



*From the Golden Age  
of Science Fiction*

THE  
POUL ANDERSON  
READER



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[Industrial Revolution](#)  
[Inside Earth](#)  
[The Chapter Ends](#)  
[Duel On Syrtis](#)  
[Innocent At Large](#)  
[The Valor Of Cappen Varra](#)  
[The Sensitive Man](#)  
[Security](#)  
[Sentiment, Inc](#)

# INDUSTRIAL REVOLUTION

*Ever think how deadly a thing it is  
if a machine has amnesia—  
or how easily it can be arranged....*

**BY WINSTON P. SANDERS  
(POUL ANDERSON)**

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CHEMICAL INDUSTRY IN SPACE

INDUSTRIAL REVOLUTION | BY WINSTON P. SANDERS



"Well, yes," Amspaugh admitted, "it was a unique war in many ways, including its origin. However, there are so many analogies to other colonial revolutions—" His words trailed off as usual.

"I know. Earth's mercantile policies and so forth," said Lindgren. He fancies himself a student of interplanetary history. This has led to quite a few arguments since Amspaugh, who teaches in that field, joined the Club. Mostly they're good. I went to the bar and got myself another drink, listening as the mine owner's big voice went on:

"But what began it? When did the asterites first start realizing they weren't pseudopods of a dozen Terrestrial nations, but a single nation in their own right? There's the root of the revolution. And it can be pinned down, too."

"Ware metaphor!" cried someone at my elbow. I turned and saw Missy Blades. She'd come quietly into the lounge and started mixing a gin and bitters.

The view window framed her white head in Orion as she moved toward the little cluster of seated men. She took a fat cigar from her pocket, struck it on her shoe sole, and added her special contribution to the blue cloud in the room after she sat down.

"Excuse me," she said. "I couldn't help that. Please go on." Which I hope relieves you of any fear that she's an Unforgettable Character. Oh, yes, she's old as Satan now; her toil and guts and conniving make up half the biography of the Sword; she manned a gun turret at Ceres, and was mate of the *Tyrfing* on some of the earliest Saturn runs when men took their lives between their teeth because they needed both hands free; her sons and grandsons fill the Belt with their brawling ventures; she can drink any ordinary man to the deck; she's one of the three women ever admitted to the Club. But she's also one of the few genuine ladies I've known in my life.

"Uh, well," Lindgren grinned at her. "I was saying, Missy, the germ of the revolution was when the Stations armed themselves. You see, that meant more than police powers. It implied a degree of sovereignty. Over the years, the implication grew."

"Correct." Orloff nodded his bald head. "I remember how the Governing Commission squalled when the Station managers first demanded the right. They foresaw trouble. But if the Stations belonging to one country put in space weapons, what else could the others do?"

"They should have stuck together and all been firm about refusing to allow it," Amspaugh said. "From the standpoint of their own best interests, I mean."

"They tried to," Orloff replied. "I hate to think how many communications we sent home from our own office, and the others must have done the same. But Earth was a long way off. The Station bosses were close. Inverse square law of political pressure."

"I grant you, arming each new little settlement proved important," Amspaugh said. "But really, it expressed nothing more than the first inchoate stirrings of asteroid nationalism. And the origins of that are much more subtle and complex. For instance ... er...."

"You've got to have a key event somewhere," Lindgren insisted. "I say that this was it."

A silence fell, as will happen in conversation. I came back from the bar and settled myself beside Missy. She looked for a while into her drink, and then out to the stars. The slow spin of our rock had now brought the Dippers into view. Her faded eyes sought the Pole Star—but it's Earth's, not our own any more—and I wondered what memories they were sharing. She shook herself the least bit and said:

"I don't know about the sociological ins and outs. All I know is, a lot of things happened, and there wasn't any pattern to them at the time. We just slogged through as best we were able, which wasn't really very good. But I can identify one of those wriggling roots for you, Sigurd. I was there when the question of arming the Stations first came up. Or, rather, when the incident occurred that led directly to the question being raised."

Our whole attention went to her. She didn't dwell on the past as often as we would have liked.

A slow, private smile crossed her lips. She looked beyond us again. "As a matter of fact," she murmured, "I got my husband out of it." Then quickly, as if to keep from remembering too much:

"Do you care to hear the story? It was when the Sword was just getting started. They'd established themselves on SSC 45—oh, never mind the catalogue number. Sword Enterprises, because Mike Blades' name suggested it—what kind of name could you get out of Jimmy Chung, even if he was the senior partner? It'd sound too much like a collision with a meteorite—so naturally the asteroid also came to be called the Sword. They began on the borrowed shoestring that was usual in those days. Of course, in the Belt a shoestring has to be mighty long, and finances got stretched to the limit. The older men here will know how much had to be done by hand, in mortal danger, because machines were too expensive. But in spite of everything, they succeeded. The Station was functional and they were ready to start business when—"

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It was no coincidence that the Jupiter craft were arriving steadily when the battleship came. Construction had been scheduled with this in mind, that the Sword should be approaching conjunction with the king planet, making direct shuttle service feasible, just as the chemical plant went into service. We need not consider how much struggle and heartbreak had gone into meeting that schedule. As for the battleship, she appeared because the fact that a Station in just this orbit was about to commence operations was news important enough to cross the Solar System and push through many strata of bureaucracy. The heads of the recently elected North American government became suddenly, fully aware of what had been going on.

Michael Blades was outside, overseeing the installation of a receptor, when his earplug buzzed. He thrust his chin against the tuning plate, switching from gang to interoffice band. "Mike?" said Avis Page's voice, "You're wanted up front."

"Now?" he objected. "Whatever for?"

"Courtesy visit from the NASS *Altair*. You've lost track of time, my boy."

"What the ... the jumping blue blazes are you talking about? We've had our courtesy visit. Jimmy and I both went over to pay our respects, and we had Rear Admiral Hulse here to dinner. What more do they expect, for Harry's sake?"

"Don't you remember? Since there wasn't room to entertain his officers, you



promised to take them on a personal guided tour later. I made the appointment the very next watch. Now's the hour."

"Oh, yes, it comes back to me. Yeah. Hulse brought a magnum of champagne with him, and after so long a time drinking recycled water, my capacity was shot to pieces. I got a warm glow of good fellowship on, and offered—Let Jimmy handle it, I'm busy."

"The party's too large, he says. You'll have to take half of them. Their gig will dock in thirty minutes."

"Well, depute somebody else."

"That'd be rude, Mike. Have you forgotten how sensitive they are about rank at home?" Avis hesitated. "If what I believe about the mood back there is true, we can use the good will of high-level Navy personnel. And any other influential people in sight."

Blades drew a deep breath. "You're too blinking sensible. Remind me to fire you after I've made my first ten million bucks."

"What'll you do for your next ten million, then?" snipped his secretary-file clerk-confidante-adviser-et cetera.

"Nothing. I'll just squander the first."

"Goody! Can I help?"

"Uh ... I'll be right along." Blades switched off. His ears felt hot, as often of late when he tangled with Avis, and he unlimbered only a few choice oaths.

"Troubles?" asked Carlos Odonaju.

Blades stood a moment, looking around, before he answered. He was on the wide end of the Sword, which was shaped roughly like a truncated pyramid. Beyond him and his half dozen men stretched a vista of pitted rock, jutting crags, gulf-black shadows, under the glare of floodlamps. A few kilometers away, the farthest horizon ended, chopped off like a cliff. Beyond lay the stars, crowding that night which never ends. It grew very still while the gang waited for his word. He could listen to his own lungs and pulse, loud in the spacesuit; he could even notice its interior smell, blend of plastic and oxygen cycle chemicals, flesh and sweat. He was used to the sensation of hanging upside down on the surface, grip-soled boots holding him against that

fractional gee by which the asteroid's rotation overcame its feeble gravity. But it came to him that this was an eerie bat-fashion way for an Oregon farm boy to stand.

Oregon was long behind him, though, not only the food factory where he grew up but the coasts where he had fished and the woods where he had tramped. No loss. There'd always been too many tourists. You couldn't escape from people on Earth. Cold and vacuum and raw rock and everything, the Belt was better. It annoyed him to be interrupted here.

Could Carlos take over as foreman? N-no, Blades decided, not yet. A gas receptor was an intricate piece of equipment. Carlos was a good man of his hands. Every one of the hundred-odd in the Station necessarily was. But he hadn't done this kind of work often enough.

"I have to quit," Blades said. "Secure the stuff and report back to Buck Meyers over at the dock, the lot of you. His crew's putting in another recoil pier, as I suppose you know. They'll find jobs for you. I'll see you here again on your next watch."

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He waved—being half the nominal ownership of this place didn't justify snobbery, when everyone must work together or die—and stepped off toward the nearest entry lock with that flowing spaceman's pace which always keeps one foot on the ground. Even so, he didn't unshackle his inward-reeling lifeline till he was inside the chamber.

On the way he topped a gaunt ridge and had a clear view of the balloons that were attached to the completed receptors. Those that were still full bulked enormous, like ghostly moons. The Jovian gases that strained their tough elastomer did not much blur the stars seen through them; but they swelled high enough to catch the light of the hidden sun and shimmer with it. The nearly discharged balloons hung thin, straining outward. Two full ones passed in slow orbit against the constellations. They were waiting to be hauled in and coupled fast, to release their loads into the Station's hungry chemical plant. But there were not yet enough facilities to handle them at once—and the *Pallas Castle* would soon be arriving with another—Blades found that he needed a few extra curses.

Having cycled through the air lock, he removed his suit and stowed it, also

the heavy gloves which kept him from frostbite as he touched its space-cold exterior. Tastefully clad in a Navy surplus Long John, he started down the corridors.

Now that the first stage of burrowing within the asteroid had been completed, most passages went through its body, rather than being plastic tubes snaking across the surface. Nothing had been done thus far about facing them. They were merely shafts, two meters square, lined with doorways, ventilator grilles, and fluoropanel. They had no thermocoils. Once the nickel-iron mass had been sufficiently warmed up, the waste heat of man and his industry kept it that way. The dark, chipped-out tunnels throbbed with machine noises. Here and there a girlie picture or a sentimental landscape from Earth was posted. Men moved busily along them, bearing tools, instruments, supplies. They were from numerous countries, those men, though mostly North Americans, but they had acquired a likeness, a rangy leathery look and a free-swinging stride, that went beyond their colorful coveralls.

"Hi, Mike.... How's she spinning?... Hey, Mike, you heard the latest story about the Martian and the bishop?... Can you spare me a minute? We got troubles in the separator manifolds.... What's the hurry, Mike, your batteries overcharged?" Blades waved the hails aside. There was need for haste. You could move fast indoors, under the low weight which became lower as you approached the axis of rotation, with no fear of tumbling off. But it was several kilometers from the gas receptor end to the people end of the asteroid.

He rattled down a ladder and entered his cramped office out of breath. Avis Page looked up from her desk and wrinkled her freckled snub nose at him. "You ought to take a shower, but there isn't time," she said. "Here, use my antistinker." She threw him a spray cartridge with a deft motion. "I got your suit and beardex out of your cabin."

"Have I no privacy?" he grumbled, but grinned in her direction. She wasn't much to look at—not ugly, just small, brunette, and unspectacular—but she was a supernova of an assistant. Make somebody a good wife some day. He wondered why she hadn't taken advantage of the situation here to snaffle a husband. A dozen women, all but two of them married, and a hundred men, was a ratio even more lopsided than the norm in the Belt. Of course with so much work to do, and with everybody conscious of the need to maintain

cordial relations, sex didn't get much chance to rear its lovely head. Still—

She smiled back with the gentleness that he found disturbing when he noticed it. "Shoo," she said. "Your guests will be here any minute. You're to meet them in Jimmy's office."

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Blades ducked into the tiny washroom. He wasn't any 3V star himself, he decided as he smeared cream over his face: big, homely, red-haired. *But not something you'd be scared to meet in a dark alley, either*, he added smugly. In fact, there had been an alley in Aresopolis.... Things were expected to be going so smoothly by the time they approached conjunction with Mars that he could run over to that sinful ginful city for a vacation. Long overdue ... whoooo! He wiped off his whiskers, shucked the zipskin, and climbed into the white pants and high-collared blue tunic that must serve as formal garb.

Emerging, he stopped again at Avis' desk. "Any message from the *Pallas*?" he asked.

"No," the girl said. "But she ought to be here in another two watches, right on sked. You worry too much, Mike."

"Somebody has to, and I haven't got Jimmy's Buddhist ride-with-the-punches attitude."

"You should cultivate it." She grew curious. The brown eyes lingered on him. "Worry's contagious. You make me fret about you."

"Nothing's going to give me an ulcer but the shortage of booze on this rock. Uh, if Bill Mbolo should call about those catalysts while I'm gone, tell him —" He ran off a string of instructions and headed for the door.

Chung's hangout was halfway around the asteroid, so that one chief or the other could be a little nearer the scene of any emergency. Not that they spent much time at their desks. Shorthanded and undermechanized, they were forever having to help out in the actual construction. Once in a while Blades found himself harking wistfully back to his days as an engineer with Solar Metals: good pay, interesting if hazardous work on flying mountains where men had never trod before, and no further responsibilities. But most asterites had the dream of becoming their own bosses.

When he arrived, the *Altair* officers were already there, a score of correct



young men in white dress uniforms. Short, squat, and placid looking, Jimmy Chung stood making polite conversation. "Ah, there," he said, "Lieutenant Ziska and gentlemen, my partner, Michael Blades, Mike, may I present—"

Blades' attention stopped at Lieutenant Ziska. He heard vaguely that she was the head quartermaster officer. But mainly she was tall and blond and blue-eyed, with a bewitching dimple when she smiled, and filled her gown the way a Cellini Venus doubtless filled its casting mold.

"Very pleased to meet you, Mr. Blades," she said as if she meant it. Maybe she did! He gulped for air.

"And Commander Leibknecht," Chung said across several light-years. "Commander Leibknecht. *Commander Leibknecht.*"

"Oh. Sure. 'Scuse." Blades dropped Lieutenant Ziska's hand in reluctant haste. "Hardjado, C'mander Leibfraumilch."

Somehow the introductions were gotten through. "I'm sorry we have to be so inhospitable," Chung said, "but you'll see how crowded we are. About all we can do is show you around, if you're interested."

"Of course you're interested," said Blades to Lieutenant Ziska. "I'll show you some gimmicks I thought up myself."

Chung scowled at him. "We'd best divide the party and proceed along alternate routes," he said, "We'll meet again in the mess for coffee, Lieutenant Ziska, would you like to—"

"Come with me? Certainly," Blades said.

Chung's glance became downright murderous. "I thought—" he began.

"Sure." Blades nodded vigorously. "You being the senior partner, you'll take the highest ranking of these gentlemen, and I'll be in Scotland before you. C'mon, let's get started. May I?" He offered the quartermistress his arm. She smiled and took it. He supposed that eight or ten of her fellows trailed them.

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The first disturbing note was sounded on the verandah.



They had glanced at the cavelike dormitories where most of the personnel lived; at the recreation dome topside which made the life tolerable; at kitchen, sick bay, and the other service facilities; at the hydroponic tanks and yeast vats which supplied much of the Station's food; at the tiny cabins scooped out for the top engineers and the married couples. Before leaving this end of the asteroid, Blades took his group to the verandah. It was a clear dome jutting from the surface, softly lighted, furnished as a primitive officers' lounge, open to a view of half the sky.

"Oh-h," murmured Ellen Ziska. Unconsciously she moved closer to Blades.

Young Lieutenant Commander Gilbertson gave her a somewhat jaundiced look. "You've seen deep space often enough before," he said.

"Through a port or a helmet." Her eyes glimmered enormous in the dusk. "Never like this."

The stars crowded close in their wintry myriads. The galactic belt glistened, diamond against infinite darkness. Vision toppled endlessly outward, toward the far mysterious shimmer of the Andromeda Nebula; silence was not a mere absence of noise, but a majestic presence, the seething of suns.

"What about the observation terrace at Leyburg?" Gilbertson challenged.

"That was different," Ellen Ziska said. "Everything was safe and civilized. This is like being on the edge of creation."

Blades could see why Goddard House had so long resisted the inclusion of female officers on ships of the line, despite political pressure at home and the Russian example abroad. He was glad they'd finally given in. Now if only he could build himself up as a dashing, romantic type ... But how long would the *Altair* stay? Her stopover seemed quite extended already, for a casual visit in the course of a routine patrol cruise. He'd have to work fast.

"Yes, we are pretty isolated," he said. "The Jupiter ships just unload their balloons, pick up the empties, and head right back for another cargo."

"I don't understand how you can found an industry here, when your raw materials only arrive at conjunction," Ellen said.

"Things will be different once we're in full operation," Blades assured her. "Then we'll be doing enough business to pay for a steady input, transshipped from whatever depot is nearest Jupiter at any given time."

"You've actually built this simply to process ... gas?" Gilbertson interposed. Blades didn't know whether he was being sarcastic or asking a genuine question. It was astonishing how ignorant Earthsiders, even space-traveling Earthsiders, often were about such matters.

"Jovian gas is rich stuff," he explained. "Chiefly hydrogen and helium, of course; but the scoopships separate out most of that during a pickup. The rest is ammonia, water, methane, a dozen important organics, including some of the damn ... doggonedest metallic complexes you ever heard of. We need them as the basis of a chemosynthetic industry, which we need for survival, which we need if we're to get the minerals that were the reason for colonizing the Belt in the first place." He waved his hand at the sky. "When we really get going, we'll attract settlement. This asteroid has companions, waiting for people to come and mine them. Homeships and orbital stations will be built. In ten years there'll be quite a little city clustered around the Sword."

"It's happened before," nodded tight-faced Commander Warburton of Gunnery Control.

"It's going to happen a lot oftener," Blades said enthusiastically. "The Belt's going to grow!" He aimed his words at Ellen. "This is the real frontier. The planets will never amount to much. It's actually harder to maintain human-type conditions on so big a mass, with a useless atmosphere around you, than on a lump in space like this. And the gravity wells are so deep. Even given nuclear power, the energy cost of really exploiting a planet is prohibitive. Besides which, the choice minerals are buried under kilometers of rock. On a metallic asteroid, you can find almost everything you want directly under your feet. No limit to what you can do."

"But your own energy expenditure—" Gilbertson objected.

"That's no problem." As if on cue, the worldlet's spin brought the sun into sight. Tiny but intolerably brilliant, it flooded the dome with harsh radiance. Blades lowered the blinds on that side. He pointed in the opposite direction, toward several sparks of equal brightness that had manifested themselves.



"Hundred-meter parabolic mirrors," he said. "Easy to make; you spray a thin metallic coat on a plastic backing. They're in orbit around us, each with a small geegee unit to control drift and keep it aimed directly at the sun. The focused radiation charges heavy-duty accumulators, which we then collect and use for our power source in all our mobile work."

"Do you mean you haven't any nuclear generator?" asked Warburton.

He seemed curiously intent about it. Blades wondered why, but nodded. "That's correct. We don't want one. Too dangerous for us. Nor is it necessary. Even at this distance from the sun, and allowing for assorted inefficiencies, a mirror supplies better than five hundred kilowatts, twenty-four hours a day, year after year, absolutely free."

"Hm-m-m. Yes." Warburton's lean head turned slowly about, to rake Blades with a look of calculation. "I understand that's the normal power system in Stations of this type. But we didn't know if it was used in your case, too."

*Why should you care?* Blades thought.

He shoved aside his faint unease and urged Ellen toward the dome railing. "Maybe we can spot your ship, Lieutenant, uh, Miss Ziska. Here's a telescope. Let me see, her orbit ought to run about so...."

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He hunted until the *Altair* swam into the viewfield. At this distance the spheroid looked like a tiny crescent moon, dully painted; but he could make out the sinister shapes of a rifle turret and a couple of missile launchers. "Have a look," he invited. Her hair tickled his nose, brushing past him. It had a delightful sunny odor.

"How small she seems," the girl said, with the same note of wonder as before. "And how huge when you're aboard."

Big, all right, Blades knew, and loaded to the hatches with nuclear hellfire. But not massive. A civilian spaceship carried meteor plating, but since that was about as useful as wet cardboard against modern weapons, warcraft sacrificed it for the sake of mobility. The self-sealing hull was thin magnesium, the outer shell periodically renewed as cosmic sand eroded it.

"I'm not surprised we orbited, instead of docking," Ellen remarked. "We'd have butted against your radar and bellied into your control tower."

"Well, actually, no," said Blades. "Even half finished, our dock's big enough to accommodate you, as you'll see today. Don't forget, we anticipate a lot of traffic in the future. I'm puzzled why you didn't accept our invitation to use it."

"Doctrine!" Warburton clipped.

The sun came past the blind and touched the officers' faces with incandescence. Did some look startled, one or two open their mouths as if to protest and then snap them shut again at a warning look? Blades' spine tingled. *I never heard of any such doctrine*, he thought, *least of all when a North American ship drops in on a North American Station.*

"Is ... er ... is there some international crisis brewing?" he inquired.

"Why, no." Ellen straightened from the telescope. "I'd say relations have seldom been as good as they are now. What makes you ask?"

"Well, the reason your captain didn't—"

"Never mind," Warburton said. "We'd better continue the tour, if you please."

Blades filed his misgivings for later reference. He might have fretted immediately, but Ellen Ziska's presence forbade that. A sort of Pauli exclusion principle. One can't have two spins simultaneously, can one? He gave her his arm again. "Let's go on to Central Control," he proposed. "That's right behind the people section."

"You know, I can't get over it," she told him softly. "This miracle you've wrought. I've never been more proud of being human."

"Is this your first long space trip?"

"Yes, I was stationed at Port Colorado before the new Administration reshuffled armed service assignments."

"They did? How come?"

"I don't know. Well, that is, during the election campaign the Social Justice Party did talk a lot about old-line officers who were too hidebound to carry out modern policies effectively. But it sounded rather silly to me."

Warburton compressed his lips. "I do not believe it is proper for service officers to discuss political issues publicly," he said like a machine gun.

Ellen flushed. "S-sorry, commander."

Blades felt a helpless anger on her account. He wasn't sure why. What was she to him? He'd probably never see her again. A hell of an attractive target, to be sure; and after so much celibacy he was highly vulnerable; but did she really matter?

He turned his back on Warburton and his eyes on her—a five thousand per cent improvement—and diverted her from her embarrassment by asking, "Are you from Colorado, then, Miss Ziska?"

"Oh, no. Toronto."

"How'd you happen to join the Navy, if I may make so bold?"

"Gosh, that's hard to say. But I guess mostly I felt so crowded at home. So, pigeonholed. The world seemed to be nothing but neat little pigeonholes."

"Uh-huh. Same here. I was also a square pigeon in a round hole." She laughed. "Luckily," he added, "Space is too big for compartments."

Her agreement lacked vigor. The Navy must have been a disappointment to her. But she couldn't very well say so in front of her shipmates.

Hm-m-m ... if she could be gotten away from them—"How long will you be here?" he inquired. His pulse thuttered.

"We haven't been told," she said.

"Some work must be done on the missile launchers," Warburton said. "That's best carried out here, where extra facilities are available if we need them. Not that I expect we will." He paused. "I hope we won't interfere with your own operations."

"Far from it." Blades beamed at Ellen. "Or, more accurately, this kind of interference I don't mind in the least."

She blushed and her eyelids fluttered. Not that she was a fluffhead, he realized. But to avoid incidents, Navy regulations enforced an inhuman correctness between personnel of opposite sexes. After weeks in the black, meeting a man who could pay a compliment without risking court-martial must be like a shot of adrenalin. Better and better!

"Are you sure?" Warburton persisted. "For instance, won't we be in the way

when the next ship comes from Jupiter?"

"She'll approach the opposite end of the asteroid," Blades said. "Won't stay long, either."

"How long?"

"One watch, so the crew can relax a bit among those of us who're off duty. It'd be a trifle longer if we didn't happen to have an empty bag at the moment. But never very long. Even running under thrust the whole distance, Jupe's a good ways off. They've no time to waste."

"When is the next ship due?"

"The *Pallas Castle* is expected in the second watch from now."

"Second watch. I see." Warburton stalked on with a brooding expression on his Puritan face.

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Blades might have speculated about that, but someone asked him why the Station depended on spin for weight. Why not put in an internal field generator, like a ship? Blades explained patiently that an Emmet large enough to produce uniform pull through a volume as big as the Sword was rather expensive. "Eventually, when we're a few megabucks ahead of the game—"

"Do you really expect to become rich?" Ellen asked. Her tone was awed. No Earthsider had that chance any more, except for the great corporations. "*Individually* rich?"

"We can't fail to. I tell you, this is a frontier like nothing since the Conquistadores. We could very easily have been wiped out in the first couple of years—financially or physically—by any of a thousand accidents. But now we're too far along for that. We've got it made, Jimmy and I."

"What will you do with your wealth?"

"Live like an old-time sultan," Blades grinned. Then, because it was true as well as because he wanted to shine in her eyes: "Mostly, though, we'll go on to new things. There's so much that needs to be done. Not simply more asteroid mines. We need farms; timber; parks; passenger and cargo liners; every sort of machine. I'd like to try getting at some of that water frozen in the Saturnian System. Altogether, I see no end to the jobs. It's no good our



depending on Earth for anything. Too expensive, too chancy. The Belt has to be made completely self-sufficient."

"With a nice rakeoff for Sword Enterprises," Gilbertson scoffed.

"Why, sure. Aren't we entitled to some return?"

"Yes. But not so out of proportion as the Belt companies seem to expect. They're only using natural resources that rightly belong to the people, and the accumulated skills and wealth of an entire society."

"Huh! The People didn't do anything with the Sword. Jimmy and I and our boys did. No Society was around here grubbing nickel-iron and riding out gravel storms; we were."

"Let's leave politics alone," Warburton snapped. But it was mostly Ellen's look of distress which shut Blades up.

To everybody's relief, they reached Central Control about then. It was a complex of domes and rooms, crammed with more equipment than Blades could put a name to. Computers were in Chung's line, not his. He wasn't able to answer all of Warburton's disconcertingly sharp questions.

But in a general way he could. Whirling through vacuum with a load of frail humans and intricate artifacts, the Sword must be at once machine, ecology, and unified organism. Everything had to mesh. A failure in the thermodynamic balance, a miscalculation in supply inventory, a few mirrors perturbed out of proper orbit, might spell Ragnarok. The chemical plant's purifications and syntheses were already a network too large for the human mind to grasp as a whole, and it was still growing. Even where men could have taken charge, automation was cheaper, more reliable, less risky of lives. The computer system housed in Central Control was not only the brain, but the nerves and heart of the Sword.

"Entirely cryotronic, eh?" Warburton commented. "That seems to be the usual practice at the Stations. Why?"

"The least expensive type for us," Blades answered. "There's no problem in maintaining liquid helium here."

Warburton's gaze was peculiarly intense. "Cryotronic systems are vulnerable to magnetic and radiation disturbances."