

## Technical Error

Seven spacesuited human beings stood motionless, at the edge of the little valley. Around them was a bare, jagged plain of basalt, lit sharply by the distant sun and unwavering stars; a dozen miles behind, hidden by the abrupt curvature of the asteroid's surface, was a half-fused heap of metal that had brought them here; and in front of them, almost at their feet, in the shallow groove scraped by a meteor ages before, was an object which caused more than one of those men to doubt his sanity.

Before them lay the ship whose heat-ruined wreckage had been left behind them only minutes ago—perfectly whole in every part. Seven pairs of eyes swept it from end to end, picking out and recognizing each line. Driving and steering jet pits at each end; six bulging observation ports around its middle; rows of smaller ports, their transparent panes gleaming, obviously intact, in the sun-light; the silvery, prolate hull itself—all forced themselves on the minds that sought desperately to reject them as impossibilities. The Giansar was gone—they had fled from the threat of its disordered atomic engines, watched it glow and melt and finally cool again, a nearly formless heap of slag. So what was this?

None of them even thought of a sister ship. The Giansar had none. Spaceships are not mass production articles; only a few hundred exist as yet, and each of those is a specialized, designed-to-order machine. A spaceman of any standing can recognize at a glance, by shape alone, any ship built on Earth—and no other intelligent race than man inhabits Sol's system.

Grant was the first to throw off the spell. He glanced up at the stars overhead, and figured; then he shook his head.

"We haven't circled, I'll swear," he said after a moment. "We're a quarter of the way around this world from where we left the ship, if I have allowed right for rotation. Besides, it wasn't in a valley."

The tension vanished as though someone had snapped a switch. "That's right," grunted Cray, the stocky engine man. "The place was practically flat, except for a lot of spiky rocks. And anyway, no one but a nut could think that was the Giansar, after leaving her the way we did. I wonder who left this buggy here."

"Why do you assume it has been left?" The query came, in a quiet voice, from Jack Preble, the youngest person present. "It appears uninjured. I see no reason to suppose that the crew is not waiting for us to enter at this moment, if they have seen us."

Grant shook his head. "That ship might have been here for years—probably has, since none of us can place it. The crew may be there, but, I fear, not alive. It seems unlikely that this craft has been registered in the lifetime of any of us. I doubt that it would have remained here unless it were disabled; but you must all have realized by now that it holds probably our only chance of life. Even if it won't fly, there may be a transmitter in repair. We had better investigate."

The men followed the captain as he took a long, slow leap down the slope. Little enthusiasm showed in the faces behind the helmet masks; even young Preble had accepted the fact that death was almost inevitable. At another time, they might have been eager and curious, even in the face of a spectacle as depressing as a derelict usually is; now they merely followed silently. Here, probably, a similar group of men had, no one knew how long ago, faced a fate identical to theirs; and they were about to see what had befallen those others. No one saw humor in the situation, but a wry smile was twisting more than one face as the group stopped beneath the circular entrance port. More than one thought of the possible irony of their being taken for a rescue crew.

Grant looked at the port, twenty-five feet above their heads. Any of them could easily have jumped to it; but even that effort was not necessary, for a row of niches, eight inches square and two deep, provided a ladder to the rim. It was possible to cling to them even on the lower curve of the hull, for they were deeply grooved around the inside edges. The captain found that his gauntlets could grip easily, and he made his way up the wall of metal, the others watching from below. Arriving at the port, he found that the niches formed a circle around it, and other rows of them extended over the hull in different directions. It was at the entrance, however, that he met the first of the many irregularities.

The others saw him reach the port, and stop as though looking around. Then he traveled entirely around it, stopped again, and began feeling the mirrorlike metal with his gloved hands. Finally he called out:

"Cray, could you come up here, please? If anyone can find the opening mechanism, you should."

The engineer remained exactly where he was.

"Why should there be any?" he asked. "The only reason we use it on our ships is habit; if the door opens inward, atmospheric pressure will hold it better than any lock. Try pushing; if the inner door is sealed, you shouldn't have much trouble—the lock chamber will be exhausted, probably."

Grant got a grip near the edge of the door, and pushed.

There was no result. He moved part way around the rim and tried again, with the same lack of success. After testing at several more points, he spoke again:

"No luck. I can't even tell which side the hinge is on, or even if there is a hinge. Cray, you and a couple of others had better come up and give a hand at pushing; maybe there's a trace of air in the inner chamber."

Cray grunted, "If there's anywhere near an atmosphere's pressure, it'll take tons to budge the door—it's twelve feet across." But this time he began to climb the bull. Royden, probably the most powerful one present, and a chemist named Stevenson followed him. The four men grouped themselves about the forward edge of the port, their feet braced on the door itself and hands firmly gripping the climbing niches; and all four tensed their bodies and heaved. The door still refused to budge. They rested a moment, and followed Grant to the opposite side of the metal disk.

This time their efforts produced results. The pressure on the other side of the valve must have been only a few millimeters of mercury; enough to give four or five hundred pounds' resistance to an outside thrust at the edge opposite the hinge. When the door opened a crack, that pressure vanished almost instantly, and the four men shot feet first through the suddenly yawning opening. Grant and Stevenson checked the plunge by catching the edge of the port frame; the other two disappeared into the inner darkness, and an instant later the shock of their impact upon some hard surface was felt by those touching the hull.

The captain and the chemist dropped to the floor of the lock and entered; Preble leaped for the open door, followed by Sorrell and McEachern. All three judged accurately, sailing through the opening, checking their flight against the ceiling, and landing feet down on the floor, where they found the others standing with belt lights in their hands. The sun was on the far side of the ship, and the chamber was lighted dimly by reflection from the rocks outside; but the corridors of the vessel themselves must be dark.

The inner valve of the air lock was open—and had apparently been so from the beginning. Cray and Royden had shot through it, and been brought up against the farther wall of a corridor running parallel to the ship's long axis. They were both visible, standing back to back, sweeping the corridor in both directions with their lights. Grant took a step that carried him over to them, motioning the others to remain where they were, and added his light to those already in action.

To the right, as one entered it, the corridor extended almost to the near end of the ship—the bow, as the men thought of it for no good reason, in another direction, it ran about ten yards and opened into a large chamber which, if this craft resembled the Giansar as closely within as it did without, was probably the control room. At least, it was just about amidships. Smaller doors opened at intervals along the hallway; some were open, the majority were closed. Nothing moved anywhere.

"Come on," said Grant finally. He walked toward the central room, and paused on the threshold, the others at his heels. The floor they were walking on continued in the form of a catwalk; the chamber they were entering occupied the full interior of the hull at this point. It was brightly lighted, for it was this compartment that possessed the six great view ports, equally spaced around its walls, and the sun shone brightly through these. The men extinguished their own lights. Cray looked about him, and shook his head slowly.

"I still think I must be dreaming, and about to wake up on our own ship," he remarked. "This looks

more and more like home, sweet home."

Grant frowned. "Not to me," he replied. "This control layout is the first serious difference I've seen. You wouldn't notice that, of course, spending all your life with the engines. It might be a good idea for you to see if the drive on this ship is enough like ours for you to puzzle out, and whether there's a chance of repairing it. I'll look over this board for signs of a transmitter—after all, the Mizar shouldn't be too far away."

"Why shouldn't I be able to understand the drive?" retorted Cray. "It should be like ours, only a little more primitive—depending on how long this boat's been here."

Grant shot him an amazed glance. "Do you still think this is a Terrestrial ship, and has been here only a few decades?" he asked.

"Sure. Any evidence otherwise?"

Grant pointed to the floor beneath their feet. All looked down, and for the first time noticed that they left footprints in a thin, even layer of dust that coated the corridor floor.

"That means that the ship held its air for a longer time than I care to think about—long enough not only to reduce the various organic substances on board to dust, but at random currents to distribute it through the open spaces. Yet when we came the air was almost gone—leaked out through the joints and valves, good as they were, so that there was not enough left to resist us when we pushed a twelve-foot piston against its pressure. Point one."

The finger swung to the control board. "Point two." He said nothing further, but all could see what he meant.

The center of the control room was occupied by a thick-walled hemisphere—a cup, if you like—swung in gimbals which permitted its flat side always to the uppermost with respect to the ship's line of net acceleration. The control board occupied the inner surface and upper edge of this cup, all around the circumference; and in the center of the assembly was the pilot's seat—if it could be called a seat.

It was a dome-shaped structure protruding from the floor about two feet; five broad, deep grooves were spaced equally about its sides, but did not quite reach the top. It looked somewhat like a jelly mold; and the one thing that could be stated definitely about its history was that no human being had ever sat in it. Cray absorbed this evident fact with a gulp, as though he had not chewed it sufficiently.

The rest of the men stared silently at the seat. It was as though the ghost of the long-dead pilot had materialized there and held their frozen attention; overwrought imaginations pictured him, or strove to picture him, as he might have looked. And they also tried to picture what emergency, what unexpected menace, had called upon him to leave the place where he had held sway—to leave it forever. All those men were intelligent and highly trained; but more than one pair of eyes explored the corridor the human invaders had just used, and its mate stretching on from the other side of the control room.

Cray swallowed again, and broke the silence. "I should be able to figure out the engines, anyway," he said, "if they're atomics at all like ours. After all, they have to do the same things ours did, and they must have corresponding operations and parts."

"I hope you're right." Grant shrugged invisibly in the bulky suit. "I don't expect to solve that board until you fix something and the pilot lights start signaling—if they have pilot lights. We'd all better get to work. Cray's regular assistants can help him, McEachem had better stay with me and help on the board, and Preble and Stevenson can look over the ship in general. Their fields of specialty won't help much at our jobs. Hop to it." He started across the catwalk toward the control board, with McEachem trailing behind him.

Stevenson and Preble looked at each other. The younger man spoke. "Together, or should we split up?"

"Together," decided the chemist. "That way, one of us will probably see anything the other misses. It won't take much longer; and I doubt that there's much hurry for our job, anyway. We'll follow Cray and company to whichever engine room they go to, and then work from that end to the other. All right?"

Preble nodded, and the two left the control room. The engineers had gone toward the bow—so called because the main entrance port was nearer that end—and the two general explorers followed. The

others were not far ahead, and their lights were visible, so the two did not bother to use their own. Stevenson kept one hand on the right-hand wall, and they strode confidently along in the semidarkness.

After a short distance, the chemist's hand encountered the inner door of the air lock by which they had entered. It had been swung by the men all the way back against the wall, leaving both doors open, so that the light was a little better here. In spite of this, he did not see the object on the floor until his foot struck it, sending it sliding along the corridor with a metallic scraping sound that was easily transmitted through the metal of the floor and their suits.

He found it a few feet away, and, near it, two more exactly similar objects. He picked them up, and the two men examined them curiously. They were thick, oval rings, apparently of steel, with an inch or so of steel cable welded to one side of each. The free end of the cable seemed to have been sheared off by some sharp tool. Stevenson and Preble looked at each other, and both directed their lights on the floor about the inner portal of the air lock.

At first, nothing else was noticeable; but after a moment, they saw that the chemist's foot, just before striking the ring, had escaped a groove in a layer of dust much thicker than that over the rest of the floor. It was piled almost to the low sill of the valve, and covered an area two or three feet in radius. Curiously, the men looked at the outer side of the sill, and found a similar flat pile of dust, covering even more of the floor; and near the edges of this layer were five more rings.

These, examined closely, proved larger than the first ones, which had been just a little too small for an average human wrist; but like them, each had a short length of wire cable fused to one side, and cut off a short distance out. There was nothing else solid on the floor of the lock or the corridor, and no mark in the dust except that made by Stevenson's toe. Even the dust and rings were not very noticeable—the seven men had entered the ship through this lock without seeing them. Both men were sure they had some meaning, perhaps held a clue to the nature of the ship's former owners; but neither could decipher it. Preble dropped the rings into a pocket of his spacesuit, and they headed down the corridor again on the track of the engineers.

They caught up with them about a hundred and fifty feet from the control room. The three were standing in front of a heavy-looking, circular door set in a bulkhead which blocked off the passage at this point. It was not featureless, as the air lock doors had been, but had three four-inch disks of darker metal set into it near the top, the bottom, and the left side. Each disk had three holes, half an inch in diameter and of uncertain depth, arranged in the form of an isosceles triangle. The men facing it bore a baffled air, as though they had already tackled the problem of opening it.

"Is this your engine room?" asked Preble, as he and Stevenson stopped beside the others. "It looks more like a pressure lock to me."

"You may be right," returned Cray gloomily. "But there's nowhere else in this end of the ship where an engine room could be, and you remember there were jets at both ends. For some reason they seem to keep the room locked tight—and we don't even know whether the locks are key or combination. If it's combination, we might as well quit now; and if it's key, where is it?"

"They look like the ends of big bolts, to me," suggested Stevenson. "Have you tried unscrewing them?"

Cray nodded. "Royden got that idea, too. Take a closer look at them before you try turning the things, though. If you still feel ambitious, Royden will show you the best way to stick your fingers into the holes."

Preble and the chemist accepted the suggestion, and examined the little disks at close range. Cray's meaning was evident. They were not circular, as they had seemed at first glance; they presented a slightly elliptical cross section, and obviously could never be made to turn in their sockets. The lock theory seemed to remain unchallenged.

That being granted, it behooved them to look for a key. There was no sense toying with the combination idea—there was no hope whatever of solving even a simple combination without specialized knowledge which is seldom acquired legally. They resolutely ignored the probability that the key, if any, was only to be found in the company of the original engineer, and set to work.

Each of them took one of the nearby rooms, and commenced going over it. All the room doors proved to be unlocked, which helped some. Furniture varied but little; each chamber had two seats similar to that in the control room, and two articles which might at one time have been beds; any mattress or other padding they had ever contained was now fine dust, and nothing save metal troughs, large enough to hold a man lying at full length, were left. There was also a desklike affair, which contained drawers, which opened easily and soundlessly, and was topped by a circular, yardwide, aluminum-faced mirror. The drawers themselves contained a variety of objects, perhaps toilet articles, of which not one sufficiently resembled anything familiar to provide a clue to its original use.

A dozen rooms were ransacked fruitlessly before the men reassembled in the corridor to exchange reports. One or two of them, hearing of the others' failure, returned to the search; Preble, Stevenson, and Sorrell strolled back to the door which was barring their way. They looked at it silently for several moments; then Sorrell began to speak.

"It doesn't make sense," he said slowly. "Why should you lock an engine-room door? If the motors have to be supervised all the time, as ours do, it's a waste of time. If you grant that these creatures had their motors well enough designed to run without more than an occasional inspection, it might be worth while to seal the door against an accidental blowoff; but I still wouldn't lock it. Of course we don't know anything about their ideas of what was common sense.

"But I'd say that that door either isn't fastened at all, and is putting up a bluff like the outer air-lock valve, or else it's really sealed, and would be opened by tools rather than keys. You may think that's quibbling, but it isn't. Keys, you carry around with you, in your pocket or on your belt. Tools have a place where you leave 'em, and are supposed to stay there. Kid, if you were an engineer, in the practice of unsealing this door every few days, perhaps, and needed something like a monkey wrench to do it with, where would you keep the monkey wrench."

Preble ignored the appellation, and thought for a moment. Finally he said, "If I were fastening the door against intentional snooping, I'd keep the tool in my own quarters, locked up. If, as you suggested, it were merely a precaution against accident, I'd have a place for it near the door here. Wouldn't you say so?"

The machinist nodded, and swept his light slowly over the bulkheads around the door. Nothing showed but smooth metal, and he extended the search to the corridor walls for several yards on both sides. The eye found nothing, but Sorrell was not satisfied. He returned to the edge of the door and began feeling over the metal, putting a good deal of pressure behind his hand.

It was a slow process, and took patience. The others watched, holding their lights to illuminate the operation. For several minutes the suit radios were silent, those of the more distant men cut off by the metal walls of the rooms they were searching and the three at the door prosecuting their investigation without speech. Sorrell was looking for a wall cabinet, which did credit to his imagination; such a thing seemed to him the last place to keep tools. He was doing his best to allow for the probably unorthodox ideas of the builders of the ship, reducing the problem as far as he could toward its practical roots, and hoping no physical or psychological traits of the being he never expected to meet would invalidate his answers. As Preble had said, a tool used for only one, specialized purpose logically would be kept near the place in which it was used.

The machinist turned out to be right, though not exactly as he had expected. He was still running his hands over the wall when Preble remembered a standard type of motor-control switch with which even he was familiar; and, almost without thinking, he reached out, inserted his fingers in the three holes of one of the disks, and pulled outward. A triangular block, indistinguishable in color from the rest of the disk, slid smoothly out into his hand.

The other two lights converged on it, and for a second or two there was silence; then Sorrell chuckled. "You win, Jack," he admitted. "I didn't carry my own reason-ing far enough. Go ahead."

Preble examined the block of metal. What had been the inner face was copper-colored, and bore three holes similar to those by which he had extracted it. There was only one other way to fit it into the disk again; he reserved it, with the copper face outward, and felt it slip snugly back into place. Sorrell and

Stevenson did the same with the upper and lower disks, which proved to contain similar blocks. Then they stood back, wondering what happened next.

They were still waiting when Cray and Royden rejoined them. The former saw instantly what had been done to the door, and started to speak; then he took a second, and closer look, and, without saying a word, reached up, inserted three fingers in the holes in the coppery triangles of the block face, and began to unscrew the disk. It was about five inches thick, and finally came out in his hands. He stared doubtfully at it, and took a huge pair of vernier calipers from the engineer's kit at his side and measured the plug along several diameters. It was perfectly circular, to within the limit of error of his instrument.

He looked at the others at length, and spoke with a note of bewilderment. "I could have sworn this thing was elliptical when we first examined it. The hole still is, if you'll look." He nodded toward the threaded opening from which the disk had come. "I saw the line where it joined the door seemed a good deal wider at the top and bottom; but I'm sure it fitted tightly all around, before."

Sorrell and Royden nodded agreement. Evidently re-versing the inset block had, in some fashion, changed the shape of the disk. Cray tried to pull the block out again, but it resisted his efforts, and he finally gave up with a shrug. The men quickly unscrewed the other disks, and Royden leaned against the heavy door. It swung silently inward; and four of the men instantly stepped through, to swing their lights about the new compartment. Cray alone remained at the door, puzzling over the hard-yet-plastic metal object. The simple is not always obvious.

Grant and McEachern, in the control room, were having trouble as well. They had approached the control cup along the catwalk, and the captain had vaulted into its center without difficulty. And he might just as well have remained outside.

The control buttons were obvious enough, though they did not project from the metal in which they were set. They occurred always in pairs—probably an "on" and "off" for each operation; and beside each pair were two little transparent disks that might have been monitor lights. All were dark. Sometimes the pairs of buttons were alone; sometimes they were in groups of any number up to eighteen or twenty. Each group was isolated from its neighbors; and they extended completely around the footwide rim of the cup, so that it was not possible to see them all at once.

But the thing that bothered Grant the most was the fact that not a single button, light, or group was accompanied by a written label of any sort. He would not have expected to be able to read any such writing; but there had been the vague hope that control labels might have been matched with similar labels on the machines or charts—if the other men found any of either. It was peculiar, for there were in all several hundred buttons; and many of the groups could easily have been mistaken for each other. He put this thought into words, and McEachern frowned behind his helmet mask before replying.

"According to Cray's logic, why should they be la-beled?" he remarked finally. "Do we allow anyone to pilot a ship if he doesn't know the board blindfolded? We do label ours, of course, on the theory that an inexperienced man might have to handle them in an emergency; but that's self-deception. I've never heard of any but a first-rank pilot bringing a ship through an emergency. Label-ing controls is a carry-over from the family auto and airplane."

"There's something in that," admitted the captain. "There's also the possibility that this board is labeled, in a fashion we can't make out. Suppose the letters or characters were etched very faintly into that metal, which isn't polished, you'll notice, and were meant to be read by, say, a delicate sense of touch. I don't believe that myself, but it's a possibility—one we can't check, since we can't remove our suits to feel. The fact that there are no obvious lights for this board lends it some support; they couldn't have depended on sunlight all the time."

"In either case, fooling around here at this stage may do more harm than good," pointed out McEachern. "We'll have to wait until someone gets a machine iden-tified, and see if tampering with it produces any results here."

Grant's helmet nodded agreement. "I never had much hope of actually starting the ship," he said, "since it seems unlikely that anything but mechanical damage of a serious nature could have stranded it here; but I did have some hopes for the communicators. There must be some."

"Maybe they didn't talk," remarked the navigator.

"If that's your idea of humor, maybe you'd better not, yourself," growled Grant. He vaulted back to the catwalk, and morosely led the way forward, to see if the engineers or free-lance investigators had had any luck. McEachern followed, regretting the remark, which must have jarred the commander's optimism at an unfortunate time. He tried to think of something helpful to say, but couldn't, so he wisely kept quiet.

Halfway to the bow; they met Preble and Stevenson, who had satisfied themselves that the others could do better in the engine room and were continuing their own general examination of the ship. They gave the officers a brief report on events forward, showed them the metal rings found by the air lock, and went on aft to find some means of visiting the corridors which presumably existed above and below the main one. The control room seemed the logical place to look first, though neither had noticed any other openings from it when they were there the first time. Perhaps the doors were closed, and less obvious.

But there were no other doors, apparently. Only two means of access and egress to and from the control room appeared to exist, and these were the points where the main corridor entered it.

"There's a lot of room unaccounted for, just the same," remarked Stevenson after the search, "and there must be some way into it. None of the rooms we investigated looking for that 'key' had any sign of a ramp or stairway or trapdoor; but we didn't cover them all. I suggest we each take one side of the bow corridor, and look behind every door we can open. None of the others was locked, so there shouldn't be much trouble."

Preble agreed, and started along the left-hand wall of the passage, sweeping it with his light as he went. The chemist took the right side and did likewise. Each reached a door simultaneously, and pushed it open; and a simultaneous "Here it is" crackled from the suit radios. A spiral ramp, leading both up and down, was revealed on either side of the ship, behind the two doors.

"That's more luck than we have a right to expect," laughed Stevenson. "You take your side, I'll take mine, and we'll meet up above."

Preble again agreed silently, and started up the ramp. It was not strictly accurate to call it a spiral; it was a curve evidently designed as a compromise to give some traction whether the ship were resting on its belly on a high-gravity planet, or accelerating on its longitudinal axis, and it did not make quite a complete turn in arriving at the next level above. Preble stepped onto it facing the port side, and stepped off facing sternward, with a door at his left side. This he confidently tried to push open, since like the others it lacked knob or handle; but unlike them, it refused to budge.

There was no mystery here. The most cursory of examinations disclosed the fact that the door had been welded to its frame all around—raggedly and crudely, as though the work had been done in frantic haste, but very effectively. Nothing short of a high explosive or a heavy-duty cutting arc could have opened that portal. Preble didn't even try. He returned to the main level, meeting Stevenson at the foot of the ramp. One look at his face was enough for the chemist.

"Here, too?" he asked. "The door on my side will never open while this ship is whole. Someone wanted to keep something either outside or inside that section."

"Probably in, since the welding was done from outside," replied Preble. "I'd like to know what it was. It would probably give us an idea of the reason for the desertion of this ship. Did you go down to the lower level?"

"Not yet. We might as well go together—if one side is sealed, the other probably will be, too. Come on."

They were still on the left-hand ramp, so it was on this side that they descended. A glance at the door here showed that, at least, it was not welded; the pressure of a hand showed it to be unlocked. The two men found themselves at the end of a corridor similar in all respects to the one above, except that it came to a dead end to the right of the door instead of continuing on into the central chamber. It was pitch-dark, except for the reflections of the hand lights on the polished metal walls and along either side were doors, perhaps a trifle larger than most of the others on the ship. Many of these were ajar, others closed tightly; and by common consent the men stepped to the nearest of the former.

The room behind it proved similar in size to those above, but it lacked the articles which the men had come to look upon as the furniture of the long-dead crew. It was simply a bare, empty cubicle.

The other chambers, quickly examined, showed no striking difference from the first. Several contained great stacks of metal ingots, whose inertia and color suggested platinum or iridium; all were thickly coated with dust, as was the floor of the corridor. Here, too, there must have been organic materials, whether crew or cargo none could tell, which had slowly rotted away while the amazingly tight hull held stubbornly to its air. The makers of the ship had certainly been superb machinists—no vessel made by man would have held atmosphere more than a few months, without constant renewal.

"Have you noticed that there is nothing suggestive of a lock on any of these doors?" asked Preble, as they reached the blank wall which shut them off from the engine room in front.

"That's right," agreed Stevenson. "The engine-room port was the only one which had any obvious means of fastening. You'd think there would be need to hold them against changes in acceleration, if nothing else."

He went over to the nearest of the doors and with some care examined its edge, which would be hidden when it was closed; then he beckoned to Preble. Set in the edge, almost invisible, was a half-inch circle of metal slightly different in color from the rest of the door. It seemed perfectly flush with the metal around it. Just above the circle was a little dot of copper.

Both objects were matched in the jamb of the door—the copper spot by another precisely similar, the circle by a shallow, bowl-shaped indentation of equal size and perhaps a millimeter deep. No means of activating the lock, if it were one, were visible. Stevenson stared at the system for several minutes, Preble trying to see around the curve of his helmet.

"It's crazy," the chemist said at last. "If that circle marks a bolt, why isn't it shaped to fit the hollow on the jamb? It couldn't be moved forward a micron, the way it is. And the thing can't be a magnetic lock—the hollow proves that, too. You'd want the poles to fit as snugly as possible, not to have the field weakened by an air gap. What is it?"

Preble blinked, and almost bared his head in reverence, but was stopped by his helmet. "You have it, friend," he said gently. "It is a magnetic lock. I'd bet"—he glanced at the lung dial on his wrist—"my chance of living another hundred hours that's the story. But it's not based on magnetic attraction—it's magnetostriction. A magnetic field will change the shape of a piece of metal—some-what as a strong electric field does to a crystal. They must have developed alloys in which the effect is extreme. When the current is on, that 'bolt' of yours fits into the hollow in the jamb, without any complicated lever system to move it. This, apparently, is a cargo hold, and all the doors are probably locked by one master switch—perhaps on the control board, but more probably down here somewhere. So long as a current is flowing, the doors are locked. The current in any possible storage device must have been exhausted ages ago, even if these were left locked."

"But what about the engine-room door?" asked Stevenson. "Could that have been of this type? It was locked, remember." Preble thought for a moment.

"Could be. The removable block might have been a permanent magnet that opposed another when it was in one way, and reinforced it when it was reversed. Of course, it would be difficult to separate them once they were placed in the latter position; maybe the ship's current was used to make that possible. Now that the current is off, it may be that there will be some difficulty in returning that block to its original position. Let's go and see." He led the way back along the corridor to the ramp.

Cray received the theory with mingled satisfaction and annoyance; he should, he felt, have seen it himself. He had already discovered that the triangular blocks had developed an attachment for their new positions, and had even considered magnetism in that connection; but the full story had escaped him. He had had other things to worry about, anyway.

The free-lance seekers had met the engineer at the entrance to the engine room. Now the three moved inside, stepping out onto a catwalk similar to that in the control room. This chamber, however, was illuminated only by the hand torches of the men; and it was amazing to see how well they lit up the whole place, reflecting again and again from polished metal surfaces.



When one had seen the tube arrangement from outside the ship, it was not difficult to identify most of the clustered machines. The tube breeches, with their heavy injectors and disintegrators, projected in a continuous ring around the walls and in a solid group from the forward bulkhead. Heavily insulated leads ran from the tubes to the supplementary cathode ejectors. It seemed evident that the ship had been driven and steered by reaction jets of heavy-metal ions, as were the vessels of human make. All the machines were incased in heavy shields, which suggested that their makers were not immune to nuclear radiation.

"Not a bad layout," remarked Preble. "Found out whether they'll run?"

Cray glared. "No!" he answered almost viciously. "Would you mind taking a look at their innards for us?"

Preble raised his eyebrows, and stepped across the twenty-foot space between the catwalk and the nearest tube breech. It was fully six feet across, though the bore was probably not more than thirty inches—the walls had to contain the windings for the field which kept the ion stream from actual contact with the metal. The rig which was presumably the injector-distintegrator unit was a three-foot bulge in the center, and the insulated feed tube led from it to a nearby fuel container. The fuel was probably either mercury or some other easily vaporized heavy metal, such as lead. All this seemed obvious and simple enough, and was similar in basic design to engines with which even Preble was familiar; but there was a slight departure from convention in that the entire as-sembly, from fuel line to the inner hull, appeared to be one seamless surface of metal. Preble examined it closely all over, and found no trace of a joint.

"I see what you mean," he said at last, looking up. "Are they all the same?" Cray nodded.

"They seem to be. We haven't been able to get into any one of them—even the tanks are tight. They look like decent, honest atomics, but we'll never prove it by look-ing at the outside."

"But how did they service them?" asked Stevenson. "Surely they didn't weld the cases on and hope their machines were good enough to run without attention. That's asking too much, even from a race that built a hull that could hold air as long as this must have."

"How could I possibly know?" growled Cray. "Maybe they went outside and crawled in through the jets to service 'em—only I imagine it's some trick seal like the door of this room. After all, that was common sense, if you look at it right. The fewer moving parts, the less wear. Can anyone think of a way in which this breech mechanism could be fastened on, with an invisible joint, working from the same sort of common sense?"

Why no one got the answer then will always remain a mystery; but the engineer was answered by nothing but half a dozen thought expressions more or less hidden in space helmets. He looked around hopefully for a mo-ment, then shrugged his shoulders. "Looks like we'll just have to puzzle around and hope for the best," he concluded. "Jack and Don might as well go back to their own snooping—and for Heaven's sake, if you get any more ideas, come a-runnin'."

After glancing at Grant for confirmation of the sugges-tion, Preble and Stevenson left the engine room to continue their interrupted tour. "I wonder if the upper section behind the control room is sealed," remarked the chemist as they entered the darkness of the corridor. "I think we've covered the bow fairly well." Preble nodded; and without further speech they passed through the control chamber, glancing at the board which had given Grant and McEachern such trouble, and found, as they expected, ramps leading up and down opening from the rear corridor just as one entered.

They stayed together this time, and climbed the star-board spiral. The door at the top opened easily, which was some relief; but the hallway beyond was a disap-pointment. It might have been any of the others already visited; and a glance into each of the rooms revealed nothing but bare metal gleaming in the flashlight beams, and dust-covered floors. The keel corridor was also open; but here was an indication that one, at least, of the rooms had been used for occupancy rather than cargo.

Stevenson looked into it first, since it was on the side of the corridor he had taken. He instantly called his companion, and Preble came to look at the object standing in the beam of the chemist's light.

It was a seat, identical to the one in the control chamber—a mound of metal, with five deep groove; equally spaced around it. The tiny reflected images of the flashlights stared up from its convex surfaces like luminous eyes. None of the other furniture that had characterized the room in the central bow corridor was present but the floor was not quite bare.

Opposite each of the five grooves in the seat, perhaps foot out from it, a yard-long metal cable was neatly welded to the floor. A little farther out, and also equally spaced about the seat, were three more almost twice as long. The free end of each of the eight cables was cut off cleanly, as though by some extremely efficient instrument the flat cut surfaces were almost mirror smooth. Stevenson and Preble examined them carefully, and then looked at each other with thoughtful expressions. Both were beginning to get ideas. Neither was willing to divulge them.

There remained to explore only the stern engine room and the passage leading to it, together with the room; along the latter. They had no tools with which to remove a specimen of one of the cables, so they carefully noted the door behind which the seat and its surroundings had been found, and climbed once more to the central deck. Before making their last find, they had begun to be bored with the rather monotonous search, particularly since they had no clear idea of what they were searching for without it, they might have been tempted to ignore the rooms along the corridor and go straight to the engine room. Now, however, they investigated every chamber carefully; and their failure to find anything of interest was proportionally more disappointing.

And then they reached the engine-room door.

Flashlights swept once over the metal surface, picking out three disks with their inset triangular blocks, as the men had expected, but the coppery reflection from two of the blocks startled them into an instant motionlessness. Of the three seals, they realized, only one—the upper-most—was locked. It was as though whoever had last been in the room had left hastily—or was not a regular occupant of the ship.

Preble quickly reversed the remaining block, and un-screwed the three disks; then the two men leaned against the door and watched it swing slowly open. Both were unjustifiably excited; the state of the door had stimulated their imaginations, already working overtime on the material previously provided. For once, they were not disappointed.

The light revealed, besides the tanks, converters, and tube breeches which had been so obvious in the forward engine room, several open cabinets which had been mere bulges on the walls up forward. Tools and other bits of apparatus filled these and lay about on the floor. Light frameworks of metal, rather like small building scaffolds, enclosed two of the axial tube breeches; and more tools lay on these. It was the first scene they had encountered on the ship that suggested action and life rather than desertion and stagnation. Even the dust, present here as everywhere, could not eradicate the impression that the workers had dropped their tools for a brief rest, and would return shortly.

Preble went at once to the tubes upon which work had apparently been in progress. He was wondering, as he had been since first examining one, how they were opened for servicing. He had never taken seriously Cray's remark that it might have been done from outside.

His eye caught the thing at once. The dome of metal that presumably contained the disintegrator and ionizing units had been disconnected from the fuel tank, as he had seen from across the room; but a closer look showed that it had been removed from the tube, as well, and replaced somewhat carelessly. It did not match the edges of its seat all around, now; it was displaced a little to one side, exposing a narrow crescent of flat metal on each of the two faces normally in complete contact. An idea of the position can be obtained by placing two pennies one on the other, and giving the upper one a slight sideward displacement.

The line of juncture of the two pieces was, therefore, visible all around. Unfortunately, the clamping device Preble expected to find was not visible anywhere. He got a grip—a very poor one, with his gloved hand—on the slightly projecting edge of the hemisphere, and tried to pull it free, without success; and it was that failure which gave him the right answer—the only possible way in which an air-tight and pressure-tight seal could be fastened solidly, even with the parts out of alignment, with nonmagnetic alloys. It was a method that had been used on Earth, though not on this scale; and he was disgusted at his earlier failure to see it.

Magnetism, of course, could not be used so near the ion projectors, since it would interfere with the controlling fields; but there was another force, ever present and available—molecular attraction. The adjoining faces of the seal were plane, not merely flat. To speak of their accuracy in terms of the wave

length of sodium light would be useless; a tenth-wave surface, representing hours of skilled human hand labor, would be jagged in comparison. Yet the relatively large area of these seals and the frequency with which the method appeared to have been used argued mass production, not painstaking polishing by hand.

But if the seal were actually wrung tight, another problem presented itself. How could the surfaces be separated, against a force sufficient to confine and direct the blast of the ion rockets? No marks on the breech suggested the application of prying tools—and what blade could be inserted into such a seal?

Stevenson came over to see what was keeping Preble so quiet, and listened while the latter explained his discovery and problems.

"We can have a look through these cabinets," the chemist remarked finally. "This seems to fit Sorrell's idea of a tool-requiring job. Just keep your eyes and mind open."

The open mind seemed particularly indicated. The many articles lying in and about the cabinets were undoubtedly tools, but their uses were far from obvious. They differed from man-made tools in at least one vital aspect. Many of our tools are devices for forcing: hammers, wrenches, clamps, pliers, and the like. A really good machine job would need no such devices. The parts would fit, with just enough clearance to eliminate unde-sired friction—and no more.

That the builders of the ship were superb designers and machinists was already evident. What sort of tools they would need was not so obvious. Shaping devices, of course; there were planers, cutters, and grinders among the littered articles. All were portable, but solidly built, and were easily recognized even by Preble and Stevenson. But what were the pairs of slender rods which clung together, obviously magnetized? What were the small, sealed-glass tubes; the long, grooved strips of metal and plastic; the featureless steel-blue spheres; the iridescent, oddly shaped plates of paper-thin metal? The amateur investigators could not even guess, and sent for profes-sional help.

Cray and his assistants almost crooned with pleasure as they saw the untidy floor and cabinets; but an hour of careful examination and theorizing left them in a less pleasant mood. Cray conceded that the molecular attrac-tion theory was most probably correct, but made no headway at all on the problem of breaking the seal. Nothing in the room seemed capable of insertion in the air-tight joint.

"Why not try sliding them apart?" asked Stevenson. "If they're as smooth as all that, there should be no diffi-culty."

Cray picked up a piece of metal. "Why don't you imagine a plane through this bar, and slide it apart along that?" he asked. "The crystals of the metal are practically as close together, and grip each other almost as tightly, in the other case. You'll have to get something between them."

The chemist, who should have known more physics, nodded. "But it's more than the lubricant that keeps the parts of an engine apart," he said.

"No, the parts of one of our machines are relatively far apart, so that molecular attraction is negligible," an-swered the machinist. "But—I believe you have something there. A lubricant might do it; molecules might conceiv-ably work their way between those surfaces. Has anybody noticed anything in this mess that might fill the bill?"

"Yes," answered Preble promptly, "these glass tubes. They contain liquid, and have been fused shut—which is about the only way you could seal in a substance such as you would need."

He stepped to a cabinet and picked up one of the three-inch long, transparent cylinders. A short nozzle, its end melted shut, projected from one end, and a small bubble was visible in the liquid within. The bubble moved slug-gishly when the tube was inverted, and broke up into many small ones when it was shaken. These recombined instantly when the liquid came to rest, which was encouraging. Evidently the stuff possessed a very low vis-cosity and surface tension.

Cray took the tube over to the breech which had been partly opened and carelessly closed so long ago, held the nozzle against the edge of the seal, and, after a moment's hesitation, snapped off the tip with his gloved fingers. He expected the liquid to ooze out in the asteroid's feeble gravity, but its vapor pressure must have been high, for it sprayed out in a heavy stream. Droplets rebounded from the metal and evaporated almost instantly; with equal speed the liquid which spread over the surface vanished. Only

a tiny fraction of a percent, if that, could have found its way between the surfaces.

Cray stared tensely at the dome of metal as the tube emptied itself. After a moment, he dropped the empty cylinder and applied a sideways pressure.

A crescent, of shifting rainbow colors, appeared at the edge of the seal; and the dome slowly slid off to one side. The crescent did not widen, for the lubricant evaporated the instant it was exposed. Preble and Stevenson caught the heavy dome and eased its mass to the central catwalk.

The last of the rainbow film of lubricant evaporated from the metal, and the engineers crowded around the open breech. There was no mass of machinery inside; the disintegrators would, of course, be within the dome which had been removed. The coils which generated the fields designed to keep the stream of ionized vapor from contact with the tube walls were also invisible, being sealed into the tube lining. Neither of these facts bothered the men, for their own engines had been similarly designed. Cray wormed his way down the full length of the tube to make sure it was not field failure which had caused it to be opened in the first place; then the three specialists turned to the breech which had been removed.

The only visible feature of its flat side was the central port through which the metallic vapor of the exhaust had entered the tube; but application of another of the cylinders of lubricant, combined with the asteroid's gravity, caused most of the plate to fall away and reveal the disintegrator mechanism within. Preble, Stevenson, Grant, and McEachern watched for a while as pieces of the disintegrator began to cover the floor of the room; but they finally realized that they were only getting in the way of men who seemed to know what they were doing, so a gradual retreat to the main corridor took place.

"Do you suppose they can find out what was wrong with it?" queried Stevenson.

"We should." It was Cray's voice on the radio. "The principle of this gadget is exactly like our own. The only trouble is that they've used that blasted molecular-attraction fastening method everywhere. It's taking quite a while to get it apart."

"It's odd that the technology of these beings should have been so similar to ours in principle, and yet so different in detail," remarked Grant. "I've been thinking it over, and can't come to any conclusion as to what the reason could be. I thought perhaps their sense organs were different from ours, but I have no idea how that could produce such results—not surprising, since I can't imagine what sort of senses could exist to replace or supplement ours."

"Unless there are bodies in the sealed-off corridor and rooms, I doubt if you'll ever find the answer to that one," answered Preble. "I'll be greatly surprised if anyone ever proves that this ship was made in this solar system."

"I'll be surprised enough if anyone proves anything at all constructive about it," returned Grant.

Cray's voice interrupted again.

"There's something funny about part of this," he said. "I think it's a relay, working from your main controls, but that's only a guess. It's not only connected to the electric part of the business, but practically built around the fuel inlet as well. By itself it's all right; solenoid and moving core type. We've had it apart, too."

"What do you plan to do?" asked Grant. "Have you found anything wrong with the unit as a whole?"

"No, we haven't. It has occurred to me that the breech was unsealed for some purpose other than repair. It would make a handy emergency exit—and that might account for the careless way it was resealed. We were thinking of putting it back together, arranging the relay so that we can control it from here and test the whole tube. Is that all right with you?"

"If you think you can do it, go ahead," replied Grant. "We haven't got much to lose, I should say. Could you fix up the whole thing to drive by local control?"

"Possibly. Wait till we see what happens to this one." Cray moved out of the line of sight in the engine-room doorway, and his radio waves were cut off.

Stevenson moved to the doorway to watch the process of reassembly; the other three went up to the control room. The eeriness of the place had worn off—there was no longer the suggestion of the presence of the unknowable creature who had once controlled the ship. Preble was slightly surprised, since it was now night on this part of the asteroid; any ghostly suggestions should have been enhanced

rather than lessened. Familiarity must have bred contempt.

No indicator lights graced the control panel. Grant had half hoped that the work in the engine room might have been recorded here; but he was not particularly surprised.

He had given up any hopes of controlling the vessel from this board, as his remark to Cray had indicated.

"I hope Cray can get those tubes going," he said after a lengthy silence. "It would be enough if we could push this ship even in the general direction of Earth. Luckily the orbit of this body is already pretty eccentric. About all we would have to do is correct the plane of motion."

"Even if we can't start enough tubes to control a flight, we could use one as a signal flare," remarked Preble, "Remember, the *Mizar* is in this sector; you once had hopes of contacting her with the signal equipment of this ship, if you could find any. The blast from one of these tubes, striking a rock surface, would make as much light as you could want."

"That's a thought," mused Grant. "As usual, too simple for me to think of. As a matter of fact, it probably represents our best chance. We'll go down now and tell Cray simply to leave the tube going, if he can get it started."

The four men glided back down the corridor to the engine room. The reassembly of the breech mechanism was far from completed, and Grant did not like to interrupt. He was, of course, reasonably familiar with such motors, and knew that their assembly was a delicate task even for an expert.

Cray's makeshift magnetic device for controlling the relay when the breech was sealed was a comment on the man's ingenuity. It was not his fault that none of the men noticed that the core of the relay was made of the same alloy as the great screw cocks which held the engine-room doors shut, and the small bolts on the doors in the cargo hold. It was, in fact, a delicate governor, controlling the relation between fuel flow and the breech field strength—a very necessary control, since the field had to be strong enough to keep the hot vapor from actual contact with the breech, but not strong enough to overcome the effect of the fields protecting the throat of the tube, which were at right angles to it. There was, of course, a similar governor in man-made motors, but it was normally located in the throat of the tube and was controlled by the magnetic effect of the ion steam. The device was not obvious, and of course was not of a nature which a human engineer would anticipate. It might have gone on operating normally for an indefinite period, if Cray had used any means whatever, except magnetic manipulation, to open and close the relay.

The engineers finally straightened and stood back from their work. The breech was once more in place, this time without the error in alignment which had caused the discovery of the seal. Clamped to the center of the dome, just where the fuel feed tube merged with its surface, was the control which had been pieced together from articles found in the tool cabinets. It was little more than a coil whose field was supposed to be strong enough to replace that of the interior solenoid through the metal of the breech.

Preble had gone outside, and now returned to report that the slight downward tilt of the end of the ship in which they were working would cause the blast from this particular tube to strike the ground fifty or sixty yards to the rear. This was far enough for safety from splash, and probably close enough so that the intensity of the blast would not be greatly diminished.

Cray reported that the assembly, as nearly as he could tell, should work.

"Then I suggest that you and anyone you need to help you remain here and start it in a few moments, while the rest of us go outside to observe results. We'll keep well clear of the stern, so don't worry about us," said Grant. "We're on the night side of the asteroid now, and, as I remember, the *Mizar* was outward and counter-clockwise of this asteroid's position twenty-four hours ago—by heaven, I've just realized that all this has occurred in less than twenty hours. She should be able to sight the flare at twenty million miles, if this tube carries half the pep that one of ours would."

Cray nodded. "I can start it alone," he said. "The rest of you go on out. I'll give you a couple of minutes, then turn it on for just a moment. I'll give you time to send someone in if anything is wrong."

Grant nodded approval, and led the other five men along the main corridor and out the air lock. They leaped to a position perhaps a hundred and fifty yards to one side of the ship, and waited.

The tube in question was one of the lowest in the bank of those parallel to the ship's longitudinal axis. For several moments after the men had reached their position it remained lifeless; then a silent, barely visible ghost of flame jetted from its lip. This changed to a track of dazzling incandescence at the point where it first contacted the rock of the asteroid; and the watchers automatically snapped the glare shields into place on their helmets. These were all in place before anyone realized that the tube was still firing, cutting a glowing canyon into the granite and hurling a cloud of boiling silica into space. Grant stared for a moment, leaped for the air lock, and disappeared inside. As he entered the control room from the front, Cray burst in from the opposite end, making fully as good time as the captain. He didn't even pause, but called out as he came:

"She wouldn't cut off, and the fuel flow is increasing. I can't stop it. Get out before the breach gives—I didn't take time to close the engine-room door!"

Grant was in midair when the engineer spoke, but he grasped a stanchion that supported the catwalk, swung around it like a comet, and reversed his direction of flight before the other man caught up to him. They burst out of the air lock at practically the same instant.

By the time they reached the others, the tube fields had gone far out of balance. The lips of the jet tube were glowing blue-white and vanishing as the stream caught them; and the process accelerated as the men watched. The bank of stern tubes glowed brightly, began to drip, and boiled rapidly away; the walls of the engine room radiated a bright red, then yellow, and suddenly slumped inward. That was the last straw for the tortured disintegrator; its own supremely resistant substance yielded to the lack of external cooling, and the device ceased to exist. The wreckage of the alien ship, glowing red now for nearly its entire length, gradually cooled as the source of energy ceased generating; but it would have taken supernatural intervention to reconstruct anything useful from the rubbish which had been its intricate mechanism. The men, who had seen the same thing happen to their own ship not twenty hours before, did not even try to do so.

The abruptness with which the accident had occurred left the men stunned. Not a word was spoken, while the incandescence faded slowly from the hull. There was nothing to say. They were two hundred million miles from Earth, the asteroid would be eighteen months in reaching its nearest point to the orbit of Mars—and Mars would not be there at the time. A search party might eventually find them, since the asteroid was charted and would be known to have been in their neighborhood at the time of their disappearance. That would do them little good.

Rocket jets of the ion type are not easily visible unless matter is in the way—matter either gaseous or solid. Since the planetoid was airless and the *Mizar* did not actually land, not even the usually alert Preble saw her approach. The first inkling of her presence was the voice of her commander, echoing through the earphones of the seven castaways.

"Hello, down there. What's been going on? We saw a flare about twenty hours ago on this body that looked as though an atomic had misbehaved, and headed this way. We circled the asteroid for an hour or so, and finally did sight your ship—just as she did go up. Will you please tell us what the other flare could have been? Or didn't you see it?"

It was the last question that proved too much for the men. They were still laughing hysterically when the *Mizar* settled beside the wreck and took them aboard. Cray alone was silent and bitter.

"In less than a day," he said to his colleague on the rescue ship, "I wrecked two ships—and I haven't the faintest idea how I wrecked either one of them. As a technician, I'd be a better ground-car mechanic. That second ship was just lying there waiting to teach me more about shop technique than I'd have learned in the rest of my life; and some little technical slip ruined it all."

But whose was the error in technique?