



**Tight Squeeze**  
Ing, Dean

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## **About Ing:**

Dean Ing (born 1931) is an American author, who usually writes in the science fiction and techno-thriller genres.

Dean Charles Ing was formerly a member of the United States Air Force, an aerospace engineer, and a university professor who holds a doctorate in communications theory. He has been a professional writer since 1977. Following the death of science fiction author Mack Reynolds in 1983, Ing was asked to finish several of Reynolds' uncompleted manuscripts. Ing and his wife reside in Oregon.

Much of Ing's fiction includes detailed, practical descriptions of techniques and methods which would be useful in an individual or group survival situation, including instructions for the manufacture of tools and other implements, the recovery of stuck vehicles and avoidance of disease and injury.

In addition to his fiction writing, Ing wrote nonfiction articles for the survivalist newsletter P.S. Letter, edited by Mel Tappan. Following in the footsteps of sci-fi novelist Pat Frank, Ing included a lengthy nonfiction appendix to his nuclear war survival novel Pulling Through. (Pat Frank authored both the nuclear war survival novel Alas, Babylon and the non-fiction book How To Survive the H Bomb And Why.)

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*He knew the theory of repairing the gizmo all right. He had that nicely taped. But there was the little matter of threading a wire through a too-small hole while under zero-g, and working in a spacesuit!*

MacNamara ambled across the loading ramp, savoring the dry, dusty air that smelled unmistakable of spaceship. He half-consciously separated the odors; the sweet, volatile scent of fuel, the sharp aroma of lingering exhaust gases from early morning test-firing, the delicate odor of silicon plastic which was being stowed as payload. He shielded his eyes against the sun, watching as men struggled with the last plastic girders to be strapped down, high above the dazzling ground of White Sands. The slender cargo doors stood open around *Valier's* girth, awaiting his own personal O.K.

This flight would be the fourth for Major Edward MacNamara; as he neared the great, squatting shock absorbers he could feel the tension begin to knot his stomach. He had, of course, been overwhelmed by the opportunity to participate in Operation Doughnut. The fact that he had been one of the best mechanical engineers in the Air Force never occurred to him at the time. He was a pilot, and a good one, but he had languished as C.O. of a maintenance squadron for nearly two years before he was given another crack at glory. Now, he wasn't at all sure he was happy with the transition. They needed master mechanics for Operation Doughnut, but he felt they should be left on the ground when the towering supply rockets lifted.

He stopped, leaning against scaffolding as he saw a familiar figure turn toward him. He cupped his hands before his face.

"Hey, douse that butt! Can't you ... oh, Mac!" The commanding voice trailed off in a chuckle. Better to clown his way through the inspection, MacNamara thought, than to let Ruiz notice his nervousness. The co-pilot, Ruiz, walked toward him, still smiling. "One of these days, boy, you gonna go too far. Thought you were a real, eighteen carat saboteur." He clapped MacNamara on the shoulder and gazed aloft. "Good day for it. No weather, no hangover, no nothing."

"Yeah. You know, Johnny, I've been thinking about a modification for our breathing oxy." He sniffed appreciatively.

"What's that?"

"Put a little dust in it, a few smells. That stuff we breathe is just too sanitary!"

"I know what you mean. I sure begin to crave this filthy, germ-filled air after a few hours out there." They both smiled at the thought, then turned to the business at hand.

"By the way, Johnny, what're you doing out so early? Didn't expect to see you cabbies before ten."

"I donno," the bronzed Ruiz replied. "Went to bed early, woke up at six and couldn't drop off again. And here I am. Carl ought to be along around nine-thirty. Thought I'd help you preflight, if you want me to."

"Sure." He wanted nothing of the sort, but had the tact not to say so.

Edward MacNamara was as familiar with the *Valier* as he was with the tip of his nose. He had been on the scene when Dan Burke test-hopped the third stage, had made improvements and re-routing jobs, and had memorized every serial number of every bearing that went into *Valier*. As Flight Engineer, he was supposed to.

With Johnny Ruiz helping a little and hindering a little, he finished his tour of the cargo sections and grinned his approval to a muscular loading technician. "They can button her up, sergeant. I couldn't do a better job myself." It was a compliment of the highest order, and they both knew it.

Riding the tiny lift down to ground level, MacNamara stopped them every ten feet or so to circle the catwalks. He noticed Ruiz's impatience about halfway down. "No hurry, Johnny. I don't want another *Wyld* on our hands." He knew he shouldn't have said it, but it slipped out anyway. Everyone tried to forget the *Wyld* disaster, particularly the flight personnel. The *Wyld*, one of the first ships to be built, had made only two orbits before being destroyed. Observers stated that a cargo hatch had somehow swung open when the *Wyld* was only a thousand feet in the air. At any rate, the pilot reported damage to one second-stage fin and tried to brake his way down. The *Wyld* settled beautifully, tilted, then fell headlong. The resultant explosion caused such destruction that, had there not been a number of men in orbit and waiting for supplies, the project might have been halted, "temporarily." It was generally conceded that a more thorough preflight could have prevented the *Wyld's* immolation.

Ruiz was noticeably quieter during the remainder of the inspection. The external check completed, MacNamara strapped a small flashlight to his wrist and began the internal inspection, jokingly called the autopsy.

An hour and over a hundred and fifty feet later, MacNamara wheezed as he swung over the bulkhead at the base of *Valier's* third and top stage. His aching limbs persuaded him to take a breather. After all, his complete inspection of the day before really made a final preflight unnecessary, and passing near the frigid oxygen tanks was a day's work in itself. He listened to the innumerable noises around and below him. The clicks and hums near him meant that Ruiz, having given up following him, was checking out the flight controls, with power on only in the top stage. From below came a vibrational rushing noise, nearly subsonic, which told him of the fueling operation. He thought of the electrical relays governing the fuel input and shuddered. He violently disliked the idea of having hot wires near fuel of any kind, and rocket fuel in particular.

MacNamara swept his light over his wrist watch. Fifteen after. Logan should be along soon, he thought, and hastened to finish checking the conduits, servos, pumps and hydraulic actuators below the cabin level. This done, he crawled up the final ladder to the cabin, or "dome."

"Well," cried a cheerful voice, "if it isn't our grimy Irishman."

MacNamara shook the sweat from his brow and muttered, "Irishman, is it? How about 'Logan'? That's a good Scandinavian name."

"How about Logan? He's great, as usual. Just look at me, Mac. What a specimen!" Logan, the inevitable optimist, bounced out of his acceleration couch and spread his arms wide as if to show the world what a superman he, Carl Logan, was. The gesture and its intimations made MacNamara smile. Logan wasn't much over five feet tall, and his flight suit made him look like a bald pussycat. His small physique covered a fantastic set of reflexes, however, and Logan's sense of humor was a quality of utmost importance. He hadn't an enemy in the world. His enemy was out of this world by definition; Logan wanted to conquer space and, so far, was doing just that.

"O.K., O.K. Laugh. Just remember this, Gargantua; I may not be tall, but I sure am skinny." MacNamara smiled again, nodding agreement. "Well, don't everybody talk at once. How is she, Mac?"

"With luck," answered MacNamara, "we might get ten feet off the turf." He paused for effect. "Seriously, Carl, she never looked better. You could take her up right now. Say, where's Johnny? I thought you'd just be checking in to the medics; looks like everybody's early today."

"He's probably over in some corner, making out his will. He was down below a while ago with a face a mile long."

*Probably, thought Mac, he's still thinking about the Wyld. Why did I have to bring that up?* Aloud, he said, "I ought to check the ground crew. Did you bring the forms?"

"Nope. Just my magnificent self. If anything had gone astray, they'd have told you."

"All the same, I think I'll go down and question the troops. Don't leave without me." He clambered out onto the catwalk, leaving the air lock open. The sun was riding higher every minute. In a little over an hour, he'd be a thousand miles away—vertically. The knot in his stomach began to form again. He wasn't scared, exactly; he kept telling himself "excited" was a nicer word.

The inspection forms signed, Mac held a short interrogation with the crew chief. The grizzled lieutenant, commissioned because of his long experience and responsibilities, gave *Valier* a clean bill of health. Each engine of the booster stage had been fired separately, before dawn. A cubic foot of mercury seemed to roll from Mac's shoulders as he saw Logan and Ruiz lounging at the bottom of the lift; there wasn't anything to worry about. He recalled feeling the tension before the other three flights, then chided himself. *Ya, ya, scared-y cat. Well, why not? It's a hel-luva risk every time you make a shot, in spite of all the propaganda. Hooey; if you didn't know everything's O.K., you wouldn't be getting ready to make the shot. Yeah, but you never can tell*—He stopped his inward battle and forced some spring into his step as he moved toward Logan and Ruiz.

"I've tried my best to abort this big bug, but I can't find anything amiss."

"That's Granny MacNamara for you," jibed Logan. "Always trying to find fault." He winked at Ruiz and rubbed his hands together. "Well—tennis, anyone?"

Mac knew without asking that Logan, for all his apparent indifference, had painstakingly gone over every phase of the flight, checking distribution, radar, final instructions from Operations, weather, *et al.* Ruiz, as usual, watched and took notes as Logan gathered data.

At minus fifteen minutes, the trio was in the dome, checking personal equipment, while outside, the scaffolding ponderously slid away, section by section.

There was little time for soliloquies of *to go, or not to go*; within the quarter-hour, Captain Ruiz and Majors MacNamara and Logan would

be in readiness for the final count-down. With the emergency bail-out equipment checked, the men busied themselves on another continuity test of the myriad circuits spread like a human neural system throughout the ship. All relays, servo systems and instrument leads were in perfect condition as expected, and the trio was settled comfortably in acceleration couches with minutes to spare.

Logan contacted Ground Control a few seconds after the minus-three minute signal, informing all and sundry that Gridley could fire when ready. MacNamara sighed, thinking that if Logan's humor wasn't exactly original, it was surely tenacious.

The ship was brought to dim half-life at minus one minute by Logan's agile fingers, and as the final countdown rasped in his headset, Mac felt his innards wrestle among themselves.

*Valier* bellowed her enthusiasm suddenly, lifting her eight thousand-odd tons from the ground almost instantly. Inside, her occupants grimaced helplessly as they watched various instruments guide tiny pointers across calibrated faces. Mac's throat mike threatened to crush his Adam's apple, weighing five times its usual few ounces. Of his senses, sound was the one that dominated him; an intolerable, continuous explosion from the motors racked his mind like tidal waves of formic acid. He forced himself to overcome the numbness which his brain cast up to defend itself. Then, as quickly as it had begun, *Valier* fell deafeningly silent; that meant Mach 1 was passed.

It was an eternity before stage one separated. The loss of the empty hulk was hardly felt as *Valier* streaked high over the Texas border. Ruiz, watching the radarscope, saw Lubbock slide into focus miles below. *Next stop, Fort Worth*, he thought. *I used to drive that in five hours*. The jagged line of the caprock told him they were well on their way to Fort Worth already.

The altimeter showed slightly over forty-two miles when stage two detached itself. Logan, in constant contact with White Sands, was informed that they were tracking perfectly as *Valier* arrowed over central Texas toward rendezvous at the doughnut. The exhausted lower stages were forgotten now; only the second stage was of any concern anyway. The radar boys tracked it all the way down, ready to detonate it high in the air if its huge 'chutes wafted it near any inhabited community.

The motors of stage three blasted for a carefully calculated few seconds, then cut out automatically. With the destitution of his weight, Mac felt his spirits soar also. They were almost in orbit, now, climbing at

a slight angle with a velocity sufficient to carry them around Earth forever, a streamlined, tiny satellite.

After the first few moments of disorientation, rocket crews found that a weightless condition gave them, ambiguously, a buoyant feeling. Only the doughnut crew had really adapted to this condition, living as they did without the effects of gravity for hours at a time every day. The temporary "housing" was rotated for comfort of the crews during rest periods, but while moving the plates and girders of the giant doughnut into place, they had no such luxuries. For these men, weightlessness became an integral part of their activities, but the rocket crews were subjected to this phenomenon only during the few hours needed to rendezvous, unload the cargo, and coast back after another initial period of acceleration.

Hence, Mac felt a strange elation when he tapped his fingers on the arm of his couch and saw his arm float upward, due to reaction from the tap.

Against all regulations, Logan unstrapped himself and motioned his comrades to do the same. This unorthodox seventh-inning stretch was prohibited because it left the pilot's arm-rest controls without an operator, hence could prove disastrous if, through some malfunction, the ship should veer off course.

The autopilot functioned perfectly, however, and Logan trusted it to the point of insouciance. The three men lounged in midair, grinning foolishly as they "swam" about the tiny cabin. No more satisfying stretch was ever enjoyed.

A few minutes of this was enough. Ruiz was the first to gingerly pull himself into his couch and his companions followed. Not a word had passed between them, since they were at all times in contact with monitor stations spaced across the world below. The first time they had enjoyed this irregular horseplay, on the second trip, Logan had made the mistake of saying, "Race you to the air lock!", and was hard put to explain those words. Nor could Logan switch to "intercom only," since a sudden radio silence would create anxiety below. Only their heavy breathing would indicate unusual activity to Earthside.

They were nearing the intercept point, a thousand miles above the Atlantic, when they realized their predicament.



"I'm in a fix, Carl," said Ruiz, meaning that he had tentatively fixed a position of intercept. "Correct our elevation; we're point-nine degrees high."

"Right-o. Correction in five seconds from my mark—mark!"

For slight corrections in the flight path, small steering motors were utilized. These motors were located near the rear lip of *Valier's* conical cargo section on retractable booms. Extension of the motors with no resultant air friction gave a longer pivot arm and consequently better efficiency. Mac pressed the "Aux. Steer" stud and immediately three amber lights winked on in their respective instrument consoles.

Carl Logan fired the twelve o'clock motor briefly—only it didn't fire. The change in momentum wouldn't be much in any case, but it was always perceptible by feel and by instrument. There was no change.

Logan tried the firing circuit again, and again. Still *Valier* streaked along, now miles above the intended point of intercept. By this time, the embryo space station was quite near, sailing along in the 'scope beneath them. It slowly moved toward the top of the 'scope, passing *Valier* in its slightly higher relative velocity.

"We've got troubles, Mac—find 'em!" Logan had finally lost the devil-may-care attitude, but that fact was small consolation to MacNamara.

"Keep your mitts off those firing studs, Carl," he growled, unstrapping himself quickly. The malfunction was definitely in the auxiliary motor setup, he thought. A common trouble? It wouldn't pay to find out. If the other motors fired, it would only throw them farther off-course. If worst came to worst, they could roll *Valier* over and use the six o'clock auxiliary; there was a small arc through which the motors could turn on their mounts. But the trouble was unknown, and they might end up rifling or pinwheeling if they didn't let bad enough alone.

During his mental trouble-shooting, Mac was busily worming his bulk into a balloonish-looking suit identical to those worn by the doughnut's construction crew. Ruiz gave him some aid, helping him thrust his arms past the spring-folded elbow joints. For some reason, the legs gave less trouble. Within a fumbling few moments, he was ready for work.

He glanced at Logan through his visor, feeling a vicious pleasure over the beads of sweat on Logan's forehead. Time he sweated a little, thought the mechanic.

A final check of his headset followed, after which Mac oozed into the Lilliputian air lock at the bottom, now rear, wall of the cabin. He nodded

to Ruiz, who secured the air lock, then adjusted his suit control to force a little pressure into his suit. Gradually the suit became livable. Then he cracked the other air-lock valve and allowed pressure to leak out around him.

His suit puffed out with soft popping noises and Mac heard the last vestige of air hiss out of the chamber. He found the hatchway too tight for comfort and had a moment of fear when his tool pack caught in the orifice, wedging him neatly. He could hear Logan and Ruiz through his earphones, explaining their plight to Ground Control. They wanted to know why in blue blazes *Valier* hadn't contacted the doughnut when it came within range, and Logan had no defense save preoccupation with his own plight. Belatedly, Ruiz made radio contact with the doughnut, which was still well within range. All this time, Mac busied himself with his inspection light, tracing the electrical leads to the small, turbine operated auxiliary motor fuel pumps.

"Mac?" Logan's voice startled him. "Can you brace yourself? I'm going to try to match velocities with the doughnut. Won't take over one 'g' for a few seconds."

"Wait a minute." He looked wildly about him. *Valier* hadn't been built with a view toward stowaways; and every cubic inch of space was crammed with something, except for the passageway with its ladder, leading up from the main motor section. Well, if it wasn't over a "g," he could hang on to the ladder. Suit weighs another fifty pounds, though. My weight plus fifty, he thought. "Give me a chance to get set," he said aloud. He hooked one bulbous leg over a ladder rung and braced the other against a lower rung, hugging the ladder with both arms. "Any time you say, but kill it if you hear me holler!"

"Then five seconds from my mark—mark!" Mac tightened his grip, and then sagged backward as the main motors fired. The vibrations shook him slightly but deeply, and he fought to keep his hold. He felt his back creak and pop with the sudden surge of weight. Then the motors shut off, and Mac skidded several feet up the ladder. No matter how fast a man's reactions were, they couldn't be applied quickly enough to keep him from starting an involuntary leap after bracing against a suddenly removed gravity load. "All over, Mac. You O.K.?"

"Guess so, but I feel like a ping-pong ball. How're we sittin'?"

"Just fine," Ruiz cut in. "Find anything?"

"Not yet." Mac started his search anew. Everything seemed in perfect order up to the turbine pumps. Then, he feared, the trouble was near the

little motors. That was tough, really tough. With the motors retracted it was next to impossible to get to them, past their hydraulically operated booms and actuators. Extended, he'd have to go outside. He cringed from the thought, although he knew that there was little to fear if he linked himself to the ship.

He peered along the beam of light, searching for some telltale discoloration in wiring, or a gleaming icy patch which would indicate a fuel leak. "Might be the firing plugs," he muttered.

"Let's hope not. Where are you, Mac? Maybe you better give us a blow-by-blow." Logan sounded worried.

"Good idea. Right now I'm at the nine o'clock actuator. Nothing so far." He looked around himself, forgetting for the moment how he was supposed to get past the equipment to the other auxiliary motor stations.

"Johnny," he said slowly, "I think you'd best break out the tapes. Auxiliary motor system; you'll find them under power plant." Months before, MacNamara had made a complete set of tape recordings of his own voice, recorded as he made a thorough-going rundown of every system and its components. This was a personal innovation which his fellow flight engineers considered folly. Extra weight, they scoffed. Undue complication. Mac nodded and went on with his impromptu speechmaking; a professional psychiatrist might have said, correctly, that Mac felt an unconscious need for supervision, a forgivable deficiency dating back to his cadet days. Mac simply claimed that the best of men could forget or omit when alone with a few million dollars' worth of Uncle's equipment. This way he could remind himself of each step to be taken ahead of time, in his own way.

The co-pilot rushed to comply. Mac, waiting, suddenly remembered how to get past his obstacle. Internal braces which helped keep the tanks rigidly in place on Earth were of little use while in "freeloading," or gravity-less, state. The braces were removable, and Mac had loosened a single wing-nut to let the brace swing loose when he heard Johnny Ruiz's answer.

"Ready with your tape, Mac. Where shall I start it?"

"Run it through 'til you get to a blank spot, then another, then stop it." He was certain he didn't really need the tape, but it was a maintenance aid and he was determined to use it.

He heard a click, then a hum, as the recorder was jacked into his headset circuit. Immediately, a familiar voice began a slow dissertation on

power leads from the dome, speeded up in the space of a second or two to a high-pitched alien gibberish, then to a faint scream. He began squirming around the turbine tanks, got past the first brace, and turned to attach it again. Of course it wasn't necessary, but—"PLAY IT SAFE" was embroidered on his brain by years of maintenance experience; back in his old maintenance squadron, he'd been called "the old lady" instead of "the old man," due to his insistence on precautions.

Ruiz slowed the tape suddenly, on cue, and Mac heard himself saying, "... Brace back in its slot and pin it. Be careful of those linkages on the turbine pumps. Now crawl around to the next brace and unpin it." Pause, scraping noises, and a muttered oath. "Pin sticks, but it won't without a load on it." It didn't.

He worked slower than he had on the ground, fumbling with the heavy gloves and cursing mightily. His voice rambled on, warning him of obstacles and reminding him about minor points that could give trouble. He listened carefully, discarding each suggestion.

Floating near the twelve o'clock auxiliary, Mac peered at each tubing connection, tugging and twisting. "Wait a minute," he said. His light flashed out at the motor, riding perched on its swivel, limned against cold, hard points of light that were the stars. His heart gave a bound. "I think I've found it!" His other voice droned on morbidly. "Turn that thing off a minute, Johnny. Listen; there's a lead to the twelve o'clock fuel valve solenoid that looks like ... yes, I'm sure of it. It's pulled away from a bracket and looks like it might be charred." Mac twisted around to view the wiring better.

"Can you fix it?"

"Oh, sure, if that's all there is wrong. But I'd rather do the work with the motors retracted. Tell you what; retract them about forty-five degrees when I give the word."

Mac judged the distance the booms would cover during semiretraction and half floated, half crawled out of the way. He found himself breathing heavily, despite the freeload conditions. His suit was simply too cumbersome. The thought came to him that he didn't even know how long he'd been out of the dome. His breathing oxygen gauge showed half empty, so he must have been on the job for around a half hour. He rationed his supply a bit, hoping he could finish the job without a refill.

"O.K., Johnny, you can run the tape again. And retract the motors while you're at it." He heard the tape start again on its course, watching the booms.

They leaped inward, then, and Mac felt a crushing blow across his back. He shook his head groggily and yelled.

He tried to scramble from his place between motor and turbine fuel lines without success; he was trapped like a wild animal by the heavy actuator which had swung past his head. He heard himself say, "And be sure to stay clear of the actuator. It swings through a ninety-degree arc when it's operated."

"Oh, shut up! I know it; I just judged it wrong." The tape moved on unperturbedly, reminding him to inspect the actuator bearings and extension rods.

"Mac," came Logan's voice, "you might try to hurry it. If you can't get it fixed in an hour or two, we'll have to try rolling *Valier* down to the doughnut. But it's up to you, fella. Take your time."

"Well, you might help me a bit by raising this hydraulic unit offa my shoulders. Lucky it didn't squash me." The actuator stayed where it was. "Johnny! Carl! Do you read me?" No answer. Obviously, the actuator had smashed his transmitter, but left the receiver section intact. Then all he could hope for would be a suspicion from one of the others that all was not well. If they asked him any questions and he failed to reply, they'd figure something was wrong. Well, he couldn't count on that.

He struggled with his vulcanized suit, trying to squeeze from under the actuator. If I'd had them retract it completely, he thought, I'd be a dead man. It was a tight squeeze, but he inched his way out of the trap by using every ounce of strength at his command. If his suit tore, he'd know it in a hurry.

Gasping for breath, Mac drew himself into a crouch and regarded the offending wire. His flashlight still operated, and he could see the heavy insulation which had been scraped away. No charring; then it must have been the extension rods that had scissored through the insulation. The wire hung together by a thread, the strands of metal severed completely. He groped for his tool kit, trying to ignore the voice in his headset.

"Well, that takes care of the actuators. Now for these dinky motors. The swivel mounts have to work without any lubricant, so look for indications of wear and—"

Mac cursed under his breath. He sounded so cocksure, so all-knowing. He felt like beating himself. His earlier self, who had blithely toured *Valier* trailing the microphone wires without any real premonition of trouble. It always happens to the other guy—Not this time, chum, he reminded himself.

The gloves were systematically foiling his attempts to withdraw the coil of wire at his side. The tool kit was the ultimate in maintenance work, compact and complete with extension handles for the cutters and wrenches. Everything was there, but practically impossible to use. His fingers finally closed over the wire; he jerked it out and with it the splice tool. The little pliers caromed from the brace above him and sailed out toward the motor, beyond the ship. He watched, horrified, as the tool slowly cartwheeled away into space.

"All right," he muttered, "scratch one splice tool. It was also my only pair of pliers, but I'll manage." He knew he could use the wire cutters in a pinch. "In a pinch," he repeated. "Oh, that's a hot one. That's about all that's happened this trip, so far. Pinch me, pinch the wiring—What a pinch!"

Holding the roll of wire tightly in one hand, he grasped the cutters and pulled them from the kit with utmost care. He unrolled a foot-long section of wire and clipped it off, laying his flashlight in the tool kit so that it would shine out in front of him. He managed to attach the tiny splice lugs by pinching them with the cutters, then moved cautiously to the wire which still drooped from the jumble of machinery. "Drooped" wasn't precisely the word; actually the wire had been bent into its position and stayed that way.

As the harried major reached for the brace on which the wire had been bracketed, his tool kit vomited flashlight, wrenches and screwdrivers, leaving him in total darkness. His cursing was regular, now, monotonous and uninspired. There was another pencil light in the kit, snapped tightly to the case, and Mac reached for the whole business. The spare light was a maintenance problem in itself. Question: How to retrieve a fountain pen sized object, when it's held by a small snap and the retriever is encumbered by three pairs of arctic mittens?

Mac saw his errant flashlight out of the corner of his eye, its beam fastened on a collapsed screw driver while both swam sluggishly toward the inspection ladder. He located the pencil light and jerked it loose, holding the short wire and cutters in his other hand.

This, Mac knew, was the crucial point. If he could splice the wire hanging in front of him, *Valier* would once more be in perfect shape. He would have welcomed an extra hand or two, as he straddled a brace and shoved the tiny flash between his headpiece and shoulder fabric. The wire should be stripped, he knew, but he hadn't the tools. They were scarcely ten feet from him, but could have rested atop the Kremlin for all the good they did him. He got most of the strands of one end of wire shoved into a splice lug, and called it good enough. It was like trying to thread a needle whose eye was deeper than it was wide, while in a diving suit, using the business end of a paintbrush to start the thread.

He withdrew one hand and searched the kit for friction tape. It might be mentioned that an insulating tape which would be adhesive at minus two hundred degrees centigrade yet keep its properties at plus one thousand, was the near culmination of chemical science. Silicon plastic research provided the adhesive, an inert gum which changed almost none through a fantastic range of temperatures and pressures. The tape Mac used to insure his connection had an asbestos base, with adhesive gum insinuated into the tape. He wrapped the wire tightly, then bound it to the brace. He noticed his visor fogging up and felt a faint, giddy sensation. Anoxemia! He let the tape drift as he reached for his regulator dial. *What a fool he was*, he thought, *to starve his lungs*. He turned the dial to emergency maximum and gulped precious liters of oxygen-helium mixture. The gauge showed a store of the gas which might possibly be enough to last him, if nothing else went wrong; perhaps ten minutes.

The pencil flash, mercifully, still rested in a fold of his shoulder joint fabric. The insulation tape floated near his waist; he grabbed it and stowed it between his knee and the brace, then reached once again for the wiring.

This time the splice went on without a hitch. He pinched the splice lug and taped the whole works feverishly. It was done; he had won. The trip back should take only a couple of minutes. Replacing the wire cutters in his kit, he held the pencil flash before him and started retracing his route.

He passed the twelve o'clock brace, pinned it in place again and saw one of his tools floating to the right of his head. He gathered it in and swept his tiny flash around in search of other jetsam from his tool kit. He collected a wrench and the skittish flashlight, started toward the last brace between him and the ladder, and felt his legs go limp. He wasn't particularly alarmed about it; his arms and vision failed him too, but his brain hadn't enough incoming oxygen to care much, one way or the

other. The few remaining feet seemed to lengthen into a sewerlike passageway, then vanished as did all else as his perceptions died.

MacNamara was not the sort to wonder about heaven or hell when he first awoke. He saw a faintly rounded ceiling, a soft yellow tint accentuating its featurelessness. "How the devil—", he began. His voice failed him.

"Hi, Mac." Logan's beaming face loomed over him. "You rugged character, you. Cold as a pickle an hour ago, and already you're askin' silly questions." He held up his hand as Mac started to speak. "I hear you thinkin'. 'How the devil did I get here, and where is here?' In reverse order, this is the most comfortable berth in the doughnut's facilities, and you got here courtesy of one Johnny Ruiz. Myself, I wouldn't have taken the trouble."

Mac grinned back at his pilot and cleared his throat. "Well, where is he? I wanta shake his hand, or give him half my kingdom, or something."

"You know Johnny; the shy type. He'll be along after a while. You know, I think he kinda likes you; when you quit transmitting out there, Johnny was like a cat on a hot skillet. Finally decided to go back and have a look for himself, but I told him you probably had a hot game of solitaire going. Anyway, he went back and found you asleep on the job, and lost a good ten pounds getting your fat carcass through the air lock." That was a job that must have taxed both Ruiz and Logan, but Mac held his silence. "And that was about the size of it. *Valier's* parked outside with some of the boys, good as ever. Come on, we'll sop up some coffee."

Mac swung himself up to a sitting position and realized dizzily that he was mother-naked. His ribs felt pulverized. "You guys sure mauled me up," he said accusingly.

"Unavoidable, my dear grease-monkey. You needed a little artificial respiration; I never was too good at that."

"Well, whoever did the job rates a prize of some sort," Mac answered, "but my ribs tell me he had more enthusiasm than practice."

Logan smiled his old familiar smile, relieved to find his engineer in joking spirits. "The credit again goes to Johnny. But," he added, "try not to be too hard on him. Try giving artificial respiration to a big lump like yourself sometime, without any gravity."



Mac digested this tidbit as he pulled on a fresh pair of coveralls. "O.K.," he said, standing on the foamex "floor." "How did he do it?"

"Strapped you into your couch face down and locked his legs around it. I didn't dare apply any g's. Come on," he finished, "you've managed to upset every timetable in the project. Johnny's shaking like a leaf, or was when I left him. A bulb of coffee will do us both a world of good."

"I'm sold," Mac grunted, zipping up a flight boot. "But there's something I'd like to do, first chance I get."

"Which is?"

"Which is jettison every last strip of tape I have in *Valier*. I tell you, Logan," he went on as they entered the recreation bar, "you'll never know how degrading it is to hear useless, insipid information offered to you when you're in a tight spot, knowing full well the voice is your own!"

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