

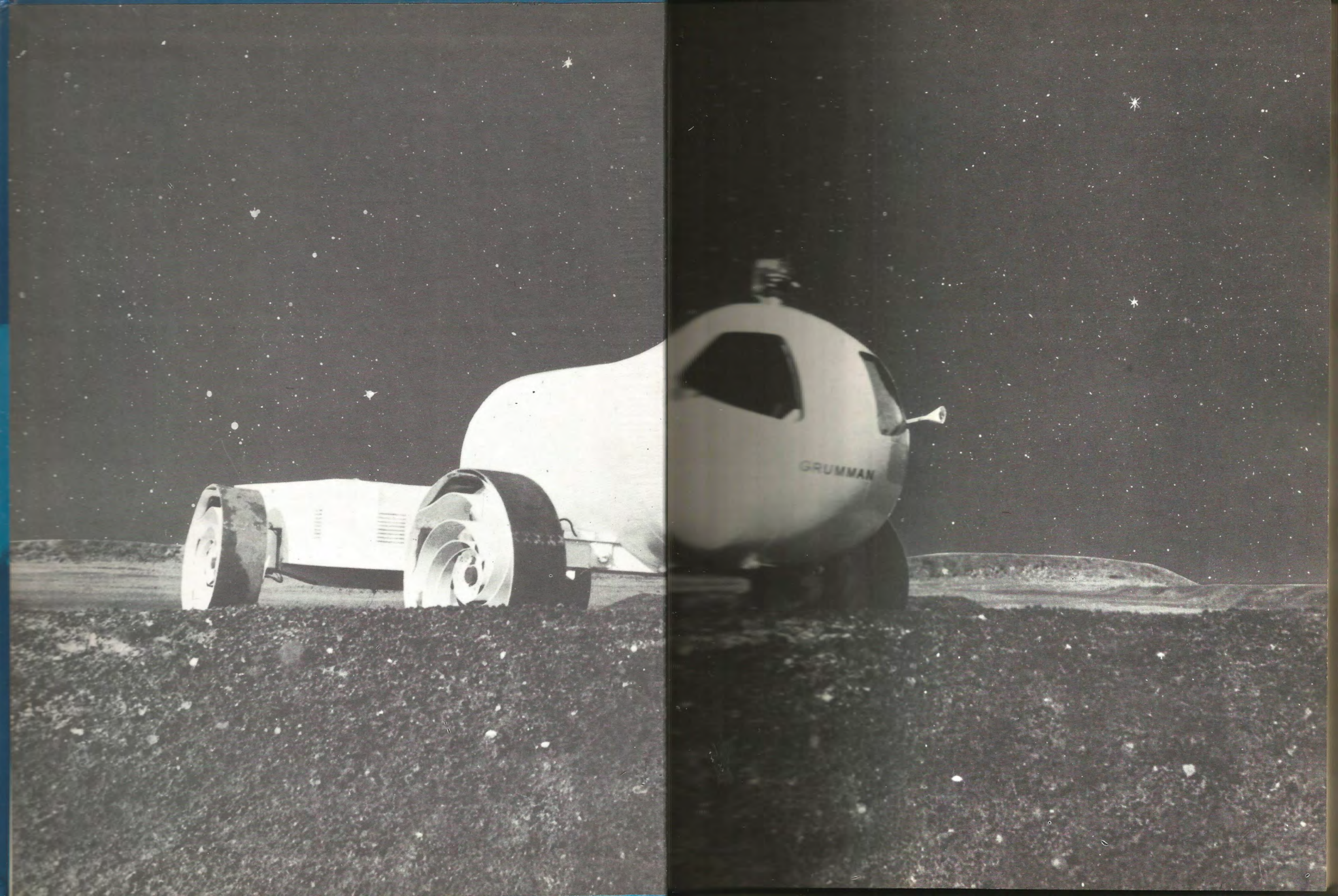
BOY'S OWN

ANNUAL



MOON
LANDING

Edited by
JACK COX



ENDPAPERS

For the first time in history designers and engineers are hard at work developing a vehicle which will be driven not on earth but its closest satellite, the Moon!

SBN 361 01084 2

First published 1969 by
Purnell, London W.1

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Printed in England by
Hazell Watson & Viney Ltd., Aylesbury, Bucks

Man toward the Moon

by PATRICK MOORE

The Moon is not a friendly place. It has no air, for instance. By day the temperature rises to over 200°F; at night the thermometer would show at least 250 degrees of frost! Yet Man longs to get there.

ON CHRISTMAS DAY, 1968, three American space-men went round the Moon. Their names were Frank Borman, James Lovell and William Anders; all were highly trained astronauts, and all knew that they were carrying out an experiment which was risky by any standards. If anything had gone wrong with their rocket, there would have been no hope for them.

Luckily, nothing did go wrong. The whole world listened as they neared their target—the strange, cratered Moon; their voices came through the radio, loudly and clearly; and then, suddenly, there was silence. Apollo 8, the craft carrying the space-men, had gone behind the Moon. The astronauts were cut off from home more completely than any men before them had ever been. During their journey on the far side of the Moon, they were scheduled to fire a motor which would put them into a circum-lunar path. If the motor had misfired, and Apollo had crashed into the Moon, nobody would ever have known just what had happened.

It was a tense moment in Houston, Texas, headquarters of Apollo Control. It was tense, too, in the London studios of BBC Television, where James Burke and I were carrying out a live commentary. When we suddenly heard Borman's voice again, the relief was startling. The risks were still great, but I think we all knew then that Apollo 8 was going to triumph.

Of course, the story of man toward the Moon did not begin with Apollo. In fiction it began almost 2,000 years ago, when a Greek named Lucian wrote a story about a lunar voyage! But it was not until rockets became powerful scientific weapons, instead of unreliable fireworks, that serious plans could be made. In a way, the initial 'breakthrough' came in 1926, when Robert Goddard, in Massachusetts, fired the first liquid-fuel rocket in history; but to me, the Space Age really began on October 4, 1957, when the Russians sent up their artificial satellite Sputnik I. It was a tiny thing, no larger than a football, but as it sped round the Earth, sending back its 'Bleep! bleep' radio signals, it ushered in the new era.

Two years later there came the first Moon rockets, again of Russian origin. Lunik I in January 1959, bypassed the Moon at a distance of 4,000 miles; Lunik II, in September, crash-landed there; and Lunik III, in October, went round the Moon and sent back television photographs of the mysterious far side of the lunar world which is always turned away from the Earth. That, too, I remember vividly, because I was in front of a television camera carrying out a live broadcast, when the first pictures from Lunik III came through on the screen.

Of course, the Moon is not a friendly sort of world. It has practically no air, so that nobody

could breathe there, and it is uncomfortable in other ways too. At midday the temperature rises to more than 200 degrees Fahrenheit, but at midnight a thermometer would show at least 250 degrees of frost! There are high mountains, deep valleys and huge craters, but there can be no sign of life, and it is not likely that any life has existed on the Moon. Conditions were never right for it.

Why, then, do men want to reach it? There are many answers. One is the simple 'Because it is there'; men always like to find out as much as they can. But a scientific research station set up on the Moon would be of tremendous value, and would be of great benefit to everyone on Earth. I have no doubt that this will be done in the fairly near future.

During the early 1960s there was a theory that the Moon's broad dry plains, miscalled 'seas', might be filled with soft dust, so that a spaceship unwise enough to land there would sink out of sight. Luckily this has been found not to be so. Automatic, unmanned rocket vehicles first came down gently on the Moon in 1966, and showed no signs of plunging into dust-drifts, so that one more 'bogey' of space-travel had been laid! But to land a vehicle on another world is a difficult business, and there are any number of things that could go wrong. This is why the Americans were so cautious in their plans; they made no attempt to rush things.

Project Apollo began with some test launchings. The main rocket used in the series was the Saturn-V, and the total height of the vehicle, before firing, was 365 feet—though only the extreme upper part would return to Earth; it takes a very large and powerful rocket to send even a fairly small object on to the Moon. There were some early difficulties, but nothing that could not be sorted out, and in 1968 Apollo 7 went up on a full-scale rehearsal. It went nowhere near the Moon, and simply circled the Earth well above the top of the atmosphere, but it was most encouraging—and the Houston planners decided to press on with Apollo 8. The Christmas flight was the result.

I had the privilege of talking to Colonel Borman not long after the end of the Moon

journey. Like all the other astronauts whom I have known, he was modest, knowledgeable and amazingly competent. When I asked him whether he could sum up his view of the Moon in one word, he replied: 'Desolation', and this seems to be appropriate indeed. Nothing could be more stark or lonely than those tangled craters and rock-strewn valleys, where nothing breathes, nothing lives and nothing grows.

Altogether the astronauts went round the Moon ten times. Except when they were on the far side, and therefore cut off, they were in radio communication all the time, and they were working hard. It was fascinating to hear their very down-to-earth comments, and to remember that their voices were coming to us from a distance of almost a quarter of a million miles; anything of the sort would have seemed incredible not many years before, and even I, who do not regard myself as old yet, can look back to the time when space-flight was regarded as the wild dream of a few cranks. Yet anyone less impracticable or cranky than Borman, Lovell or Anders could hardly be imagined.

As they flew round the Moon, they described the scenes passing in front of their eyes, and I think we in BBC Television Control listened with as much eagerness as the commanders in Texas. At last there came the time when Apollo 8 was to fire its motors again and blast away from the Moon, on the route back to Earth. This was another tense moment. If the motors had failed, the astronauts would have been left going round the Moon until their air supplies ran out—a frightening prospect indeed. But nothing did go wrong; the motors fired perfectly, and Apollo 8 began the long swing back to Earth. On December 27 we watched them splash down within a few hundred yards of the waiting ships.

Apollo 8 was a triumph in every way. It was probably the greatest mechanical achievement of all time, but it was a human triumph as well. Sending men round the Moon is all very well, but they have to be the right men, and Apollo 8 had what everyone must regard as an ideal crew. The three space-men were running fantastic risks, but they faced them all with the

calm courage which cannot be too highly praised.

Next—Apollo 9. This was not a lunar journey, but another round-the-Earth trip, designed to test what was called the lunar module or L.E.M. The plan of landing a man on the Moon was to put the main space-ship into a path round the Moon, and then send down the L.E.M. on to the surface, carrying two of the astronauts and leaving the third member of the crew to wait in the larger vehicle. Apollo 9 was duly launched, in the spring of 1969, and did all that had been hoped of it. The way to the Moon was open.

I am writing these words on March 12, 1969, with Apollo 9 still in orbit above the Earth. By the time that this issue of *BOY'S OWN ANNUAL* appears in September, 1969, the first men may have reached the Moon; I hope they have. What I propose to say now applies whether the lunar journey has been achieved or not—and whether it has been done by the Americans, the Russians or both.

Astronauts are brave men and skilful men; they are also *Earthmen*. They are pioneers of our race, who take their lives in their hands and plunge into the unknown. If all goes well, their journeys will lead to a new spirit—the spirit of co-operation, when we stop bothering about nationalities and remember that we all belong to humanity. In a very minor way this has happened in the inhospitable continent of Antarctica, where the various national communities work together much more freely and

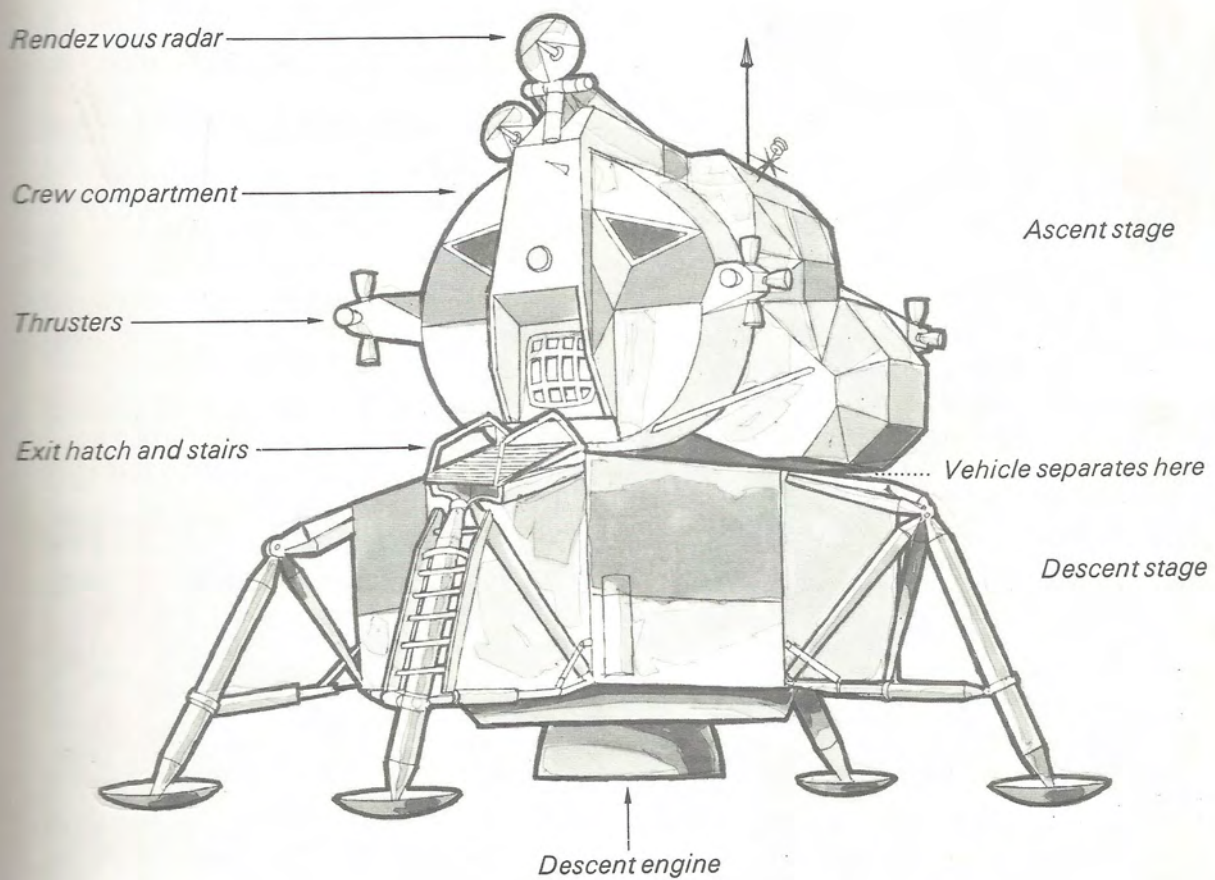
closely than can happen in more 'civilized' parts of the globe. Let us hope that there will be no disputes between the men who go to the Moon; there ought not to be, because the whole concept is too grand for petty bickering.

Moreover, the Moon is only the first step. Beyond lie the planets, of which Venus and Mars may be regarded as within range of rockets. Venus, admittedly, seems to be extremely hostile, with a dense, choking atmosphere and a hopelessly high temperature, but Mars may hold out more promise; there is at least an atmosphere, even though we could not breathe there. Some of the space-scientists are talking about reaching Mars before 1990. This I very much doubt; but not so long ago I was openly writing that I was not hopeful that the first men would go to the Moon much before 1980! In any case, the Martian journey will be made sooner or later, provided that mankind learns to work in harmony.

The rocket began as a war weapon, but it has lost its evil reputation in the eyes of scientists, and it is now recognized as the vehicle which can take us to other worlds. Progress during the past few years has been amazing, and the prospects are exciting indeed. When history is studied by our remote descendants, I am sure that the 20th century will always be remembered as the Century of the Astronauts. And it was only a few months ago that Borman, Lovell and Anders became the first men to look down only a few tens of miles above the tangled wastes of the Moon.

The Lunar Excursion Module (LEM) is nicknamed after the dog Snoopy in the Peanuts cartoon. It was designed to land on, and explore the moon's surface.

SNOOPY



ASTEROID

by H. B. GREGORY
illustrated by GLENN STEWARD

The perfectly spherical lump of dust-covered iron, a mile in diameter on a collision course with earth. Was it some mysterious *Mary Celeste* of the space lanes?

JIM BALLANTYNE struggled head-first out of the scout-rocket's narrow port, hampered by his unaccustomed pressure-suit. Six months' exploring on the surface of Mars, wearing only warm overalls and a light respirator, outside the plastic domes of Base, had made him impatient of the heavy armour and helmet essential in the airless void of space.

Grabbing the hand-holds clumsily with his thick gauntlets, he half-crawled, half-floated, down the hull to the surface of the asteroid. By astronomical standards this was a tiny body, little more than a mile in diameter, and its gravity was correspondingly minute.

Since his apparent weight was only equivalent to a few milligrammes, Jim knew that any unguarded movement might send him floating off into space, and he made sure his life-line was fastened firmly to the ship before he began probing for a fissure in the rock into which to drive the mooring-spike he carried.

Even the scout-craft *Venturer* herself, weighing several tons on Earth, rested here lightly as a feather, and her pilot, Bill Fleming, remained at her controls ready to check any tendency to drift before Jim secured her. His voice rang metallic over the helmet radio:

'Get a move on, chum! I want to come out too.'

'Sorry, Bill! The spike won't hold—the

surface is smooth and hard as iron under the dust.'

'Perhaps that's just what it is—iron! Hang on—I'll try the magnetic coupling.'

Venturer's slender hull shuddered, settling firmly into the dust, as Bill energised the powerful electro-magnets, normally used only to hold her fast in her berth within the mother-ship, *Astarte*. Jim heaved hard against the hull.

'Firm as a rock, Bill,' he reported. 'You can come down now.'

A moment later, the other's figure, grotesque as his own in helmet and armour, emerged through the port and crawled down to join him. They exchanged a cheerful grin through their quartzite vizors: this trip had come as a welcome break in the routine exploration of Mars. Bill touched a switch at his belt and took a few experimental steps away from the ship.

'Try your boot-magnets,' he advised.

Jim followed suit, and found the tug at his boots made it possible to walk, just as he had learnt on the steel decks of a space-craft in free flight.

'Rum go, this!' he remarked. 'Ironstone meteorites we've met before, but none so spherical as this, surely.'

Together they surveyed the weird scene. A small, featureless, circular plain of brown dust, visibly curving down to the fantastically close

Carrying the mooring spike, Jim half-scrambled, half-floated down to the surface of the asteroid



horizon: they seemed to be standing on the rounded summit of an infinitely high mountain, surrounded by the black gulf of empty space. A multitude of stars, untwinkling in the airless vacuum, stared at them with ferocious, brilliant eyes, and, to the left, the great disc of Mars burned with a baleful glow.

The Sun's blinding glare was mercifully hidden by the bulk of the asteroid beneath their feet, but one limb of the Corona projected above the horizon to the right, shining with pearly radiance. For an instant Jim felt he was sliding down the curving surface, falling into that hideous gulf, and a sickening vertigo wrenched at his stomach. Staggering he clutched blindly at Bill's arm.

'Sorry!' he gasped, 'just a touch of space-sickness.'

'Hang on, chum!' said the other, cheerfully. 'It'll pass.'

A moment later he had recovered, and stood straight again.

'The surface is too smooth, Bill—I didn't mind those rocky ones in the Asteroid Belt. I wonder if that's where this came from.'

'That's what we're trying to establish. When the astro. boys down at base spotted it, apparently orbiting Mars beyond Deimos, the Skipper thought it sufficiently odd to be worth a visit. But I don't think we'll go far from the ship. Just collect samples for analysis, and get back to Astarte.'

They began filling their specimen jars with samples of dust, then dug down to the solid surface beneath, and tried to chisel off a fragment. After blunting several tools, they gave it up, and returned to Venturer for a power-drill. Bill had just broken his second bit, and was fitting a third into the chuck, when Jim's voice rang sharply in his ear.

'Bill! What was the radiation count when we landed?'

Laying aside his drill, the other glanced at the Geiger counter on his wrist. He stood up.

'Five—now it's ten. Quick, get aboard!'

Hastily collecting their gear, the two scrambled up through the open port, secured it, and strapped themselves down on the acceleration

couches in the tiny cabin. Without another word, Bill set the course, primed the rocket-motors, released the magnetic coupling, and touched the red starter-button. The jets roared briefly, and Venturer was clear of the asteroid, orbiting back towards the mother-ship. Jim was the first to speak.

'That was a near thing, Bill. Think we'll be O.K.?'

'If we are, it'll be thanks to you. I never gave the radiation level another thought.'

'Why should you? It was safe enough when we landed. I was just checking the figure for the report. What made it rise like that?'

'Us, I suppose, switching on the ship's field and clumping around in our magnetic boots. Must have induced electrical currents in the metallic surface of the asteroid and set up some sort of reaction. It'll give the boffins something to think about.'

An hour later Venturer made her rendezvous with Astarte, where the mother-ship still circled Mars in her ceaseless orbit, two hundred miles above the planet's surface. Bill had reported their situation by radio, and, the moment Venturer was secured in her berth under the great hull, he and Jim emerged, to be seized by masked and gowned orderlies, stripped and scrubbed until they were sore, and then hurried to the sick-bay for a rigorous examination by the Medical Officer.

'Both clean,' he reported, at last. 'The radiation was dangerously high, but your armour stopped most of it, and you got clean in time. No harm done. Get dressed and report to the Skipper!'

Peter Bradley, Astarte's Captain, and Commander of the first Martian Expedition, was waiting for them in his cabin.

'Hallo, you two!' he grinned, cheerfully. 'Sit down, and cheer up! You're not dead yet, and there's work to be done.'

He went through their report point by point, checking every detail. Finally he asked:

'Well, what do you make of it?'

Bill answered.

'It appears to be an ironstone meteorite of unusual size, perfectly spherical and without

surface features of any kind, apart from a uniform layer of dust, several inches deep, which has probably collected over a vast period of time. It is, of course, too small to retain any gaseous atmosphere. My guess is that it has wandered out of an irregular orbit in the Asteroid Belt and got caught up by Mars, much as Phobos and Deimos, the existing moons, are supposed to have done. Jim has a very fancy theory though.'

Peter chuckled.

'He generally has. Well, Jim?'

Jim ran his fingers through his sandy hair, his face red. 'I think it could be artificial, Skipper,' he blurted out at last, 'from Outside—beyond the Solar System—some sort of alien spaceship!'

Peter's lips twitched, but he did not laugh.

'You read too much science-fiction, Jim! Von Braun's idea of a closed-system planetoid, carrying a whole colony of space-travellers and their descendants on a thousand-year journey to the stars, is now considered impracticable for a variety of reasons—problems of conservation, of atmosphere, disease, degeneration, and so on. No, whatever else it may be, it's not that, but I agree it is most unusual, and may be highly dangerous. So we are beaming a full report back to Lunar Base. It's up to the Space Council on Earth to decide what to do about it. Meantime, you'd better get some sleep.'

Next morning, ship's time, Jim and Bill, quite recovered from their alarming experience, reported back to the Captain. Peter's usually cheerful face was grave as he greeted them.

'Another sticky job for you chaps, I'm afraid. They fed all the data into the Master Computer at Lunar Base, and it's come up with an answer they don't like. Your asteroid has failed to find a stable orbit about Mars, and has begun to accelerate towards the Sun. Its extrapolated orbit intersects that of Earth in about three months' time. There is a strong possibility of head-on collision!'

The two friends stared at him.

'Is that so bad, Skipper?' Jim ventured. 'It's such a little thing compared with Earth.'

'Depends where it lands, Jim. The Siberian

meteorite of 1908 devastated hundreds of square miles of uninhabited forest, and its mass can only have been a fraction of ours. Besides, there's this radiation hazard. No, it must be diverted from its present course.'

'Couldn't they launch an interceptor missile from Earth and destroy it?' Bill put in.

'That would require a nuclear war-head,' Peter replied, 'and those horrors have now all been dismantled and neutralised by international agreement. Even if the United Nations could be persuaded to sanction the construction of a new one, there are now insufficient stocks of plutonium available—rocket fuel's no use—and it would take far too long to set up the plant again. No, it's got to be diverted here and now, whilst its velocity remains relatively low, and quite a small thrust will do the job.'

'Using Venturer?'

'Yes, Bill. That's where you and Jim come in once more. I daren't take Astarte anywhere near that thing—there's no knowing what the radiation products from her nuclear drive might do to it. Venturer is powered by conventional chemical rocket-motors.'

'But surely not powerful enough to start shoving asteroids around?'

'Of course not—here's the plan. We have ample stocks of dynamite and blasting gelatine down at Mars Base. They are being ferried up here now. The engineers will pack them into one of our empty fuel tanks, equip it with a detonator and time-fuse, and you two will plant it on the asteroid, light the blue touch-paper, and stand clear! That should do the trick.'

Jim swallowed hard.

'Sounds a piece of cake,' he remarked, 'but what about the radiation?'

'You'll have to check before you land, naturally, but if it's not higher than when you left, the medics say it'll be safe to make a quick touch-down. You'll not want to linger, anyway.'

Twenty-four hours later, Venturer closed in slowly towards the asteroid, her slender symmetry marred by the huge cylindrical fuel tank lashed against her hull. In empty space the loss of streamlining was of no consequence, but the imbalance rendered Bill's job of piloting

considerably more difficult. Astarte's Chief Engineer had assured him that nothing but its own detonator would explode the dynamite, but every time he fired his motors he was acutely conscious of the tons of high explosive only feet away from the flaming jets.

Jim was watching the long-range Geiger on the instrument panel. As they drew closer to the enigmatic sphere, its sunward side a bright brown crescent against the star-strewn blackness, the radiation level was rising ominously. They had had to pursue their quarry for almost ten thousand miles, so rapidly was it accelerating away from Mars, and now it seemed they might be too late.

'Hold it, Bill!' he said, sharply. 'We can't land.'

The other frowned, gunning the retro-rockets to check their approach.

'Pity! That means Plan B—much more chancy. I'll make a fresh approach. You'd better go topside and be ready to cut the tank adrift when I give the word. Its own momentum will take it in, and the nose magnets should hold it down, once it makes contact. Don't forget to switch on. You've got the key?'

Jim nodded, tapping the big steel carriage-key fastened to his belt. He and Bill dropped their helmet-vizors, automatically inflating their pressure-suits. Venturer had no air-lock—she had no room for such refinements—and it was necessary to exhaust the cabin before opening the port to avoid sudden and dangerous decompression. When this was done Jim released his harness, secured his life-line, and crawled out on to the hull.

Since Alexei Leonov first performed this feat, way back in 1965, it had become a regular exercise, but Jim still found the first few minutes sufficiently nerve-wracking as he clung to the hand-holds, floating weightless beside the ship, alone in the immense gulf of empty space. Although his magnetic boots were useless on the scout-craft's dural hull there was no real danger of his falling away, so long as his body had the same velocity as the ship; but, when Bill started manoeuvring, he must hold tight, in case he was flung off, to trail uselessly at the

end of his life-line, when he should be doing his job at the fuel tank.

Hand-over-hand he floated round to the enormous cylinder, almost as big as Venturer herself, securely lashed alongside by means of thin steel hawsers. He made his way to the forward end of the tank, where Astarte's engineers had fitted three massive electromagnets to grip the smooth surface of the asteroid.

Nearby a crude circle of bright yellow paint splashed on the tank's dull metal marked the small hole into which he must insert his key to energise a powerful bank of fuel-cells, simultaneously starting the time-switch to explode the detonator fifteen minutes later. Below, the free ends of all six hawsers had been neatly bent on to a row of cleats. There had been no time to rig and test any sort of remote control—this was strictly a man-power job!

Making sure the heavy wire-cutters were ready in his belt, beside the key, Jim hitched his life-line to a convenient hand-hold and hung on, watching the stars wheel slowly about him as Bill swung the ship, using the gyro-motors. He was careful never to glance towards the blazing eye of the Sun, knowing how fatally easy it was to be blinded by its fierce radiance, untempered by any atmosphere.

The ship shuddered as the main jets flared briefly, and Venturer slid away on a collision course with the asteroid, now several miles distant. The minutes passed, the bright brown crescent grew steadily larger. Would Bill never give the word? Then—

'O.K., Jim. Switch on and cut the cables, then hold tight while I decelerate!'

The big key slid easily into its hole, turning with a reassuring click which Jim could feel. Pulling it out, he let it float on its lanyard while he bent to cut the cables. As the last one parted, he gave the word, and Bill fired the retro-rockets, checking the ship. Slowly, ponderously, the huge tank glided on, a monstrous time-bomb, bound for its inevitable rendezvous with the asteroid.

To his utter horror, Jim felt his hand-hold torn from his grasp, and saw Venturer's shining

hull drop away. The fuel-tank was taking him with it!

For an instant his heart stood still and his brain refused its function. What had he done?—hitched his life-line to the tank? No, he could feel it whirring from the reel at his belt. Soon it would reach its full length and pull tight with a frightful jerk. Would it pull him free? He dare not risk it: he found the quick-release buckle and jettisoned the reel.

Now, what was holding him to the tank? Ah, the lanyard at his belt, with its heavy steel switch-key, was caught on the nose of the tank. He peered round the edge and saw what had happened. The key must have floated into the field of the nearest magnet and was now flat on the pole-face. Unthinking, he pulled himself closer, trying to slide it sideways off the pole.

Too late he felt the drag at his shoulders as the field caught his steel oxygen-cylinders, turning him neatly over and clapping him firmly on top of the key.

Until this moment Jim had been vaguely aware of Bill's frantic voice in his ear, demanding to know what had happened. Now this was cut off, his helmet radio was dead, silenced by the intense magnetic field. He was quite alone, caught like a fly on a fly-paper in the magnet's merciless grip.

Jim had been in tight spots before, but never one quite like this. Dead ahead loomed the asteroid, growing visibly as the tank bore down upon it. If he could not free himself within the next few minutes he would be crushed between them. He could not reach the key now, much less shut off the power to the magnets. The only way to release himself would be to jettison his oxygen cylinder. He was trapped beyond all possibility of escape.

With this knowledge a curious calm came upon him, and he studied the approaching asteroid with detached interest. From his vantage point on its nose he could see that the tank was dead on course: it would land precisely on the terminator, at right angles to the body's orbit, where the thrust of the explosion would be most effective. The operation would be successful; men had died in

worse causes; perhaps he would be awarded a posthumous decoration.

His calm was shattered abruptly by a light blow on his helmet. A life-line was floating in front of his vizor! Grabbing it, he tied it securely about his waist. As it pulled tight he saw Venturer's silvery prow against the stars, and knew that Bill, risking destruction in a desperate bid to save his friend, had brought the ship alongside.

The line took the strain, vibrating like a guitar-string, but the magnet's grip was too strong to break, the winch simply drew the scout-craft down towards him until the open port was only a few feet away from Jim's head. There was only one thing to do. Taking a deep breath, he unbuckled his belt, releasing his pack and all his equipment, closed the valve on his helmet, and uncoupled the cylinders. A moment later he was safe on board, and Bill was clamping a fresh cylinder to his helmet.

'Thanks, Bill!' he said, as the precious oxygen filled his lungs, but his friend was already at the controls, firing the retro-rockets just in time to avert disaster.

'Close that port and strap down, chum!' he yelled. 'We've about ten seconds to get clear.'

Venturer shuddered from stem to stern as the tank grazed her, landing in a great cloud of dust upon the surface of the asteroid and blanketing her observation ports. His eyes fixed on the radar screen, his fingers playing the jet control keys with a master's touch, Bill brought her about in a great curve. Just as he straightened out the dynamite exploded, bombarding the ship with fragments of the shattered tank.

Fortunately there is no compression wave from an explosion in empty space, but the expanding cloud of superheated gas caught the scout-craft like a giant's hand and flung her away savagely. Instantly Bill cut the drive and powered the gyros, locking the massive fly-wheels at right-angles, and checking the frantic spin on both axes. There was a succession of sickening jolts as the opposing forces battled, then she came to rest on an even keel. Jim switched on the telescopic viewer, focusing it on the now-distant asteroid.

The appearance of the sphere had changed since the explosion. The surface dust had been blown away, and the sunward side shone like a dark mirror. The other side, previously almost invisible, now glowed dull red, brightening even as they watched.

'I don't like the look of that,' Bill remarked, 'let's get going.'

He pressed the starter and the deep music of the jets throbbed through the ship. At maximum acceleration, Venturer leapt towards Mars. Thrust deep into the foam-rubber of his couch. Jim watched the dwindling image on the screen pass from bright red through orange to a fierce yellow. Soon it was no more than a bright speck, distinguishable from the stars beyond only by its changing colour, now an intense blue-white.

Guessing what was about to happen, Bill turned Venturer's electronic radiation shield to full power, praying that it would be sufficient. An instant later the asteroid blossomed into a dazzling violet flare, brighter than the Sun itself, and vanished utterly.

White-faced, the two friends watched the Geiger-counter rocket towards the danger-mark as the deadly rain of neutron particles, travelling at velocities approaching that of light itself, overtook the ship. They knew that, in the cavity between the inner and outer hulls, lit by a blue haze of ionisation, their radiation shield was being subjected to the severest test it had ever had to bear, whilst their lives hung in the balance. Just short of the danger-mark the pointer checked, hovered, and began to drop. The shield had won: they were safe.

'But what was that thing?' asked Jim, in a shaken whisper. Bill shook his head.

'I don't suppose we shall ever know. That last reaction was more than thermo-nuclear—it looked like complete conversion of matter into energy. Imagine what might have happened if "that thing" had hit the Earth!'

Sporting Quiz I

set by JACK KOSKY

- WHAT above all else, is the one annually held outdoor race that all France follows with fanatical interest?
- WHEN (a) in the 1930's were Arsenal Wembley F.A. Cup winners?
(b) in the 1950's were Luton Town defeated Wembley Cup finalists?
- WHERE in the United States did the Winter Olympic Games take place in 1932?
- WHICH snooker ball is worth five points when potted?
- WHO Who is the South African test cricketer whose claim to greatness rests mainly on his brilliant fielding skill and his uncanny ability of being able to pick up a fast moving ball and throw it at the stumps with such accuracy as to cause many a batsman to be run out?

answers on page 80