Supremeo studied them in silence for a time. He was staring at the reproduced face of a miser, a man whose evil visage betrayed the fact that he would do anything for money—kill, rob, betray. " You are pleased with the portraits ? "

There could be no doubt of the Minister's sincerity. " They are workmanship of the highest quality, magnificence. Of the highest quality." He gazed fondly at the noble features of the high-browed financial genius that was pictured. " You see, my lord, the boons which your divine guidance brings to us all in Pransland. Such a brilliant standard of workmanship would not be possible under any guidance other than that of the magnificent, the all-wise, the all-powerful El Supremeo."

The dictator nodded complacently. It was quite true that he had weeded out the worst photographers in the country. None of them had been able to produce anything but a traversty of his true greatness. But this man Bruni . . .

" You will tell the other Ministers to have their pictures taken," he ordered.

The latest edict was obeyed, the photographs being sent direct to the dictator, who brooded over them. His belief that all his Ministers were fools was confirmed by what he saw. No one but a fool could possibly be pleased by the images shown in the pictures, yet every one of the Ministers expressed his delight in them.

El Supremeo sent for the Minister of Trade and External Affairs. " Tomorrow the two-man mission from the Western Powers will arrive, seeking trade. You will take them to this photographer and show me the results."

The photographs of the two-man trade mission were shown to the dictator. He looked at the American's portrait and saw an iron-faced, ruthless man of business, ignorant, caring nothing for that which was not material. " You think our work is good ? " he asked the American, handing him the picture.

The American examined his likeness. He saw an open, he-man face, with warm, generous eyes filled with child-like trust and affection for all men. " Say ! That surely is great !" He had never expected these niggers to be able to do anything good. " I'd like to buy some copies."

El Supremeo handed a print to the Englishman, a weak-chinned, insolent individual, furtive, with the cunning of a rat, according to the dictator's view of the print.

The Englishman stared at it. The tie was correctly in place, the face completely undistinguished—the sort of face that would pass unnoticed in a crowd of more than three people. " Jolly good ! " he said.

" You find it an excellent likeness ? "

" Rather ! "

Next day the Professor was summoned to the palace. On arrival he was stripped and searched; his equipment, cameras, lights and so on were taken from him, scrutinised, then handed back to him. He was kept waiting in an ante-room, and the longer he waited, the greater his fear grew. Had they discovered his identity ? Were they playing with him ? He mopped his streaming forehead, watched in every movement by the two guards sitting opposite him, less than two yards away.

" There is something wrong ?" one of the guards asked softly.

" No—no." It was hardly more than a whisper. The close air, the sense of impending discovery, and the consequences of

failure, all combined to make the period of waiting almost unbearable.

The guard was watching the photographer's trembling hands. "It is warm, yet you are shivering. Do you have a fever?"

Proni made a great effort. "It—it is nothing."

"You will be able to carry out your task? Should you fail . . . But I do not need to tell you of what will happen to your miserable body if you fail."

Once again the Professor mopped his face. "I—I am overcome by the glory of being summoned into the presence of his magnificence, El Supremeo."

"Of course. It is too great an honour for an ordinary man."

A door opened and Proni was conducted from the ante-room and into the presence of the dictator. Some of his fear left him, swamped by the moment of triumph he felt. His plan had worked! The scheme he had suggested to Allutin, the scheme whereby he would get the dictator into a position where his own weakness could be used against him, had succeeded—but only if nothing went wrong.

Two of the Ministers were in attendance, each of them watching every movement, listening to every word. El Supremeo, dressed for the occasion in his Supreme Admiral of the Fleet uniform, was gracious.

"My Ministers tell me that your photographs do them full justice. Do you think that you will be able to do me full justice with your equipment?"

Proni abased himself. "Magnificence, the photographs that my camera produces are unsurpassed in this world. But even so, I shall fail. No mere human, equipped with whatever devices, could do better than part justice to the glory that is El Supremeo!"

"That is true," the dictator agreed. "But you have our gracious permission to do your miserable best."

The photographs were taken, and Proni retired to the dark room that had been specially fitted out in the palace, his heart thumping with mingled anticipation and fear. The two Ministers went with him, watching everything, having every part of the various processes explained as he went along.

Although Proni had expected it, when he actually saw the face of the dictator as shown in the negative, he was appalled. He delayed printing as long as he could, but eventually he could stall no longer, and as the monstrous, maniac face of El Supremeo gradually developed, his heart quailed.

One of the Ministers, peering over his shoulder in the dim light, gasped in horror, his knees suddenly too weak to support the generous weight of his body. "If El Supremeo sees this . . ." He gulped. "We are dead men!"

His companion nodded. "We must destroy them. Des—" He broke off as someone entered the dark room. It was El Supremeo.

"The work is done?" the dictator asked. "Hand me the photographs."

"Mag—magnificence," one of the Ministers faltered. "The —the photographer has—has not done you justice—"

"No one could." The dictator held out a hand. "Come!" He took a print from the trembling Minister. There was a moment that lasted a week, and then the dictator's face lit up with a pleased smile.

"It is not *quite* excellent, but—" He stood smirking at the photograph. "You have done well," he said to Proni. "You are hereby appointed a Knight Grand Cross of the First Order of Groppo. Let no one say that we in Pransland do not reward talent."

El Supremeo turned to the two Ministers. "I shall give every man, woman and child a present of one of these photographs—everybody in Pransland shall have one. It shall be a free gift, to show my love for the citizens." He paused. "You will arrange an extra tax to pay for them."

The next few weeks were pleasant ones in the palace. Every day El Supremeo had his portrait taken in more of the two hundred and forty-one uniforms he possessed, and preparations went ahead for the distribution of photographs to the people.

When the first batch of prints were sent out, the recipients regarded them with frightened wonder. "Is it a trap, do you think?" one man whispered to his wife as they stood staring at the monster portrayed in El Supremeo's uniform.

His wife, twitching with nervous tension, snatched the two prints. "We must burn them at once!" she quavered. "If the guards should find these in our home . . . !"

The door was locked, the shutters closed again, and not until the last vestige of ash disappeared did the man and his wife breathe easily. The man mopped his brow. "Wife, if the guards had come . . . !"

But when he went out into the streets he had a further shock, for huge photographs of El Supremeo, blown up to more than life-size, were erected at many street corners. "What do you think it means, neighbour?" he asked the man who lived in the hovel next door.

"The good gods alone know, friend," the man whispered. "But whatever it is, it bodes ill for us."

"What doesn't!"

"Aye. But when El Supremeo hears of this, much blood will swill in the gutters." A shouted order made him turn in dismay. A body of guards swept round the corner of the alley behind him, driving before them a horde of silent citizens.

"Come!" The sergeant in charge beckoned the two men. "His magnificence has a message for you to hear, and you, the citizens, must show your approval of what is being done for you all."

They reached the market square to find it jammed with thousands of men and women, all standing silently, watched by lines of troops who stood facing outwards from the middle of the square. Suddenly the loudspeakers boomed. "Attention, attention, citizens!" There was a strained pause, then the voice went on.

"His magnificence, El Supremeo, our guide, philosopher, friend, father of us all, has a message for his beloved people. As a mark of the affection he bears for you, his magnificence has decreed that each man, woman and child throughout the land shall receive a personal token of his wondrous esteem for you all. Today, the more fortunate of you will receive a likeness —a photograph of El Supremeo—so that each and every one of you may have constant reminder of the blessings of life in Prans-land, under the benevolence of El Supremeo.

"A photograph will be given to all, but some may not receive their copies for a time. Therefore we ask those to have patience; you have not been forgotten. But in order to help you during the days of waiting we have erected large portraits, similar to those you will have, all over the city, so that you may constantly feast your eyes upon El Supremeo. That is all, citizens. You will now give your usual spontaneous demonstration of gratitude to his magnificence. There will be seven cheers. The first of these will be given after I have counted three . . . One . . . Two . . . Three."

The noise of the cheering died away and the crowd dispersed, bewildered, certain that they were being tricked, but uncertain as to what it was. The state of bewilderment grew as the days passed and more and more photographs were distributed. The whole country was in an uneasy calm.

Then, a month after the distribution had begun, a small group of citizens were discussing the photographs. The men and women were gathered at the edge of a secondary road that led out from the edge of the capital. Hesitantly they began to discuss the photographs, growing bolder as they continued. One of them, bolder than the rest, voiced his real thoughts.

" I may be wrong, my friends," he said, " but to my mind, if a man could bring himself to show such pictures of himself to all and sundry, then there cannot be too much wrong with him, for he obviously has a sense of humour."

" El Supremeo ? "

" Yes."

" It is not possible. He is a mad beast; not a clown."

But there were some who agreed with the first man. " Certain it is that no mad beast would permit others to laugh and sneer at him. Ansaldo is right. There is something to be said for El Supremeo after all."

A woman thrust herself forward. " I heard he has always loved us, but that he has had to be firm because of his enemies."

One of the men, who was the great-uncle of one of the soldiers in the dictator's personal bodyguard, had his say. " It is true that El Supremeo has defeated the decadent Western Powers who tried to enslave us, and that therefore his magnificence no longer has to be so vigilant."

" It is also true that life is easier for us nowadays."

" True, true."

They were happily contemplating the improved state of affairs when a cavalcade of cars rolled at high speed round the corner and rushed past them, headed towards the city.

" El Supremeo ! It is El Supremeo ! "

Half a dozen of the men and women standing at the side of the road smiled at the man in the gorgeous uniform, who sat huddled behind the bullet-proof glass, then they clapped, half-heartedly, as the cars went by.

The dictator was in a flaming rage when he got back to the palace. Immediately he sent for the Minister of Security. "I gave orders that my return to the city was not to be observed," he shouted at the trembling man.

"Your orders were obeyed, magnificence," the Minister stated.

"*Your orders were obeyed* !" the dictator mimicked. "Fool, dolt, idiot !"

"But the strictest orders were issued, magnificence !" The Minister was bewildered; it was the first time in weeks that the dictator had been in an evil temper.

El Supremeo stared at him with distaste. "Were they ? Then you failed to see that they were carried out . . . unless you are a traitor, and did it deliberately ?" He smiled unpleasantly. "You know the penalty for either offence ?"

The wretched man did, only too well. The dictator looked down at him. "You organised a spontaneous demonstration when you knew that I had ordered that there should be none. There, I think that will do for the charge." Even in Pransland there had to be some sort of charge levelled against a prisoner before he could be executed. "And as a secondary charge, I accuse you of failing in your intention. There were no more than twenty people gathered !"

The Minister, with the courage of despair, raised his forehead from the carpet. "But magnificence, no demonstration was organised—"

"Insolent dog—" the dictator began, then stopped. Something odd had occurred to him. To have a spontaneous demonstration it was necessary to have troops on hand to see that the people did the correct thing. But there had been no troops near the group that had cheered that morning. Was it possible that the citizens were *really* applauding—that they really loved him ? Tears of pleasure dropped from his eyes as he contemplated the possibility.

Ever a cautious man, he tried the same experiment several times before he was finally convinced that he was indeed beloved by his people. Each time he appeared unexpectedly before a group of citizens, the people would begin to laugh, eagerly pointing him out to their children, laughing, cheering and clapping as he went by, pointing in turn to the dictator and then to the huge photographs which were displayed everywhere.

It was obvious to El Supremeo that he had at last reached the hearts of his people—and equally obvious that the photographs

had been mainly responsible. Once the citizens had been able to see a good picture of him, so that they could judge for themselves what sort of man he was, then all had gone well.

He paid a personal call to the photographer's premises and gave instructions that production of the prints should be speeded up. " You will open another factory," he ordered the Professor.

" It shall be done, magnificence."

Professor Proni watched the dictator being driven away, and turned to go back inside the studio. A huge man pushed his way through the crowd who had been watching the dictator and entered the photographer's office. Proni looked up in surprise. " Allutin ! "

Allutin, Third Councillor of the world of Perloos, smiled. Dressed in the garb of an American tourist, with a camera slung round his neck, he settled down into a chair. " My friend," he said, " you have done well. There can be no doubt that El Supremeo is a man of peace these days."

Proni smiled. " Thanks to the camera you gave me "

The Third Councillor shook his head " Not so. Thanks, instead, to the weapon that El Supremeo had forged to be used against himself." He was silent for a moment. " I can flatter myself that I chose well when I chose you to be the other instrument. Tell me, what are your plans for the future ? "

The smile on Proni's face broadened. " I have a life contract to take his photograph as often as he gets a new uniform—which is pretty often. But I am not to take photographs of anyone else unless I have El Supremeo's specific permission."

" And you intend to abide by that ruling ? "

" Yes."

" I see. You do not intend to leave Pransland, then ? "

" No. I am happy here. It is my country. Perhaps in the future I shall be able to reveal myself . . . Who knows ? But in any case I shall remain here. I am no longer afraid, and I feel that I am helping my fellow citizens."

" Your actions will have helped more than your fellow citizens of Pransland, my friend." Allutin stood up. " But I cannot stay. I have been ordered to return and report, therefore I shall say farewell." He shook hands warmly, then moved to the door, where he turned. " There is just one small point. When I first contacted you, I said that you would have no regrets if you accepted the task. Was I right ? "

The Professor hesitated. "Not altogether," he said slowly. "There is one thing—the name under which I registered this business. I called myself Bruni. How much better had I called myself Oliver Wadsome Power."

Allutin was frowning, puzzled. "I do not see that there is great cause for regret in that? But Oliver Wadsome Power? That is a strange name."

Proni grinned. "Yes. I'd have registered the business as 'O. Wadsome Power.'"

"I still do not understand—" Allutin began.

"It is a joke; just a private joke," Proni assured him.

John Boland

This is the first of a two-part article in which Kenneth Johns deals with the apparent obselescence of modern surface navies, explains what world governments are doing about changing this type of fighting unit, and will show in Part Two where the future of modern naval warfare will lie.

THE NUCLEAR NAVY

By Kenneth Johns

Part One of Two Parts

When news of the first nuclear weapons was released, it seemed as though the great navies of the World were doomed to irretrievable extinction. " Air power is all that matters," was the creed of many self-styled experts. The mere threat of hydrogen bombs and 5,000 mile range Inter-Continental Ballistic Missiles had, they said, dealt the death-blow to the use of fleet-based strategy.

Yet the great nations are rebuilding their navies, redesigning and re-evaluating their basic naval structures in the light of the triple devils of fission, fusion and reaction thrust. Latest British Naval Estimates are £401 million, yet there is no large scale building programme in hand.

To morrow never just comes. It grows from the seeds of today; and the headlines today are of nuclear power and the yet imperfect rocket weapons. These are remolding the navies as fast —or as slow—as the new ideas penetrate old minds. During World War II the balance of power hung between battleships, submarines and aircraft; minor improvements were able to swing the balance over; then the first atomic holocaust showed that entire fleets were vulnerable to a single high-flying aircraft. Nuclear-powered submarines tilted the scales slightly the other way—an ocean has an immense *area*, but finding a submarine with unlimited range within its total *volume* is a fantastically greater problem. Then the light-weight hydrogen-bomb carried by the ICBM brought the advantage well over to the offensive side again.

So naval staffs are now busily putting science fictional concepts to work whilst, in the naval centres of the sea-faring nations, a great controversy rages. The two diametrically opposing views are that all navies are obsolete and that all future conflicts will be fought from ship-based units. What are the facts and what will be the shape of the navies of tomorrow ?

Perhaps the first and most astonishing point is that there is not a single ship afloat today that is not obsolete. Some countries —notably Great Britain—have been deliberately lagging behind in their naval construction programmes in the hope that their final answers would be better than everyone else's.

Unfortunately, the threat—and the threat is enough—of nuclear warfare, makes that type of thinking completely out of date. The major blows of the next global conflict, should such catastrophe be allowed to happen will be struck in the first forty-eight hours of war—in that last heart-beat of the world there will be no time to use any weapons not held in instant readiness. Unless one side is so devastated that it is forced to capitulate, the conflict will then harden into a war of attrition in which navies will play a major part.

Other countries have plunged into vast building programmes. Russia has concentrated on building up a large and powerful navy mainly composed of submarines and nuclear-age cruisers and destroyers. The United States has concentrated on super-aircraft carriers and their attendant surface craft, and is in the process of constructing a fleet of 15 nuclear-powered submarines. Great Britain has been building wooden minesweepers, anti-submarine frigates and fast patrol boats.

Each nation has taken to heart its *own* lessons from the last war, so much so that each one's practical answers tend to obscure the trends that must eventually be followed by all armed nations in conjunction with their own individual needs.

One thing is certain: the day of the great surface capital ships is over. The five battleships of the Royal Navy are obsolete and four are to be scrapped. Even the mighty 44,500 ton, £9 million *Vanguard* is to be 'mothballed' and is not likely to put to sea again, apart from a possible Royal Tour. The Americans are using the USS *Mississipi* as a floating guided missile test ship, the only use they can find for her.

But the battleship will never die, only her design will change. Today, attack aircraft carriers are the battleships of the U.S. and Royal Navies; tomorrow the capital ships will be large underwater battleships. Aircraft carriers have greater striking power than any other ship in present navies. With the angled flight deck and steam catapults invented by Britain for rapid take-off, and mirror landing techniques for landing, one carrier and her nuclear-armed jets is more powerful than all the fleets of the past. Too, their decks are suitable for both vertical take-off aircraft and the launching of long-range guided missiles. Already, a Viking test rocket has been successfully fired from a carrier in the Pacific.

The U.S. has the largest carriers, the 59,650 ton *Forrestal*, equipped with 600 m.p.h. Douglas A-3-D atom bombers, and the recently commissioned 60,000 ton *Saratoga*. 275 F8U Crusaders, 1,320 m.p.h. jet planes able to land on *Forrestal* and *Saratoga* are on order and with their 1,000 mile combat range will immensely strengthen the U.S. carrier forces.

These, together with other small carriers, constitute the practical backbone of American naval policy. A typical example of atom-age naval thinking is found in the Mediterranean, where Task Force 60, part of the Sixth Fleet, consists of the 45,000 ton attack Carrier *Coral Sea*, with 100 aircraft, the 40,000 ton *Randolph* with 80 aircraft, the heavy 8-inch cruisers *Macon* and *Salem* and about a dozen destroyers. Task Force 60 is a self-contained unit supplied by freighters from Norfolk, Virginia, 3,200 miles away.

True, the Sixth Fleet is considered expendable. Vice-Admiral Brown, its commander hopes to live through the first 48 hours of any future war and use the remnants of his air-borne nuclear

weapons to smash the enemies' central cities—but he does not sound very hopeful about that.

Already plans are well under way in the U.S. for the construction by 1961 of a 70,000 ton aircraft carrier and a 11,000 ton cruiser both to be nuclear-powered. Such nuclear ships will enormously increase the cruising range of the Sixth Fleet, making part of it completely independent of fuel oil transport.

Britain is rebuilding many of her old aircraft carriers, fitting them with angled decks; but she is building only one new carrier.

Certainly, the carrier is at present the Queen of the Seas; but she remains so only as long as her aircraft and missiles can rule the skies above and the sea below. 15-inch guns and torpedoes can never outrange her aircraft, whilst she conceivable need put only one plane into the air, carrying one H-bomb to win one war.

But the future does not look so promising for the carrier. She has always been charged with being a lumbering, unwieldly, vulnerable target, notwithstanding her high speed and all her anti-aircraft armament. Even though catapults can still put planes into the air if the flight deck is damaged, the fact remains that carriers are more sensitive to damage than other types of warship. A medium range, accurate guided missile is all that is needed to send her to the limbo where present battleships are being banished.

The increase in accuracy of guided missiles to the point where they can find and sink a carrier will in itself do away with the need for flying aerodromes in major operations. Why send a huge lumbering ship out into enemy waters, wait for good flying weather, despatch aircraft and all-too-easily killed crews, then hang about in the offing until they return, bringing with them retaliation in the shape of rocket missiles, when all that is needed is a few rockets fired from submarines ?

The Canadians have concentrated on anti-submarine destroyers like the 2,600 ton *St. Laurent*—the most advanced ship in the world for submarine killing—able to fight on amidst the fall-out from nuclear weapons. With rounded surfaces easily flushed down with water and all compartments hermetically sealed, she is the forerunner of the surface ships of the future. Costing £5 million, twice as much as a conventional destroyer, she has radar-controlled twin 3.5-inch A.A. guns and plastic armour turrets with a complement of 290 officers and men. Fourteen others of her class have been launched in Canada.

U.S. cruisers are being fitted with water sprays to wash off radio-active fall-out whilst at least one British cruiser has a remote-controlled engine room so that vast quantities of contaminated air could be drawn in for the oil-fired furnaces.

Many cruisers are being re-equipped as missile ships. The U.S. cruiser *Boston*, 13,600 tons with nine eight-inch guns has had the rear triple-gun turret removed and in its place has two twin missile launchers, which reload through hatches in the deck and are controlled by radar bowls immediately forward. The missile is the Terrier, 20 mile range ship to air weapon using the beam-rider guidance system. The *Canberra*, a sister ship is also being equipped with the Terrier, whilst the *Galveston* will use a super-Terrier, the Talos. A smaller missile without booster, the Tartar, has been designed for destroyers and to replace the 5-inch secondary armament of larger warships. For anti-shipping strikes, the Regulus, and Regulus II, a 1,000 m.p.h. turbojet guided missile with a range of at least 500 miles is probably the most effective of the U.S. Navy's ship to surface weapons and already a £10 million order has been placed for them. They can be catapulted from a carrier and ' zero-length ' launchers enable them to be fired from cruisers with a minimum of modification.

The Royal Navy's first missile ship, the experimental *Girdle Ness*, was commissioned in the summer of 1956 and seems to be very similar to the US experimental missile ship *Norton Sound*—first used in missile test four years ago.

The *Girdle Ness* is not a warship, she is intended to be used to investigate anti-aircraft rocket behaviour against supersonic targets, and the British cruisers of the Superb type, which have been waiting ten years for completion, will wait a little longer until the results and recommendations of the trials can be incorporated into their armament.

A brand new US ship, the *Compass Island*, has just been commissioned expressly to investigate and overcome one of the most serious problems facing naval guided missiles, and their effective use against individual targets. Even under the most favourable conditions a guided missile ranging for 1,500 miles—an Intermediate Ballistic Missile—is unlikely to strike within a quarter of a mile of the target: when fired from a moving ship which is never 100% sure of her exact position on the Earth's surface, the error is more than enough to ensure a harmless

miss. And even that quarter of a mile need not spell absolute destruction to the streamlined and resilient atomic-age ships of the future.

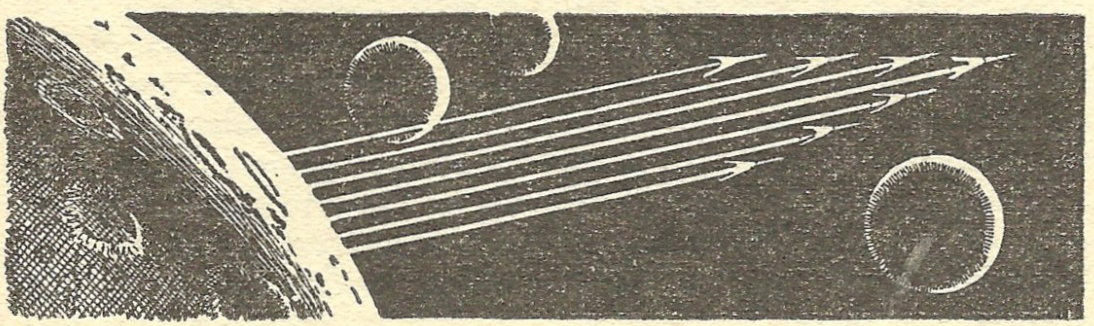
Housed aboard the *Compass Island* in a 67-ton tower in the most stable portion of the ship, the Ship's Inertial Navigational System—SINS—will continuously provide statements of the ship's position, speed and the direction of true North—all without the aid of shore-based stations.

By the summer of 1958 the US Navy hopes to have the SINS installed in all its missile cruisers and submarines.

With this clear pattern of the naval future showing up already in present construction, the day of all surface warships will soon be over. Satellite stations orbiting the Earth will be able to pinpoint any reasonably sized ship on the surface and bring down on her a rain of destructive atomic and hydrogen missiles. Although the carrier will dominate the oceans for a number of years yet, the only future the navies will have will be deep within the seas, far below the prying eyes from the sky and from space.

It is with underwater development—for attack, for defence and for commerce—that the navies of the world are now grappling for technological mastery.

To be concluded



There is a wide range of versatility in the works of John Brunner, as witness the extreme difference between the story herewith and the plot and development of his last published story "Out of Order" in our April issue. This time the action takes place far from civilisation of any kind, where in fact the eye of the beholder may be something more than alien.

EYE OF THE BEHOLDER

By John Brunner

The peak jutted up from the scorched range like a blood-stained fang, and its colour was indescribable. Painter knew that rose and vermilion and scarlet and crimson all entered into the total effect, for he had climbed all over it to see. It had taken him many days to survey the whole area, but he did not begrudge the time expended. He knew now precisely how he might duplicate the effect.

He was placing the first layer of pigment when the ship went past.

The movement had caught his attention a fraction before the scream of riven air came down to him, and he was quick enough to catch a glimpse of it before it dropped below the horizon. His first thought—as was natural to him—was to remark how magnificently the white vapour trail, tinted to blush-pink by the fury of the exhausts, stood out against the almost unbearable

steel-blue of the sky, and to fix the impression in his mind to be reproduced at leisure.

His second was to wonder where it came from. There were no scheduled vessels visiting this world, he was certain, which left one alternative: the pilot was making an emergency landing.

In which case, he might be able to help.

The passing regret at having to postpone the completion of his picture was negligible; he had an almost perfectly trained visual memory, and the colour effects of this mountain range were unlikely to be forgotten in a hurry.

He was quite a way from his ship, of course—he was almost at the outward end of his trek—and it would take him a full rotation of the planet to get there and back. But if the stranger was in control of his ship, he would have put it down where Painter had put his down, for the excellent reason that it was the only decently flat and solid piece of ground on the planet. In fact, he remembered, the line of flight of the ship had been in that direction.

There was no point in picking up his equipment—it would come to no harm where it was, and he would travel faster for the reduction of weight. Painter—that was his name as well as his occupation—gave a final glance around to make sure he had left nothing to be blown away, and started with lengthy strides towards his base.

As the ship dipped into atmosphere, Froude was blaming Takamura and Takamura was blaming the mechanics at their last port of call. Christy, of course, being a woman, was blaming both of them, and probably with justification.

Tak shot a quick glance at her when he could safely take his mind off the controls for a mile or two, and wondered how long this expensive and delicate female was going to stay married to Froude. A short stay on the third planet of a B-type star would certainly do nothing to ease their tempers.

Froude was still shouting at him, he noticed, and he broke in with a weary shrug. " All right ! " he said. " You hired me to fly the ship, remember, not to service it ! We can't settle anything by quarreling now, and if you don't let up, I won't be able to concentrate on the controls."

He had told Froude when the man hired him that he could put a ship down with an Alpheratzan leg-show running on the exterior view-screen, but Christy seemed suddenly to wake up to the fact that their survival depended on the skill and judgment

of Tak. She dropped into a chair and spoke in a more reasonable voice than either of the men.

"Tak's right, dear," she told Froude. "Time enough to argue when we're out of this mess."

"Did you think to turn on the emergency distress call?" said Froude, suddenly remembering it. Tak gave him a sour nod.

"It's been on for over an hour," he said. "Since we first fell out of hyperspace."

"And how long will it take them to get to us?" Christy wanted to know.

Tak shook his head. "Five days—a week. Something like that. Unless they have the stress characteristics of this area on record, which is doubtful. No one's interested in visiting planets as hot as this bunch here."

Air whispered outside.

"You mean we may have to spend a *week* down there?" Christy sounded appalled; she was gazing at the furnace-mouth surface of the world as it streaked past below them. "Why, there's nothing but rocks and sand!"

"I know." Tak was studying the radar profilometer with a frown; it seemed that the average angle of the surface was about fifteen degrees from vertical.

Froude had noticed the fact, too; he quit biting his nails in the corner of the cabin—thinking the same way as I was about Christy's reactions, Tak commented to himself—and came over to watch the wriggling line on the scanner. "You can't be going to try and land in that?" he said.

"Well, we can't spend a week just going round and round," said Tak ill-temperedly. "There's some oxygen in those rocks, and there ought to be a trace in the air, too, but if we stick in orbit we're going to find it damned difficult to breathe in another day or so."

"Look!" said Froude suddenly. "Over there!"

Tak saw it at almost the same instant: a patch of usably flat ground four or five miles square, cut off amid toothed ridges of rock and lava. Whether he could put the ship down on it after being used to the twenty-mile runways of decent spaceports, he didn't know, but he would obviously have to find out.

"Quiet!" he ordered, giving a swift look back to see that Christy was going to keep out of the way. She was sitting with her face set in a grim mask, and Tak guessed Froude was going to hear something from her when the two were alone.

There was only one possible approach to the level spot, between sharp-edged hills four thousand feet high, but he managed to keep the ship well clear of them, and was on the point of congratulating himself when he saw a smooth rise in the ground ahead—a heap of sand round-backed by the wind like a stranded whale.

Gasping, he lifted the ship and cleared it by what he suspected was mere yards; then there was a slithering . . .

They were down.

He shut off the power and sat back, wiping his forehead unashamedly. The half-hope that one of the others would appreciate and remark on his achievement died as Christy got to her feet and walked deliberately over to a viewport, followed by the anxious gaze of her current husband.

She studied the landscape for some time. Then she turned and went to another port opposite. Only after that did she say anything, and then her voice was full of blistering contempt.

" This is a blood-stained place for a wedding trip ! "

And they were at it again. Tak wished the ship were big enough for him to get out of earshot, but it had only been designed for the six or eight hour journeys between stars through hyperspace, and although there were stores kept aboard for events such as this, there was precious little else, and room was in shortest supply of all.

The quarrel died slowly; Christy had shouted herself hoarse, and crossed to the water-spigot to draw a drink. Tak's hand closed over the knob before she could press it down.

" Careful," he said flatly. " What we have has got to last us the week. I'm going to try and rig a distillation outfit, but I doubt if there's much water to be had here."

Christy looked at him for a few seconds as if she could hardly believe her ears; *hired space pilots don't talk to me like that* ! He could practically hear the thought.

Then she seemed to sag a little. She turned away. " No water," she said flatly. And the words suddenly reminded them that it was getting hot in the cabin.

" I'll go see if I can turn up the refrigeration," said Tak, and stepped over to the rear door guarding the power compartment. Christy made to duck back from the sweep of the radiation field, and he gave her a humourless grin.

" This close to a B-type sun," he said, " we're getting about double a safe rate already. I shouldn't let the little leak from the pile worry you."

There was none of the normal fear of a woman who has not born children in the expression on Christy's face, he noted. As he passed down the shaft towards the power compartment, he thought that if he had sized Christy up right, it was unlikely Froude and she would be in the classic hurry of newly-weds, and in the confined space of the cabin, that was as well. It would be inconvenience, not frustration, that worked on her mind—but there was no doubt that Froude saw clearly how much mere inconvenience might weigh with a woman so spoiled.

Tak turned the 'frig controls over to maximum. On the way back to the cabin, he paused and reached deep into his kitbag in the baggage storebox. His fingers found the hard efficient shape with no trouble at all—he believed in having it handy.

But, he thought as he looked at the squat bolt-gun in his palm, there were degrees of handiness, and if the situation called for it, he wanted this right in his pocket.

Froude was down in the heads, though Tak presumed it was nerves that had driven him there more than anything else—he could think of no adequate physical reason under the circumstances. He had been wondering how much longer Christy could keep up her stubborn resistance.

Now it began to crack.

" Doesn't it ever get dark on this blood-stained world ? " she demanded in a passionate tone.

" About once in three days," said Tak flatly. " I checked the rotation period. We landed near dawn."

" So we sit here and fry till the sun goes down." Christy nodded. She started to rub her eyes, and then checked herself in mid-motion, dropping her hands to clench them in her lap.

Another point, thought Tak with surprise. So she was as scared of losing Froude as he of losing her—otherwise she wouldn't be going to so much trouble to preserve that impeccable —once—makeup. Maybe he had never seen her face without it; now, though—he looked closely—the signs were appearing: unable to wash herself, Christy had been patching it as best she could. There was an end to that process.

And it might not be a pleasant one.

Froude stepped back through the door into the cabin and shot a quick glance at Tak. *Not at Christy*, the pilot noted. Interesting—but nasty !

He was very glad of the weight of the bolt-gun in his side-pocket.

" Tak just told me we have to sit in here and bake until the sun goes down the day after tomorrow," said Christy, making an attempt at establishing contact with her husband again. Tak made no attempt to correct the statement, only waited for Froude's reaction.

It didn't come—or rather, it took the form of blank acceptance, as if their spirit were being drained out into the parching air along with the sweat of their skins. He put one hand on the edge of a viewport and stared out at the blindingly bright plain. " What is that, anyway ?" he said, gesturing at the round-backed hummock they had so nearly struck on the way down.

" Star knows," shrugged Tak. " A sand drift, maybe. You wouldn't expect to find much flat ground on a world like this anyway. We ought to be glad it wasn't a ten-thousand-foot mountain."

" Don't say that to me !" blazed Froude, rounding on him; then, gathering himself with an effort, " I'm sorry, Tak. You didn't mean it."

Mean what ? The pilot gave a non-committal grunt.

" Isn't there even a breeze ?" said Christy desperately, and at the tone of her voice Tak looked up sharply. That was the edge of hysteria ! He forced himself to reply matter-of-factly.

" Only near the terminator," he said. " After it's been under direct sun for some time, the ground is pretty well uniformly warmed. There are some pretty fierce gales, I expect, about dusk and dawn, when the surface is heated unequally."

And Christy's control broke; she finally rubbed her face, and the makeup flaked like plaster.

Froude was still staring at the round-backed hummock; it seemed to fascinate him. Tak made an urgent gesture to Christy, and she put her hand to her mouth in horror, got up, and made for the heads to repair the damage.

Froude glanced round when he heard the door slide to, and relaxed thankfully when he saw she was out of sight. He breathed a shuddering sigh. " She's standing it better than I ever thought she would," he said finally. " Oh, can't that rescue ship get a *move* on ? "

Tak shook his head. " Deducing the stress pattern of this area will take some time, and they'll have to come in under light speed from some way out in case they hit the same flaw-complex we did. Then there'd be two of us to be collected."

" You seem very calm about all this," said Froude after a while. Tak shrugged.

" I've been stranded before—alone—once," he replied. " Having company makes it a little easier, you know."

Froude's eyes narrowed, and he turned away. *Stars* ! thought Tak in horror. *Have I said something as wrong as I think I have* ?

At that point Christy came back, her face back to its mask-like perfection but set in a sullen and determined expression.

" I'm going to explode if I stay in this ship another moment!" she said. " I'm getting claustrophobia !"

" Go outside ?" said Froude in startled disbelief. " Why ? "

" There's nothing out there but rock and sand," put in Tak, equally astonished. " And—look, we only have one heat-proof suit."

" Well, there's only one of me, isn't there ?" said Christy. " That's enough."

" But you can't go out there into—" Baffled, Tak came to a stop to find Froude's eyes on him.

" You're awfully concerned for my wife's safety all of a sudden, aren't you ?" Froude said silkily. " Is it just that having company makes the stay more bearable ? You'd hate to lose her, wouldn't you ? "

Christy was having trouble following the trend of the speech; Tak didn't propose to enlighten her. He turned away.

" You think there may be monsters lurking out there to attack her ?" Froude went on. " If you're so concerned, why don't you do something constructive ? Like giving her that bolt-gun !"

Tak whirled. " How—"

" How did I know ? I didn't. You just have something heavy in your pocket If it is a gun, go on—give it to her !"

Safer with her than with him, Tak thought. Reluctantly, he unpocketed the weapon and handed it over, then showed her how to fasten the clumsy heatproof suit and how to operate its radio and power-assisted walking devices.

For fully a minute after the lock had closed behind her, Froude stood watching her march off across the level ground. At length, however, he turned to face the silent Tak.

" Don't be a fool !" said the pilot desperately, seeing the purpose in the other's eyes. " How the hell could there be anything like that ? You haven't been out of sight for more than five minutes together—"

" If that's the way your mind's running," said Froude flatly, " you've told me all I wanted to know. That's why I made sure you hadn't got a gun to pull on me. Clever—wasn't it ?"

Exactly as he finished the last word, his fist shot out, Tak was not quite fast enough to evade it; it caught him on the side of the head and knocked him staggering back against the wall. Helplessly, he shook his head, trying to clear it, and saw Froude moving purposefully in to finish the job.

The second blow was never launched.

" Hey ! Can you hear me ?"

At the sound of Christy's voice from the wall speaker, Froude spun round, his face swiftly changing to an expression of horror. " Yes, we hear you !" he shouted, and then, giving a venomous glance at Tak, added more quietly, " If anything's happened to her—"

Tak didn't try to reason with him; the time was past when reason would help. Instead, he pushed himself groggily upright and crossed to the microphone.

" We hear you," he said, his jaw working stiffly. " What is it ? "

" Someone else has been here before us ! I've found a sort of hut out here ! "

Tak ran his tongue over his lips. " Be careful," he advised.

" Careful nothing ! It's deserted. It's made of some sort of sheet metal, I think—quite well made, too. I'm going in to take a look."

Froude was wrestling with the dogs of the airlock, his face twisted. When the hum of the carrier vanished at the end of Christy's sentence, he redoubled his efforts.

" That won't do you any good," said Tak wearily. " The lock monitor won't open to anyone who hasn't got a suit on unless there's good air outside."

" But what's happened to her radio ? Why's it gone dead ?" Froude's hands went on tugging at the dogs as if he could no longer control them.

" She's gone into a metal hut," said Tak sourly. " Of course the transmission's gone dead."

Just at that moment, the speaker woke up again, in the middle of an excited sentence. "—absolutely wonderful ! Come and see what I've found !"

Tak gave the other a searching glance and saw him almost wilt with relief; he hated to think what processes were going on in his mind.

"We can't come out," he said reasonably. "No suits. Can you bring it over?"

"Yes—yes, all right. I'm coming straight away. Oh, but this is fantastic!"

The object was big, flat and awkward to get through the lock, but Christy struggled it into the cabin impatiently and then fumbled the helmet off her head. "Look at it!" she said. "Isn't it *tremendous*?"

Bewildered, Froude stared at it. "But it's only a picture of the mountains over there," he began, and let his voice die away. Tak had had the same first impression, but his mind was not so crowded with frustration; it had been barely a fraction of a second before he saw this was not just *a* picture, but—

There was complete silence for three minutes by the wall chronometer, while they simply stood and gazed at it. Tak broke it finally, with a long deep sigh.

"I don't know anything about painting," he said slowly, and Christy interrupted him.

"I do!" There was genuine life and excitement in her tone for the first time since Tak had met her. "I do, and I'll swear that the man who painted that was one of the great artists of all time. Maybe the greatest. Spinoccho couldn't have done it, or Yestena, or Michelangelo—they couldn't have put the sheer *life* into a barren scene like that!"

And yet it was only some mountains. Tak found the contradiction too much for his mind to cope with; he was satisfied to accept it as a fact. Froude, more practically for once, demanded, "Are there any more?"

"Yes, a stack of them." Christy was examining the back of the painting, trying to find out what it was made of; she ran her fingers over it frowningly. "I just took the first one I saw and looked at it, and I had to show it to you right away, but there must be a dozen or so of these plates, and if all of them have pictures on as good as this—why, every art gallery on fifty planets would give all their stock for the sake of them." She sounded breathless with wonder.

"But who could have done such a thing?" Froude asked, and Christy shrugged.

"Must have been someone who got stranded here," suggested Tak. "Maybe he wrecked his ship and couldn't call for help."

"Obviously," Christy nodded. "But who was he? You don't think anyone could have been painting like this without the galaxy knowing about him, do you?"

" Maybe he just had nothing else to do before he died," said Tak, knowing as he spoke that it sounded foolish. Christy gave him a glance that was less than contemptuous; half an hour earlier, he realised, it would have been as acid as a lemon. The mere presence of the picture had crystallised and precipitated the tension; it was sinking like mud through still water. In another moment it would have gone.

Froude had gone to the viewport which looked over the mountains depicted in the painting, and was glancing back and forth as if trying to see where the difference between original and reproduction lay. He failed, and turned away. " To think all that—beauty—is out there, and we never saw it," he said in mild astonishment. " Tak, I'd like to go and look at this hut—see if we can make out anything about the painter."

" Is there any way we can all go out there ?" Christy demanded. Tak thought for a minute, and finally nodded.

" There's a trick where you soak your clothes inside an ordinary spacesuit," he said slowly. " In this heat it should be good for half an hour's cooling." He half expected Froude to round on him and demand why he hadn't mentioned it before instead of letting Christy go out alone, but there was no anger left.

He felt a curious reluctance to leave the ship, and the sight of the painting, and he could tell that the others experienced it too. It was only the prospect of more and perhaps better pictures outside which let them go at all.

There were more paintings. Thirteen of them, in a stack in the little metal hut. And every single one of them opened their eyes a little wider.

" I thought there was nothing here but red and yellow," said Tak, swallowing painfully. " How is it that when you look at the pictures you can see the greens and blues and pinks as if they were staring you in the face ? "

Christy's voice came to him over the helmet phones. " If I knew that, Tak, I could paint like this. I've never seen—never dreamed of anything like it ! "

" You were right, Chris," put in Froude. " He must have been one of the greatest men of all time."

A thought struck Christy, and she looked round at Tak. " Tak—he couldn't still be here, could he ? "

"Where's his ship?" said Tak wearily. "I thought of that. But he must have crashed in the mountains somewhere nearby, and maybe just managed to get this far and leave a cache of his paintings in the hope that one day someone would find them. Then—well, there are a lot of ways a man could die on a planet like this."

And yet it wasn't so horrible any more—not now he had been enabled to *see*, instead of looking. With a flash of unexpected insight he realised that that was why the tension, the bitterness and the anger had gone out of them: so long as the world was unwanted and hostile, it was ugly; when it was no longer ugly, it was no longer to be hated. Whoever this artist was, they owed him—perhaps as much as their sanity.

"We can't stay out here much longer," he warned. "The evaporation's beginning to die down. But it'll be sunset pretty soon now, and then it'll be cool enough for us to come out in ordinary suits."

The sight of the ship was the first thing that struck Painter as he approached. It *jarred*—it stuck out of the unity of the landscape like a stain. That was why he had so carefully covered his own vessel, in case the sight of it disturbed the carefully ordered precision in his mind. One had to become almost a part of a world before it was possible to represent it properly.

But it was that jarring more than anything else which informed him what the strange shape was. It looked nothing like any ship he knew of, but logically—since it was artificial—it had to be one. Which meant . . .

He was shaken almost to the roots of his mind. These creatures were *aliens*.

And either they were very small, or their vessel was like *his* vessel—a solo craft of absolutely minimal size. Even that seemed unlikely.

He was glad that he had not casually shown himself as he approached. Now he dropped behind a ridge of piled sand and kept carefully out of sight for the last stage of his journey, until he came to a gap between two boulders from which he could see the area round the two ships, and the hut where he had stored his paintings to save uncovering his craft.

So there were three of them, not counting any more there might still be in the ship. And they were not too unlike himself, after all: bipeds, with two arms and a head. At least, that was his impression; they wore protective suits which might or might not exactly conform to their bodily shape.

He debated within himself whether he should show himself or wait till they had gone. The latter course seemed ridiculous —after all, it was the first time he had ever run across another race in space, though it was quite possible others of his far-flung species had done so. But he was a painter; it was his life. He was no expert in communication, in psychology, in any of the myriad subjects which might have lightened the burden of opening contact between two different races.

Then it came home to him what they were doing. They had brought his paintings out of the hut, and they were looking at them. There was a certain something about their attitude—

Painter felt decision harden in his mind. People who respected his work like that must be fundamentally similar to himself—obviously. There would be no problem of contact, for the barrier was already broken.

He got up and started down the slope towards the aliens.

" Christy !" Froude's voice exploded in the helmet phones. " *Look out* ! "

Tak had barely time to turn and see the monstrous shape descending on them before Christy had seized the bolt-gun from her belt and fired it in a spasm of pure terror. The beast lasted only an instant before the force of the weapon; then it went sprawling in the sand.

Tak's heart seemed to have stopped. He waited to make sure it was still beating before he moved again, and by that time the sound of Christy sobbing as she leaned her head on her husband's shoulder echoed in his ears, mingled with Froude's comforting phrases of commendation. Awkwardly, he walked over to them.

" So that's what happened to our artist," said Froude sombrely, gazing at the huge, clumsy shape of the black-hided beast bleeding dark brown into the thirsty sand.

" What do you mean ? " said Tak.

" Isn't it obvious ? That thing must have got him." He swallowed audibly. " What a foul end for a man like that ! "

Tak hesitated. " We'd better get back to the ship," he said finally. " I'm heating up. Here, want me to give you a hand ?"

Christy straightened. " I'm all right," she said in a strained voice. " It was just the shock of seeing that—coming towards me. You're right—let's go in."

" Careful when you take off your suit, Froude," Tak reminded him. " We've got to get the water back into the circulator."

They turned and plodded across the sand towards the airlock again; as Christy was climbing up first into the cabin, Tak turned and looked back, a sudden idea forming.

" You don't suppose that *that*—"

No, the notion was ridiculous. " Nothing," he said to Froude's inquiry, and clambered up the ladder. " Wait till the crew of the rescue ship see what we've found ! "

Outside the first winds of evening were tugging at the sand which covered Painter's ship. The sun caught the fugitive gleam of metal through the grains as they fell away.

John Brunner

THE LITERARY LINE-UP

Most outstanding stories, whether science fiction or in the general categories, are usually based on a simplified type of plot. From there on it is the author's skill that develops the magic to hold the reader. We think next month's lead novelette is one such story—and it is by Kenneth Bulmer whose recent serial " Green Destiny " has been so popular with all our readers. " Defiance " is merely the story of a crashed spaceship on an alien planet—or rather *two* wrecked ships; from the whole pieces of both it would be just possible to salvage one spaceworthy craft. Add environment, terrain, and alien conditions, and the task becomes practically impossible—except for the grim determination of the humans involved.

There are some terrific supporting short stories, too. Australian Frank Bryning is back with " For Men Must Work "; Arthur Sellings has another new story, " Fresh Start "; another gem of a James White yarn, " False Alarm "; a new Brian Aldiss story and one by American author Richard Wilson. Quite a line-up !

Story ratings for No. 57 were :

1. Green Destiny (Part 1) - - - Kenneth Bulmer
2. The Tools Of Orlas Boyn - - - Peter Hawkins
3. Beautiful Weed - - - - - E. R. James
4. Time To Change - - - - Bertram Chandler

There were only minor variations in the ratings for the three short stories, which, to all intents and purposes, were tied.

The modern Utopia—the Golden Age—when it arrives, may be through a natural progression of events, an off-spring of the laboratory. It could, however, be a deliberately induced state to keep Mankind happy. For a purpose, of course . . .

THE GOLDEN AGE

By Philip E. High

This, in truth, is the Golden Age. An age of prosperity, peace, leisure and happiness. An age in which the wealth of one is the wealth of all and each may possess the overflowing riches of the robotic State.

This is the age of leisure, the age in which man became heir to the foresight of his forebears, for today no man need labour in order to live.

This is the age of freedom and liberty. Liberty from want, from fear, from labour. Liberty from doubt, restriction and mental repression, for only in true freedom does man find himself and realisation.

Man has emerged from the darkness of labour, ignorance, fear, poverty and war. He has come into the LIGHT, the light of a new era of abundance and welfare. He has come to the GOLDEN AGE—.

Extract from an instructional tape (Class 4). Ottawa Educational Authority.

Carmody stirred uneasily, opened his eyes and gazed dully at the ceiling. His head throbbed and there was a sour metallic taste in his mouth as if he were recovering from a hang-over. He knew he wasn't. There had been no hangovers for two years.

With some effort he raised himself on one elbow and looked about him. The room, the bed on which he lay, were unfamiliar and there was a strange man seated in a recline-chair at the foot of the bed.

"Awake now?" The man smiled.

"Rather obvious, isn't it?" Carmody scowled at him angrily and struggled to a sitting position. "What happened?"

"You were taken ill. We brought you in here to rest."

Carmody made a rasping sound which might have been a laugh. "Think I'm a fool? I've only got to keel over once and the nearest Cleanse and Med would have hauled me in for a check-up."

"Yes, yes." The man was still smiling. "In this case, however, your keel-over was assisted. We jabbed you with a needle while you slept in the park. The drug, as you will probably guess, was hypnotic. You walked here, more or less, of your own free will and quite normally."

Carmody digested the information. "Who are you? One of Leverick's yes-men?"

"It will be explained in due course. Henkler will see you as soon as he can."

Carmody threw back the sheets and swung his feet to the floor. "Have you ever been punched on the nose?"

The other looked him up and down and laughed. "Carmody, you're fat, wheezy and out of condition. I'm not." He paused. "In case you have ambition beyond your strength I also carry a gun."

Carmody sighed. "I thought I'd taken my punishment, apparently there is more to come. Where did I slip up this time?"

"You didn't, set your mind at rest. We're nothing to do with Leverick. We had to pick you up discreetly for reasons of safety. Please accept our apologies if our methods, up to now, have been a little unpleasant."

Carmody said: "Oh, sure, think nothing of it. The whole business intrigues me no end. When do I start asking you riddles?"

The man laughed softly. "You don't, you ask Henkler." He reached down beside him and tossed a bundle carelessly on

the bed. " Your clothes. While you're dressing I'll tell Henkler you're awake." At the door he turned. " You realise, of course, you can't get out even if you try ? "

Carmody nodded without speaking and began to dress. I ought to be afraid, he thought. I'm in some kind of tight spot and I ought to be afraid—queer. Probably there was something in the hypno-drug which took care of that, but why ?

When he had finished dressing he waddled to the mirror and stared at his reflection. ' Fat, wheezy and out of condition ' the man had said. He decided the criticism was almost flattering. He had little bright eyes in a face that was too fat and too florid. He had jowls, a noticeable paunch and there were little ringlets of fat round his wrists. At forty-two he looked a mess, but what did it matter ? He ran his fingers through his thinning brown hair and decided he would soon be bald. Cleanse and Med could fix that, of course, but was it worth it ? Was anything worth it in the Golden Age ?

He crossed to the standard auto-serve and dialed for cigarettes.

There was a click as the sealed package shot from the delivery slot and he scowled at it almost with dislike. The Golden Age ! No work, no effort and no strain on the intelligence—just dial the correct combination. If you were illiterate or a moron, you just made a verbal request into the speaker.

It didn't matter what you wanted, a bottle of whisky or a new flyer, it came through the delivery slot or was brought to your door by a robotic. ' *The wealth of one was the wealth of all.*' The system had eliminated class, want, and the need to work. It had also driven Carmody crazy ever since he had been old enough to think.

The door slid open and his captor came in. " Mr. Henkler will see you now."

Henkler was a tall, gaunt man with a fine, almost transparent skin stretched tightly over his nose and cheek bones. He looked searchingly at Carmody with curiously light blue eyes and waved him to a chair. " I will come straight to the point. It will save a great deal of time and trouble." He sat down behind a fold-desk and looked at the other without expression. " We know a great deal about you. At one time you were the greatest critic of the Golden Age in our society, unfortunately, when drunk, you aired your opinions too loudly. The authorities found it necessary to effect a cure, you worried them. Your books, one of which fell into our hands, incidentally, did not help your case.

Although no one reads today, your opinions, although privately expressed, did not meet with official approval by any means." He paused. "You received an official visitor who—er—provided treatment. Perhaps the treatment was effective, we brought you here to find out."

"Why?" said Carmody directly.

"We wanted to know if your objections to the present system were purely verbal or whether—" He paused, meaningly. "Or whether you had guts enough to do something about it."

Carmody said softly. "A wrong answer and I could hurt myself, couldn't I?"

Henkler's pale eyes looked a him coldly. "Surely it is obvious that we have nothing to do with Leverick? Our methods of getting you here would hardly be necessary."

"You have a point there. Just what are you, then?"

"People like yourself, rebels, an underground organisation. We don't give it a name." Henkler leaned forward. "Our psychs read your book, they drew an analytical from it. They say you have a brilliant mind and outstanding organising ability. We could use both."

Carmody scowled at him. "I don't know what your aims are, presumably rebellion. Rebellions are only successful when supported by a majority, this one won't be. The majority are not only apathetic, they believe they're happy. They believe in the Golden Age."

Henkler rose. "You are right, Mr. Carmody. The people, as a majority, enjoy the amenities of the age. They are enjoying and dying, a whole race, rotting and degenerating on its feet. We thought, perhaps, you might care to do something about it."

"What?" said Carmody.

Henkler smiled thinly but did not answer the question directly. "Mr. Carmody, you are maladjusted. You are a seeker after truth in an age which has forgotten the meaning of the word, a rebel in a ward of happy morons." He paused. "We have the answers to many of your questions. You may have the answers to our problems. We'll give you three days to think it over."

"You're letting me go?"

"Of course."

"How do you know I won't go running to the authorities?"

"What authorities?" Henkler's mouth twisted a little. "This is the Golden Age of absolute freedom, remember? Although you underwent a 'cure' where would you contact the authorities

responsible ? You are a curious man, Mr. Carmody, we believe you will consider and return. Shall we say my lakeside house in three days ? You will find the address in any directory."

Carmody walked slowly through the park, thinking. There was no doubt Henkler had touched the one vital spot in his psychology—curiosity. There had been the inference that the organisation had the answers to important questions, questions which had worried him all his life and finally driven him, too frequently, to the bottle. Drunk, he had been argumentative, loud mouthed and careless in his opinions. It had brought about something which he had not known existed, official retribution.

" I am Leverick, Department of Mental Well-being."

" Never knew we had one." Carmody had staggered to a chair and flopped into it. " What do you want with me ? "

" You are a sick man, very sick and you are worrying other citizens. You are challenging the foundations of the wonderful state in which we live, a state brought by men who devoted their lives to the brightness of the future."

" So history tells us." Carmody had belched. " History is so much double-talk anyway, like geography it doesn't fit the facts."

" And what is wrong with geography ? "

" We seem to have lost a continent since the Golden Age, not to mention a few islands. What happened to them ?

" Mr. Carmody, you are suffering from delusions."

" Yes ? I found an old map in a ruined building when I was a kid of eighteen. It showed a continent called Africa. Where did we lose it ? Official maps only show two continents, North America and Europe. What happened to Africa ? "

Leverick had risen from his chair. " Mr. Carmody, your very words prove the state of your mind. There is no such continent as Africa, there never was. Obviously this map of which you speak is a delusion, possibly alcoholic." Something in his hand purred softly and Carmody had found himself incapable of movement.

Leverick had a clear boyish skin, soft fair hair and a face that was almost gentle but he had taken a small floppy club from his pocket and proceeded to beat Carmody from head to toe.

Whatever the paralyser beam had done, it didn't inhibit pain. Carmody tried to scream and couldn't. Later he found that the beating had left no marks, but Cleanse and Med had had to work on him for four hours before he could move without screaming.

Leverick later produced an hypnotic device which the other did not recognise until it was too late.

" A drink, Mr. Carmody ?" Leverick held the glass to his lips.

Carmody swallowed greedily and vomitted it back.

" Another ? "

He retched again.

" Try again."

It had gone on for a solid hour and at the end of it he had felt as if a net of hooks was being drawn across the inside of his stomach.

Leverick had looked down at him and smiled his gentle boyish smile. " You suffered from alcoholic delusions, you have now been conditioned against alcohol. With a clear mind you will soon perceive how mistaken you were and temper your personal opinions with discretion."

Carmody stared across the park, remembering. No matter what Leverick said, he *knew* there was another continent. In his search for truth Carmody had availed himself of many of the instructional courses in the city information banks, one of which had been meteorology. He grinned to himself, twistedly. It was an interesting subject, providing you accepted a tidal current could run backwards and were prepared to concede that empty ocean would have an uncanny influence on prevailing winds and temperatures.

He sighed. The Golden Age, an age which produced nothing and inspired nothing. The majority of the people were not only going downhill fast but were ninety-eight per cent illiterate. In a way he could understand it. Although the information banks contained the complete knowledge of the race, all the instructional courses were theoretical. Information supplied details of any given subject on request but failed to provide a means to realise it in fact. It was like telling you how to make a cake without providing ingredients. If you wanted to make a robotic flyer, Information would tell you complete to blue prints and wiring circuits. Unfortunately Information failed to provide the tools and equipment. There were no tools in the Golden Age. What did a people who had been freed from labour want with tools ? The only concession was writing materials and oils. In the Golden Age you could write a book or paint a picture. Mentally, Carmody made a vulgar sound with his lips.

He sat down on one of the park benches and considered history. It read rather like a fairy story : Once upon a time there had been the Age of Darkness when people were worried, maladjusted and had been dependent upon their own efforts to gain a living. Finally had come the ultimate war which had decimated mankind by the million and had turned a whole continent—Europe—into a radioactive waste. The survivors of the holocaust, evidently dedicated men, had got together and started laying the foundations, not only of a new civilisation, but a new dispensation. The world became robotic, production, supply, even knowledge was given to the machines; machines which were self-repairing and consequently eternal. The need for work ceased and mankind found himself with absolute freedom, absolute leisure. In the place of work rose the erotic pleasures, the joy houses, sense parlours, the exciter cubicles and there was an elaborate duelling system as an outlet for man's animal instincts.

Carmody scowled unseeingly in front of him. There was an underground organisation which professed to have the answers to the countless questions which rose in his mind. Could he afford to let the chance go by, a chance to get some sense somewhere ?

Henkler smiled his aloof smile and waved Carmody to a chair. " We thought you would come." He paused and came directly to the point. " Are you prepared to join us ? "

Carmody's eyes narrowed a little. " Aren't we being a little premature ? Join what against whom ? History—ancient history—is full of plotters who got themselves shot, burned, or otherwise eliminated without achieving anything but their names on a memorial. I'd want a few facts first. When I get those facts I'll tell you."

Henkler nodded and rose. " I have something in the next room which may help—"

In the next room a short, brown-faced man rose as they entered. Henkler waved a casual introduction. " This is Brian Wingate—Brian specialises in maps."

Wingate nodded briefly and began to unroll something on a small table. " You're familiar with official maps; we won't waste our time with them. Take a look at this." He pointed with a thick blunt finger.

" Africa ! "

" Yes, Africa. As you see, we occupy what was once the United States and Canada. Here, marked in green and extending from central Germany and into Asia, is the radioactive area."

" What about the rest, marked in black ?"

Wingate turned, his face wooden and expressionless. "Occupied territory," he said.

Carmody sat down heavily, he had lost interest in the map. " You mean we lost that final war ? "

Wingate nodded slowly. " All organised resistance ceased within a week."

Carmody shook his head dazedly. " I don't get it, what happened ? "

Henkler stepped forward. " The race were not fighting among themselves—something came from the stars, another race. A people, to all intents and purposes, human beings like ourselves but so far ahead of us technically that we were literally beaten before we started to fight back."

" But the Golden Age— ?" Carmody stared at them stupidly.

" Golden Age, hell." Wingate almost spat the words. " Man never created the Golden Age or the robotic state, it was created by the invader. An invader who ruthlessly destroyed ninety or ninety-five per cent of the population and tossed the survivors into the American continent."

Carmody waved his hand vaguely around him. " But all this— ? "

" My God, man ! " Wingate banged his fist suddenly on the table. " Do I have to draw a diagram for you ? The invaders took the parts of Earth which suited them best and placed the survivors where they wanted them." He leaned forward, his face flushed and angry. " Can't you grasp it ? We're natives in a reservation ! "

Carmody gr pped the arms of his chair. " You may be right. For God's sake give me time to think, this makes less sense than the old mumbo jumbo—"

After a long silence Carmody looked up. " We must have put up quite a fight to destroy a continent and yet you say we were beaten within a week." There was a trace of suspicion at the back of his eyes.

Henkler said, quickly, " We can't explain that ourselves. You see, it was not brought about by war—the invaders made Europe uninhabitable themselves."

Carmody rose, crossed to the auto-serve and began to dial. " One of us is crazy or a liar—not a very good liar either." He watched the auto-serve deliver a cup of hot coffee. " An invader who destroys half and more of the population and provides the

survivors with the abundance of a robotic state." He frowned and dialed again and watched the small package drop into the delivery chamber. He held it up. " Crethene, the most dangerous drug known to the human race delivered without question. If I become an addict, Cleanse and Med will pick me up and cure me before I reach a killer dose. If I wish I can start the cycle all over again." He tossed the package into the disposal slot and picked up the coffee. " Before you tell me more I'll be frank. I think you're both crazy but I've enough common sense left to suspect my own sanity." He sighed and sat down. " Tell me the rest but make it brief."

Henkler sat down opposite him. " Man suffered the occupation for twenty years, then there was an uprising which was ruthlessly suppressed. The invader began a programme of re-education; young children were taken to Canada to be taught the alleged truth and history was altered to suit the facts. Man became happy in his new environment, unaware that he was a subject race in a reservation.

" Fortunately, the instigators of the first uprising made sure that truthful records were preserved in event of failure. Again, fortunately, there are rebels in every age and, somehow, some sort of organisation has been preserved since the invasion, that is, about fourteen generations ago." He paused. " You may see the records if you are in doubt."

Carmody scowled at him. " You make it sound almost logical. I only wish it made sense, but it doesn't."

Wingate rose. " We can show you the records now." His voice was angry.

" All right, all right !" Carmody made an irritable gesture. " At the moment I am not doubting you, it's the whole set-up. Consider, an invader conquers a world, destroys nearly the whole population and tosses the survivors into a reservation. Man has done the same thing in the past and, despite mistakes and brutalities, finally educated the subject race up to his own level and absorbed them into his culture. Here the reverse is true, we are placed in a reservation and the invaders embark on a programme designed not only to emasculate but to degrade. Further, if they needed us for purposes of study, eighty would have been sufficient not eighty million. A slave state in a robotic culture is also absurd and can be ruled out. Why keep us alive, allow us to reproduce ? Why didn't they kill the lot of us and have done with it ? "

" Who the hell cares ?" Wingate's face was flushed. " The point is we're here, what are we going to *do* about it ?" He began to stride angrily up and down. " Maybe the invader finds us amusing, quaint, or our presence stimulates his ego. Maybe we're culture on a slide, fish in a bowl, animals in a zoo. Two more generations and it will be too late, the race will be beyond regeneration. People have absorbed the phoney psychology of the age which boils everything down to a physical sensation and the invader is helping it along as fast as he can. I can dial for any dangerous drug I wish and no matter where I go for liquor its always half adulterated with aphrodisiacs. I say who the hell cares why, let's *do* something ! "

" That's an impassioned speech," said Carmody coldly. " It might impress me if it didn't come from one of the top ten. Yes, I know, you hold position No. 2 in the duelling lists, second only to Mr. Henkler who holds First."

Henkler half rose. There was a sudden dignity in his eyes which made his gaunt face almost handsome. " Mr. Carmody, we are not duellists from choice. Our names were added to the duelling lists because, like yourself, we were rebels. We had to fight our way to the top in order to survive. Do you think we liked killing other men ? Do you think, knowing what we did, that we could salve our consciences by telling ourselves that the men we killed were only morons after a gold trophy shield ?"

Carmody shifted uncomfortably in his chair. There was no doubting Henkler's sincerity. " I apologise. I shouldn't have said that."

" Thank you. Shall we get down to business Mr. Carmody. Will you join us ? "

" What do you plan to do ? "

" That, Mr. Carmody, is why we need you. The resistance is well organised but there is no plan. Plans are frequently submitted but all are unfortunately of the heroic variety and quite useless."

" What arms have you ? "

Wingate stepped forward. " Enough to equip everyone, fifty or sixty thousand men."

" Duelling weapons ? "

" Some of them, yes. Also we have a large quantity of pre-invasion weapons."

Carmody looked at him and shook his head slowly. " Worthless, you might as well use your fists. Duelling weapons are no

danger to the invader or we should not be permitted to use them If pre-invasion weapons were any threat, resistance would have lasted more than a week."

" We have secret work rooms, given the time we could produce nuclear weapons."

Carmody laughed contemptuously. " How long before our friends' detectors picked up fissionable materials ? And even if we got over that, how would we deliver it and where ? A flyer won't take you more than ten miles from the coastline. It appears to but it doesn't." He sighed. " You can throw your bomb on the junk pile with the rest of your arms." He leaned forward in his chair. " Just how many uprisings have there been ? "

" Four."

" Four ! " Carmody rose. " Four and all obviously abortive. You don't stand a hope in hell ! "

Henkler's face was pale. " You refuse to consider it ? "

Carmody said, almost gently : " Gentlemen, I might or might not be prepared to consider suicide on my own behalf but you're asking me to take fifty or sixty thousand members of your resistance group with me. God ! An untrained and untried army without arms, against an enemy who is about a thousand years ahead of us technically. We could just go out some place and blow our brains out ourselves. At least, that way, the invader might have some difficulty finding the bodies, your way he won't even have that."

Curiously, Henkler was smiling. " Don't you understand, Carmody, we've thought of that too. We hoped you would be able to contribute something a little less suicidal."

Carmody sat down slowly and drummed his fingers on the arm of the chair. " I'd want the records, time to think, a psych chart of the invader, a hundred things. You don't defeat a superior enemy by force of arms, you exploit his weaknesses, if any—"

" May we take it you are—er—sold, Mr. Carmody ? "

Carmody scowled at him. " Let's say I'm a sucker for the lousiest bargain in history."

The days passed and the pile of papers on the desk grew to alarming proportions. Carmody stared at them and sighed. He had been trying to draw up a chart of the invaders' weaknesses but they didn't add up to much. An inclination to beat up the natives now and again was certainly a psychological weakness

but not big enough without something to back it. He had learned that the enemy employed a large number of collaborators who had been trained from childhood and, of course, there were a number of alien administrators watching the collaborators. There, too, was an administrative weakness if only he could think of a way to exploit it. He rubbed his chin and sighed again. In the pre-invasion fiction he had read in his teens there had always been a hero who destroyed the enemy single-handed or some sort of super weapon. Carmody had neither and it looked as if Henkler's faith in him was misplaced.

He rose and began to pace up and down. His real trouble was, he conceded, his inability to make sense of the invaders' programme. Why make radioactive a whole continent ? Why spare a handful of survivors, grant them luxury and ease with a planned policy of degradation. It was not even as if the invader feared the natives. Looked at from any angle, the whole set-up was crazy and could have been settled by the simple process of wiping out the whole race. Wingate had suggested animals in a zoo but who would see the animals but the keepers ? Carmody stopped pacing suddenly. Yes, who ?

Henkler looked up from his desk. " Well ? "

Carmody tossed down a heap of papers. " I think I've got an angle. It's a hell of a long shot, but it's better than nothing."

Wingate who had been seated in the corner, rose quickly. " Action ? We're going to do something at last ? "

" Of a kind, yes, but take it easy. If this thing is going to work, it's got to be planned correctly." He retrieved one of the papers and tapped it with his finger. " The weakness in the system is the collaborator. A dead collaborator means a replacement and a replacement means training a fresh man."

" So we kill collaborators ?" Wingate's face was eager.

Carmody grinned faintly. " Let us say we arrange a series of nasty accidents. We don't want our friends calling too soon. Our purpose is to keep them occupied but don't get big ideas about that either, the death of a few collaborators won't give our friends a sleepless half hour. While I'm on the subject, let's shed a few illusions. The invader is no fool, as soon as he realises what is happening he's going to pick up his chief suspects first. I imagine we stand pretty high on the list." He paused. " When they come we can't shoot our way out of it or even die like heroes. The enemy uses a personal force-screen which will stop any weapon we know. Do I have to remind you that his methods

of interrogation will not only be highly effective but extremely unpleasant. The less we know about others in the resistance the better." He bent down and rummaged among the papers again. " Can your secret work rooms make this ? The specifications are in the information banks ? "

Henkler frowned at the paper. " A sub-space radio ? Yes, yes, I think we can make that."

" Good." Carmody nodded quickly. " I'll want every one you can turn out. In the meantime, here's what we'll do."

Collaborator Lyndos stepped on the air brakes of his bubble flyer and nothing happened. He was not unduly alarmed, there was a robotic safety device which took care of the occasional mechanical failures. He pressed the emergency switch without haste and there was a single dull report. The bubble seemed to come to a sudden stop and tip sickeningly sideways.

Collaborator Mackley leaned back in his chair and sucked alight a cigar.

It was an old joke, almost as old as smoking, but the way the resistance had done it increased its effectiveness and ended the joke forever.

The cigar exploded. It took most of Mackley's head with it.

Carmody looked out of the window and stared for a long time, when he turned away he was pale and sweating slightly. "They're coming." His voice hoarse but calm. " They're dressed as a tourist party but when they catch the sunlight you can see the personal force-screens ? "

" Many of them?" Henkler's voice was almost conversational.

" Enough to surround us and see we don't get away." He grinned, twistedly. " Forty-seven collaborators must have got them worried." He turned to the window again and peered down. " Ah, Pretty Boy Leverick in the van. You know, even if this fails and they kill us, it might be worth it. I wonder if he'll like the way we've rigged the room."

Wingate sprang angrily to his feet. " It may suit you to talk, Carmody but not me. They're not taking me without a fight." He slid back a wall panel. " I wonder how they'll go for a pre-invasion exploder gun."

Henkler moved so swiftly that Carmody saw only half of it. There was a sharp crack and the gun clattered to the floor.

Henkler kicked it quickly out of sight beneath a chair. " You crazy idiot, they'd blast the whole place to pieces ! "

Wingate held a hand to his bleeding mouth. " All right, I'm hot-headed but this is a hell of a way to die—rats in a trap." He looked accusingly at Carmody. " We've killed a few collaborators, what else have we got to show ? "

" If our friends had come a few days earlier we'd never have found out." Carmody glanced quickly at his watch. " Even now we'll have to play for time."

Henkler said, evenly, " One more act like that, Wingate, and I shall have to kill you."

" But we don't know what he's doing. He may have helped to trap us." Wingate's voice was harsh with tension.

" Even if he has, it's too late to do anything about it now." Henkler sat down without haste and crossed his legs.

There was a purr and the door slid open.

" I trust I am not disturbing you ?" Leverick was smiling. It was not a pleasant smile and his face looked cold and angry.

Carmody said: " No. We saw you coming."

" I have evidently come to the right address."

" From your point of view or ours ?" Carmody sat down and continued quickly. " You wear a little silver coloured badge on your coat, Leverick, which acts as a pass key. The door mechanism recognises the badge and reacts, opening as you approach. Try getting out, we've removed the mechanism on this side of the door."

Leverick looked at him almost without comprehension, then he laughed softly. " I can burn a hole through it inside four seconds."

Carmody shrugged. " Shall we lay our cards on the table ? I know who, and what, you are. You, for your part, are picking up suspects, but first you have to get them out of here." He fumbled for a cigar and changed his mind. He was playing desperately for time and unsteady hands might give Leverick too much confidence. At the moment he had him nonplussed and uncertain. He continued to talk. " Just how will you burn a hole in the door wearing a force screen ? A screen reacts to sound but you can't fire through it can you ? Of course," he managed a convincing smile, " you can always lower your screen but, as you are no doubt aware, you are facing two of the finest shots in legal duelling. Want to lay bets who'll get hurt first ?"

Leverick's face was colourless. At that minute the differences between the two races was startlingly obvious. There was a strangeness about the eyes, a fragility about the sharply pointed chin emphasised by the heavy, full-lipped mouth.

He said, expressionlessly: "How long do you think I have to wait before my men investigate? One hour? Two? Time, one might say, is on my side."

"But it isn't." Carmody shook his head. He rose and crossed to the window. "I am expecting company." He glanced at the sky. "You are a powerful and ruthless race but you have superiors."

"Superiors! You flatter yourself, Carmody. One man alone can handle your rabble from the city."

"This company," said Carmody softly, "is not coming from the city, they are coming from the stars."

Leverick smiled his bitter contemptuous smile. "More delusions, Carmody?" He laughed softly. "Delusions which evidently, are of little comfort. You are sweating, my friend, perhaps you have doubts."

Carmody glanced again at the window and sighed with sudden relief. He staggered to the chair and almost fell into it his whole body trembling vivibly. "I told you time was not on your side Leverick." His voice became muffled as he rested his head in hands and tried to fight reaction. "I told you we were expecting company. The company has arrived. You'd better take a look through the window."

Leverick crossed the room in four swift strides and stopped. A long line of spheres, shining like miniature suns, were descending silently from high in the sky.

Leverick's face contorted, the heavy muscles about his mouth began to twitch uncontrollably.

He screamed soundlessly and turned.

The three men ducked, almost instinctively, but there was no need. Leverick had lost his head, he fired blindly four times forgetting to lower his force screen. There was a shower of sparks a rending sound and an acrid pillar of oily smoke began to drift slowly across the room. Where Leverick had stood were a few pieces of metal and some cindered objects which might have been bones.

The air conditioner detected the smoke and began to purr softly. The compensator in the opposite wall woke to sudden life and blew clean pine scented air across their faces.

Carmody watched the skirting panels open and the robotic cleaners emerge from their hiding places like metal rabbits. They slid silently past the three men, converging on the cindered remains and began to remove and scour busily. Carmody put his hand over his mouth and tried not to vomit.

"Well?" Wingate sounded impatient.

Carmody leaned back in his chair and looked complacent, he felt he had a right to. "I'm not going to say it was simple because it wasn't. In the first place it was sheer guesswork and one hell of a risk which might have got us all killed." He sucked alight a cigar and pointed it at Wingate. "You gave me the first clue when you said 'animals in a zoo.' It was not the right answer but it gave me a lead. It made me think of a zoo inspector I once read about and the picture began to make sense. Why should the invader go to the immense trouble of building a robotic reserve for a mere eighty million people? Why not take over the whole planet and have done with it? There had been no real war, yet they radioactivate a continent and it suddenly occurred to me that if I were a visitor to Earth I might conclude, from the state of Europe, that there *had* been a war. In that light it began to look as if the invader were setting a stage with intent to deceive. Then it dawned on me, *these people had to account to someone*!"

Carmody settled back comfortably in his chair and puffed at the cigar. "All the rest was guesswork but I figured it out something like this. There was a galactic society, or Federation, neatly grouped according to cultural level, with the top culture imposing rules of conduct and ethics on those below. Our invaders, I assumed, rated pretty low on the cultural level and their home planets were probably on the extreme rim of galactic influence.

"One day, one of their survey ships found Earth, and our friends decided to have it for themselves. I assumed, however on the basis of the invaders careful stage-work, that the top culture had laid pretty hard rules about colonisation with a number of unpleasant penalties if these rules were broken. Obviously, one of these rules laid down sternly that a planet must not be colonised if it contained a life form which had reached a certain cultural level. Our invaders took over the planet and worried about the cultural level of the inhabitants afterwards. They *did* worry and rushed through a scheme to

reduce that level as soon as possible at the same time setting a convincing stage to fool a possible inspection committee. No doubt, too, they took their time informing the proper authority that they were colonising a new planet and after that it was easy."

Carmody tossed the remains of his cigar into the disposal tray and fished for another in his pocket. " When the inspection committee arrived they would be set and ready with all the answers. You can imagine the line they were going to use, probably it was going to run something like this : ' When our ships arrived, these savages were destroying their planet in an atomic war—note the vast area of radioactivity. We stopped the war, saved the survivors, placed them for their own safety in a reservation, under ideal conditions, as you will observe. In the city memory banks is the accumulated knowledge of both races but the natives will not avail themselves of it. As you see, they are debased, being more interested in physical experience and killing each other in duels.' "

Carmody laughed softly and sucked alight the cigar. " They could have got away with it, too. A spot psych check of the human race would have placed their cultural level as being pretty debased. The knowledge of both races *was* in the information banks." He laughed. " Where the hell do you think I dug up a sub-space radio ? Of course, the committee would not have been told that, although we had access to the knowledge, we couldn't use it." Carmody stopped and blew a smoke ring.

" But why didn't they just wipe us out and hide all traces of our existence ?" said Wingate.

" I thought about that, too. It occurred to me, however, that getting away with a single murder, even in pre-invasion days, was well-nigh impossible, getting away with race murder in the face of an inspection committee—hopeless."

Henkler was leaning forward. " I am beginning to understand. You committed the facts to recording tapes, set the transmitters and let them broadcast continuously."

" Yes, I had fourteen transmitters working continuously, some of them set for forty light years. I figured that, sooner or later, the message would be picked up by the right people. Any intelligent race would recognise the message for what it was and render it understandable. Two weeks ago, I found an answer on the receptor tapes of the receivers." He grinned apologetically. " I'm no hero, I couldn't have faced Leverick if I hadn't known help was coming."

" Then killing collaborators was a diversion ? "

" Yes, I had to draw their attention from curious noises on their communicator bands, not to mention unaccountable power losses. I was bleeding power off wholesale to run the transmitters. Without a diversion of some kind they might have started asking too many questions."

Henkler rose and crossed to the window. " We have an immense task ahead of us. Lands to reclaim, rebuilding a world, a race to regenerate and make whole." He stared unseeingly at the Federation ships hanging like tiny suns above the distant city. " Perhaps we shall receive help in our task—"

Carmody rose and joined him. " We are, at least, out of our cages. I wonder how the invaders feel now." He grinned suddenly. " At the moment, just who are the prisoners ? "

Philip E. High

'Gone Away—No known address'

Subscribers are reminded to keep us informed of any change of address to ensure the safe delivery of their copies as far too many issues are returned by the Post Office marked as above. Overseas subscribers are particularly requested to let us know in good time.

PLANETS CALLING EARTH

At Jodrell Bank in Cheshire you can see one of the most futuristic-looking pieces of science fiction machinery in the shape of one of the world's largest radio telescopes. Its presence marks one of the most fascinating steps in Mankind's search for greater knowledge of the finite Universe.

By John Newman

Compared with Man's other scientific achievements, the physical exploration of space and other planets seems to be slow in getting underway. The mass-ratio problem of large, manned chemical-fuelled rockets may never satisfactorily be solved, whilst a practical nuclear rocket drive is still only an idea batted around by science-fiction addicts—plus a number of top-grade far-seeing engineers and physicists.

But Mankind is not easily stopped. Scientists are exploring the Solar System by proxy, immeasurably extending our probing senses by the use of invisible radio waves, and it seems that for some time to come we will have to rely upon the radio and optical 'windows' in our atmosphere for most of our extra-planetary information.

The two chief radio methods of exploration now employed by astronomers are the analysis of radio waves from extra-terrestrial radio sources and the use of radar 'fingers' to reach out from Earth so their echoes will tell us of bodies and conditions we have yet to explore by more direct means. The tools of radio astronomers are the giant radio telescopes now found near many

of the major universities of the world, weird arrays of wire netting and paraboidal reflectors at least a dozen times the diameter of corresponding optical telescopes. Not so obvious are the small dipole aerials, no larger than normal television aerials, used to monitor continually the Sun's radio radiation. Combined with each radio telescope and connected to it by co-axial cable, is a set of complex analysing instruments, recorders, amplifiers and radio spectrometers, usually housed in a small hut or caravan.

The largest and most versatile of these radio telescopes is at Jodrell Bank, Cheshire. Originally slated to cost £400,000, improvements in design of the reflector incorporating sheet steel in place of wire mesh enabling it to focus the important short waves more accurately, have boosted the figure to £650,000. Seen for the first time, it appears a fantastic instrument, growing out of the peaceful countryside. Supported by enormous steel towers 180 feet high, the steel bowl has a diameter of 250 feet and weighs 500 tons alone. Thousands of tons of ferro-concrete were sunk in the ground to support the 2,000 ton superstructure which is capable of being aimed at any part of the sky.

The elevation and depression movements of the sheet steel bowl are controlled by racks salvaged from the battleship *Royal Sovereign*, which was loaned to Russia during he war, whilst the whole mass can be made to rotate around a 17 feet gauge railway track. A dozen electrically driven bogies enable the whole to be smoothly and accurately tracked on any single point in the heavens. The main power supply comes from electrical generators developing 464 kilowatts.

Using this new telescope, radio sources emitting on the one metre band can be pinpointed to within one degree of arc whilst this improves to a few minutes of arc on the important 21cm. hydrogen gas wavelength. Until now, the largest radio telescope in the world has been a fixed 220 feet diameter installation at Jodrell Bank ; but this relies on the Earth's rotation to cover a limited band across the sky. It is useful in mapping intensities across the whole sky but cannot be fixed on and made to follow a single source as can the new telescope.

Arthur C. Clarke was one of the few non-professional astronomers to realise that optical telescopes are highly efficient light projectors as well as receivers—given a good light source at its focus the 200 inch reflector would make a magnificent searchlight. In just the same way, the new radio telescopes can be used as radio beam emitters and provision has been made for this use in

the 250 feet Jodrell Bank giant enabling a tight beam of radio energy to be jetted out into space and its reflected echoes recorded and analysed.

By pulsing the beam and using electronic switchgear the bowl may be used for both emission and reception, the basic principle of radar : although astronomers usually have the advantage of knowing where to point their projectors and so obviate the need to sweep the skies in a complex scanning pattern.

So far astronomers have used this radar technique only on relatively close bodies and phenomena—the Moon, the clouds of ionised gas radiating as the aurora and the trails left by meteors 25 to 75 miles above the surface of the Earth.

Clear reflections are obtained from the Moon using a kilowatt of energy pulsed to give a microsecond burst every 3-4 seconds. When conditions are good reflected pulses are received back after two-and-a-half seconds but the intensity of the echo is affected by a number of factors. The pulses traverse the Earth's atmosphere twice and are randomly polarised by ionised layers of air, arbitrarily rotating the plane of polarisation so that a normal aerial array often cannot pick them up. This may be overcome by sending out circularly polarised waves from the transmitter, a system which will undoubtedly be the most effective method of communication from Earth to satellite—or to spaceship.

Although too small to give a radar-echo itself, a meteor forms a long column of gas ionised by the heat of its passage through the upper air and this trail is a good conductor of electricity and an excellent radar reflector. It has been found possible in this way to plot the speed and direction of meteor showers more accurately than by visual or photographic observation and the plots are equally effective during the day or in fog as they are at night. Furthermore, the speed at which the meteor trails drift and dissipate gives a direct reading of the direction and speed of the tenuous upper winds.

Because radar relies on reflection, the intensity of the echo falls off as the fourth power of the distance—double the distance and the echo is sixteen times weaker. Thus it is only from the nearest planet, Venus, that we can hope to obtain clear radar echoes using even the 250 feet telescope. Venus at its closest opposition is 25 million miles away, whilst smaller Mars, closest at 35 million miles, is just that extra distance away to place it beyond the range of present day instruments.

But radio astronomers were too interested in the planets to let the matter rest there, and their patience was rewarded. Five major bodies in the Solar System are now known to be emitters of radio signals : the Sun, Venus, Earth, Mars and Jupiter.

The first planet discovered to be a radio source was Jupiter. Astronomers Burke and Franklin using the radio telescope at the Carnegie Institution of Washington in Maryland in 1956 picked up bursts of radio noise lasting several seconds. The bursts were modulated at 30 cycles a second, within the audio-frequency band. These were thought to be due to lightning in the turbulent atmosphere of gale-lashed Jupiter.

Then, later in 1956, radio waves were identified as emanating from Venus. When fed into the microphone, a steady hissing noise was analysed as that of a body at just over 100 degrees Centigrade, the first measurement of the temperature of the surface of Venus. This signal was detected by Cornell Mayer at the American Naval Research Laboratory using their 50 feet diameter radio telescope.

Dr. Kraus at Ohio State University found two types of radio signals coming from Venus. The first was in the form of sporadic bursts on the 11 metre band, lasting only a fraction of a second and similar to terrestrial lightning crackle. The curious point was that these seemed to reach a peak of intensity every 22 hours 17 minutes. Dr. Kraus concluded that there are a number of permanent or semi-permanent radio sources on the surface of Venus, more of them clustered on one side than the other. If this is so, then a long outstanding and hotly contested point is at last settled. It means that the Venusian day is finally fixed at 22 hours 17 minutes ($\pm$ 10 minutes). Theories accounting for the non-uniformity of the positions of the radio sources over the surface suggest that they are lightning from thunderstorms formed over particularly prominent mountains or continents, or the giant trees of science fiction.

The second type of radio signal lasts for at least a second and appears to be modulated at audio frequencies, of 15, 60 120 and 150 cycles a second. With these signals an echo delay effect of about a second was also noticed and was traced to reflectors of the Venusian radio waves from the Moon, the time-lag being due to the extra distance covered by the echo.

Then, in September, 1956, Mayer, McCullough and Sloan-acker of the Naval Research Laboratory identified very weak radio

signals coming from Mars. On the 3 cm. band, these waves indicated that the *average* Martian temperature was just below 0 degrees Centigrade, agreeing well with astronomers' figures calculated from heat radiation measurements. On the same basis the average temperature of Earth would be 15 degrees Centigrade.

Thus the new instruments and methods of radio astronomy are adding a rich and diverse collection of facts to our knowledge of the Solar System, with an accuracy little dreamed of when Jansky first pointed his home-made aerial at the stars a quarter of a century ago. The information about the planets that radio-astronomy is now giving us will write an important chapter in the handbook for the first spacemen.

John Newman

STRESS

Numerous authors have postulated a variety of difficulties besetting Man's attempt to break the force of gravity chaining him to this planet; some have even inferred that it will never be accomplished. Either way these plots make interesting reading and Mr. Rayer's story herewith is no exception.

COMPLEX

By Francis G. Rayer

Illustrated by HARRY

The *Monmurry* was as perfect as human ingenuity could make her. No reason why she should not have his final clearance, Ruby Bond thought. Further delay would only put the project behind schedule.

He rode down in the ship's cage. The *Monmurry* was larger than any of the remote-controlled, auto-piloted craft set down on Luna. Rightly so, Ruby thought as the cage touched concrete. Luna was no longer the target. Nor would servo mechanisms operate the controls—this time, the pilot must be a living man.

Afternoon sun made red fire of Ruby's hair as he crossed to the field runabout. He hoisted himself in, long-legged in the light blue uniform senior personnel wore, and smiled. The ship could accomplish what men demanded.

At the main entrance to the works, Pembridge himself waited. Lean, grey-haired, almost in his sixties, he had a vigilance younger men could envy. Upright, with the clear-cut features of a man aware of his own ability, he stepped out to meet the runabout.

Ruby slowed the vehicle, halting. Pembridge was no mere figurehead, but commanded respect. If younger, he would have been in the ship, not merely watching.

Ruby jumped out. Pembridge's keen grey eyes appraised him.

" The *Monmurry* is ready, Captain Bond ? "

" She is, sir ! The reports were finished this morning. I'd stake my life on her."

" Good ! " Satisfaction curved his straight lips. " Captain Pellon will be glad you feel like that. It's easy to send up an auto-pilot." Pembridge made an expressive gesture. " We've sent up thousands, and destroyed more than I can count in the process. But human life is different. Yet in the end, it's the ability to carry people that matters. A bagful of electronic gadgetry set down on Luna or Mars is a scientific achievement. But a group of living men landed there is a step forward for humanity."

" It is, sir."

Ruby well knew his senior's enthusiasm. Visionary, sometimes inspired, it had made *Pembridge Rockets* a name known the world over. Pembridge had set the first bagful of gadgetry on Luna—a minute radio beacon, fist-sized final step of a multi-stage rocket. Four stages had got the missile to Luna. Two had braked. Miraculously the beacon had landed intact and burbled out its radio wave until its batteries failed.

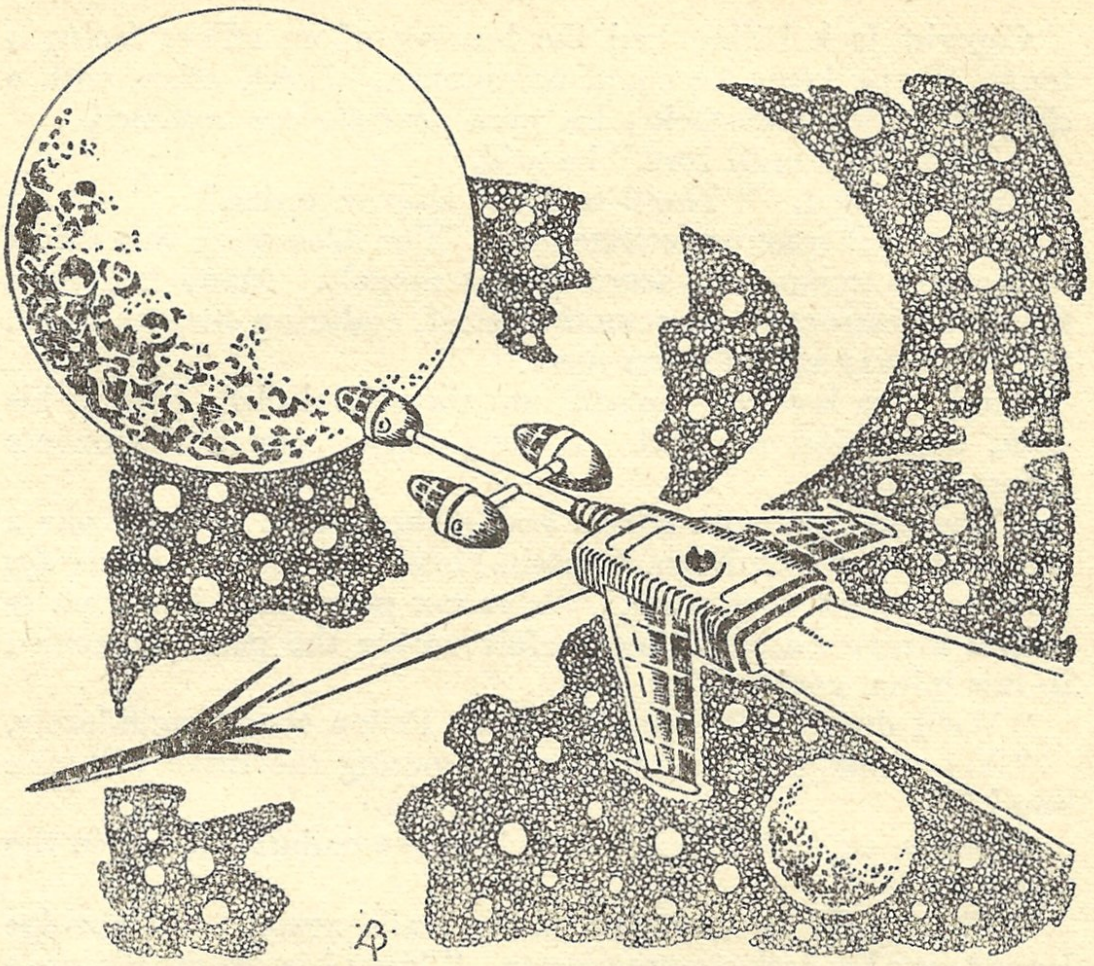
" Captain Pellon and Ed Simpson are waiting back in my office," Pembridge stated.

He walked smartly through the works entrance. To the left high machine shops whined and thudded in their chorus of production. The works covered a hundred acres, being one of several, and Ruby remembered something Pembridge had said many years before.

" When capital permits, build in threes ! One to blow up, one to investigate, and one to keep for stock ! It costs more in the first place, but loses less eventually."

Ruby hoped that advancing techniques had by now out-moded the warning. The *Monmurry* was one of three—her identical sisters *Goblincar* and *Allegro* stood at respectful distances. Ships could be replaced. But the living men destroyed with them could not.

" You think Pellon and Simpson will stand the drive ?" Pembridge asked as they turned between high buildings.



"The personnel testing wing says they will."

That fact should dispel unease, Ruby thought. Both pilot and radio man had undergone tests which exactly simulated flying the *Monmurry*. They had passed readily.

"I'll admit the drive is hell," Pembridge said frankly. "But it's virtually essential. Steady burning would put a ship on Mars, but not leave fuel to come back. It's the power-to-weight factor we've been fighting all along."

Ruby nodded, following through the door. All too often in the past calculations had set impossible conditions. He remembered an old cadetship problem in which fifteen-hundred weight units of fuel were needed to set a thousand unit ship on Mars. How could a thousand-unit ship carry fifteen-hundred units of fuel? But a team of experts had come up with explosive-propulsion, as they aptly termed it. A violent detonation at regular intervals gave increased exhaust velocity, and more speed per unit of fuel, compared with steady burning. Unfortunately the method was purgatory, as Pembridge said, but a steady thrust could not yet give a return trip to Mars.

Captain Jack Pellon had the bearing of an officer facing a tough job he knew he could accomplish. Erect, crisp, with a clipped brown moustache, his eyes nevertheless twinkled.

"Two hours until zero," he said.

Ruby nodded. "You'll find the ship in order."

It was deliberate understatement. The *Monmurry* was a final improved version of a score of test models. Many had been flown to destruction by remote control, enduring stresses which the *Monmurry* would never meet.

Pembridge lowered himself into the swivel chair behind his desk, expression satisfied. A long finger tapped documents before him.

' The government contract and grant is ours if you make a safe touch-down on Mars, Captain Pellon," he said. "*Pembridge Rockets* can use that grant. We've not many days left if we're to put a manned ship down safely within the period specified in our initial contract."

"We'll do it easily enough," Jack Pellon stated confidently.

"You think you'll stand the hammering the drive will give you ?"

"Easily, sir ! Ed Simpson and I have endured worse in the test wing."

"Then we'll go over the final details again." Pembridge leaned over his desk communicator. "Have Lieutenant Simpson located and sent up."

"I understand he's on his way, sir," the speaker said.

"Good."

Within minutes Simpson entered. Ruby liked him, and respected his efficiency. They talked over details, and for once it seemed that everything was perfect. Jack Pellon was confident, and an excellent pilot. His training had been complete. Ed Simpson, whose duty it was to keep Earth informed, was equally sure. The *Monmurry* would fly as scheduled ; would reach Mars as planned. Simpson would beam back information. The contract would be signed. Everything was perfect, as good as done. Ruby felt glad. Rocket projects seldom went off as smoothly as this !

When they left the office there was an hour to go. Ruby spent it about the works. A certain tension made it impossible that he go home until the ship was safely on her way. Better phone Ella, he decided. Wives of rocketmen grew uneasy when husbands became overdue.

Her voice was cheery, tinkling. "They'll make it, Ruby! Ed's as good a radioman as you'll find—and I should know, as I was in signals before meeting you. Jack's tough, too."

"You sound happy about it," he said.

"Perhaps." A pause. "I was half afraid Pembridge would want you to fly her."

He reassured Ella, and hung up. This, too, was a lurking fear always in a wife's mind a husband might any day find himself piloting a craft which was three-quarters explosive fuel, and one-quarter complicated machanism where the minutest fault could cause disaster. When he rang Ella unexpectedly from the works a tiny note of unease lay in her voice.

He was back on the field in time to see Pellon and Simpson enter the ship. Far away across the concrete the sister vessels gleamed, twin steel spires. When the two men had gone from view, the lock closed, and the area cleared, Ruby walked towards the radio tower. Everything was up to Pellon and Simpson now.

Men alone and in twos and threes were converging on the tower as if by chance. Recognising two, Ruby nodded. Wilf Jeffs and Joe Hopwood might either have been in Ed Simpson's place. As he entered the lift, Ruby saw an officer, lean and upright, with taut features. Captain Telse who might have been in Jack Pellon's sprung hammock. In due time each would have his chance, Ruby thought.

Clearance signals were passing between Ed Simpson and the control officer. Ruby stood at the wide, curved window that overlooked all the field. Pellon and Simpson lay on steel-mesh hammocks, elaborately sprung, mounted on hydraulic pistons. The kick in the *Monmurry's* tail could have flattened them to pulp, without such precautions.

Final messages had passed. Ruby wondered what Devil's inspiration had first set the team of experts on calculating the results of exploding fuel in hefty quantities. Pembridge's old rockets had been a joy to ride, on their little hops a scant few thousand miles high. Continuous thrust was easy on men and machinery. Violent explosions at frequent intervals were not. Men had come out of the test wing dazed and pale. Machinery that could stand twenty-gravities continuous acceleration broke down under the hammer blows of *thrust*, *drift*, *thrust*, *drift*.

The count had gone down to zero, a tense drone. Blue, scalding fire erupted under the *Monmurry's* stern. For a fractional instant she seemed to pause, drive balancing inertia, then she was gone

like a shell. Fury glared at her stern again. She was in the heavens, then gone from view. A tiny spark glowed, ceased ; then another, barely visible. Then nothing.

" All in order and on course," Ed Simpson's voice said in the control room speaker.

He began repeating data, all to be recorded. Elsewhere in the building radar was tracking the ship's course. At fifteen second intervals the voice ceased, and a dull, thunderous murmur came. The drive was operating in the way which achieved maximum velocity with minimum fuel.

Ruby left after twenty minutes because it had been a very long day. He got out his car unhurriedly, and drove slowly for home, pleasurably anticipating supper.

An hour had gone when he gained the house. The open door streamed light and Ruby felt unease ruffle his calm. Ella had heard the car and came out, running.

" Mr. Pembridge is phoning for you ! "

Her oval face was shocked. He strove to cling to his tranquility, refusing to believe Pembridge could want him instantly.

Ella dragged open the car door. " It's the *Monmurry*, Ruby !"

Iced water washed through him. He sprang from the car and ran. The unhooked phone was not silent. He lifted it.

" Captain Bond here."

The noisy demands for attention terminated. " This is Pembridge. The *Monmurry* has crashed."

Ruby echoed the word, shocked.

" Where ? "

" Africa. The Sahara. Radar watched her down west of a place called el Mabruk. A jet plane is waiting to take us over. I'll give you twenty minutes."

The iced water was cold in Ruby's stomach. " What of Pellon and Simpson, sir ? "

" We can guess." A pause showed Pembridge was talking to someone in his office. " Radar says she probably struck at about 3,000 ft. per second—over two thousand miles per hour— "

The receiver was replaced : Pembridge had nothing more to say, at that moment. Ruby swore. The *Monmurry* had seemed so safe, so perfect.

He told Ella quickly, and saw she was remembering the day Ed Simpson had looked in for drinks and a talk. Rocketmen stayed in their craft. Escape was so impossible there weren't even parachutes. No one could use them. There wasn't time. Ruby read it all in her eyes.

" I'm sorry, Ella," he said.

He drove fast on the way back to the works. A stratocruiser stood on the concrete. Pembridge was waiting, cheeks sunken, the collar of a brown overcoat drawn up round his ears. He nodded curtly, silent, but dropped into the adjoining seat when they boarded. Other technical personnel from the works filed in.

" We'll be lucky if we find much worth sifting," Pembridge said. He looked at his watch jerkily. " I'd give all I have for her to have been on auto pilot."

Ruby nodded, thoughts sombre. Unfortunately no remote-controlled or auto-piloted craft would satisfy the government, this time. Proof that men could reach Venus and Mars, and live, was wanted.

The last man reached his place. Such trips to the site of fallen rockets were not rare, and the *Monmurry* had hit nearer home than many. When the craft was airborne, whistling towards Europe above scattered cloud, Ruby ventured the question he knew others would soon be asking him.

" Any indication of a—defect, sir ? "

' No." Pembridge stared through the window of the pressurised cabin, hat touching overcoat collar, thin nose projecting as from a cavern. " Simpson kept reporting all well. Another hour would have seen them right out in space and on their way. Then Simpson's reports ceased. Soon after radar said her course had changed and was parallel with the Earth's surface. Then she began to come down. It was pretty quick. We could do nothing."

" No, sir."

Ruby strove to analyse the information into terms which would indicate the fault. Radio broken down, then steerage lost. Or the sequence might be reversed. The *Monmurry's* layout was clear in his mind. A blow-out in the steerage tubes one side might conceivably have damaged the radio equipment power generators one bulkhead away. The loss of steerage might not show up immediately, but the cessation of radio contact would.

" It'll be dark by the time we're there, and dawn before we can do much," Pembridge said wearily. " When radar crosses have been checked there won't be many square miles to search—nor much difficulty in finding what we want."

His opinion proved correct. The plane and pilot had been on many such hunts, sometimes for crashed rockets not one fiftieth the *Monmurry's* size. Radar fixes came in, cutting down the area. Long hours passed, then the plane began searching at mile altitude under a silvery sky. Pembridge went for'ard,

supporting himself by the seat backs like an old man. The craft began to wheel, homing on something radar had found. From the cabin window Ruby saw a crater in the silver sand sea below, a black hole the moonlight did not penetrate.

Soon the plane levelled, speed dropping further, as the pilot chose his landing place.

The sand was still, windless, and the day's heat had been radiated back at the stars. Brilliantly illuminated, the plane stood with wide wheels pillowed in the furrows they had made. Just like any other crash check, Ruby thought. And yet unlike . . . Someone had placed two holly wreaths on the sand. Their green was singularly incongruous here, where no green thing ever grew.

Pembridge walked once round the crater, then returned to the plane and went in. Ruby stood on the crater lip. The brilliant light of day might reveal something—but he doubted whether anything of real use would emerge. Give a mechanic a broken car—he could easily say where the trouble was. But smash that car to scrap, then demand where the fault had been. It was awkward.

Dawn brought heat, drifting sand, and the certainty that investigation would not help. The several thousand tons of bullet-shaped steel had struck with such velocity that the *Monmurry's* tail was well below surface level. The ship had squashed outwards, spreading under the hammer blow of momentum. She was a total wreck, pulverised, broken members bulging and interlocking. Pellon and Simpson could not still live.

Ruby half slid down into the crater. A minor explosion had blasted out one side of the ship, but the sand had closed back like silt round a forgotten hulk. He doubted whether a salvage operation would be justified.

" So they're dead," a clipped voice said above.

Pilot Captain Telse stood on the crater lip, thumbs in his belt. Ruby had never liked him, but had to admit his efficiency.

Ruby nodded. " Yes, they're dead."

It was certain that the *Goblincar* would follow the *Monmurry* heavenwards—and likely Telse would pilot her.

Telse surveyed the visible wreckage, his hard, lean face heavy with judgement. He came down, boots slipping ankle-deep at each sliding step.

" Formed any opinion of the defect yet ?" His tone was condemning. " Jack and Ed would like to know they had holly wreaths."

Ruby compressed his lips. The tone was deliberate insult. " The *Monmurry* was as safe as technical know-how could make her ! Every component of every part of her was checked time and time again. Her control and drive equipment was run, dismantled, reassembled, and run again. There was no flaw. I'd have staked my life on that—"

" Jack and Ed did !" Telse said bitingly. " You're not flying auto-pilots, crate loads of junk, but human lives ! When we turn out a human pilot who can do his job, we expect the technician who tests the ship to be able to do his too ! "

Ruby was silent. How could he argue, standing by the last monument to two good men ? It hurt to know Telse was half right.

" If the *Monmurry* had a defect, it won't be present in the *Goblincar* when she blasts off !" he stated.

Ruby was less certain, after three days investigation. The days were blistering, the nights frigid. Pembridge decided the ship was so wrecked it would be uneconomical to salvage her. They would dig for clues; after that drifting sand would obliterate the sight, if not the memory.

Pembridge left in the stratocruiser. Engineers cut into the rear of the *Monmurry*. Inside, the impact had so flattened her that it was impossible to move for'ard. It would have taken weeks to reach the control and radio cabin. It seemed kinder to the memory of Jack Pellon and Ed Simpson to leave them undisturbed.

Grimed, tired, Ruby spent every hour he could on the site. Only three slender clues emerged, in all. The radio could have gone silent because power failed. The generator was near the side steering tube, and it was here that a minor explosion had ripped the hull. Yet that explosion had seemingly arisen on impact.

Finally they placed the two wreaths on the wreckage and shovelled back sand. The pit was a dark, shadow-filled depression when the plane took off into the steely evening sky.

Ruby slept on the return journey, fatigue triumphanting. Only twenty-four hours grace would remain before his report must be in—and it would confess failure. No one really knew why the *Monmurry* had crashed.

Pembridge's manner showed his feelings. " You know what she cost as accurately as I do, Captain Bond," he said when

Ruby saw him. " We have always prided ourselves on not losing human lives. The *Monmurry* was supposed to be safe—if any rocket is that."

" She was, sir." Ruby felt acutely uncomfortable. " I can only suppose that conditions in actual flight differed from those of experimental tests. Going off course, then out of control, must mean steerage failed."

" Why didn't Simpson radio details. He had time. He was the sort to use the last minutes of his life giving information which would have saved others."

" He was, sir." Ruby remembered Ed well. A nice young fellow. " I am working on the assumption that the same fault damaged the radio."

Pembridge sighed, looking old. " I leave it to you. Put what you think fit in your report for the directors. Then study the *Goblincar* in the light of any suspicions you have." He looked up. Ruby was struck by the deep lines round his eyes. " I'm relying on you, Captain Bond. Double check her until there's nothing else to check, then test it all again ! Suspect everything. Take nothing for granted. Make her as perfect as you know !"

In the days that followed, Ruby did exactly that. There was an infinitesimal possibility that the repeated hammering of the drive caused some unanticipated fatigue failure in the generator So the latter was removed and fixed to a giant, rocket-fuel fired mechanism which simulated the stress of flight. The captive propulsion thumped day and night, shuddering on its mountings. At three hour intervals blessed silence came while the generator. was tested. Each time if was perfect.

The control circuits were tested for minute flaws. None were discovered. Thunder and fury surrounded the *Goblincar* as her steerage jets were tested, thrusts balanced. Threefold normal thrust was used. The tubes would have withstood twice as much again.

During his short periods away from *Pembridge Rockets*, Ruby was a prowling bear who walked his apartment with his pockets bulging notes and data. He snapped monosyllabic replies at Ella, and did not observe that she understood his mood. He checked facts which he already knew by heart as he ate; more than once he left his bed, seeking his study, there to pour over some trifling doubt which proved unfounded.

At last there was nothing more to test. The *Goblincar* was perfect. So had the *Monmurry*.

Ruby jumped when the phone rang, and knew his nerves were in a bad way. Ella had just lain breakfast. Pembridge's voice came on the line.

"When will tests on the *Goblincar* be completed?"

"They were finished late last night, sir." This was the statement Ruby had been striving to delay.

"There is nothing further you wish to check over?"

"No, sir." Ruby felt dispirited. "Anything more will be chasing my own tail. If she's not perfect now, she never will be."

"Good." Pembridge's voice carried returning optimism. "We must not fail this time. Apart from the loss of life, prestige, and capital, time grows short. You will remember we have provisionally undertaken to set a manned craft down on Mars."

"I remember, sir," Ruby said thinly.

"Very well. Telse and Jeffs will be leaving early this evening. Be present at blast off."

The line went dead. Ruby knew that some of his tests had been a mere playing for time, though he would never admit it. The utter perfection of the waiting ship no longer gave confidence. The hunk of scrap silted over near el Mabruck had been similarly perfect.

He tried to rest, knowing it pointless to reach the field early. He had done all that it was within human power to do.

Telse was lean and sharp as a hawk, his eyes predatory and his nose beak-like. His brown leather suit gleamed creamy wool at the wrists as he zipped the suit to his throat. He struck a thigh with a padded glove as he stood waiting for the runabout to carry him across to the *Goblincar*.

"We'll get the ship to Mars if she'll fly," he said.

He was overbearingly confident. But better that than unease and timidity, Ruby thought. A man like Telse, buoyed up by pride and arrogance, skilful, capable, could accomplish much.

Wilf Jeffs was only up to Telse's shoulder as he came from the offices. His confidence was more suppressed, but equally strong. He was short, yet rugged, a wide, stocky man who had withstood fantastic accelerations and pressures in the test-wing centrifuge. He had pounded out intelligible Morse while suffering discomforts rendering nine out of ten men unconscious.

The two rode out on the low vehicle, and Jeffs looked back giving a wave which expressed confidence and anticipated

triumph. Telse forebore to look back, but faced the ship which was to be the first manned vessel on Mars.

Ruby ascended to the control tower to witness the take-off, and noted that two government observers had arrived. Pembridge talked to them in brief, clipped phrases. His gaze switched from them as Ruby entered.

"You have given your clearance for the *Goblincar*, Captain Bond?"

"I have, sir," Ruby said heavily.

"Good!"

It was dream-like, a repetition of the first occasion. But now only two ships stood on the field. Ruby listened to the talk, and quick hush as the count down began. The *Goblincar* was farther from the tower than the *Monmurry* had been. Beyond her was the *Allegro*, last of the three ships Nowhere on the field or in the works was any other manned rocket even one-tenth finished.

Fire roared into being under the distant vessel, licking outwards from the narrow gap between ship's base and concrete. The *Goblincar* rose like a fired shell, steerage jets flaming horizontally from near her stern. An explosion thumped the control room window. Silence came, then an abrupt down-flaring of energy marked the ship's position. Seconds later a dull thud came. The ship was riding the hammer blows of her drive satisfactorily, and Wilf Jeffs was speaking over the radio link.

"We are settling down to regular propulsion period."

His voice was that of a man who had just had an elephant sit on his chest. The firing period was fifteen seconds. Four times each minute a thunderous explosion awoke in the stern, driving the ship's velocity up and up in fierce steps of acceleration. At each, Jeffs was silent. Ruby could almost hear the breath forced from his lungs by shock.

The ship had long gone from sight and hearing into the tranquil evening sky. Pembridge and the two observers went down to the works offices to discuss details. Ruby stood by the window, gazing at the lonely *Allegro*, or watched the radar man as he plotted the *Goblincar's* ascent. Jeffs was relaying information regularly, his voice that of a tired man. Hull temperatures, fuel consumption, tube temperatures, accuracy of course. Automechanisms could have radioed signals conveying the information. But the ship could not carry such equipment and men, and so the duty was Jeffs's.

Ruby strove to calm himself with the thought that the ship was flawless, but it didn't help. He wondered if Pembridge was trying to accomplish too much. As rocket efficiency had slowly increased, longer journeys had become feasible. Yet Mars had still been too far, until the explosive-propulsion system. It might have been wiser to wait. In a decade, perhaps two, design would have caught up with distance, and steady thrust could have taken a ship to Mars.

" Deviation in course," radar said, tones clipped.

Ruby felt as if kicked in the stomach. Lips moving wordlessly he watched the screen. The blip that was the distant ship no longer rested on its datum line, but was drifting to the right. In terms of actual flight, that meant the beginning of a curve west.

Jeffs was still reading data. His voice had the toneless quality of a man under great stress. The voice ceased in mid-sentence.

The radio officer's lips were bare inches away from the control room mike. " You are off course. You are off course."

" Telse isn't answering— "

Jeffs's words were faint, as if he leaned over to the circuit which gave him contact with the ship's pilot. Ruby could picture it all—Jeffs strapped flat on his back, elbows brushing the steel walls. Suspended over him was the radio equipment. Telse was a mere fifteen feet away, for'ard. Yet the distance might have been infinity.

" Telse doesn't reply." Panic coloured the statement.

" Read your dials !" the radio officer snapped.

Jeffs began, faltered, and started again, voice almost inarticulate with tension. There was a grunt, then silence.

Face set, Ruby watched the blip creep across the screen. Jeffs was gone off the air. The next ten minutes were bedlam. Phones rang, radar reported mechanically. The *Goblincar* reached the top of her parabola and began to fall. The radio officer called regularly, as if repetition would evoke some reply. Ruby watched the radar screen, tight-cheeked, and calculated that the *Goblincar* had lasted a good ten minutes longer than the *Monmurry*.

The ship was soon descending at 2000 m.p.h., her altitude a mere 180 miles. She had only minutes to live. Ruby felt stricken. He could do nothing: his part had been finished before the ship rose, and somehow he had failed.

A thin-lipped officer was calculating the probable point of impact, and setting it some hundred miles north of Scotland. *In the Atlantic*, Ruby thought. Many crashed test rockets had

been lost at sea. It was invariably impracticable to lift them, even when their exact location was known.

No human eye saw the *Goblincar* streak from the heavens and plunge into the sea. The waters parted in a fountain under the hurtling impact of the ship's nose. Spray rained down over an area five hundred yards in diameter, and a ring of foam floated on the swell. For'ard plates buckled from the blow and the vessel sank deeper, into depths unknown.

Ruby's thoughts had been unbearable from the moment the blip on the radar screen had ceased to exist. Without his clearance the *Goblincar* would never have taken off—yet he had supposed her perfect.

He listened with clenched fists while the usual crash warning went out trying not to think of Telse and Wilf Jeffs. The failure of a remote-controlled rocket had never made him feel like this.

It was an hour before a search craft radioed in a report that a drifting ring of foam was seen. Allowing for tide, wind and currents, the *Goblincar* had struck 59 degrees North on the meridian 6 degrees West of Greenwich. A glance at charts completed Ruby's misery. She must be considered a total loss.

A peculiar silent gloom had settled over the works when he left. A seaplane was investigating, to be followed by a ship with sounding and diving equipment, but Ruby knew it was only a token search. Pembridge himself did not go; nor did he ask to see any of the men who had helped prepare the *Goblincar*, to Ruby's secret relief. Investigation could only prove that the ship had been thought perfect.

Home, Ruby prowled his study. Ella kept out of his way, respecting his emotion. He did not sleep, but reviewed again details which he already knew were correct.

With first daylight he phoned the works for news. The ship had not been located. He stood in the doorway watching Ella prepare breakfast, his fists knotted in his jacket pockets.

" Pembridge still has a third ship—the *Allegro*," he said.

Her quick glance and pale cheeks showed she had caught the tone.

" He will try her, when the others failed, Ruby ? "

" Of course ! "

Ella lifted cups from the cupboard. " It may not be so easy as that, Ruby," she said guardedly. " I can't imagine Pembridge's pilots showing themselves anxious to fly the only one left of three"

" They won't need to," Ruby said between his teeth. " I shall take her up."

A cup fell, breaking. Ella put her hands behind her on the table edge, her lips shaking.

" You—you've been thinking of this for a long time, Ruby." Her voice was small, tiny with fear.

" All night, Ella ! "

She looked unspeakably miserable. " Don't, Ruby— "

" I shall. There's no other course. Am I afraid to go up in a ship when I've passed her ? I let Pellon, Simpson, Telse and Jeffs go up, didn't I ? Do I say to somebody: *The ship's right, sure she's right—but you fly her, I won't* !" He raked fingers through his uncombed red hair. " What kind of a man do you want to be married to, Ella ? "

He turned from her, refusing to watch her face. He took up the phone and got Pembridge without delay.

" No news of the *Goblincar*, Captain Bond," Pembridge said wearily.

" I'm sorry." He went on in a rush, assuring Pembridge did not ring off. " I want to take up the *Allegro* as soon as I've passed her as ready."

If Pembridge was shocked, he made no sound to reveal it. " I was thinking of trying her on remote control—"

" They've all been flown under remote control !" Ruby snapped. " You know as well as I do that there's nothing further to do but put a man in her and find out what goes wrong then ! It's time I was present in person, sir—"

" Very well."

The line went dead. Ruby felt relief, now that it was settled. He would be in the last of the three ships.

" You don't *know* you can find out what's wrong with the *Allegro*," Ella said quietly.

He faced her, pained : she thought he had missed a defect on the sister ships !

" It'll be my last chance to make sure I *do* find it !" he retorted.

He was sorry for the quick words, and the hurt on her face, but an acid, cold fury was eating him and would not be suppressed. He hated himself unendurably for letting Pellon and the others die.

The deadline date crept relentlessly nearer. To leave after schedule would lose the contract. Pembridge did not press it as a reason for haste.

" I hadn't expected such losses, Bond." He was weary. " If you're not satisfied with the ship don't take her up."

Ruby shook his head. " I'll be taking her up ! "

He repeated every test he had done to the *Monmurry* and *Goblincar*, and added a few more. He would stake his life on the *Allegro* being perfect, he thought—then recalled Pellon and the others had done exactly that with the other ships.

He interviewed the officer who would act as signals, and found him complaining of stomach pain. Joe Hopwood was slight, but no funk. Ruby hoped the pain would go soon.

In the personnel testing wing they rode the tethered rockets upon their spinning courses while instruments checked blood pressure and a host of other factors. Hopwood was as good as either Simpson or Jeffs, and could stand as much on the centrifuge as any man Ruby had known.

Ruby himself hated the explosive-propulsion system, as every officer did, but stuck out a long test period. While instruments recorded his physical activities, and the rocket hammered as if to pulp every cell of his frame, he operated a mock-up of the ship's control panel. At last, when he had had enough, he depressed a switch terminating the test.

He spent the last night before blast-off at the works, phoning Ella briefly just at dawn.

" Good luck, Ruby."

She always said that. He tried to pretend it was a tiny flip in some safe, well-tested craft.

" I'll phone you before coming home, Ella."

He always said that too, understanding her tension.

Three hours remained until departure. The ship had been tested to finality. He had located no fault, no weakness, no defect. She was as perfect as the best *Pembridge Rockets* had made, as had been the *Monmurry* and *Goblincar*.

Surprisingly, he slept, only waking when a young officer came urgently to his door.

" Time for flight, sir !"

" Thanks."

Just like a tiny, local flip. He had discussed the flight with Pembridge and his experts until further words were pointless. Pembridge merely waved from the control room lower window as Ruby went out.

Ruby adjusted his padding straps as he rode across the wide field.

" All routine checks cleared ?" he asked.

An officer besides the runabout driver's side nodded. " Yes, sir. Your signals officer is already aboard. We are a trifle late, sir."

" Nothing to matter."

Deposited by the silver spire, Ruby rode the lift up, entered the tiny port, and with quick skill operated the controls closing the ship for flight.

He was higher than the signals man, and did not descend the tiny tunnel to see him. The captain's bunk, as they humourously called it, was steel mesh sprung and cushioned so that the kick in the ship's tail was not fatal.

Strapped down, he flipped a switch. Dials, knobs and controls were close over his chest and face, suspended from metal panels.

" Ready for take-off, signals ?"

" Ready, sir."

The voice was low, as if spoken aside. Ruby tightened the straps across his chest.

Continued on Page 124

" Synchronise with Control, and count me down."

" Aye, sir."

There were two minutes to go. The clock above Ruby's head was correct, and his quick work in stowing the cage and closing the ship had left them easily on schedule. A red hand made a circuit; began another.

" Twenty seconds, sir," signals said.

Ruby felt it all slightly unreal, but mentally checked his routine. The signal officer's voice was counting down as the red hand turned. Ruby's fingers played over the studs. Thunder shook his ears and an elephant kicked his back. The thrust drove his hands back upon his chest, but he was ready for it. In the seconds of drift he set the controls for automatic firing. The *Allegro* was following her sister ships into the heavens.

The drive *was* torment, Ruby thought. Every fifteen seconds a thunderous explosion roared at the stern. Springs creaked, hydraulic cylinders hissed, and the shattering burst of acceleration flattened him like a giant's hand. He began to watch the red second hand, his nerves growing taut in expectation of each blow. Four moments of torture for each revolution. The very regularity of the punishment made it worse.

The ship was on course. Acceleration must continue for many hours . . . *wham.* It would be a long time before the drift at constant velocity across space began . . . *wham.* He found himself thinking in urgent cycles, interrupted rhythmically by the fierce thrust of the drive.

Time drifted, and the massive control panels above him grew to new significance. As each *wham* of erupting fuel struck the ship, he expected the panels to collapse upon him. Instead, they shot away out of reach, as the couch sank, then crept back as it rose.

He tried closing his eyes at each quarter minute, but that was worse. He sensed that the massive equipment was collapsing upon him, girders caving in his ribs, and his eyes fled open. Sweat stood on his face . . . *wham.* He had endured this in the test wing, he reminded himself . . .*wham.* Panic was foolish.

He groaned, listening to signals from his companion, lower in the ship. The voice was talking in ten second spasms, trailing off in a note of terror as each quarter minute approached. He could hear breath forced from the officer's lungs as acceleration struck. The voice was oddly high pitched, weak.

The Chinese drove men mad with dripping water, he thought. His mind seemed to be retreating, refusing to believe it was real. Only rarely did he move a hand up, adjusting a control minutely, and it was an automatic action.

The pulsations of thrust never ceased. He wished they would. Once, his hand was caught raised, and smashed down upon his lips. Blood began to flow.

His thoughts began running in circles. Never to know peace again. Always the shattering, killing thrust. He raked at the clock face with his fingers, to halt the turning hand, but the toughened glass resisted him. He gulped air, chest rising and falling. A psychological block seemed to be interrupting his breathing. He did not trust the turning hand. If the thrust came with his chest expanded, it could break every rib.

He held his breath, afraid to breathe, then gulped, choking. He cursed the red hand, always turning, and the terrifying hammer blows pounding his back. He'd had enough, he thought wildly . . .

His hand lifted to the switch which would signal the end of the test. It was not there. His fingers brushed cold metal, and a *wham* of acceleration took him, smashing his arm back upon the padding.

It was not a test, his mind screamed. He must endure this, on and on, for hours.

Cold fear made his thoughts leap up into new clarity for a moment. In the silence between the quarter minutes he heard someone sobbing. Not Joe Hopwood's voice. Someone he knew. Astounded he tried to sit up, but the couch straps retained him.

" Ella ! "

He scarcely knew he had spoken. The sobbing halted, a thrust took them, then her voice came, weak.

" Joe was still ill. I made Pembridge let me come. I didn't want to live if you didn't come back—"

Ruby swore inwardly again. Ella ! Qualified for just such a job long before they were married.

" You shouldn't have come !" he roared.

" It was both of us or nothing, Ruby— "

Thrust kicked as she spoke, and her breath rasped out. When he called her again she did not reply.

Drifting minutes. The rotating hand. Punishment like strokes of a whiplash, regular beyond enduring. Ruby felt he would go mad. The tests could always be stopped, when a man wished, but this repetitive torment could not.

No sound came on the intercom now. He wondered whether Pembridge really knew Ella had come, or whether she had merely walked aboard.

Soon his thoughts lacked sufficient coherence to wonder. Only misery remained. The rhythm of the drive was killing him, its slow thudding punctuating the unbearable tension. He strove to fight it, but could not; strove to quell his mental agony, and failed. Sanity and consciousness were failing together. It was doubtful which would out-last the other.

His nervous system was failing under the punishment. Pain racked every limb and agony in his forehead made lights dance across the seemingly unreal panels above. Their rise and fall made him feel like a fly under a great power press. Everything was distorted, fantastic, unendurable . . .

His last sane, conscious thought was directed to ceasing the torment. His fingers grasped at the master switch, missed, grasped again, and it clicked over.

The rhythmic thrust at the *Allegro's* stern ceased. Like a spent projectile her velocity fell, became zero, then she was hurtling back Earthwards. Both occupants were unconscious, and would remain so for hours.

The ship gained speed steadily, her slender fins biting into rarified air bringing her nose down. Soon her course was almost vertical, and her velocity over 1000 m.p.h. The Earth was taking back to itself a mote that had dared to try to escape.

At thirty miles altitude, her speed was nearly 2000 m.p.h., and not rising so fast now, from atmospheric resistance. Both occupants lay in the deep coma of shock, white-faced, breathing shallowly. Land and sea awaited the impact.

At fifteen miles, her passage began leaving a trail of ice crystals, a white vapour stalk which observers on Earth could see against the blue sky. In a far-off building, a radar officer was already calculating the point where she would hit. He shook his head sadly. At such a velocity, even the scrap would not be worth collecting.

The altitude was barely seven miles when braking and steerage jets flared. The *Allegro* went into a curve that might bring her on to a horizontal course with as much as half a mile to spare.

Ruby awoke knowing all motion and noise had ceased. The control panel was still, the hands showed six hours had passed since he had knocked up the switch.

An irregular tapping began and his gaze sped to the observation port at his right. Pembridge clung there, elf-like, his nose red, breathing steam from the cavern formed by his coat collar and hat.

It took Ruby nearly an hour to free himself and reach the lock. Every muscle felt as if punched to pulp. The ship was one third buried in snow, on a sloping hillside. A helicopter stood fifty yards higher. A short ladder sloped to the lock, and Pembridge now waited on it.

Ruby stared at him. He thought of Ella.

"My wife—?"

Continued on Page 128

" She's all right. She recovered enough to contact us by radio five minutes ago."

Thankful, Ruby began descending the ladder. Half way down he halted.

" Where are we ? "

" A few miles West of Murmansk. You lasted longer than Pellon or Telse."

Ruby stepped from the ladder on to the trampled snow, steadying himself. It all seemed astonishingly impossible. Pembridge read his expression.

" *Pembridge Rockets* have always put human life first, and success second, Captain," he said. " That's the only basis for lasting progress. You're saved because you told me that both the *Monmurry and Goblincar* were faultless, and I believed you. Your words put my thoughts in new channels." He indicated the silent ship. " I had remote control equipment fitted when you were away. We could take over at anything under ten miles altitude." He sighed. " We were trying to get men onto Mars before we were technically ready. There's no point in shooting a corpse from Earth to Mars and calling that successful interplanetary transport. From now on I stick to ships men can fly in comfort. They won't reach Mars yet—but one day they will."

An officer was helping Ella from the signals exit. Ruby guessed Pembridge would never have let her go without this precaution of a remote control able to take over if the pilot failed.

He looked at Pembridge quickly. " Fitting that equipment put the ship outside the terms of the contract, sir. Even if we'd reached Mars it wouldn't have counted."

" I know." Pembridge drew a hand from his overcoat pocket, and bits of printed paper fluttered to the snow underfoot. " I tore up the agreement before you left. I'm a wiser man. Losing the *Monmurry* and *Goblincar* taught me a lot. With luck the *Allegro* will reach Mars one day—perhaps in five years, perhaps ten. She'll try when *we're* ready, this time !"

Ruby smiled. A truck was whirring down over the furrowed snow to pick them up.

Francis G. Rayer