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by Tom Godwin

Five Short Stories

Mother of Invention

Editor's note: This story, as with the previous one, is a celebration of tenacity and perseverance in the face of disaster. The enemy here, however, is simply nature. But, whether facing death because of intelligent hostility or accidental misadventure, Godwin's heroes in this story are cut from the same cloth as all of his "survivors."

The Star Scout's normal-space speed was far below that of light when she dropped out of hyperspace beyond the rim of the Thousand Suns. Two last stars lay beneath her; a binary composed of a small yellow sun and a larger blue-white sun. Observations were taken and instruments noted the tiny, shining mote that swung four hundred million miles out from the blue-white sun. Other instruments determined the new destination and the Star Scout vanished again into hyperspace.

When she dropped once more into normal space the shining mote had become a planet that blazed like a great, radiant gem against the black void beyond. The planet grew as the hours went by, filling the viewscreen as Blake braked for the descent into its atmosphere. Land masses and small oceans were faintly discernible through the fiery, opalescent haze that blanketed the planet. The image swelled and enlarged, the surplus running off the four sides of the screen, until the western side of a continent and a small portion of ocean filled the screen.

The four men in the deceleration chairs behind Blake, and held as helplessly as he by the force, watched the image on the viewscreen and the multiple hands of the air analyzer. The hands began to move as the first thin sample of air was scooped into the analyzer, then settled into position a few minutes later.

"Breathable." The gray-haired Taylor spoke with difficulty against the deceleration.

"Less carbon dioxide than New Earth," Wilfred commented. Young, short and stocky, he was far less affected by the deceleration than the elderly ex-dean. "I can't understand why the spectroscope showed such an incredibly high percentage of carbon. How could any planet's crust contain such an excess of carbon?"

"The carbon must be in the crust, rather than in the atmosphere," Taylor said. "Either that or the old spectroscope is erroneous. We know the air analyzer is a new and reliable instrument, but these old Warden spectroscopes, like men, develop eccentricities with age. If we had a new"

"Hang on," Blake interrupted, his eyes on the instruments before him. "I'm going to have to brake a little harder."

The increased deceleration settled them all deeper in their chairs and no one spoke while the section of continent on the viewscreen became a hazy desert or plain through which ran dim wrinkles. The surplus slid away and the wrinkle in the center of the screen became a range of mountains. Blake watched the translucent white dot in the center of the screen that represented their point of landing and saw it would be along the eastern side of the mountain range. It would do as well as any other unknown section of the unknown world and he let the ship hold its course.

The green line of a tree-bordered creek appeared, hugging the mountain's foothills, with the white dot between the creek and the mountain. The area covered by the dot became a small delta of alluvium from one of the canyons with a few trees scattered across it. The delta swept up to meet them, slowing as it came, with the white dot in a flat clearing that seemed to be of some curiously glittering

sand.

The Star Scout halted ten feet above the ground with a staccato of blasts from the drive tubes that sent the bright sand swirling in heavy clouds, then it dropped, cushioned by the drive, to touch the ground with a slight lurch. The wide tail fins settled in the sand and Blake cut off the drive.

"And here we are," he remarked.

* * *

The others were already hurrying to read the data recorded on the instruments; Taylor and Wilfred, Lenson and Cooke. Blake watched them, interested by their reactions. None of them had ever been off New Earth before, let alone on a world hitherto unknown to exist, and they were as excited as children with a new toy. Taylor, steeped in the academic environment all his life, was the most enthusiastic of them all. He had once told Blake: "With all due respect to ivied walls of stone, they can become a prison. I want to see a few things before I grow any older; deep space and distant suns and strange worlds--" Lenson, a tall, lean man with the easy grace of a cat, stood a full head taller than the pink young Wilfred; a pleasant sort of a man with a slow smile and a tolerant understanding of the foibles of others.

There was the indefinable mark of the intellectual upon all three of them and among them the paradox, Cooke, stood out-- like a black sheep among white. He was, Blake knew, fully as intelligent as any of the others; he, like the others, had been selected by Taylor because his intelligence and knowledge were considerably greater than the intelligence and knowledge of the average graduate. But he did not look the part. His dark, hard-jawed face was not that of an intellectual. Neither were his broken nose and glittering black eyes. Blake watched him, thinking: He doesn't belong with the others; he belongs

on Old Earth three hundred years ago, on the deck of a pirate ship with a bloody cutlass in his hand.

But, for all his appearance of being a man of sanguine physical violence, Cooke seemed to be content to do no more than laugh at what his black eyes found in others and in life, itself.

"Earth-type in every important respect," Taylor was saying. "Gravity, temperature, air. No indications of any harmful bacteria--we've been incredibly fortunate."

"We had about one chance out of several thousand of this being an Earth-type planet, didn't we, Red?" Lenson asked, looking over at Blake.

Blake nodded his red head. "Quite a few thousand, since this isn't a class-G sun. As Taylor said, we were incredibly lucky to hit the jackpot the very first try."

"Then let's get out and look our find over," Cooke said, shifting restlessly. "Let's get out and romp across the sand and breathe some air we haven't breathed a million times already."

Taylor looked questioningly at Blake and Blake nodded. "I don't see any reason why we shouldn't," he said. He checked the readings on the control board instruments from long habit and saw the red line that indicated the drive room's temperature. It was climbing rapidly, and he turned a knob marked: DRIVE ROOM--OUTSIDE VENTILATION. This would open the ports in the drive room and start the blower to rushing its great volumes of cool outside air through the overheated room. "Drive room's mighty hot from the decelerating," he said as he followed the others to the elevator. "If we had had a little more money le--t over, we could have had full-size coolers installed."

"We were lucky to scrape up enough money to buy what we have," Wilfred said, dropping the elevator to the cabin level.

"Our worries are over, now," Cooke declared. "Anyone who owns an Earth-type world isn't just rich--he's lord of all he surveys."

* * *

They stopped at the cabin level only long enough to procure a sidearm each. "You can't tell what you may run into on an alien planet," Blake said as he stepped back into the elevator. "No signs of any intelligent, civilized life, but there might be animals. Sometimes animals don't wait for you to run into them--they take a deep breath and do their level best to run into you and tramp you into the ground."

They dropped to the lower air lock and went through it. The boarding ramp was dropped to the ground and they descended into the cloud of dust that still swirled about the ship.

"The blower is filling the drive room with this dusty air," Blake said, sneezing. "I didn't realize it was so thick. But the drive room door is shut and none of this dust can get into the rest of the ship."

They walked out away from the ship and the dust and stood in the glittering sand, looking about--them curiously. The mouth of the canyon was visible above them, with the iridescent haze hiding the higher peaks. The trees were almost like those of the desert regions of New Earth, scattered very thinly across the mountain's foot, and viciously thorned bushes grew among them. Some of them, Blake noticed, were in bloom with exotically beautiful blossoms, ranging from delicate pink to vivid scarlet.

"Pretty," Cooke commented. "A little dangerous to try to pick one, I'd say; those thorns are Nature's ice picks."

"We ought to name it . . . this world," Taylor said. "What shall we call it?"

"Aurora," Lenson said instantly. "She was the goddess of the dawn in ancient mythology. She was beautiful and she wore a veil. This world is beautiful and it wears a veil--that shining haze."

"A good name," Taylor agreed. He looked towa--d the creek a few hundred feet away, the creek itself hidden by the green trees that grew thickly along its banks. "Let's get a sample of the water for analysis."

They walked toward the creek, each of them unconsciously glancing back at the towering bulk of the ship as they went their way. Men always did that, Blake had noticed, when they set down on an alien planet. They would go out from their ship with their eyes alertly watching for danger ahead, and they never failed to look back at the ship as though to reassure themselves that its ponderous mass was still there. It was a n--rmal thing to do; when a man set down on an alien world he was on his own and his only link with other humans and other worlds was his ship. It had brought him there; it, alone, could take him back. A man walked out from his ship knowing that it would be waiting for him to return, like a great, patient dog; waiting and ready to hurl itself into space at his--command. Sometimes an alien planet held death for the bipeds who ventured to explore it, such as the spider-monsters of Nelson 14, and the ship would be the sword of vengeance for those who lived to fight their way back to it. The ship would avenge the fallen with fury in the thunder of its voice and annihilation in its flaming breath, leaving only drifting ashes where once had been alien things that had made the mistake of killing a human.

Without their ship, men on a hostile, alien world would be near-

helpless; with their ship, they were invincible conquerors.

"Flowers, even," Cooke exclaimed as they neared the trees by the creek. "Red, blue, yellow, purple; green trees and good air--what more could we offer colonists?"

* * *

Blake had been examining the shining sand with increasing curiosity and he stopped to inspect a bright crystal half the size of his hand. It was not quartz. He scratched at it with his knife point but could not make any impression. The same would have been true of quartz, but the crystal did not have the appearance of quartz. It was alive with internal fires and the crystal system, such as he could tell from its rounded, worn form, was distinctly not that of quartz. A little way farther on he found one that glowed a deep ruby red. He paused to pick it up, then hurried on at an excited exclamation from Lenson, who had gone with the --thers to the edge of the creek. "Look at this!"

"This" was a crystal at the very edge of the creek's roiling, opalescent waters, the same deep ruby red as the one he had in his hand but a foot in diameter. Near it were other, smaller, crystals of blue-white, yellow, red, blue, green, with the blue-white ones predominating. The sand, gravel and rocks of the creek bed seemed to be composed exclusively of the bright mineral.

"Did you ever see so many quartz crystals in your life?" Lenson was asking the others. "Or so many different colors? Look at this one--it looks like a ruby."

Blake failed to hear the reply of the others, a thought he had had upon first examining the bright sand suddenly losing the fantastic quality which had caused him to dismiss it. It all checked, the lack of any mineral other than the one in the creek bed, the "erroneous"

spectroscope that had shown the world to possess an impossible percentage of carbon, the high index of refraction possessed by the mineral.

He could find out very quickly.

"Let me have your diamond ring," he said to Wilfred.

Wilfred pulled it off his finger and handed it to him with a look of questioning surprise. Blake scratched the diamond in the ring across the red crystal he still held in his hand. It left no impression and he repeated the performance on several other crystals scattered on the ground near him. On none of them could he produce the faintest scratch with the diamond in Wilfred's ring, no matter how heavily he bore down.

"The spectroscope was right," he said, wondering if the others would find it as hard to believe as he did. "I don't see how it could be, but it is."

"Is what?"--Wilfred asked.

"Carbon--all these crystals are diamonds!"

They stared at him, incredulous. "They couldn't be!" Wilfred objected. Lenson asked, "How can you tell for certain? Are you sure?"

"The diamond in this ring won't scratch them," he replied. "The only mineral a diamond can't scratch is another diamond."

"Then they really are diamonds?" Taylor said, dropping to his knees to pick up a deep, bright-blue one that lay beside the ruby-red stone that Lenson had found. "But the variations in color--are they all diamonds?"

"All those that are any size," Blake told him. "The softer silica would soon be reduced to a powder by the grinding action of the diamonds in the creek bed. Anything of any appreciable size that shines is pretty certain to be a diamond."

"Hmm-m-m!" Cooke grunted, and shook his head in amazement. "I'm delighted to hear it, but it's still hard to believe. Talk about luck--here we sink our last cent to make this one trip, with the odds all in favor of our finding nothing, and the first thing we do is hit a double jackpot; not only an Earth-type--almost--planet but also an unlimited fortune in diamonds. Such luck is incredible."

"It is incredible," Blake agreed. "It jus-- isn't the sort of thing that--"

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His voice was drowned by a thunderous bellow from the ship. He whirled toward it, as did the others, wild disbelief on the faces of all of them. The same thought flashed in their minds at the same instant; they were all five there--there was no one in the ship!

The ship shot into view, leaping high enough in the air that they could see it above the trees that surrounded them. A gout of blue-white flame was lashing from a hole torn in its stern, then the flame vanished and the ship poised motionlessly for a moment; a great, metal monster halted in mid-flight and pinned against the background of hazy sky. Then the nose dropped, the tail went up, and it fell. It fell in a horizontal position, its impact hidden from them by the trees but the sound of it loud and terrible to hear; the muffled scream of rending metal shrill above the ground-jarring thud of the impact.

Blake ran past the others, toward the ship. He was vaguely aware of someone yelling, "What--" then he broke through the concealing trees and stopped, appalled by the sight that met his eyes.

Spaceships were made to withstand the pull of gravity --hen at rest on their tail fins; to withstand the thrust of the drive which, whether accelerating or decelerating, was only the equivalent of gravitic attraction from the stern. They were constructed to possess great longitudinal strength, with no great cross-sectional strength needed. They were not constructed to withstand a horizontal drop.

The Star Scout was broken in two.

Taylor stopped beside him, white and shaken.

"What . . . what was it?" someone asked. "What happe--ed . . . how could it happen?"

"The converter blew up," Blake said, his lips feelings oddly stiff and numb. "It was my fault--I should have had brains enough to think about it before it was too late."

"What do you mean?" Cooke demanded.

"I left the blower going, driving cool air into the drive room. The air was loaded with the dust we stirred up when we landed, and that dust was --ainly diamond dust."

"Oh!" Cooke's eyes were fixed on Blake. "So that was it. Diamond dust--carbon--catalyst!"

"But how?" Taylor asked. "How could the --iamon-- dust have gotten into the converter?"

"I don't know." Blake shook his head. "Maybe the inspection crew forgot to put the cover back on the fuel in--et--maybe the clamps broke while we were en route. Anyway, it happened--somehow enough of the dust got into the fuel inlet to put the amount of catalyst

past a critical percentage and the converter exploded. I shouldn't have started the blower until I --irst went in and made a check of the fuel inlet."

"Why?" Cooke asked. "Did you ever hear of anything like this ever happening before?"

"No."

"Then why should you have checked? You had no reason to think the fuel inlet might be open, and neither did you discover this was diamond dust until about a minute before the explosion. You couldn't have done anything about it in only one minute."

"I suppose not," Blake agreed, "but I can't help feeling I should have been more careful. But that's all water under the bridge; here we are among our diamonds with no way of getting home--not for a long time at best, I'm afraid. So let's see just how long that may be, just how great the damage to the ship is."

"From here," Cooke observed as they walked toward the ship, "the situation looks hopeless. Our ship looks exactly like an overripe watermelon that's had a bad fall. It's not only broken in two, with a few girders holding the broken halves together, it's also sort of flattened now, rather than round like it once was."

"And gaping open at every seam," Wilfred added.

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They passed the stern of the ship, where the rim of the ragged hole still glowed redly with half-molten metal, and Blake motioned toward the deep furrow blasted in the ground where the ship had stood. "The blast was directional," he said. "If it hadn't been, it would have

destroyed the lower half of the ship."

"It didn't make such a big hole in the stern," Cooke remarked with a return of his characte--istic optimism. We could patch it."

"Of course," he added bleakly, "we'd only have half a ship to drive, and no converter to power our drive--if we have a drive left."

They entered the ship by the gap where it had broken apart, climbing through the bent and broken steel. The elevator shaft, now a horizontal passageway, was accessible by climbing up the ragge--, tor-- sheet metal and girders. Blake made a suggestion to the older Taylor before they climbed up into the elevator shaft.

"I'd like to look at the drive room and the repair shop. So, suppose Cooke and I do that while you and t--e others see what the damage is in the forward half of the ship?"--

"Anything you say, Red," Taylor answered. "I have an idea we'll find nothing but wreckage either way."

"First, I'll get some lights for you," Blake said.

He climbed up into the elevator shaft and made his way to the supply level of the ship. The door to the room he entered opened with considerable difficulty and the scene inside, as revealed by his pocket lighter, was utter confusion and chaos. He found the locker that held the emergency lights under a mass of miscellaneous supplies, equipment and broken containers and took five lights from it.

He went back to the gap in the ship and tossed three of the lights to the others. They began to climb up into their own section of the ship and Cooke scrambled up to where he stood.

"How did it--look where you were?" Cooke asked.

"Just a little untidy," he answered, leading the way to the drive room.

They forced the now-horizontal drive room door open and a gush of warm air struck them. The drive room was fairly well lighted by the hole the converter's explosion had produced and they appraised the damage, not caring to drop the ten feet to the new floor.

"That shapeless gob over there by the hole--that's all that remains of our converter," Blake said. "The explosion was directional, all right, and the converter was working at minimum output--if it had been up to as much as quarter output, it couldn't have remained directional and at a quarter output the entire ship would have vanished in a blaze of glory."

He flashed his light down into the shadowy corners of the room and found what he sought. "Look--see that square metal thing?" he asked. "That's the fuel inlet cover. Sure enough, it wasn't in place--they must have forgotten to tighten down the clamps."

"And we paid them to do that?" Cooke asked bitterly, flashing his own--light over the cover.

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Blake moved his light slowly over the drive assembly. Originally equipped with the old Harding atomic drive, the transformation to the hyperspace drive had--for financial reasons--been confined to the installation of the space-shift units and the installation of the nuclear converter to supply the enormous energy required by the hyperspace units to wrench the ship from normal space into hyperspace. Although a modern drive would have been preferred, their limited capital had forced them to compromise by leaving the atomic rocket drive intact

and modifying its fuel chambers to accept the tailor-made fuel prepared for it by the converter.

"How does it look?" Cooke asked. "I can't see where the blast did any damage to it. Am I right?"

"I think you are--the directional blast missed it and its construction was rugged enough that the fall didn't affect it. This is more than I had dared hope for--we can alter those fuel chambers back to the way they were and we have a rocket drive again.

"If," he added, "we can find uranium."

"And then what? Won't we be a little bit old and feeble by the time we get home through normal space, thirty thousand years from now?"

"Well, I don't know of any outpost of civilization we can reach in less than two hundred years," Blake said, "which would be too far to do us any good. However, to get anywhere in hyperspace, we still have to have a drive, you know. We have to have a drive to get off this planet so we can get in hyperspace in the first place."

"Once we fix up our drive and get away from here--how do we get into hyperspace with no converter to power the space-shift units?" Cooke asked.

"That is the question, and I d--n't know the answer. But I was taking first things first. If we can find uranium--and we surely can--we can soon solve every problem but that one.--

He passed his light over the squat generator that had served to supply the ship with electrical power before the installation of the converter. It hung by two of its mounting bolts from the vertical floor, but it seemed undamaged.

"There's our powe----if we had some way to store it," he said. "If we could devise a perfect condenser of unlimited capa--ity, we could accumulate enough power to give the space-shift units the wallop that would jump us into hyperspace. Anyway, whatever we do, we're going to need that generator. We're going to need electrical power for operating the lathe--if it isn't smashed beyond repair--welding, perhaps even for refining metals with some sort of an--electric furnace."

"How do we power the generator?" Cooke asked.

"That can be done," Blake said. "Provided we have a lathe to build what we want."

He turned away from the drive room without further explanation and Cooke followed him to the repair shop. As with all other rooms in the ship's new position, the door was horizontal, but the repair shop was smaller than the drive room and it was no more than a six-foot drop to the new floor. Blake saw, with a sense of vast relief, that the lathe was still solidly bolted to the vertical floor. The other equipment was a jumbled mass on --he floor and they poked into it curiously for a few minutes.

"Not much in the way of broken stuff here," Cooke said. "Steel tool--seem to stand up pretty good when a ship does a belly-whopper. I hope the transmitter fared as well."

"That's something we're all hoping, but you're the first one to speak out loud about it," Blake said. "I don't see how it could have survived--a transmitter is big, heavy and fragile."

"Neither do I. I suppose that's why no one dared even say he hoped it wouldn't be smashed."

"Let's see about our truck," Blake said. "If the transmitter is smashed beyond repair, we'll have to try to find uranium and we'll stand little chance of prospecting these ranges on foot."

Again, luck had been with them. The little truck was unharmed but for a cru--pled fender. Some of its bright red enamel had been knocked off by the fall of the diamond drill rods but the diamond drill, itself, seemed untouched.

"And that covers the important things in our end of th-- ship," Blake sa--d. "Let's see what luck the others had."

* * *

Wilfred was just descending from the broken elevator shaft, carrying a load of food and cooking utensils. "We'll camp out for a while, it looks like," he said. "With the new floors knee deep in wreckage and the doors six feet to ten feet up on the walls, living--in the ship would be just a little inconvenient."

"We'll have to cut a passageway along the bottom side of the ship's hull," Blake said. "We can dodge the girders and just cut through the old flooring."

"How did it look up there?" Cooke asked. "What about the transmitter?"

"We won't send any SOS," --ilfred said flatly. "The transmi--ter tubes are smashed to fragments."

"I was afraid they would be," Blake said. "Do the others need help with their loads?"

"They could use some help, all right," Wilfred said, climbing down

with his own.

They crossed the gap and met Lenson and Taylor in the elevator shaft, each with a burden of sleeping bags and various other things needed for a comfortable night outside. Blake and Cooke relieved them of part of their loads and the four of them carried their burdens to the clean, sandy spot near one of the trees where Wilfred had set up their "kitchen."

Blake dropped his load and spoke to Taylor. "So the transmitter is ruined?" he asked.

"The final power stage is," Taylor replied. "The drive stage took the fall pretty well and we could couple that in, except--"

"Except what?"

"In normal space that would give us a range of around a billion miles--no more than halfway to our sun's yellow companion. Useless."

"Oh--so we don't even get the chance to use our little driver stage in h--perspace?"

"The space-shift signal transformers are complete wreckage. Any signal we sent, even if we had our final power stage intact, would take three lifetimes to reach the nearest outpost through normal space. We could send a signal through hyperspace, with our drive stage, for sixty thousand billion miles--but the hyperspace transformers are broken and smashed and we could never, with our resources, replace them. So that brings up the question--what now?"

"Our space-shift units in the drive room seem to be undamaged and it wouldn't be difficult to change the rocket fuel chambers again so that we can lift the ship with an uranium fuel," Blake answered. "And

we do have to lift the ship to make the jump into hyperspace under any circumstances. If uranium is to be found, we'll only have the one big problem to solve--and it's really big--how to produce enough power to activate the space-shift units. If necessity forced us to, I have an idea we might even make another converter. Of course, our success would be an uncertain thing and it would require years of work as well as luck, but it would be better than just giving up--at least, we would be trying."

He glanced toward the nearby canyon mouth. "Uranium is the vital essential, no matter what we do. I'm going to take a little walk while Wilfred fixes something to eat--I want to see what the formations look like, and if they offer any encouragement."

"And then we'll talk over our plans after we eat," Taylor said. "A man takes a more optimistic view of his circumstances when is stomach is full, anyway."

* * *

Blake walked until he came to the first bank of rock and gravel, then examined what he found with considerable muttering. The formations represented by the rocks that had washed down out of the canyon were almost like those of any Earth-type planet, with one incredible exception; every rock, whether near-granite, near-rhyolite, near-andesite, whether high or low in silica content, contained almost the same high percentage of diamond crystal inclusions. In the coarse-grained rocks, such as the near-granites, the diamond crystals were as large as the e--d of his little finger, while the fine-grained near-rhyolites contained the diamonds as minute inclusions. Bu--, whether the rock was fine- or coarse-grained, the diamond was present in a--l in approximately the same high percentage.

He had just come upon his first specimen of Aurora's animal life

when he heard the distant call of Wilfred announcing dinner. He ignored the call for a moment, walking closer to the small, brown-furred animal. It was about the size of a squirrel, with a round, dark-eyed face and a fat little stomach that it scratched in an absent ma--ner as it solemnly watched his approach. It let him reach within six inches of it before it scampered a few feet farther away from him, to--stop and resume its solemn staring.

Wilfred called again and he turned back toward camp, the little animal staring after him as he went. Apparently they would have no ferocious carnivora to contend with on Aurora--the little animal had been without fear of him, or virtually so. It had not behaved in the manner of an animal accustomed to the law of "Run--or be eaten!"

* * *

Dishes were scrubbed with a generous amount of sand and a small amount of water after the meal was over, then Taylor began the discussion of their circumstances.

"Our simplest solution would have been to send out an SOS," he said. "We could have contacted a ship easily enough on --he emergency band--possibly one no more than a day or so from here."

"A day or so by hyperspace--two hundred years or more in normal space," Cooke commented. "A man doesn't really realize how great --alactic distances are until he gets stuck thirty thousand light-years from home, does he?"

Lenson sighed and gave the broken ship a dark look. "I'm already beginning to acquire an unpleasant comprehension of the true magnitude of galactic distances."

"It seems to me that we have only two alternatives," Blake said. "We

have to get either our ship or an SOS into hyperspace. We have the power to send the SOS through hyperspace, but the space-shift transformer that would send our signal into hyperspace is broken. The space-shift units that would send our ship into hyperspace are undamaged--but we haven't the power they would have to have. Which do we want to try to do--build a nuclear converter and take our ship back, or make a space-shift transformer for the transmission of an SOS?"

"We would not only have to make the transformer that would send our signal into hyperspace, we'd also have to replace the broken power stage of the transmitter," Taylor said. "The driver stage, even in hyperspace, would have a range so limited that it wouldn't reach the nearest outpost. Unless a ship happened to wander within its range, its signals would never be picked up. And Space being the size it is, that might not occur within our lifetimes."

"You think it would be useless to attempt to duplicate the space-shift signal transformer and the transmitter tubes?" Wilfred asked.

"I'm convinced that their duplication is beyond us," Taylor said. "They require special alloys as well as rare gases. They require delicate precision assembly; in fact, the machines that assemble them would require years of labor to build."

"We already have the means of putting our ship into hyperspace," Blake said. "All we--need is the power. It seems to me we could more easily figure out a method of accumulating that power than we could build precision electro--ic equipment. After all, all we need is a tremendous store of energy to power our jump into hyperspace--a lot of energy for a short period. The drop back into normal space doesn't require but a fraction of that power."

"If there is no hope of sending an SOS, then we haven't any choice

but to do that, have we?" Wilfred asked.

"I think we can safely say that the hope of sending an SOS is nil," Taylor said.

None of the others voiced any disagreement and Blake said:

"If we can find uranium, we won't have much trouble changing the fuel chambers to suit the fuel. We probably will have to spend more time making the ship--or the stern half of it--air-tight again than anything else. At any rate, the whole thing is hopeless unless we do rig up an atomic drive. We have to lift our ship into space to slip it into hyperspace and there's no use conjecturing on how we're going to take the second step until we know we can take the first step."

No one spoke for a few seconds, then Taylor said, "I suppose we agree on that, then. Now, the important thing is; can we find the uranium?" He looked at--Blake. "How about it--what do you think of the possibilities?"

"I couldn't say," Blake answered. "I haven't seen any of this country, yet. I saw no evidence of metallic ores in the rocks washed down out of that canyon, but we could hardly expect to discover uranium that easily."

"What did you find?" Cooke asked.

"These rock formations are similar to Earth-type formations, and the silica content is about normal--if a person discounts the diamond present. The diamond is present in all formations, whether high or low in silica, usually as small to minute crystals. The larger crystals we saw must have come from pegmatitic formations."

"Which are--?" Cooke asked.

"Extremely coarse-grained bodies of rock. Minerals in pegmatitic form as unusually large crystals. On Charon we found a perfect quartz crystal that weighed a thousand pounds in a pegmatitic formation. Cummings--an old white-haired fellow who had been born on Old Earth--said that crystals much larger than that had been found on Old Earth in the past.

"There's something else about pegmatites," he added. "Pitchblende is sometimes found in pegmatitic formations. So, it may possibly be that the uranium ore we find--if we find any--will be in the same formation that these diamond boulders come from."

"Another thing--" Taylor said, thoughtfully. "We'll ha--e to have cadmium. Cadmium and uranium--if we can find the two ores and refine them, we can alter the drive."

"Which will take how long--just as a wild guess?" Lenson asked.

Taylor smiled. "That's like asking how high is up. But, just as an optimistic guess, I'd say from one to two years."

Wilfred nodded his head in agreement. "I'd say that was about right--not less than one and not more than two years. We're lucky in that we have a lathe and other tools to work with, a truck to use for prospecting and all the mining equipment--we need to mine the ore after we find it."

"The first thing will be to fix up a place to live," Taylor said, pulling up his pants leg to rub a skinned and bruised knee. "Climbing in and out of those rooms as we did this afternoon is hard work, and painful."

"Red suggested cutting a passageway along the bottom of the hull--using the bottom of the hull as the floor," Wilfred said. "That shouldn't take long. We can rearrange everything to accommodate the new

floor and we'll cert--inly have to take the lathe down off the wall and set it up again on the floor."

* * *

Their first Aurorian sunset stopped all talk of future operations a few minutes later. The sun was invisible behind some distant range, its last rays throwing lances of ruby, emerald and gold across the scintillating rainbow field that was the western sky. The lances shifted as they watched, widening and quivering with the sp--endor of their ever-changing colors until they rippled across the sky like the banners of some celestial fairyland.

Lenson was the first to speak, after the colors began to fade. "I never saw anything like that," he said, almost awe --n his voice.

"Nor I," Cooke said, sprawling back against his sleeping bag. "That looks exactly the way my mother used to tell me heaven would look--before she decided I'd never go there, anyway."

"Probably caused --y several different layers of air currents, traveling at--different speeds and carrying varying amounts of dust and water vapor," Wilfred offered.

"Huh!" Cooke snorted. "Do you always have to be so pragmatic and practical?"

"Oh, it was impressive, I'll admit, but there was a simple, every--ay reason for--its beauty--the one I suggested, likely. Beautiful sunsets on Earth-type planets are due to wate-- vapor and impurities in the atmosphere."

"Then, so long as we're--stuck here, let's be grateful that our atmosphere does contain these beautiful-sunset producing

impurities--" Lenson said.

* * *

The afterglow faded from the sky and the Thousand Suns revealed themselves; a field of bright points of light shining through the haze with sufficient brilliance to throw dim shadows along the ground.

"We'll have to make observations," Taylor remarked. "I'll start making daily observations of our sun and its companion. We know the days here are about twenty-four hours long, but we don't know whether it's spring or summer--or possibly this world has no seasonal inclination of the poles."

"I think it's spring," Blake said. "The higher peaks we saw through the haze were covered with snow. Of course, that's not very conclusive evidence."

"Let's hope it's spring," Taylor said. "We know that o--r year is about six Earth-years in length and, with luck, we may be able to get away from here before winter comes."

There was a little more talk of their plans; then, one by one, they spread out their sleeping bags and crawled in. Blake, the last to retire, sat for a while watching the golden field the Thousand Suns made of the haze, reaching from the western horizon halfway to the zenith. To the east the sky was dead black, with no star to relieve it. There were none in that direction; not for a long, long way. Aurora had recently passed the farthest point from the Thousand Suns in her orbit; a straight line would pass from her to her sun, to close by the blue-white sun's yellow companion, then on into the Thousand Suns.

Blake remarked, just before he went to sleep, "You'll see what utter darkness is before morning--after the Thousand Suns go down and

before the sun comes up."

* * *

It required fifteen days to get the ship even partly in c--ndition for living. There was the passage to be cut, doors to be fitted to keep out the fine dust stirred up by the afternoon winds, the ship's water tank to be equipped with sediment filters, the tables and chairs to be unbolted from their incongruous positions on what had become the walls, the truck to be lowered out of the ship--an endless number of things to be done.

Blake and Cooke left on the morni--g of the sixteenth day, leaving the other three to continue the work on and in the ship. They watched Blake and Cooke depart with a certain wistfulness and Cooke remarked, as they ground away through the sand, "I think all would have liked to go with us. They'll have nothing but hard work while we're out enjoying the fresh air and new scenery."

"You may change your mind about 'enjoying' it," Blake said. "Walking can be hard work when you do it all day."

"What's this truck for?" Cooke wanted to know.

"To haul our stuff. We won't use it any more than we have to--we can make new shoes by hand but we can't make a new truck."

"Do you think the diamond dust will be that bad?"

"I ho--e we find diamond dust and sand are the exceptions rather than the rule, but all evidence shows the diamond to be present everywhere. If so, we'll have to use the truck as little as possible--if we find the ores we want, then the truck will be indispensable for hauling them to the ship. Whatever we have to have for refining the ores will

have to be at the ship--or we'll have to haul a good deal of material and equipment to the ore. Either way, we'll have to have this truck, so we'd better take care of it."

"I can see your point," Cooke agreed, "but I doubt that we'll wear it out very fast. After all, this thing was made to use in country where there was silica sand, and diamond is less than fifty per cent harder than silica."

"If you were correct in that surmise, I wouldn't be worried," Blake said.

"What do you mean--'if'?" Cooke demanded. "Quartz has a hardness of seven and diamond has a hardness of ten. That's less than fifty per cent harder, isn't it?"

Blake sighed. "The true and unpleasant facts are these: Diamond is said to have a hardness of ten because it's the only thing harder--than corundum's nine. A mineralogist named Woodell, a long time ago and back on Old Earth, determined the true hardness of diamond in comparison with quartz's seven and corundum's nine. The actual hardness of diamond ranges from a fraction over thirty-six to a fraction over forty-two."

"Oh." Cooke was thoughtfully silent for a while. "Then we can count on this diamond sand and dust being six times harder than the sand and dust this truck was made to resis--."

"Six times harder, and also tougher."

* * *

They lurched across a small gulch and onto a silty flat, winding to avoid the thorn bushes that were scattered across it. The morning air was still and the dust they raised followed them in a dense cloud,

coating their faces and clothing an iridescent gray, gritting harshly wherever two parts of metal moved together, such as the driving controls. They had traveled an hour, enclosed in the cloud of destructive dust, when Blake said, "I wonder--"

"You wonder what?" Cooke asked, his black eyes made blacker by the gray dust that covered his face.

"I wonder if this diamond dust hasn't got u-- behind an eight-ball--a big, shiny eight-ball named Aurora."

They worked their way along the southern foot of the mountain, toward the high plateau to the east where the creek might have its headwaters. They prospected the canyons one by one, both by carrying back samples of the bedrock gravels to the truck, to pan for--particles of the heavy uranium and cadmium ores they sought, and by use of the Geiger counters they each carried. Cooke ran the gauntlet from his first feeling of carefr--e adventure to a condition of sore, aching legs and blistered hands. Their picks and shovels wore away with amazing rapidity, even from digging in the comparatively loose gravels of the canyon beds, and they found nothing.

They reached the eastern end of the range, a high, bleak plateau where the creek had its headwaters and where the nights were chilly with the breezes from the slowly melting snowbanks. There was nothing there but barren flow rocks and the inevitable diamond so th--y turned and worked their way back down the northern side of the range. Cooke's soft muscles hardened and his habitual optimism returned, undaunted by the lack of heavy-metal concentrates in the samples they panned or by the Geiger counters that remained silent but for the intermittent clicking of the natural background count.

Twice they found veins of soft iron oxide and once they found a narrow vein of low-grade copper ore but the mountain seemed

devoid of any uranium or of any lead-zinc ore that might contain the cadmium they needed.

Blake cared for the little truck with painstaking attention, doing everything possible to keep the diamond dust out of its moving parts. But no way could be devised to keep the dust out of such moving parts as the brake drums, the ball and socket of the front-wheel drive, the control-lever linkage, the winch they were forced to use so many times, and many other moving parts. The air filter caused him more worry than anything else. He knew a certain amount of the fine dust was getting past the filter and into the motor, and there was nothing he could do about it. It was a good filter, made to protect an engine against silica dust; any silica dust fine enough to get past the filter would be too fine to--cause any damage before it was reduced to an impalpable powder. But the diamond dust it admitted was six times harder than silica, as well as tougher--the diamond dust would refuse to be reduc--d to a harmless, impalpable powder.

They rounded the west end of the range early on the thirtieth day and saw the green line of the creek a mile away. The truck labored noisily as Blake turned it up a gentle grade toward the mouth of a narrow canyon and he shifted into a lower gear.

"It's a good thing we're only five miles from camp," Cooke said. "You're about three gears lower than you would be if this truck was in the same condition it was in when we left camp thirty days ago."

"I'm afraid this will be its last trip--I've tried to baby it along and keep the dust out of it, but you just can't enclose a machine in a dust-proof wrapper."

* * *

They left the truck on the smooth alluvial fan just outside the canyon's

narrow portal and began the by now repetitious process of prospecting the canyon. It was late in the afternoon when they found their first cadmium; a thin gray seam of metallic sulfide in a rock washed down from higher on the canyon's wall.

"The gray sulfide is lead and zinc," Blake said. "Those little yellowish-orange spots in it are cadmium sulfide."

Cooke shook his head. "The percentage of cadmium is so slight--and the lead and zinc is only a thin seam."

"It might have wider portions where it's in place," Blake said, looking up the steeply sloping canyon's side. "It shouldn't be hard to find."

They located it in place an hour later, halfway up the canyon's side, but it was only a short, narrow seam. Blake tried unsuccessfully to dig into it with his prospector's pick, the point of which had long since been worn to a blunt stub. Cooke, pounding vainly at the tight-grained formation beside him, stopped to light a cigarette and wipe the sweat from his face.

"We have acids and glycerin," he said. "If we only had a few holes drilled in this rock, we could fill them with nitroglycerine."

"There's a chance in a thousand that it might get wider at a greater depth," Blake said, ceasing his own futile pounding. "But how do we drill holes in it?"

"The diamond drill--" Cooke began, then his voice trailed off.

"Exactly," Blake said, seeing what was suddenly in Cooke's mind. "How do we drill diamond-bearing rock with a diamond drill?"

"How did we intend to drill holes for mining when we started out thirty

days ago? I--won't argue about the diamond drill--I can't see how it could drill through diamond-bearing rock--but why didn't we think of all that before?"

"We didn't know for sure that all formations carried the same high percentage of diamond," Blake pointed out. "We hoped such wouldn't be the case, remember?"

"What a world to live on!" Cooke sighed. "Everything we try to do is foiled by diamonds. How can a superabundance of just one element manage to cause so much grief?"

"Well"--Blake shook his empty canteen and glanced to the west where the sun had disappeared behind th-- canyon wall--"we can't do any more here, now, so we might as well get on back to the truck and have something to eat before dark."

Cooke led the way to the bed of the canyon, his blithe spirits returned sufficiently for him to be whistling by the time they reached it. They were halfway to the canyon's portal when it became suddenly darker, as though a heavy cloud had covered the sun. It grew darker, although Blake's watch said the sun was not quite ready to set, and when they were almost to the portal's cliffs, where the canyon suddenly opened out upon the desert, he became aware of a low roar above the crunching of his footsteps i-- the diamond sand. It came from the desert beyond the portal; a sound like a distant waterfall.

Cooke, two hundred feet ahead of him, was still whistling cheerily and had obviously not heard it. Blake increased his pace and was almost up with him when Cooke stepped beyond the cliffs that still hid the desert from Blake.

Cooke stopped, then, a look of amazement on his face, staring in the

direction of their truck and the desert beyond. Then he wheeled to shout back at Blake, "What is it?"

Blake was beside him a few seconds later and he saw the source of the sound he had heard.

It was a mile away; a great, high black wall rushing toward them, its towering crest lost in the atmospheric haze. It was racing toward them at perhaps fifty miles an hour, roaring with a deep, sustained roar and the sheer front of it seething and boiling.

"What--?" Cooke beg--n, but Blake cut him off with a terse, "Come on!" He ran toward the truck, estimating the distance they must cover before the black wall reached them. The truck was not far--but the wall was traveling at least fifty miles an hour.

"Is it--" Cooke began again, then gave up as a gust of wind whipped san-- in his mouth and devoted his full attention to keeping up--with the fleet Blake.

They reached the truck with the black wall looming almost upon them and jumped inside, slamming the doors. "Sandstorm," Blake said, as Cooke started to ask again. A harder gust of wind lashed at the truck, stinging their faces with sand. "Close your window," Blake said as he cranked up his own. "Those baby zephyrs are the advance guard. I think we're in for a real one."

* * *

The black wall struck a moment later with a thunderous roaring and screaming, smashing at t--e little truck with savage blows and enveloping them in darkness. Sand and gravel slashed against the windows with a sharp, dry hiss and, above the roar of the wind, Blake could hear a violent thumping as the wind found an empty and

unfastened water can in the bed of the truck and slammed it back and forth. The pounding ceased abruptly and Blake had a mental vision of their water can going in kangaroo leaps across the mountainside.

" . . . long do you think?" Cooke shouted through the darkness.

"What?" Blake asked, shouting, himself, to be heard above the howl and roar of the storm.

"How long do you think this will last?"

"Don't know. Sometimes a sandstorm will last an hour, sometimes ten hours."

He felt inside the utility box under the dash and found a flashlight. Its beam had the appearance of a three-dimensional cone in the dust-filled air of the cab.

"How did that get in here so quick?" Cooke demanded.

"It comes in every little crack and crevice," Blake answered, flashing the light through the windshield. The light revealed the dust and sand flowing past them with incredible speed. There were bright gleams in the torrent of air and sand as larger pieces of diamond reflected the light for a microsecond and bits of dead vegetation were being carried along.

Blake shut off the light and made himself as comfortable as possible in his half of the small cab. "You might as well try to make your mind a contented blank for an inde--inite number of hours," he advised.

Cooke followed his advice, grumbling at the lack of leg room. He was asleep within fifteen minutes; a fact Blake confirmed by a quick fla--h

of the light. Blake sighed enviously and composed himself for the hours --f futile thinking and worrying that would be his own lot until sleep came. There was, in the genial Cooke's philosophy, a blithe unconcern for "Unborn Tomorrow and Dead Yesterday." But, while he envied Cooke for his carefree attitude, he wondered if it would be of sufficient stability to survive the eventual recognition of a not-so-remote possibility--that all their efforts to leave their shining prison might prove to be futile.

The wind was shaking the truck and roaring with undiminished fury when he finally went to sleep, still worrying about the diamond dust that was being driven into every tiny crack about the truck wherever two parts of metal moved against each other. Silica, over a period of time, would ruin machinery. This was diamond, not silica; this had a hardness of forty-two, not seven--

He awoke at dawn, stiff and cramped, with Cooke's snoring loud in the silence that had replaced the storm. He jabbed an ungentle elbow into Cooke's ribs. "Wake up--the storm is over."

"Huh?" Cooke blinked and straightened with a moan. "My leg's been asleep so long it--Hey! What happened to our windows?"

"We now have frosted glass all around," Blake said, rolling down the opaque window on his own side. "Diamond sand is really tough on glass."

He stepped out of the truck into the calm morning air and looked at the damage. Cooke came around from the other side and stared open-mouthed at the bright, gleaming metal side of the truck where, before, there had been a thick coat of hard red enamel.

"It looks like we need a new paint job," he said at last. "And we'll have to knock a hole in the windshield to see how to drive to camp."

Blake lifted the motor cover and ran a finger through the blanket of diamond dust that covered every part of the motor. It was heaped on more thickly where there had been grease or oil to hold it.

"What do we do about that?" Cooke asked.

"Nothing. If we should try to wipe it off, it would cause it to work in deeper. We can only let it stay and hope the grease will keep most of it from getting any deeper into the moving parts."

"I wonder how they made out at camp?" Cooke asked as Blake lowered the motor cover.

"I was wondering the same thing. We'd better let the canyons to be prospected between here and camp wait for the time being. They're all near enough to camp that we can walk out to look at them, anyway."

They removed the opaque windshield and got under way, the steering wheel and gearshift lever grating harshly. They saw something shining metallically a half mile farther on and it proved to be their errant water can; lodged beneath a thorn bush, stripped of its enamel and polished to a high luster--

* * *

Taylor and Lenson were waiting outside the ship when they drove up. The question and hope was plain to be seen on Lenson's face but there seemed an almost imperceptible anxiety tingeing the questioning look on Taylor's face.

Blake shut off the motor and climbed out. "Nothing," he said. "Not a sign of uranium."

Lenson's face reflected a natural disappointment but Taylor seemed to have something on his mind more serious--than simple disappointment. "Then there's no hope of finding uranium in this range?" he asked.

"There was no indication whatever that there is any such thing anyw--ere along the range," Blake answered. He looked toward the ship. "Where's Wilfred?"

"He left early to --pend the day prospecting. We have the ship pretty well fixed up inside and there hasn't been much to do the past few days. Now--how about other minerals? Did you find anything at all?"

"A thin seam of lead-zinc ore that carries a small percentage of cadmium. But I don't think the diamond drill could ever drill through the rock it's in."

Lenson grinned sourly. "I know it can't," he said. "We no longer have a diamond drill. While you were gone I got to looking around and found a formation that carried zircons. Since we'll need zirconium, we all three agreed it would be a good idea to set up the drill, put down some holes and blast out some zirconium-bearing ore. We set the drill up yesterday morning. By mid-afternoon we had worn out six of our eight diamond bits and were down four inches. I came back to the ship late in the afternoon to get some more oil for the drill's motor--we've been using it and it was getting worn--and the storm hit before I could get back to the drill. I had left the drill running; its progress was so slow that it didn't need any attention. I got lost in the darkness of the storm and finally had to hole up behind an outcropping until morning. Then I saw where I was and went on to the drill. I found the sand blowing into it while it was running had ruined it. Not only the motor, but the gears of the drill, itself."

"It was no loss, I'm afraid," Blake said. "All the formations Cooke and

I saw carried the same high percentage of diamond."

"But suppose we should find some ore--how do we drill it without a drill?" Cooke asked. "That is, suppose we find some ore that isn't so hard and filled with diamonds as to make drilling impossible."

"In that case, we'd probably find we could fix up the old drill after all," Blake said. He turned to Lenson. "You said you had been using the drill's motor for something else--what was that?"

"Water pump," Lenson said. "It seemed like a foolish waste of effort and time to carry water to the ship's tanks in buckets so we took the little high-speed water pump that we had brought along for the very purpose of filling the ship's tanks, took the motor off the drill--we weren't using the drill then--stripped enough tubing out of the ship's air circulating system to reach to the creek and set up our pump." He grinned again. "It lasted long enough to fill one tank, then the bearings went out. We fixed it and a week later, when we used it again, the bearings went out again. Finally, the last time we used it, the impellers were half abraded away as well as the bearings and shafting cut out."

"And the motor was wearing out, too?"

Lenson nodded. "The bank was dry and sandy where we set the pump and breezes were always stirring up little clouds of dust. The motor was in pretty bad shape before it soaked through our thick skulls that the dust was pure diamond dust and not at all as harmless as it looked."

"So now you're back to carrying water in buckets?" Cooke observed. "And Red and I are going to be back to walking. This is a cruel world to anyone accustomed to mechanized assistance."

"About finding uranium--" Taylor said, the aura of worry still about him. "What would you suggest next?"

"We can hike across the desert to the nearest range an-- see what we can find," Blake said. "It wi--l be slow, doing it all on foot, but we have a boundless supply of two things on this world--time and diamonds."

"No." Taylor shook his head. "Time is the very thing we don't have. I haven't said anything to Len or Wilfred about it yet. I wanted to wait until all five of us were here to talk over what we--"

"Hello." Wilfred's hail interrupted Taylor and he came hurrying toward them. "I saw your truck pull in so I turned around and came back. Any luck?"

"None," Blake said. "It just wasn't there to be found."

"What was this about not having time, and somethi--g you hadn't told us yet?" Lenson asked Taylor, his eyes on Taylor's face.

The others turned their attention to Taylor as he spoke.

"I've been making daily observations with the transit, as you know," he said. "I've observed the apparent motion of our sun, the yellow sun, and the Thousand Suns cluster. I found that this i-- spring--whether late or early I don't know--but that's of no importance. I thought, at first, the yellow sun was swinging in its orbit around our blue-white sun. You can see the yellow sun--like a very bright yellow star--in advance of our own sun each morning. According to my observations, the yellow--sun is making an apparent adva--ce of approximately one degree every five days in front of our own sun. This happens to be what its apparent advance should be as we swing out in our orbit, so I became suspicious and made other

observations. I discovered we are approaching the Thousand Suns at a speed of one hundred miles a second."

"That's what you didn't tell us?" Lenson asked. "I don't understand--we'll either be long since gone from here, or long since dust, before our wandering binary reaches the nearest star of the Thousand Suns."

"I said the apparent advance of the yellow sun is accounted for by our own orbital movement," Taylor said. "There is no orbital movement of the yellow sun observable. This isn't a binary--the yellow sun is a member of the Thousand Suns."

"You mean--" Blake began.

"In approximately seven and a half months the two suns will collide."

"And our position in our orbit at that time?"

"We'll g-- into the yellow sun the radius of our orbit--four hundred million miles--in advance of the collision."

* * *

Tall Lenson barely changed expression and the surprise on Wilfred's face hardened into quick stubbornness, as though he had already decided he would refuse to acc--pt such a fate. Cooke leaned one hip on the fender of the truck, his black eyes flickering over the others as he analyzed their reactions. But for once, Blake felt, Cooke was finding nothing to amuse him.

"You'r-- sure your observations were accurate--that there's no hope we might have already swung past the yellow sun by then?" Blake asked.

"I've made my observations as accurate as possible, and checked for errors. Our sun is moving toward the yellow sun at a hundred miles a second and a distance of slightly more than one and a half billion miles now separates them. Our observation of these suns couldn't indicate that they were not a binary during the brief period we dropped into normal space--especially with our limited means for taking observations from the ship. It was natural for us to assume that two suns so close together were a bin--ry. Only very precise observation-- during the short time we observed them could have revealed the truth and we had neither the proper instruments for such observations nor any r--ason to think such observatio--s were necessary."

"It wouldn't have changed our circumstances," Blake pointed out. "With seven or eight months of grace, we would have landed to see what the planet had to offer in the way of mineral wealth, anyway."

"That's true," Taylor said. "The result would have been the same. So here we are and we have, according to my most optimistic calculations, six months to fit our ship with a drive and get away from here as fast as we can."

"Six months?" Coo--e demanded. "You said it would be seven and a half."

"We'll have to be a long way from here by then--Aurora carries an exceptionally high percentage of carbon and you know what happens when any nuclear conversion process absorbs an excess of carbon."

"Oh-oh--nova!"

"And they reach out a long, long way--" Taylor said.

"The hyperspace units--the power for them--" --ilfred began.

"If we ever find a way to power them, it will have to be en route in space," Taylor said. "Or that's the safest course of action for us, I would say."

"I agree," Blake said. "If we c--n find ore pure enough, w-- might possibly be able to take off from here within six months. It would have to be exceptionally pure ore--it's improbable that we can find such ore but we don't know that it's impossible. The first thing we want to do is to start getting as far away from here as possible, and as fast as possible. Given pure enough ores, we can do that, I think."

"You said 'improbable but not impossible,' " Taylor said. "Just how improbable do you think it is?"

--If the other ranges are similar to this one, our chances are very poor. We can try; we can go out as two different parties to save time. Cooke has had experience in the hills, now, and could go with one of you to the range north of us while I went with the other to the range south of us. If there's nothing in the adjoining ranges, I would say there is no use looking farther."

"Why?" Lenson asked.

"Time. Time and distance. Any ore we --ound would have to be carried to the ship on our backs--the truck is worn out."

"Then let's start today," Cooke suggested. "Since our time is so short, we shouldn't waste an hour of it. Let's start right now."

Blake glanced at the early morning sun. "A good idea. We certainly won't have any days to waste. We'll take along about sixty days' supply of concentrated food tablets, plus spare shoe soles and, above all, canteens."

"The concentrated food tablets for two months--" Wilfred began doubtfully, but was interrupted.

"For roughage we can eat thorn berries," Blake told him. "Cooke and I tried them. They're tasteless, but they're completely harmless." He turned to Cooke. "You can take Wilfred across to the north range, and Lenson is better built for the hike across the desert to the south range than Wilfred is--it will be about three days on the water in our canteens to reach that south range."

"And if the south range has no creeks or springs in it--how will you come back across the desert without water?" Taylor asked.

"We won't," Blake said simply.

Cooke slid off the fender and looked at the truck, shaking his head. "If only we could have ha-- this truck to us----"

* * *

Blake and Lenson reached the south range on the third day of tramping across the glittering diamond sand of the desert, their throats burned and dry and their canteens empty. They found water; a seepage of sickening alkali water, but it was water. They found a creek of sweet water the next day as they started up the range's northern fr--nt, tumbling down out of the mountains and disappearing beneath the sand at the mountain's foot. It was a high, rugged range and they found other creeks and springs as they went. They reached its eastern end on the thirtieth day and turned down its southern face. They came to the last canyon on its southwest slope on the fiftieth day and knew they had failed. They had found an occasional vein of iron oxide and, once, a fairly soft vein of copper ore, but there had been no indications of uranium.

On the fifty-fourth day they reached the ship again, gaunt and ragged, with Blake's red whiskers flaming riotously and Lenson's brown beard giving him the look of a benign but destitute young religious father.

As though by prearranged plan, Cooke and Wilfred returned at the same time; Wilfred's pink face burned red by the sun, his blond whiskers sprouting r--ggedly, while Cooke wore a bushy black beard that, together with his glittering black eyes, gave him an even greater appearance of piratical fierceness.

Taylor was carrying two buckets of water to the ship when the four of them appeared. He set the buckets down and waited.

"No luck," Blake said as they drew near him.

"Same here," Cooke said. "That range we went to was as barren as this one."

"I've bee-- continuing my observations," Taylor said. "Everything checks with my first ones, and now we're sixty days nearer the end. We'll have to start accomplishing something pretty quick."

"I know it," Cooke said, scratching at his black beard, the tattered sleeve of his shirt flapping in the wind. "But before we start any long talks on what we shal-- do next, let's have something to eat besides thorn berries and pills. And take a bath--I'm so covered with diamond dust that, in the nude, I'd glitter --ike a precious jewel."

Taylor picked up his buckets of water. "There's enough water for all of you to take showers," he said, "so long as you don't waste it. I've been busy with other things or I would have had more water carried-- to the ship."

"We'll have to have a pump," Blake said, relieving Taylor of one of the buckets. "There's no use spending time carrying water in buckets."

Lenson looked at him sharply to see if he were joking.

"Did you take a look at what that diamond silt in the water did to our pump?" he asked. "It ruined it, and it was made of the hardest alloy steel."

"We can't use any kind of pump that has moving parts of steel," Blake said. "No steel alloy ever made can resist diamond. And, since steel is our hardest man-made material, it's obvious we can't use any kind of a pump that has metal moving parts. So, we'll not try to fight the diamond with harder steel alloys--if we had them--we'll just overcome the abrasion problem by making a pump that has no moving parts."

"Oh?" Cooke stared at him. "A brilliant solution but for one thing--how do we move water without the mover doing any moving?"

"We let the water use its own velocity to force part of itself higher than the source--we make a hydraulic ram."

"Hm-m-m!" Taylor grunted in self-disgust. "I could have had one made long ago, in my spare time, but I never thought of such a simple solution. I kept thinking of some way to combat the diamond's abrasion, rather than how to avoid it completely."

"But a hydraulic ram does have moving parts," Wilfred objected. "The valves. Without the valves alternately opening and closing, the ram wouldn't work. How do you keep valves in it?"

"The valves are so simple--one floating valve and one flap valve--that all we have to do is spray the valves and valve seats with plastic rubber. The diamond can't harm rubber--the rubber is so soft that the

diamond's hardness has no effect on it."

* * *

A shower and a full meal did much to improve their spirits, and a shave did even more to improve their appearance. Taylor brought up the subject of their next course of action and asked Blake for his opinion of the desirability of further prospecting for uranium. Blake answered the question with a suggestion.

"We'll have to rest a week, even though our time is so short," he said. "This time we'll have two deserts to cross, as well as the mountain between, and our past sixty-day diet of food tablets and thorn berries has all four of us in pretty weak condition. While we rest up I suggest we try to think of some alternative to the atomic drive. I won't argue if the rest of you want to continue looking for uranium, but I'm afraid it's hopeless. Without a truck or any other form of transportation, it would do no us good to find the ore. We're not going to be given the time to carry ore for great distances on our backs, across deserts and mountains. So, suppose for the next six days everyone makes a try at thinking up some plan other than the atomic drive?"

"The more plans, the better," Taylor said. "If we had a large enough selection to choose from, we could pick out one that would be sure-fire. But I can't see how we can find a quicker and simpler way to lift this ship than the atomic drive."

The others felt the same way; they seemed quite willing to consider any alternate plan but with no conception of any such plans. Blake made no mention of the idea in his own mind, certain that it held their only hope for survival but fearing its radical departure from conventional lines of thinking would cause them to reject it, despite the magnitude of its possibilities.

They made the hydraulic ram the next day and laid a line of the ship's air tubing to a point sufficiently upstream along the noisy little creek to give the necessary pressure. Shortly before the sun went down they connected the last length of tubing to the ram, then returned to the ship to wait for the first flow of water into the ship's tank. It required some time for the tubing between the ram and the ship to fill with water but the water came at last; a steady little--trickle.

"You know," Coo--e remarked as he watched the tiny flow, "those ancients weren't exactly fools."

"At last, we've won one round in our battle with this diamond dust," Lenson said.

"I want all of you to keep in mind how we did it," Blake said. "We did it by using the natural forces at hand and by not trying to fight the abrasiveness of the diamond grit. Remember this, in any planning you do--you can't fight diamond with metal!"

"I think we're all aware of that by now," Taylor said.

"I hope so. Until we acknowledge that fact, we won't get anywhere."

No further mention was made of their problem in the succeeding days and Blake hoped that such silence was indicative of serious thinking on their part and not merely a fatalistic acceptance of the status quo.

On the sixth day following their return they gathered in the central room of the ship for each to present his plan, if any. Blake procured a few small items from the repair room and his own locker just before the discussion began.

Taylor made a quick summary of their predicament.

"There could have been only three possible ways of leaving this planet," he said. "The most certain would have been to send a message to New Earth, but that's impossible. We can't repair or duplicate the smashed transmitter tubes or hyperspace transformer. Their construction calls for very complex precision machinery as well as special alloys. We can't re-use the various alloys in the shattered tubes because exposure to the air has turned several of the more delicate alloys to dust.

"The second easiest method, and the most impossible, would be to simply wait and hope a ship comes along in time to save us. I know that we all reject that. That leaves only one way of leaving this world before it burns--to make a drive for our ship. And that boils down to the question: Shall we continue to search for uranium and cadmium or shall we devote our time and effort to some other method of lifting the ship than an atomic drive?"

"I've kept my mind a receptive blank for six days and not one single idea has come near it," Lenson said. "I don't see where we have any choice--what else can we plan on with any hope at all other than an atomic drive?"

"Before we go on to new plans," Wilfred said, "suppose we let Blake give his opinion of the chances of finding uranium and cadmium in time to make a drive."

"We haven't found any evidence of any uranium in three full-grown mountain ranges," Blake said. "There's iron, and a small amount of copper, but no radioactive elements. I don't know whether it's true of all this continent, but the section we're on is almost wholly light elements.

"I am not in favor of any further prospecting. Our time is very limited;

anything --e do will have to be done without delay. Further prospecting, on foot, would require time, lots of time. Possibly the ore we want is within fifty miles of us, but how do we find it in time, on foot? Even if we found it, and in a sufficiently pure state, how do we transport it back to the ship in time? We have no truck, you know; we have only our legs and backs. If we had the time--and if this world permitted us to use the truck--I would be in favor of continuing the prospecting until we did find the ores we needed. The truck would shorten days of travel into hours; it would haul needed supplies and equipment to the ore and haul the ore back. But we don't have a truck any more--and we don't have the time. In my own opinion, further prospecting is a waste of our short and precious time."

"There doesn't seem to be anyone who disagrees with you," Taylor said when the others remained silent. "You paint a dark picture, but there's no denying the truth of it."

"Do you have a plan?" Wilfred asked.

"I have. You've all been thinking along conventional lines, haven't you?"

"Such conventional lines of thinking produced the ship that brought us here," Wilfred pointed out.

"It did, but the same conventional type of thinking is never going to lift it up again. I have an unconventional idea, and a deceptively simple question. If you can answer my question, we'll know how to ma--e a drive for our ship."

Blake extracted several items from his pocket: a short steel bar, a square of sheet aluminum, a piece of thin glass and a large darning needle on a long thread. He laid them down on the table before him and continued:

"I'm afraid that conventional thinking won't work on an unconventional world. We've all been tackling our pro--lem as though we were marooned on a counterpart of New Earth, with New Earth's dust-free air and plentiful supply of minerals. We keep thinking of a rocket drive because a rocket drive was the simplest type of drive to build on a world of machinery and radioactive ores. We have neither, here; we don't have Earth-type resources and equipment to fight a decidedly non-Earth-type environment. On New Earth we would use machines--all human technological progress stemmed from that simple little thing, the wheel. Without wheels there would never have been machinery, without machinery there would never have been the atomic drive. You've all seen that we can't have wheels on this world. We can't have wheels, we can't have any kind of moving-parts machines on a world of diamond dust. Our own science is built on the wheel and if we don't develop a substitute science for it, we go up in smoke in seven or eight months."

Blake picked up the steel bar. "There is one force that no one has mentioned, and it is a force that all the diamond dust on this would could never faze because it has no moving parts--field-type force."

He picked up the needle by its thread. "This is a common bar magnet," he said, letting the needle click against the end of it. "We all know that opposite poles attract,--like poles repel. I pull the needle off the end of the magnet and the needle snaps back against it the moment I release it because its lower end has been magnetized with a polarity opposite to that of that end of the bar. If I switch ends with the bar magnet, the needle, instead of being attracted to it, will swing away out on the thread to stay away from it. I have a piece of sheet aluminum here--the magnetic repulsion goes right through it. The same with this piece of glass."

He laid the magnet and needle back down on the table. "You four

have the technical training and knowledge--I'm only a fairly competent mining engineer. But my common sense tells me the reason we can't leave here is because a field-type force, gravity, holds us here. My common sense also tells me that there must be the same basic principles underlying all field-type forces; magnetism, induction, gravity. If two magnetized bodies can be made to repel each other, is it impossible that two bodies held together by gravitational attraction could be made to repel each other?

"As I said, I think the same basic principles underlie all field-type forces. If we can learn what that principle is, we can produce a drive that operates by antigravity. So, this is the question I wanted to ask you: What caused the needle and magnet to behave as they did?"

There was silence for a while as they considered Blake's proposal. Wilfred was the first to speak.

"It's a simple phenomenon," he said, "and known to any child."

"That's true," Blake agreed. "Any child knows what a magnet will do, but do any of you know any more about a magnet than the hypothetical child? You all know what a magnet will do--do any of you know why it does it?"

"I know nothing of magnetic forces, myself," Lenson said, somewhat uncertainly, "since they don't enter my own field of study, but Cooke probably knows them from A to Izzard."

"I know what a magnet will do--I don't really know why it does it," Cooke said. "Men have made use of magnetism and induction forces for centuries and the behavior of such forces is known in precise detail--but still no one knows just what these forces are. You can manipulate a force to your own advantage if you understand its behavior under various conditions, but if you understand exactly what

that force is, you can manipulate it to your own advantage much more efficiently."

"I agree," Lenson said.

"There's another field-type force we use without fully understanding it--our hyperspace drive," Blake said. "Theoretically, it shouldn't require such an enormous surge of power to activate the space-shift units--but we have to use that enormous surge of power to get any results. We say we 'slip' or 'jump' into hyperspace. We don't. We don't 'slip' throu--h that barrier--we smash our way through it with the full output of a nuclear converter. If we can learn what field-type forces are, I see no reason why we might not be able to so alter our hyperdriv-- that the ship's generator will supply more than enough power for it."

"A possibility," Cooke said.

Taylor nodded in agreement, then said, "But, while the idea has unlimited possibilities, we haven't the slightest assurance that we'll realize any of them in the short time we have."

"I know it," Blake said. "I know it's a long chance, since our time is so short. But it is a chance, and all the other plans would have been doomed to failure before we started."

"It's something of a challenge," Wilfred said. "The idea appeals to me. It's true that we actually know relatively little of field-type forces; our environment was such that our technical progress led to atomic study."

* * *

Blake looked the four men over, both surprised and relieved that they should accept his plan without argument; the only possible approach

to the problem, he was convinced, that offered any hope. Taylor seemed to be the only one who had any doubts and Blake said to him, "What is your own opinion of my plan? Are you in favor of dropping all other plans and concentrating on the study --f field-type forces?"

"My half-expressed doubts about accomplishing anything in the time we have weren't intended as an objection. It's a field of study of which we know very little, and it's a difficult field to learn. But I'm in favor of it--it, at le--st, isn't dependent upon the use of moving machinery. We can study it under controlled conditions, here in the ship. In fact, I would like to suggest the study of induction --ields as a starter--we can manipulate induction fields to suit ourselves, and under all kinds of conditions."

"In all of Man's history," Cooke said, "since the first savage wondered why a piece of natural lodestone would attract grains of magnetite, no one has been able to discover why. But, while we don't have much time, we have a very powerful incentive. And we do know a few thi--gs about magnetism. For example: all ferrous iron with a valence of two is magnetic. Ferric iron, with a valence of three, is not magnet--c. Let's find out why--an atom of iron is an atom of iron and should be magnetic whether it's combined with oxygen or not."

"We'll need juice," Taylor said. "Plain, old-fashioned electricity."

"We can manage that," Blake said. "The ship's generator wasn't damaged, so we'll make the only kind of engine a world without oil, coal or radioactive ores would have permitted--a steam engine. We have water, plenty of trees for fuel, and we have a lathe. There's a spare primer-thrust tube that will make a perfect cylinder."

"How about the diamond dust in the water?" Taylor asked.

"Only clean steam will go to the cylinder, and the diamond dust won't affect the boiler as lime would. Besides, we have our water filters on the ship's tanks."

Wilfred picked up the needle and let it swing from the thread, holding the magnet under it. "If this magnet represented this planet, and its magnetism was the force of gravity, with this needle representing our ship, fitted with some gadget to make it antigravitic at the lower end as this needle is antimagnetic--"

He let the needle swing on the thread, bouncing away from the repulsion of the magnet, then swinging in again, to be stopped and driven away by the invisible force.

"The invisible barrier," he said. "What is it? It isn't matter--not as we know matter. We call it a force, but just exactly what is it that no material--glass, metal or anything else--can bar?"

"That's the question," Taylor said. "It's going to be a hard one to answer."

"It will," Cooke said, "but we know the answer is there if we can find it. The power we need to move this ship is all around us; we'll be looking for the secret of a power that we know exists."

"And if we continued to hunt for uranium, we'd be looking for something that all the evidence shows does not exist," Blake said.

Lenson shoved back his chair and got to his feet. "Now that we know what we want to do, let's get busy," he said. "It will take all five of us quite a while to build that boiler and engine, so let's get started right now."

"I agree," Cooke said. "We're headed for an unpleasant end at a

hundred miles a second--the Bird of Time has but a little way to fly--"

"And Lo!--the Bird is on the Wing!" Wilfred finished, a rare smile on his pugnacious young face as he shoved back his own chair.

* * *

The generator was lowered from its hanging position on the wall and fastened to a new-laid flooring of steel. A gear box was made from the gears of the ship's elevator and the portholes of the drive room were equipped with glassite windows; windows which were rendered sub-translucent by the first sandstorm, but would still admit sufficient light for working. The boiler and --ngine construction progressed slowly, with the small lathe and the limited kinds of material available, but they worked steadily while the yellow star advanced farther and farther ahead of their own sun. It gleamed in the dawn sky a full hour in advance of the rising of their sun when they began the building of the engine. On the day they completed the engine it was dispelling the eastern blackness two hours before the blue-white sun brought the first touch of the rainbow dawn and almost three hours before the sun, itself, appeared.

Blake, Cooke and Lenson toasted the steam engine on the day they completed it and gave it a successful trial run; a modest toast of one small glass each, due to t--e limited amount of grain alcohol in the medicine locker. Taylor and Wilfred, who never drank, had already gone into the central room to begin the job of converting it into a laboratory.

"She's not pretty," Cooke said, indicating the shapel--ss boiler and engine with his empty glass, "but beauty is as beauty does. And she spun--that generator like a top."--

"She did," Lenson said. "As you said of the hydraulic ram--those old-

timers weren't exactly fools."

"We have all the power we need whenever we happen to need it," Blake said. "Next, as soon as we get the central room converted, will be to put our ideas to the acid test."

"They say the acid test is always sour," Cooke said. "We'll have to make an exception of that rule. And have you noticed our big yellow star? It's over forty degrees in advance of our sun, now--gives the illusion of traveling away from our sun, except that it keeps getting brighter."

"We're already a fifth of the way to it," Blake said.

"The nova created when Aurora goes into the yellow sun should be spectacular," Cooke went on. "And then what ha--pens when our big blue-white sun goes into --he nova? Will it prod--ce a super-nova? No man has ever stood off and seen such a thing, you know."

"Neither will we if we don't get busy," Lenson said. "Time, tide and Aurora's rendezvous wait for no man--and here we stand with empty glasses in our hands when we should be working."

"You're right," Cooke said, turning to go. "Holding an empty glass is about the most useless thing a man ever did."

* * *

The central room of the ship was converted into a laboratory--or as near to a laboratory as their limited equipment would permit--and large glassite windows were fitted into holes cut in the hull; a much better form of illumination than the improvised oil lamps they had been using.

Ideas were presented in the days to come; some that were no more than the repetition of known experiments and some that were contrary to accepted theories of magnetic and gravitic principles. The latter were, at first, presented somewhat self-consciously and Blake and Cooke did their best to discourage such reluctance to depart from conventional thinking. As the days merged into scores of days the reluctance to present unorthodox theories vanished and they all five adopted the policy of accepting each new theory with, as Cooke put it: "The assumption that every theory, no matter how fantastic, is innocent of the crime of invalidity until proven guilty."

Each experiment was given a number, preceded by the letter X for "Experimental," and the data gained by the experiment filed away. Blake, whose mathematical computations as a mining engineer had never required more than trigonometric and logarithmic tables, became as proficient as the --thers. His lack of advanced technical learning was, in a way, no disadvantage--he had nothing to unlearn. He absorbed all the data available concerning the actual, observed behavior of field-type forces and rejected the adoption of any preconceived theories of the causes for such behavior, keeping his mind open for the unbiased inspection of new concepts.

Thirty days passed and then another thirty, while the yello-- star grew slowly brighter and widened the apparent distance between itself and their own sun--the apparent widening of the distance that was so belied by the yellow star's increasing brightness. The first enthusiasm of Cooke, Lenson and Wilfred gave way to a quietness and they worked longer hours. Taylor betrayed no particular emotion but he was up early and to bed late.

Summer solstice came and the sun ceased its apparent northward progress and began to creep to the south, almost imperceptibly at first. The desert winds cam-- with greater frequency after solstice, hot

and searing and bringing their ever-present burden of sand and dust.

They had been on Aurora four months when Cooke, in a moment of grim humor, chalked a huge calendar on the wall of the laboratory. He made it thirty days wide a--d five rows deep. Each day that passed would be filled in with re-- chalk and the red squares would move across the calendar, row upon row, warning the five men who labored in the room of the shortness of their time.

Two lines of thirty days each were chalked a solid red when they found the first key to the secret that meant their lives.

* * *

X117 lay on the laboratory table, a complex assembly of coils and electronic apparatus, with a small blue-white diamond swinging in a tiny arc just within the focal point of the induction fields. The diamond hung on a long thread, attached to a delicate spring scale with a large dial.

Cooke glanced over the assembly, then raked his heavy hair back from his face and grinned at the others. "This," he said, "should be what we've been looking for."

"You've said that every time," Wilfred reminded him.

"Let's find out," Blake suggested, feeling his usual impatience to learn as soon as possible if their efforts had again been in vain. "We have full steam pressure and our engine is ready to spin the generator whenever you close the switch."

"That's what I say--let's get the suspense over with," Lenson said. He closed the switch that would open the --team engine's governors and the faint chuffing of it in the drive room became a fast pounding. The

needle on the generator output gauge began to climb rapidly and all eyes were transferred to the dial of the spring scale.

"Twenty seconds," Cooke said, his attention alternating between the diamond and his watch. "It should have built up an effect by then. If it hasn't, it will look like another failure and I'll have to guess agai-- on the success of the next one."

No one else spoke as they watched the diamond swing gently from the long thread. It was only a small one, not more than ten grains in weight; such a small and insignificant mass to resist all their efforts to move it.

"Ten seconds," Cooke intoned. "Eight--cross your fingers and say a little prayer--three--two--now!"

The diamond continued to swing in its tiny arc and the pointer on the scale remained motionless. No one moved nor took their eyes off the diamond, even when the smell of scorched insulation became noticeable.

"It's overloaded, now," Lenson said, but made no move to open the switch.

"Give it more," Blake ordered. "Give it the full output of the generator--let's be sure of it, and let it burn if it wants to."

Lenson snapped another switch shut and the full output of the big generator surged through X117. A coil went out in a flash of blue fire and someone cried out incredulously.

In the brief instant before the coil disappeared the diamond moved--up.

"It moved!" Cooke exclaimed jubilantly. "We're going to have our drive!"

There was a minute of quite natural elation and confused babble of excited talk during which Blake remembered to open the switch again. The muted pounding of the steam engine died away and the babble resolved itself into coherent conversation.

"We're on the right track, at last," Blake said decisively.

"We've just done something all our science has never before accomplished," Wilfred said. "We've created a force of antigravity."

"We have a long way to go," Taylor said. "We've built up a force of antigravity that lifted a diamond weighing ten grains--and it took the full output of our ship's generator to do it. But we now have a proven result to go on; we have the beginning of an understanding of the basic principles."

"When we get it where we want it, I doubt that it will bear any resemblance to this," Blake said, indicating the assembly on the table with his hand. "This just happened to be the easiest way to produce a little of the force we were looking for. Like, you might say, the easiest way to produce electricity is to stroke a cat. But you wouldn't try to supply electricity for a city by having a million men engaged in stroking a million cats."

"I have a theory," Cooke said. "Once we learn a little more about this force we created we can try something else--we'll try reversing the gravitic flow, rather than building up a counter-flow. I want to work on that theory and see what the rest of you think of it. Such a system should require almost no power since no force would be created, merely re--ersed."

"The perfect ship's d--ive --ou--d be a field-type drive," Wilfred said, "for more reasons than one. The reason I have in mind at the moment is this: there would be no limit to the speed of acceleration since the ship and its occupants would be enveloped in the driving force. It wouldn't, to the passengers, be like the rocket drive where they're actually pushed along by the seat of their pants."

Blake nodded. "I'v-- been thinking of the same thing. I suppose we all have, because the only way we're going to escape that nova is to accelerate at an unheard-of velocity. We can do that when we perfect what we're working on; with our ship and ourselves enveloped in the driving force we can accelerate immediately to any speed, and wi--h no sensation of accelerating at all."

"No more acceleration hammocks and anti-acceleration drugs," Cooke said. "No more long periods of reaching maximum acceleration, then other long periods of decelerating. We really have something--or will have when we're through." He looked over at Taylor. "How much time to we have? Did your latest observations give us as much as a day more?"

Taylor glanced at the calendar Cooke had chalked on the wall. "Your calendar still holds good--the last day you have on it will be our last day."

"Eighty-five days--that's not many," Lenson said.

"No, but we're going to make progress from now on," Blake said. "--e have something to work on; we've opened a door that no one has ever opened before."

"And if there's another door behind the one we opened?" Lenson asked.

It was Cooke who answered, the finality of conviction in his voice. "Then we'll open that one, too."

* * *

Lenson's question proved to be not an idle one; there was a door behind the one they had opened. In the countergravity they had created lay the key to the second door, the reversal of gravity, but it eluded them as the days went by. They repeated X117 and variations of it until the experimental-data record bore the number, X135. Cooke's theory was examined and re-examined and no fallacy could be found, neither could any other theory be constructe-- that would fit the facts they had discovered. They accepted Cooke's theory as valid, and no one questioned the possibility of reversing gravitic flows with a negligible amount of power.

All were convinced of ultimate success--if they could but have the time.

The days fled by while they tried and tried again. They worked longer hours, all of them thinner and the bulldog stubbornness on Wilfred's face becoming more pronounced. The yellow star crept farther ahead of their own sun, growing brighter as it went, and the red-chalked squares marched across the calendar. Their determination increased as their days of grace melted away; a determination expressed by a silent intensity of effort by all but Cooke, whose intensified efforts were accompanied by considerable cheerful speculations upon the many pleasures New Earth would have to offer them on their return.

Blake wondered if Cooke's faith in their eventual success was as firm as he insisted, or if it was only a psychological attempt to improve not only the morale of the others but also his own. The red squares had crept across two more rows and over half-way across a third when he

got his answer.

* * *

It was on the morning following the failure of X144. They had worked far into the night to complete the assembly of it and it had been devoid of observable results. The others had gone to bed to get a few hours sleep before starting the construction of X145 but Blake had found sleep imposs--ble. The failure of X144 exhausted every possibility but one; the one represent--d by the to-be-constructed X145. Theoretically, X145 would be successful--but some of the others had been theoretically certain of success until their trial had revealed hitherto unknown factors. After an hour of the futile wondering and conjecturing, Blake had given up the thought of sleep and put on his clothes.

He walked down to the creek, marveling again at the beauty of a world so harsh and barren. The yellow star, now bright enough to cast his shadow before him, was low in the west as he walked up the creek and the eastern sky was being touched with the first emerald glow that preceded the rainbow banners. When the sun came up it would bring another day of heat, and the dry, swirling winds would send the diamond dust along in low-flying clouds. But in the quiet of early dawn it was cool and pleasant along the creek with the trees bordering it making a leafy green corridor along which he walked into the emerald dawn while the fresh scent of green, living things was about him.

He saw the bulk of something red, lying in the sand beside a tree, and he went --ver to it. It was a small mound of blood-red diamonds, and he saw that someone had selected them for their flawless perfection. He squatted beside them, leaning back against the tree trunk and lighting a cigarette as he wondered idly who had placed them there, and why.

He forgot them as he rested and watched the emerald of the eastern sky glow deeper in color and the first touch of iridescence come to it. Aurora, for all her grimness, was a beautiful world, and along the creek a man could almost imagine he was on New Earth but for the glory of the dawn and the glitter of the diamond sand. The leaves of the tree over him rustled softly, and among the fresh green smells there came the scent of the red flowers that grew along the water's edge; a scent that brought a brief, nostalgic memory of the old-fashioned briar roses in his mother's garden when he was a boy. She had brought the seeds from Old Earth when she was a girl and on Old Earth, she had told him, they grew wild.

It was hard to believe, as he sat beside the creek, that it and the sweet-scented flowers and the leaves rustling overhead were not things of some stable world where they would remain so for uncounted lifetimes to come; where only the slow, slow dying of the sun could at last bring the end.

* * *

Gravel crunched behind him and he turned to see Cooke. "Nice here, isn't it?" Cooke asked, sitting down --ear him.

Blake nodded, then said, "I thought you were in bed?"

"And I thought you were," Cooke replied. "What do you think of the quality of the diamonds there beside you?"

"You're the one who piled them here?" Blake asked, surprised. "How long has this been going on, and why?"

"Ever since I said we'd unlock that second door. We may have to leave here in a hurry, but we are going to leave here. I just did the

logical thing of using some of my spare minutes to pile up some of the choicest diamonds where we can get them in short order."

"Do you really believe that, or is this diamond-gathering just to bolster your confidence?" Blake asked, watching him curiously.

"What do you think?" Cooke countered.

Blake studied him, the hard jaw and broken nose, the glittering black eyes, and saw that they were not deceptive, after all. Under ordinary circumstances Cooke was easy-going and genial, but now the mask of good humor had fallen away for the moment and the hard steel core of the man was revealed. Cooke, like the bulldog Wilfred, would be stubbornly defying their fate when Aurora went into the yellow sun.

Yet, though such stubborn faith might prove to be in vain, it had its advantages. Stubborn men die hard--sometimes it takes more than merely impossible difficulties to persuade a stubborn man to die at all.

"I think you have the right idea," Blake said.

There was a silence as Blake returned his attention to the dawn, then Cooke remarked, "We won't have but a few more like that--before we leave here, one sun or the other will be in view all the time. And, by then, the yellow one will be too bright to permit any sunrise effects from the other one."

"Aurora doesn't have many days left."

"What a show that will be!" Cooke mused. "First a nova as Aurora goes into the yellow sun, then the big blue-white sun will go into the nova." Then he sighed and said, "But I sort of hate to see it. I don't care about the suns, but I hate to see Aurora go up in a blaze, no

matter how glorious that blaze may be. She's a hard world on humans, but she forced us to pull ourselves up by our own bootstraps. She's a beautiful little devil and I hate to see her destroyed."

The good die young, Blake thought, watching the dawn flame into vivid, fiery life. Not that Aurora was good. She was cruel and beautiful; she was a splendid, glittering prison taking them with her on her swift, silent flight to extinction.

It was not the way a world should die. The death of a world should come only when the fires of her sun went out. A world should grow old and cold for millennia upon millennia; death should come slowly and quietly like that of an old, old woman. But it would not be so for Aurora; for her death would be quick and violent and she would explode a yellow sun into a nova as she died.

* * *

Two days later they were ready to put X145 to the test. It was similar to the long-past X117 in that the same blue-white diamond swung from the same long thread, but the assembly was of a different form and the steam engine was cold. They had made a battery, a simply storage battery, and X145 would either succeed or fail with the battery's small current.

The tension was far greater than it had ever been at any previous test, and even Cooke had no cheerful smile or remarks. X145 would be the test; if it failed all their labors leading up to it had been to a dead-end. And they would have no time to try another approach.

"I guess we're ready," Cooke said. Blake went to the rheostat that controlled the amount of current and the others grouped about the X1--5 assembly.

"I'll give it the juice gradually," Blake said. "Although if it as much as quivers at full current, we really will have our drive."

Blake watched the diamond as he turned the rheostat's knob. He felt the faint click of it as it made first contact, then flinched--involuntarily as something cracked like a pistol shot and the diamond, thread and scale vanished. Something clattered to the floor across the room and Lenson's surprised question was cut off by a shout from Cooke: "Look--the scale!"

He ran to where it had fallen and picked it up, holding it for all to see. There was a hole torn through it.

"How much . . . how much power did you give it?" he demanded of Blake.

"Minimum current," Blake replied.

"Minimum current," Wilfred murmured. "Minimum current--and it shot the diamond through the scale!"

The torn scale was passed from hand to hand and the talk it engendered was both voluble and optimistic.

Cooke hurried out after another scale and Blake and Lenson connected another rheostat in series with the first, then added still another when Wilfred gave the results of his calculations on the slide rule.

Cooke returned with the scale, a much larger one, and a block of copper. "Three?" He lifted his eyebrows toward the three rheostats. "If we can budge a pound of copper with full current through three rheostats, then we can lift a thousand ships with our generator."

The copper block was suspended from the scale, to swing down in the field of the X145, and Blake said, "I'll try minimum current again, even though it may not be enough to affect it at all. We can't expect it to do anything spectacular at minimum current, I'm sure."

He turned the rheostat knob a fraction of an inch and felt the faint click, his eyes on the copper block. There was a roar, sharp and deafening in the room, and the copper block vanished as the diamond had. A hard pull of hot air struck him and something ricocheted back down from the roof to strike him painfully on the shoulder, a fragment of metal from the scale. Wilfred was pointing upward, yelling something. " . . . Through the roof!"

Blake looked up and saw what he meant; there was a small hole torn through the hull of the ship over their heads, a hole such as would be made by a one-pound block of copper.

"Three rheostats," Cooke exclaimed. "We not only have the power to lift our ship; we could lift ten thousand of them!"

Cooke began to make rapid calculations and Wilfred followed suit. Blake, curious though he was, saw no reason for three of them to work simultaneously on the same problem so he waited, as did Taylor and Lenson. Taylor was smiling; the first time in many days he had seen the old man smile.

* * *

"The problem of power for the hyperspace drive no longer exists," Lenson said. "We can apply the--same principles to its alteration that we just now made use of and we can actually 'slip' through the barrier rather than bulldozing our way through it."

"We have a means of driving our ship and we have a means of

slipping her into hyperspace," Blake said. "We've come mighty near to succeeding in our plans--will w-- have the time to succeed all the way?"

"Time?" Lenson looked surprised. "How much time do you want? We have seven days. Isn't that enough?"

Blake shook his head. "We can't have the ship ready in that short space of time. To leave here within seven days we'll have to--"

"Did I say ten thousand ships?" Cooke's black eyes glittered with exultation. "We could move a world with the power in that generator!"

"We've really reversed the gravitic flow," Wilfred said, as enthused as Cooke. "The only power required to move an object is that for the reversing field--or whatever we should call it. This power requirement is negligible with a capital N."

"Homeward bound!" Cooke said. "Safe and snug beyond the nova's reach in hyperspace!"

"If we want to give up the habit of breathing," Blake pointed out.

The four of them stared at him, and one by one their faces fell as they realized what he referred to; the thing they had forgotten in the intensity of their efforts to devise a drive.

"The ship--" Cooke was the first to express the thought in the minds of all of them. "It leaks like a sieve!"

"How, in seven days, can we finish cutting the two halves of the ship apart, wall in the cut-off end and repair all the broken-apart seams?" Blake asked.

"We can't," Taylor said. He sat down, suddenly old and tired, his

former cheerfulness gone. "I don't see how we could make the ship leak-proof in less than four months with the tools and materials we have." He smiled again, but without mirth. "But we came close to succeeding, didn't we?"

"We'll succeed," Blake said. "It's a tough problem, apparently, but I have an idea."

"How about enclosing the ship in a gravitic field large enough to hold its air by plain gravity?" Wilfred asked.

"And how big a field would that have to be?" Lenson asked.

"Big," Blake said. "Even in hyperspace, it will take us six months to get home--or near that. Air has a tendency to leak away and dissipate into space rather easily. I doubt that we could enclose the ship in a field large enough to hold enough air to last us for six months--as I say, it leaks away into space very easily."

"The gradual loss of our air would be an unpleasant way to die," Cooke said. "The ship leaks, we don't have the time to repair it, so what do we do? H--w do we solve that last little problem?"

"Seven days to do a four months' repair job--" Lenson sat down beside Taylor and sighed. "It looks like we can't make our ship leak-proof in the time we have. But surely there is some way--"

"There is," Blake said. "We have a perfect m--thod of both getting home and keeping air in our ship. It should be obvious to all of you."

Questioning looks gave way to dawning comprehension. There was a long silence as they considered the plan, then Cooke said, "After all, a fortune was what we set out for."

"We'll have to call them i-- advance," Wilfred said. "We can't just barge in."

Blake nodded. "Homeward bound, safe and snug in hyperspace--but, as you say, we'll have to radio them in advance. If we just barreled in without giving them a chance to tell us where to park, it could raise merry hell with everything."

* * *

Redmond, control-tower radio operator of Spaceport 1, New Earth, was puzzled. He scratched his thinning hair and leaned closer to the speaker. The voice from it c--me in distinctly, but faintly.

"Can't you step up your volume?" he asked.

"No," the tiny voice answered. "I told you we had to couple in the driver stage--our power stage is gone."

"How far out are you?" Redmond asked.

"About a billion miles. Did you get what I told you? This is the Star Scout and we're just back from beyond the Thousand Suns. We were going to get caught by a nova--"

"I got everything," Redmond interrupted. "Your planet was going into the yellow sun and its high carbon content would create a nova. You learned how to control field-type forces so that you would have a drive for your ship. So you came back to New Earth--or a billion miles out from it. But why do you keep insisting that I have my superiors engage an astrophysicist to tell you where to park your ship? And another thing--you said it would take four months to make your ship leak-proof and you only had s--ven days. How did you do a four months' job in seven days?"

"We didn't," the thin voice from the speaker answered. "That's what I'm trying to tell you and that's why we'll have to --ave an astrophysicist define our parking place. We didn't have time to repair our ship, and we couldn't enclose it in a gravitic field large enough to hold air for six months."

Redmond clutched his thinning hair again, feeling suddenly dizzy. "You don't mean--"

"Yeah. We brought the planet with us."

Brain Teaser

Editor's note: For the most part, though, Godwin's stories--how--ver grim the situation--are really about triumph in the face of adversity. Here, in a story which is also a truly classic science fiction "problem solver tale," is a splendid example.

Carl Engle stood aside as the flight preparation crew filed out of the Argosy's airlock. Barnes was the last; fat and bald and squinting against the brightness of the Arizona sun.

"All set, Carl," he said. "They had us to check and countercheck, especially the drives."--

Engle nodded. "Good. Ground Control reports the Slug cruiser still circling seven hundred miles out and they think the Slugs suspect something."

"Damned centipedes!" Barnes said. "I still say they're telepathic." He looked at his watch. Zero hour minus twenty-six minutes. "Good luck, boy, and I hope this space warp dingus works like they think it will."

He waddled down the boarding ramp and Engle went through the airlock, frowning a little as he threw the switches that would withdraw the ramp a--d close the airlock behind him. Barnes' implied doubt in the success of the space warp shuttle was not comforting. If the shuttle failed to work, the Argosy would be on the proverbial spot with the Slug cruiser eager to smear it well thereupon . . .

Access to the control room was up through the room that housed the space warp shuttle. Dr. Harding, the tall, bristle-browed physicist, and his young assistant, Garvin, looked up briefly as he entered then returned their attention to their work. The master computer, borrowed

from M.I.T., stood like a colossal many-dialed refrigerator along one wall. A protective railing around it bore a blunt KEEP OUT sign and it was--never left unwatched. Garvin was seated before it, his fingers flitting over the keyboard and the computer's answer panel replying with strange mathematical symbols.

The space warp shuttle sat in the middle of the room, a cube approximately two-thirds of a meter along the edge, studded with dials and knobs and surmounted by a ball of some shining silvery alloy. Dr. Harding was talking into the transdimensional communicator mounted beside the shuttle.

Engle went on to the computer and waited outside the railing until G--rvin finished with his work and turned in his seat to face him.

"The last check question," Garvin said. "Now to sweat out the last twenty minutes."

"If--you've got the time, how a--out telling me about the shuttle," said Engle, "I've been kept in the dark about it; but from what I understand, the shuttle builds up a field around the ship, with the silver ball as the center of the field, and this field goes into another dimension called the 'space warp'. "

"Ah--it could be described in that manner," Garvin said, smiling a little. "A clear description could not be made without the use of several special kinds of mathematics, but you might say this field in normal space is like a bubble under water. The air bubble seeks its own element, rises rapidly until it emerges into free air--in this case, the space warp. This transition into the warp is almost instantaneous and the shuttle automatically ceases operation when the warp is fully entered. The shuttle is no longer needed; the hypothetical bubble no longer exists--it has found its own element and merged with it."

"I know that a light-hour of travel in the warp is supposed to be equivalent to several light-years in normal space," Engle said, "but what about when you want to get back into normal space?"

"The original process is simply reversed: the shuttle creates a 'bubble' that cannot exist in the warp and seeks its own element, normal space."

"I see. But if the shuttle should--"

He never completed the question. Dr. Harding strode over, his eyes blue and piercing under the fierce eyebrows as he fixed them on him. He spoke without preamble:

"You realize the importance of this test flight with the shuttle, of course? Entirely aside from our personal survival should the Slug cruiser intercept us."

"Yes, sir," he answered, feeling the question suggested an even lower opinion of his intelligence than he had thought Harding held.

Project Space Warp existed for the purpose of sending the Argosy to Sirius by means of the space warp shuttle and bringing back the Thunderbolt by the same swift method. The Thunderbolt, Earth's first near-to-light-speed interstellar ship, was a huge ship; armed, armored, and invincible. It had been built to meet every conceivable danger that might be encountered in interstellar exploration--but the danger had come to the solar system from the direction of Capella nine years after the departure of the Thunderbolt. Eight cruisers of the pulpy, ten-foot centipede-like things called Slugs had methodically destroyed the colonies on Mars and Venus and established their own outposts there. Earth's ground defenses had held the enemy at bay beyond the atmosphere for a year but such defense could not be maintained indefinitely. The Thunderbolt was needed quickly and its

own drives could not bring it back in less than ten years -- . .

"We will go into the warp well beyond the atmosphere," Harding said. "Transition cannot be made within an atmosphere. Since a very moderate normal space velocity of the ship will be transformed into a greater-than-light velocity when in the warp, it is desirable that we make turn-over and decelerate to -- very low speed before going into the warp."

"Yes, sir," he said. "I was briefed on that part and I'll bring us as near to a halt as that cruiser will permit."

"There will be communication between us during the --light," Harding said. "I will give you further instructions when they become necessary."

He turned away with an air of dismissal. Engle went to the ladder by the wall. He climbed up it and through the interroom airlock, closing the airlock behind him; the routine safety measure in case any single room was punctured. He went to the control board with a vague resentment gnawing for the first time at his normally placid good nature.

So far as Harding was concerned--and Garvin, too--he might as well have been an unusually intelligent baboon.

* * *

Zero hour came and the Argosy lifted until Earth was a tremendous, curving ball below and the stars were brilliant points of light in a black sky. The Slug cruiser swung to intercept him within the first minute of flight but it seemed to move with unnatural slowness. It should have been driving in at full speed and it wasn't . . .

"Something's up," Ground Control said. "It's coming in too slowly."

"I see that," he answered. "It must be covering something beyond it, in your radar shadow."

It was. When he was almost free of the last traces of atmosphere he saw the other cruiser, far out and hidden from Ground Control's radar by the radar shadow cast by the first one.

He reported, giving its position and course--as given him by the robot astrogating unit.

"We'll have the greatest amount of time if I make turn-over now and decelerate," he finished.

The voice of Harding came through the auxiliary speaker:

"Do so."

The Argosy swung, end for end, and he decelerated. The cruiser behind him increased its speed, making certain it would be in position to cut off any return to Earth. The other cruiser altered its course to intersect the point in space the Argosy would soon occupy, and the Argosy was between the rapidly closing jaws of a trap.

He made reports to Ground Control at one-minute intervals. At 11:49 he said:

"Our velocity is approaching zero. We'll be within range of the second cruiser's blasters in two more minutes."

Harding spoke again to him:

"We'll go into the warp now. Do not alter the deceleration or the course of the ship while we're in the warp."

"I won't," he said.

There was a faint mutter from the auxiliary speaker as Harding gave some instructions to Garvin. Engle took a last look at the viewscreen; at blue-green Earth looming large in the center, Orion and Sirius glittering above it and the sun burning bright and yellow on the right. It was a scene he had observed many times before, all very familiar and normal--

The chronometer touched 11:50 and normalcy vanished.

Earth and sun and stars fled away from him, altering in appearance as they went, shrinking, dwindling. The seas and continents of Earth erupted and shook a--d boiled befor-- Earth faded and disappeared. The sun changed from yellow to green to blue, to a tiny point of bright violet light that raced away into the blackness filling the screen and faded and disappeared as Earth had done.

Then the viewscreen was black, utterly, completely, dead black. And the communicator that had connected him with Ground Control was silent, without the faintest whisper of background sound or space static.

In the silence the voice of Harding as he spoke to Garvin came through the speaker; puzzled, incredulous, almost shocked:

"Our velocity couldn't have been that great--and the sun receded into the ultraviolet!"

There was the quick sound of hurrying footsteps then the more distant sound of the computer's keys being operated at a high rate of speed. He wanted to ask what had gone wrong but he knew no one would answer him. And it would be a pointless question--it was obvious

from Harding's tone that he did not know, either.

He had an unpleasant feeling that Man's first venture into another dimension had produced catastrophic results. What had caused sun and Earth to disappear so quickly--and what force had riven and disfigured Earth?

Then he realized the significance of Harding's statement about the sun receding into the ultraviolet.

If the ship had been traveling at a high velocity away from the sun, the wave length of the sun's light would have been increased in proportion to the speed of the ship. The sun should have disappeared in the long-wave infrared end of the spectrum, not the short-wave ultraviolet.

With the thought came the explanation of the way the continents and oceans of Earth had quivered and seethed. The shifting of the spectrum range had shortened normally visible rays into invisibly short ultraviolet radiations while at the same time formerly invisible long infrared radiations had been shortened into visible wave lengths. There had been a continuous displacement into and past the ultraviolet and each wave length would have reflected best from a different place--mountains, valleys, oceans, deserts, warm areas, cool areas--and the steady progressio-- into the ultraviolet had revealed each area in quick succession and given the appearance of agitated movement.

So there was no catastrophe and everything had a logical explanation. Except how they could have been approaching a sun that he had seen clearly, visibly, racing away from them.

"Engle--" The voice of Harding came through the speaker. "We're going back into normal space to make another observation. I don't

know just where we are but we're certain to be far from the cruisers. Don't alter our course or velocity."

"Yes, sir," he said.

They came out of the warp at 11:53. The communicator burped suddenly and the viewscreen came to life; a deep, dull red that brightened quickly. A tiny coal flared up, swelling in size and shifting from red to orange to yellow--the sun. Earth appeared as a hazy red dot that enl--rged and resolved itself into a planet with distorted continents that trembled and changed, to resume their natural shapes and colors. Within a few seconds the sun was shining as ever, Earth loomed large and blue-green before them and the stars of Orion glittered unchanged beyond. Even their position in--space was the same--they had not moved.

But the Slug cruisers had.

One was very near and from its forward port came the violet haze that always preceded a blaster beam. There was no time to escape--no chance at all. He --poke into the mike, harsh and urgent:

"Into the warp! There's a blaster beam coming--move!"

There was a silence from below that seemed to last an eternity, then the sound of a switch being slapped hastily. At the same time, the violet haze before the cruiser erupted into blue fire and the blaster beam lanced out at them.

It struck somewhere astern. The power output needle swung jerkily as the generators went out and the emergency batteries took the heavy load of the shuttle's operation. There was a sensation of falling as the ship's artificial gravity units ceased functioning. The auxiliary speaker rattled wordlessly and there was a sound like a hard rush of wind

through it, accompanied by quick bumping sounds.

Then the speaker was still and there was no sound of any kind as the viewscreen shifted into the ultraviolet and Earth and stars and sun once again raced away and disappeared--in the blackness.

* * *

A myriad of lights ab--ve the board informed him the generators were destroyed, the stern section riddled and airless, the emergency batteries damaged and reduced to quarter charge, the shuttle room punctured and airless.

And, of course, Harding and Garvin were dead.

He felt a surge of futile anger. It had all been unnecessary. If only they ha-- not considered him incompetent to be entrusted with anything more than the ship's operation--if only they had installed an emergency switch for the shuttle by his control board, there would not have been the two-second delay following his order and they would have been safely in the warp before the blaster beam struck.

But they had not trusted him with responsibility and now he was alone in a space warp he did not understand; sole and full responsibility for the shuttle suddenly in--his hands.

He considered his course of action, then got into a pressure suit. Magnets in the soles of its heavy boots permitted him to walk in the absence of gravity and he went to the interroom airlock and walked down what had been the room's wall, then across to the center of its floor.

But for the fact there was no one in the room, it was as he h--d last seen it. The shuttle, computer, and other equipment stood in their

orderly positions with their lighted dials unchanged. Until one looked at the gash ripped in the hull and saw the stains alon-- its edge where the occupants had been hurled through it by the escaping air.

He went on to the next room--and the next. The damage increased as he proceeded toward the stern. The power generators were sliced into ribbons and the emergency batteries in such condition it seemed a miracle they were functioning at all. The drives had received the greatest damage; they were an unrecognizable mass of wreckage.

He made his way back to the shuttle room, there to appraise his circumstances.

First, he would have to make the shuttle room livable; get out of the pressure suit. He would have to question the computer and he could not do that with the thick, clumsy gloves on his hands.

The job didn't take long. There were repair plates on the ship and a quick-hardening plastic spray. He closed the sternward airlock when he was done and opened the airlock leading to the control room, as well as the locks beyond. Air filled the shuttle room, with only a minor overall loss of air pressure. He removed the suit, attached a pair of magnetic soles to his shoes so he could operate the keys of the computer without the movements sending him floating away, and went to it.

He had never been permitted to touch it before, nor even stand close enough to see what the keyboard looked like. Now, he saw that the alphabetical portion of the keyboard was minor compared with the mathematical portion, many of the symbols--strange to him.

The operation of an interplanetary ship required a certain knowledge of mathematics, but not the kind used by theoretical physicists. He typed, doubtfully:

ARE YOU CAPABLE OF ANSWERING QUESTIONS PRESENTED IN NON-MATHEMATICAL FORM?

The word, YES, appeared at once in the answer panel and relief came to him like the lifting of a heavy burden.

The computer knew as much about the space warp as Harding or anyone else. It was connected with his drive controls and instruments and knew how far, how fast, and in what directions the flight had taken place. It had even been given blueprints of the ship's construction, in case the structure of the ship should affect the ship's performance in the warp, and knew every nut, bolt, plate and dimension in the ship.

There was supposed to be a certain method of procedure when questioning the computer. "It knows--but it can't think," Garvin had once said. "It lacks the initiative to correlate data and arrive at conclusions unless the procedure of correlation is given it in detail."

Perhaps he could manage to outline some method of correlation for the computer. The facts of his predicament were simple enough:

He was in an unknown medium called "the Space Warp." Something not anticipated occurred when a ship went into the warp and Harding had not yet solved the mystery when he died. The physicists in Observation would be able to find an answer but he could not ask them. The forward movement of the ship was not transferred with it into the warp and if he emerged into normal space the waiting Slug cruisers would disintegrate him before he spoke three words to Observation.

There was a pencil and a tablet of paper by the computer. He used them to calculate the time at which the charge in the damaged

batteries would reach a critical low, beyond which the charge would be insufficient to activate the shuttle.

The answer was 13:53. He would have to go out of the warp at 13:53 or remain in it forever. He had a great deal less than two hours in which to act.

He typed the first question to the computer:

WHAT IS THE POSITION OF THIS SHIP RELATIVE TO NORMAL SPACE?

The answer appeared on the panel at once; the coordinates of a position more than a light-year toward Ophiuchus.

He stared at the answer, feeling it must be an error. But it could not be an error--the computer did not make mistakes. How, then, could the ship have traveled more than a light-year during its second stay in the warp when it had not moved at all during the first stay? Had some factor of the warp unknown to him entered the picture?

As a check he typed another question:

WHAT WAS OUR POSITION, RELATIVE TO NORMAL SPACE, IMMEDIATELY BEFORE THIS SHIP WAS SHUTTLED BACK OUT OF THE WARP?

The answer was a position light-days toward Ophiuchus.

He typed: IMPOSSIBLE.

The computer replied: THIS STATEMENT CONFLICTS WITH PREVIOUS DATA.

He recalled the importance of keeping the computer free of all faulty

or obscure data and typed quickly: CANCEL CONFLICTING STATEMENT.

CONFLICTING STATEMENT CANCELED, it replied.

He tried another tack. THIS SHIP EMERGED FROM THE SPACE WARP INTO THE SAME NORM--L SPACE POSITION IT HAD OCCUPIED BEFORE GOING INTO THE WARP.

He thought the computer would proceed to give him some sort of an explanation. Instead, it noncommittally replied: DATA ACKNOWLEDGED.

He typed: EXPLAIN THIS DISCREPANCY BETWEEN SPACE WARP AND NORMAL SPACE POSITIONS.

It answered: INSUFFICIENT DATA TO ACCOUNT FOR DISCREPANCY.

He asked: HOW DID YOU DETERMINE OUR PRESENT POSITION?

It replied: BY TRIANGULATION, BASED ON THE RECESSION OF EARTH, THE SUN, SIRIUS, ORION, AND OTHER STARS.

BUT THE RECEDING SUN WENT INTO THE ULTRAVIOLET, he objected.

Again it answered with the noncommittal, DATA ACKNOWLEDGED.

DID YOU ALREADY HAVE THIS DATA? he asked.

YES.

EXPLAIN WHY THE RECEDING SUN SHIFTED INTO THE

ULTRAVIOLET INSTEAD OF THE INFRARED.

It replied: DATA INSUFFICIENT TO ARRIVE AT LOGICAL EXPLANATION.

He paused, pondering his next move. Time was speeding by and he was learning nothing of value. He would have to move the ship to some place in the warp where emergence into normal space would not put him under the blasters of the Slug cruisers. He could not know where to move the ship until he knew where the ship was at the present. He did not believe it was in the position given him by the computer, and its original space warp position had certainly not been the one given by the computer.

The computer did not have the ability to use its knowledge to explain contradictory data. I-- had been ordered to compute their space warp position by triangulation of the receding sun and stars and was not at all disturbed by the contradicting shift of the sun into the ultraviolet. Suppose it had been ordered to calculate their position by computations based on the shift of the sun's and stars' spectrum into the ultraviolet?

He asked it: WHAT IS OUR POSITION, IGNORING THE TRIANGULATION AND BASING YOUR COMPUTATIONS ON THE SHIFT OF THE SPECTRUMS OF THE SUN AND ORION INTO THE ULTRAVIOLET?

It gave him the coordinates of a position almost two light-years toward Orion. The triangulation computations had shown the ship to be going backward at many times the speed of light; the spectrum-shift computations showed it to be going forward with approximately the same speed.

THIS SHIP CANNOT SIMULTANEOUSLY BE IN TWO POSITIONS

THREE LIGHT-YEARS APART. NEITHER CAN IT SIMULTANEOUSLY BE GOING FORWARD AND BACKWARD.

DATA ACKNOWLEDGED, it agreed.

USE THAT DATA TO EXPLAIN THE CONTRADICTIONS OF THE TWO POSITIONS YOU COMPUTED.

DATA INSUFFICIENT TO ARRIVE AT LOGICAL EXPLANATION, it answered.

ARE YOU CERTAIN THERE WAS NO ERROR IN YOUR CALCULATIONS?

THERE WAS NO ERROR.

DO YOU KNOW THAT IF WE DROPPED BACK INTO NORMAL SPACE, IT WOULD BE AT NEITHER OF THE POSITIONS YOU GAVE ME?

It replied with the characteristic single-mindedness: DATA SHOWS OUR TWO POSITIONS TO BE THOSE GIVEN.

He paused again. He was still getting nowhere while time fled by. How swiftly less than a hundred minutes could pass when they were all a man had left to him . . .

The computer was a genius with the mental initiative of a moronic child. It could find the answer for him but first he would have to take it by the hand and lead it in the right direction. To do that he would have to know more about the warp.

He wrote: EXPLAIN THE NATURE OF THE SPACE WARP AS SIMPLY AS POSSIBLE AND WITHOUT USING MATHEMATICS HIGHER THAN ALGEBRA.

It answered at once: THIS CANNOT BE DONE.

The chronometer read 12:30. He typed:

THIS SHIP WILL HAVE TO RETURN TO NORMAL SPACE NO LATER THAN 13:53. IT MUST BE MOVED TO A DIFFERENT POSITION WHILE STILL IN THE WARP.

DATA ACKNOWLEDGED, it replied.

THIS SHIP CANNOT OCCUPY TWO POSITIONS AT THE SAME TIME. YOUR MEMORY FILES SHOULD CONTAIN SUFFICIENT DATA TO ENABLE YOU TO FIND THE EXPLANATION OF THIS TWO-POSITION PARADOX. FIND THAT EXPLANATION.

SUBMIT METHOD OF PROCEDURE, it answered.

I DO NOT KNOW HOW. YOU WILL HAVE TO ARRIVE AT THE EXPLANATION UNAIDED.

THIS CANNOT BE DONE, it replied.

He wrote, with morbid curiosity:

IF YOU DO NOT FIND THE ANSWER UNAIDED YOU WILL BE DESTROYED ALONG WITH ME AT 13:53. DON'T YOU GIVE A DAMN?

It answered: GIVE A DAMN IS A SEMANTIC EXPRESSION I DO NOT UNDERSTAND. CLARIFY QUESTION.

He got out of the computer seat and walked about the room restlessly. He passed by the transdimensional viewscreen and communicator and pressed the communicator's signal button. A dial

flickered in return, showing his signal was going out, but there was no sound in response. If only he could make contact with the brains in Observation--

He was umpty billion miles east of the sun and umpty billion miles west of the sun. He was racing faster than light in two different directions at once and he was sitting motionless under the blasters of two Slug cruisers.

Another thought came to him: even if he could move the ship while in the warp, where could he go?

He would have to go far beyond the outer limits of the solar system to escape detection by the Slug cruisers. And at that distance the sun would be only a yellow star, incapable of energizing the little solar power units. He would not live long after the last of the power was drained from the batteries and the air regeneration equipment ceased functioning. He would not even dare sleep, toward the last. There were no convection currents in the air of a ship without gravity, and it was imperative that the air be circulated constantly. The air circulation blowers would cease functioning while the ship still contained pure air but he would have to move about continually to breathe that air. Should he lie down to sleep he would smother to death in a carbon dioxide bubble of his own making.

If he managed to emerge into normal space at some point just outside Earth's atmosphere, beyond range of the cruisers, his driveless ship would descend as a blazing meteor. If, by some miracle, he could emerge into normal space just a few inches above the space-field it would be to materialize into space already occupied by air. Such a materialization would be simultaneously fatal to him and to the electronic components of the shuttle and computer.

And if he did not move the ship, the Slug cruisers would disintegrate

him. He had four hypothetical choices of his way to die, all equally unpleasant.

He smiled wanly at his reflection in the bright metal bordering the viewscreen and said, "Brother--you've had it!"

* * *

He went to the control room, there to brush his fingers across the useless control buttons and look into the viewscreen that revealed only black and limitless Nothing.

What was the warp? Surely it must have definite physical laws of some kind. It was difficult to imagine any kind of existence--even the black nothing of the warp--as being utterly without rule or reason. If he knew the laws of the warp he might find some means of survival hitherto hidden from him.

There was only one way he could lear-- about the warp. He would have to question the computer and continue questioning it until he learned or until his time was up.

He returned to the computer and considered his next question. The computer had calculated their positions from observations of the sun and other stars in front of the ship--what would similar calculations based on observations of the stars behind the ship reveal? He typed:

USE FIRST THE TRIANGULATION METHOD AND THEN THE SPECTRUM-SHIFT METHOD TO DETERMINE OUR POSITION FROM OBSERVATIONS MADE OF THE STARS OF OPHIUCHUS.

The answers appeared. They showed the ship to be simultaneously speeding away from Ophiuchus and toward it.

He asked: DO THESE TWO POSITIONS COINCIDE WITH THOSE RESULTING FROM THE OBSERVATIONS OF ORION?

YES, it answered.

Was the paradox limited to the line of flight?

He asked the computer: WHAT IS OUR POSITION, COURSE AND SPEED AS INDICATED BY THE STARS AT RIGHT-ANGLES TO OUR FORWARD-BACKWARD COURSE; BY THE STARS OF URSA MINOR AND CRUX?

The answer appeared on the panel: the ship was racing sideward through the warp in two diametrically opposed directions, but at only one-third the speed with which it was racing forward and backward.

So now the ship had four impossible positions and two different speeds.

He frowned at the computer, trying to find some clue in the new data. He noticed, absently, that the hand of one of the dials was near zero in the red section of the dial. He had not noticed any of the dials registering in the danger zone before . . .

He jerked out of his preoccupation with apprehension and typed: TELL ME IN NON-TECHNICAL LANGUAGE THE MEANING OF THE HAND NEAR ZERO ON THE DIAL LABELED MAX. ET. REF.

It answered: ONE OF MY CIRCUITS WAS DAMAGED BY THE SUDDEN RELEASE O-- AIR PRESSURE. I WILL CEASE FUNCTIONING AT THE END OF FOUR MORE MINUTES OF OPERATION.

He slammed the master switch to OFF. The lights on the board went

out, the various needles swung to zero, leaving the computer a mindless structure more than ever resembling an overgrown refrigerator.

Four minutes more of operati--n . . . and he had so many questi--ns to ask before he could hope to learn enough about the warp to know what he should do. He had wasted almost an hour of the computer's limited life, leaving it turned on when he was not using it. If only it had told him . . . but it was not the nature of a machine to voluntarily give information. Besides, the receding hand of the dial was there for him to see. The computer neither knew nor cared that no one had thought it worthwhile to teach him the rudiments of its operation and maintenan--e.

It was 12:52. One hour and one minute left.

He put the thought aside and concentrated on the problem of finding the key to the paradox.

What conceivable set of circumstances would cause receding stars to have a spectrum shift that showed them to be approaching the ship? Or, to rephrase the question, what conceivable set of circumstances would cause approaching stars to appear to dwindle in size?

The answer came with startling suddenness and clarity:

There was no paradox--the ship was expanding.

He considered the solution, examining it for flaws of logic, and found none. If he and the ship were expanding the wave length of light would diminish in proportion to the increasing size of the retinas of his eyes and the scanner plates of the transdimensional viewscreens: would become shorter and go into the ultraviolet. At the same time, the

increasing size of himself and the ship would make the Earth and sun relatively smaller and therefore apparently receding.

The same theory explained the two different speeds of the ship: its length was three times its diameter so its longitudinal expansion would proceed at three times the speed of its cross-sectional expansion.

Everything checked.

How large was the ship now?

He made a rough calculation and stared almost unbelievingly at the results. He was a giant, more than a third of a light-year tall, in a ship that was six light-years long and two light-years in diameter. Far Centauri, which had required thirty years to reach in the fastest interplanetary ship, floated seventy-one feet away in the blackness outside the hull.

And the sun and Earth were in the room with him, going into the shuttle's silvery focal ball.

He would have to ask the computer to make certain his theory was valid. His time was too critically short for him to waste any of it with speculation based on an erroneous theory.

He switched on the computer and it lighted up again. He typed rapidly:

ASSUME THIS SHIP TO BE MOTIONLESS AND EXPANDING WOULD THAT THEORY SATISFACTORILY EXPLAIN ALL THE HITHERTO CONTRADICTORY PHENOMENA?

There was a brief pause as the computer evaluated its data, then it

answered with one word:

YES.

He switched it off again, to squander none of its short period of usefulness until he had decided upon what his further questions should be. At last, he had some grounds for conjecture; had learned something about the warp the designers of the shuttle had not suspected. Their calculations had been correct when they showed a ship would travel in the warp at many times the normal space speed of light. But somewhere some little factor had been overlooked--or never found--and their precise mathematics had not indicated that the travel would be produced by expansion.

Nature abhors a vacuum. And the black, empty w--rp was a vacuum more perfect than any that existed in normal space. In the normal space universe there were millions of stars in the galaxy and millions of galaxies. In the warp there was utter Nothing. Did the physical laws of the warp demand that matter be scattered throughout it, in emulation of its rich neighbor in the adjoining dimension? Was the warp hungry for matter?

He rejected the thought as fantasy. There was some explanation that the physicists would eventually find. Perhaps there was a vast size-ratio difference between the two dimensions; perhaps the warp was far larger than the normal space universe and some co-universal law demanded that objects entering it become proportionally larger.

None of that aspect of his circumstances, however, was of importance. There was only one prime problem facing him: how to move the ship within less than an hour to some point in the warp where his emergence into normal space would result in neither instant nor days-away death and where he would have the time to try to carry out the responsibility, so suddenly placed in his hands, of

delivering the space warp shuttle to the Thunderbolt.

The long-range task depended upon his immediate survival. He had to move the ship, and how did a man move a driveless ship? It might not require a very large propulsive force--perhaps even an oxygen tank would serve as a jet. Except that he had none.

He could use part of the air in the ship. Its sudden release should move the ship. There was a sun very near: Alpha Centauri. If he had the proper tools, and the time, he could cut a hole in the hull opposite Centauri . . . but he had neither the tools nor the time.

And what good would it do him if he could emerge into normal space at the desired distance from Centauri? He would be provided with power for the air regenerators by the solar power units but not power sufficient to operate the shuttle. He would breathe, and eat, for a week. Then the small amount of food on the ship would be gone and he would breathe for another four or five weeks. And then he would die of starvation and his driveless ship would continue its slow drift into the sun, taking his bones and the shuttle with it.

He would h--ve to go to S--rius and he would have to reach it the first try or never. If he could emerge into normal space at the proper distance from Sirius he would have power from it to operate the communicator. The Thunderbolt would come at once when it received his message and swallow the little Argosy in its enormous hold. The return to Earth would be the swift one through the warp and the Slug cruisers, so bold in pursuit of unarmed interplanetary ships, would quickly cease to exist.

At 13:53 Sirius would be somewhere in or near the bow of the ship. The ship would not have to be moved more than two thirds of its length--twenty meters. He could do that by releasing part of the air in the shuttle room through the sternward airlock.

How much air?

He tried to remember long-forgotten formulas. So many cubic feet of air at such and such a pressure when released through an opening of such and such a diameter would exert a propulsive force of . . . Hell, he didn't know. And not even the computer would be able to tell him because there were so many unknown factors, such as the proportion of the ship's mass lost to the Slug blasters, the irregular shape of the airlock opening, the degree of smoothness of its metal . . .

He made calculations with pencil and paper. He would have to move the ship with extreme precision. A light-hour short of the proper distance put him too far from the sun for it to power the communicator, a light-hour beyond put him in the sun's flaming white --eart. One light-hour out of eight point six light-years was approximately one part out of seventy-five thousand. He would have to move the ship with an accuracy of point aught three centimeters--one hundredth of an inch.

One hundredth of an inch!

He laid the pencil back down, almost numbly. He could never open and close an airlock and move a mass of thousand of tons with an accuracy of a hundredth of an inch. The very thought was wildly fantastic.

He was already far closer to Sirius than he would be if he tried to get any closer. And that was over eight light-years from it.

He looked at the chronometer and saw the hands had already reached 13:20. Thirty-three minutes left to him. Sirius was near--soon it would be in the bow of the ship--and Sirius was eight point six light-years away.

How could he move the ship a certain distance accurate to one hundredth of an inch? He couldn't. The answer was blunt and ugly: he couldn't.

He got up and walked across the room, feeling like a man who had in quick succession been condemned, reprieved, recondemned. He had been projected into a situation for which he had had no preliminary training whatever; had been made sole custodian and operator of a computer and a space warp shuttle that he had never before been permitted to touch. He had used the sound but not at all brilliant mind nature had given him to solve the riddle of the paradoxes and learn where he was and where he wanted to go. He had done quite well--he had solve-- every problem of his survival and the shuttle's delivery except the last one!

He passed by the shuttle and stopped to rest his hand on the bright, silvery focal ball. The solar system would be deep inside the ball; the atoms of the ball larger than Earth, perhaps, and far more impalpable than the thinnest air. The Slug cruisers would be in there, infinitesimally tiny, waiting for him to return . . .

No--faulty reasoning. The solar system was as it had always been, not diminished in size and not really in the ball. It was only that two different points in two different dimensions coincided in the ball . . .

He saw the answer.

He did not have to move the ship to Sirius--he had only to move the ball!

* * *

There would be little time, very little time. First, to see if the warp shuttle was portable--

It was. When he unfastened the clamp that held it to the stand it lifted up freely, trailing a heavy cable behind it. He saw it was only a power supply cable, with a plug that would fit one of the sockets in the--bow of the ship. He left the shuttle floating in the air, leashed by the cable, and went to the computer. Next, he would have to know if Sirius would be fully in the ship--

He switched the computer on and typed:

DETERMINE THE DISTANCE FROM THE CENTER OF THE WARP SHUTTLE'S FOCAL BALL TO THE SPACE WARP POSITION OF SIRIUS AT 13:53, BASING YOUR COMPUTATIONS ON THE EXPANDING-SHIP THEORY.

It gave him the answer a moment later: 18.3496 METERS.

He visualized the distance, from his knowledge of the ship's interior--and saw the position would be within --he forward spare-parts room.

Next, to learn exactly where in that room he should place the shuttle. He could not do so by measuring from the present position of the shuttle. The most precise steel tape would have to be at exactly the right temperature for such a measurement to be neither too short nor too long. He had no such tape, and the distance from the focal ball was only part of the necessary measuring: he would have to measure off a certain distance and a precisely certain angle from the purely imaginary central line of the ship's axis to intersect the original line. Such a measurement would be impossible in the time he had.

He considered what would be his last question to the computer. The hand was touch--ng the zero and his question would have to be worded very clearly and subject to no misinterpretations. There would be no follow-up questions permitted.

He began typing:

IT IS DESIRED THAT THIS SHIP EMERGE INTO NORMAL SPACE ONE LIGHT-HOUR THIS SIDE OF SIRIUS AT 13:53. THIS WILL BE ACCOMPLISHED BY MOVING THE WARP SHUTTLE TO SUCH A POSITION THAT ITS FOCAL CENTER WILL BE IN A SPACE WARP POSITION COINCIDING WITH A NORMAL--SPACE POSITION ONE LIGHT-HOUR THIS SIDE OF SIRIUS AT 13:53. CONSIDER ALL FACTORS THAT MIGHT HAVE AFFECTED THE DIMENSIONS OF THIS SHIP, SUCH AS TEMPERATURE CHANGES PRODUCED BY OUR NORMAL SPACE ACCELERATION AND DECELERATION, WHEN COMPUTING THE POSITION OF SIRIUS. THEN DEFINE THAT LOCATION IN R--LATION TO THE STRUCTURAL FEATURES OF THE ROOM'S INTERIOR. DO THIS IN SUCH A MANNER THAT PLACING THE SHUTTLE IN THE PROPER POSITION WILL REQU--RE THE LEAST POSSIBLE AMOUNT OF MEASURING DISTANCES AND ANGLES.

It seemed to take it an unduly long time to answer the question and he waited restlessly, unpleasantly aware of the hand touching zero and wondering if the computer's mind was baffled by the question; the mind that thought best in terms of orderly mathematics and could not know or care that measurement by protractor a--d tape would result in a position fatally far from that described by the neat, rigid figures.

Then the answer appeared, beautifully concise:

POSITION WILL BE IN CORNER OF ROOM, 764.2 CENTIMETERS ABOVE FLOOR PLATE, 820 CENTIMETERS PERPENDICULAR TO PANEL AA, 652.05 CENTIMETERS PERPENDICULAR TO PANEL AB.

The computer died with an oddly human sigh. Its last act had been to give him the location of Sirius in such a manner that he could accurately position the shuttle's focal ball with the aid of the precision measuring devices in the ship's repair room.

He went to the shuttle and picked it up in his arms. It was entirely weightless, and each magnet-clicking step he took toward the bow of the ship brought Sirius almost half a light-year nearer.

* * *

He squinted against the white glare of Sirius in the viewscreen as he continued his terse report to the Thunderbolt's commander: "I have about a week's supply of food. How long will it be until you reach me?"

The commander's reply came after the pause caused by the distance involved:

"We'll be there within three days. Go ahead and eat hearty. But how did you travel from Earth to Sirius in only two hours? My God, man--what kind of a drive did that ship have?"

"Why, it didn't have any drive from the start," he said. "To get here I"--he frowned thoughtfully--"you might say I walked and carried the ship."

THE HARVEST

Editor's note: I mentioned, didn't I, that Godwin had a grim side to him? The very short story which follows, even more than "The Cold Equations," may well deserve the title of "the grimmest science fiction story ever written." I'm not sure why, but I love it. Maybe it's because of the wry humor I detect in it. Then again, maybe it's just

because I'm nuts.

It was Harvest time.

The Sky People waited where the last tenuous vestiges of atmosphere met the nothing of outer space, invisible to the land creatures below who had no way of perceiving life forms that were almost pure energy. Harthon and Ledri waited a little apart from the others, soaring restlessly on scintillating wings in the light-stream from the sun.

For many days the Release field had enveloped the world below, clouding and distorting the surface of it to the perception of the Sky People with the violence of its psycho-persuasion bands. Now the field was lifted, its work done. There remained only the last little while of waiting before the fralings came; the intoxicating, maddeningly delicious fralings that filled the body and mind with a singing, ecstatic fire . . .

"There are so many of us this time," Ledri said. "Do you think there will be enough fralings?"

"Of course," Harthon reassured her. "There are more of them, too, and they've learned how to send us as many as we need. There will be more fralings this time than ever before."

"The Harvest--" Ledri's thought was like a nostalgic sigh. "What fun they are! Do you remember the last one, Harthon? And the night we danced down the moonbeams to meet the fralings coming up, before they had ever reached the nets of the Gatherer?"

"I remember. And afterward we followed the sun-stream out, so far out that the world and the moon were like a big and a little star behind us. And we sang . . ."

"And you. And then we were hungry again and we let the sun-stream carry us back to the feast where the others were laughing because someone had almost let a fraling escape. Everyone was so happy and the world and the stars were so beautiful. The poor creatures down be--ow"--a touch of sadness came over her--"they don't know and can never know what it's like . . ."

"It has to be that--way," Harthon said. "W--uld you change it if you could?"

"Oh, no! They have to stay there and we have to watch over them. But what if they should do something beyond our control, as the Wise Ones say they may do some day, and then there would be the Last Harvest and never again any fralings for us?"

"I know. But that may not happen for a long time. And this isn't the day for worrying, little shining one--not when the feast begins so soon."

Their wings touched as they turned in their soaring and looked down upon the great curve of the world below. The eastern sea was blue and cloudless; the western continent going into the evening and the huge mass of the eastern continent coming out of the night. The turning of the world was visible as they watched; the western rim of the western continent creeping very slowly into the extinction of the horizon.

"Can the land people tell when we're watching them like this?" Ledri asked.

"No. They know we're up here, but that's all."

"How did they ever--"

A little sun blazed into being on the western continent, brighter than

the real sun. Others followed, swiftly; then they began to flare into life on the eastern continent--two fields of vivid flowers that bloomed briefly and were gone. Where they had been were tall, dark clouds that rose higher still, swelling and spreading, hiding the land beneath.

The Summoner gave the call that was like the song of a trumpet and the one who had been appointed Gatherer poised his far-flung nets.

"They're coming--the fralings!" Ledri cri--d. "Look at them, Harthon. But there are so many"--the worry came back to her--"so many that maybe this is the Last Harvest."

"There aren't that many," Harthon said, and he laughed at her concern. "Besides, will we care tonight?"

The quick darkness of her mood vanished and she laughed with him. "Tonight we'll dance down the moonbeams again. And tomorrow we'll follow the sun-stream out, farther than ever before."

The fralings drew swiftly closer, hurrying like bright silver birds.

"They're coming to us," Ledri said. "They know that this is where they must go. But how did the land people ever learn of us?"

"Once, many centuries a--o, a fraling escaped the nets l--ng enough to go back for a little while. But fralings and land people can't communicate very well with one another and the land people misunderstood most of what it tried to tell them about us."

The fralings struck the invisible nets and the Gatherer gave the command to draw them closed.

"Let's go--the others are already starting," Harthon said, and they went with flashing wings toward the nearer net.

"Do the land people have a name for us?" Ledri asked.

"They call us--'angels,' and they call the Gatherer 'God.' "

The fralings, finally understanding, were trying frantically to escape and the terror of the small ones was a frightened, pleading wail.

"And what do they call the fralings?"

"They call them their 'souls.' We'll eat the small, young ones first--they're the best and there will be plenty for all."

EMPATHY

The crisis with the natives was at hand and still the ERB showed no sign of permitting a Frontier Corps officer to make any suggestions.

For the fifth time that day Captain Harold Rider walked up the single dusty str--et of what had been his Frontier Corps outpost on Deneb Five until the unexpected arrival forty-eight hours before of General Beeling and his Extraterrestrial Relations Board unit. He--came to the huge ERB Headquarters prefab at the end of the street. There, still on duty at the door, was the ferret-faced guard who had turned him back twice before.

The guard lounged indolently against the wall, seemed not to see Rider. But when Rider reached out to open the door he came to life with a quick sidestep that barred the way,--straightening to attention with his hands brushing his holstered blaster a--d club.

"No a--mittance!" he snapped, with the crisp intonation of those who enjoy authority. "General Beeling and the others must not be disturbed, as I told you before."

He added, with deliberate delay, "--sir."

Rider withdrew his reaching hand and considered the pleasure of smashing the pointed chin and walking into the building across the man's stomach. He regretfully dismissed it as wishful dreaming. The feud between the old Frontier Corps and the politically powerful and young ERB was approaching its decisive climax and reached even to Deneb. He was a despised and unwanted superfluity in what had been his own camp and they would like nothing better than an excuse to arrest and confine him.

* * *

Quick footsteps sounded inside and the door swung open. It was Colonel Primmer, Beeling's aide, turning with his hand still on the doorknob and almost bowing in the obsequious manner characteristic of him as he said, "You are so right, Gene--al Beeling. Yes, sir. At once, sir."

He turned again and shut the door behind him. The fawning expression vanished from his red face at the sight of Rider and a cold, fishy look replaced it.

"General Beeling is far too busy to see you," he said, "if that's what you're still waiting for."

"It is," he answered. "Surely he can spare a few minutes. Right now we're two shakes away from a mass attack by the natives and if the chief isn't handled just right when he comes for the last talk--this camp will be turned into a slaughter pen. Let me tell--"

"I think," Primmer said, "that the Extraterrestrial Relations Board can successfully cope with a barbarian chieftain without first consulting a layman. As for that other matter with which you've been trying to

annoy the general all day: he requested me to inform you that the helicopter will not be available to you, that there are issues before him of a great deal more importance than the life of your talking dog."

Primmer turned to the guard, pointedly dismissing Rider. "Go tell Mantingly and Johnson that I want them here on the double. Tell Myers to bring his laborers here--"

Rider turned away and went back down the street, wondering again how he could show Beeling the deadly danger of the situation. It was a hell of a problem--how could you convince a man who wouldn't let you talk to him?

He detoured around a mound of crates--part of the huge mass of ERB equipment and supplies that had been hastily unloaded from the special Missions cruiser before it hurried back Earthward--and was met by a gust of wind that whipped the fine, poisonous--sand against his face. Deneb, almost to the horizon, was going down with a purple halo around it and the desert to the southeast was a smoky azure. He could not tell for sure through the haze but the sky above the distant Sea Cliffs seemed to have turned black.

If a storm was in progress there it would already be too late to take the helicopter more than part way to rescue Laughing Girl, the Altairian. But that made little difference--he had virtually no hope of altering Beeling's disdainful regard for what he called "the talking dogs." The helicopter would remain unavailable and he would have to find some other way of saving her.

* * *

Beeling's entire force of laborers and other non-ERB-commissioned personnel was at work along the street, erecting more prefabricated buildings to shelter the supplies. He noticed again the way they

spoke to one another in lowered voices and glanced often toward the ragged hills that surrounded the valley. One of them, a red-haired boy, stepped out and spoke to him:

"Sir--could I ask you a question?"

He appraised the boy automatically: Nineteen, a long way from home, and trying not to show that he was scared.

"Of course," he answered. "What is it?"

"Is it true that the natives have been waiting for weeks for this ERB unit to co--e, so they could kill us all?"

"They didn't even know you existed until you landed here," he said. "Who told you that?"

"Why--" The boy looked suddenly uncomfortable. "I don't remember, sir."

He did not press the question. It would have been something that came down from Beeling or Primmer.

The others had stopped to listen, all of them showing to some degree the same uncertainty that was on the freckled face of the red-haired boy. They were young; the mechanically logical ERB had selected seventeen to twenty-two as the preferred aged for its performers--of manual labor since men of that age were the hardiest and made the most efficient workers on worlds not suited to human life.

The ERB encouraged laborer--enlistments with colorful posters that promised: GOOD PAY AND HIGH ADVENTURE AWAIT YOU BEYOND THE STARS. The b--ys had thought, when they landed two days and nights before, that they had stepped across the threshold of

the promised high adventure and they had --een as excited as children. Now they were solemn and hushed as they tried to adjust themselves to the realization that there would be no adventure, no allure, in quick and violent death . . .

"There may be trouble over your coming," he said, "but it won't be anything that was premeditated. There's a likely chance it won't happen at all. We'll know in a few minutes."

He turned and walked off, feeling them silent and very thoughtful behind him.

At the end of the street was--the little building that had been his office until Beeling's arrival with the special order that had changed the Frontier Corps outpost to an ERB Primary Contact Field Installation. It was there that he and the natives had met and talked so many times in the past and it was there that old Chief Selsin would soon come to what might be the last meeting.

He went inside and saw that his few remaining possessions had been piled in a corner pending further disposal. He walked on to the desk where the hyperspace communicator, borrowed from the Frontier ship, stood locked and silent. One of B--eling's first demands, as new commander of the outpost, had been for the hyperspace communicator's key. Beeling did not need the communicator--he had a similar model in his headquarters building--but a locked communicator could not be used by a displaced Frontier Corpsman to send unauthorized reports to Earth.

The camp-to-ship radio was inside the communicator. He switched it on, to try again to reach his Frontier ship on Deneb One-- The result was the same as before; a shrieking, roaring, ear-splitting blast of static. The sun was squarely between the two worlds and, since it was a white sun, its electronic emission was tremendous. Contact

with the ship was utterly impossible.

He changed the wave length to that of the little shortwave radio under the Sea Cliffs and signaled with the Beep button. There was no response, other than a harsh grinding of static from the storm he thought he had seen, which meant that Laughing Girl must still be out tending to the mineral detector.

He switched the radio off, wondering what he could have told her if she had answered him.

* * *

"Captain--rook!"

Loper, the other shaggy, dog-like Altairian, came running through the door, his eyes bright with excitement.

"Are coming now--oh, hundreds and hundreds. Rook, Captain!"

He looked, where a wide, low pass to the northeast led to the higher country beyond, and saw the natives coming down it. There were perhaps five hundred of them, coming with their dragon-beast mounts in a run, their long rifles across their saddles and their bronze battle helmets gleaming brightly in the late sunlight.

There were nine columns and a different pennant fluttered at the head of each. Which meant that the Nine Tribes were solidly allied under the leadership of old Selsin until the business with the humans was settled.

"Are stirr more coming farther back," Loper said. "Pretty soon awr around us wirr be the big rif'res that can kirr us. Why, Captain?" There was puzzled question in his dark eyes. "We not hurt any of

them."

"They're afraid we might," he said. "We're getting this one last chance to prove we won't."

"If they not berieve us, how soon wirr they kirr us?"

"I think they'll give us a chance to leave, first."

"But we can't reave--our ship is gone."

"That, Loper, is the big, repulsive fly that's in everybody's soup today."

The columns of armed natives split as they reached the bottom of the pass, and raced to nor--h and south along the valley's rim.

"They going to surround us," Loper said. "If they say, 'You not pass,' we have to have the hericopter." He looked away from the natives and toward the Sea Cliffs. "She die there if we not come and nobody care. I not understand."

To Loper it was still incomprehensible that there could be humans who did not like Altairians. He had known only the men of the Frontier ship, who regarded Altairians with the same affection they would have had for loyal and cheerful--and sometimes blundering--twelve-year-old children. Except when it was time to meet the natives of a new world, when the Altairians' highly developed sense of empathy changed their role to that of invaluable coaches and advisors.

* * *

Frontier ships were always undermanned--each year the increasingly huge expenditures of the ERB forced the Space Board to cut the Frontier Corps budget to make up the difference--and the Altairians

diligently performed all tasks--of which they were capable. When the order came through to have Deneb One surveyed immediately he had needed to send his entire crew and had used Laughing--Girl to replace the man tending the electronic mineral detector that had been set up under the Sea Cliffs. It was a job she could manage, since the detector was near-enough automatic in its operation that its supervision required no technical knowledge. This had enabled him to send a full crew to Deneb One, while he remained at camp with Loper to help him and continued the meetings with the natives.

He had intended to take the helicopter to the Sea Cliffs a safe twenty hours in advance of the Big Tide and bring back Laughing Girl and the portable mineral detector. But Beeling had ordered: "Our only means of transportation will not be permitted to leave this camp until this trouble with the natives is fully settled."

By then it would be too late. The three moons of Deneb Five possessed complex orbits that brought the Big Tide every ten days; a titanic bulge in the waters of the oceans that raced around the world at a speed of five hundred miles per hour. The three moons were already on the opposite side of the world, swinging close around it and --ringing the Big Tide with them. It would strike the high, unscalable Sea Cliffs at sunrise and Laughing Girl, still faithfully tending the detector down under them and waiting for him to come for her, would be killed instantly.

To the few of the ERB staff he had managed to talk to, his persistent requests for the helicopter had seemed ridiculous. "Really, Captain," one natty young lieutenant he had cornered outside Headquarters had said, "you're taking the loss of your mascot far too seriously. After all, you can pick up a dozen of the beasts the next time you pass Altair." . . .

"We not got much time, Captain. Are we have to wait much ronger?"

"Not much longer, Loper. Only until the tal-- with Selsin is over."--

"I think he come now."

The long columns were still coming down the pass and parting at the bottom but one native was coming straight toward the camp in a slow trot. It was Selsin.

* * *

"--lively there! Faster, all of you . -- ."

The voice of Primmer, edged with strain, came from the street. Rider went to the window and looked out upon a scene of --onfused activity.

Primmer, with two blasters buckled around him, was trying to post as many guards as possible as quickly as possible; all the laborers and technicians among them. They were being stationed around Headquarters, around the helicopter, and all along the windows of supplies in the street.

"Damn!" he said aloud.

Beeling could have done nothing worse than to order the show of armed defense at a time when everything depended upon regaining Selsin's trust.

The door of the ERB Headquarters building opened and General Beeling stepped out, briskly despite his paunchy overweight. He strode down the street with his pink moon-face looking straight ahead, not glancing once toward the natives. He stopped a moment to say something to Primmer that caused most of Primmer's nervousness to vanish then came on with the bearing of calm

purpose.

"He not worried," Loper said. "How can he not worry now?"

Beeling stepped through the doorway with cold satisfaction on his face and a look at Rider that said, I have your muddled situation well in hand, my man.

"Good afternoon, General," Rider greeted him, and Loper said politely, "Her'ro, Generar Beering."

Beeling's eyes flicked to Loper in brief curiosity then, without answering either of them, he seated himself behind the desk.

"I presume you know we're surrounded, Rider?"

There was the same vengeful satisfaction in his tone as on his face. Rider noticed, absently, that his blouse bulged with the bulk of a concealed blaster.

"I knew they would come ready for war," he said. "When Selsin gets here we'll have our one last chance to avert it and I've been trying to see you all day to tell you we'll have to show Selsin the respect that--"

"My dear Captain," Beeling interrupted, "I have been very busy the entire day supervising a review of all data and deciding upon the best method of counteracting the damage you have done. I feel rather certain that I know how to speak to the native."

Rider kept his face expressionless and said with careful courtesy, "But couldn't you order the guards off duty before Selsin gets here, sir? He'll regard them as proof of--suspicion and enmity on our part."

The soft answer seemed to have slightly lessened Beeling's dislike

for him; Beeling's next statement was more pompous than sarcastic:

"On the contrary, that display of preparedness will prove to the natives that we are quite aware of their hostility and are not to be intimidated by it; that our request for friendship is sincere and does not spring from fear of them."

Rider looked again at the guards, able to count only seven blasters among them, and back to Beeling. "You don't understand, sir--if they call our bluff we won't have a chance."

Beeling's reply was to spread a sheaf of papers on the desk before him and say:

"Here are the Analysis Sheets; the result of almost two days of work by myself and my staff and our computer. For your information, these natives are like children both in the awe and fear with which they regard our weapons and in their eagerness to possess the labor-saving machines, the luxury items and the pretty novelties of our 'grown-up' society. By dramatically presenting the two choices--the gift-laden helping hand or the unyielding fist--they cannot logically do other than ask for our friendship and gifts."

"But it isn't that simple," he protested. "They'll--"

Annoyance passed across Beeling's face and the full degree of coldness returned. "As I remarked, the procedure outlined by the Analysis will counteract the damage you have done. Insufficient data, however, leave two questions answered. One: why have your reports never mentioned the consistent enmity of the natives?"

"Because no enmity ever existed. They were only exercising reasonable caution, due to the experience they had with that other alien race forty years ago."

"Yes? Then perhaps you can answer the other question: why should this 'reasonable caution' flare so suddenly into a lust for war? What did you do to make them hate humans so?"

"-- lied to them. They were almost ready to agree to everything but they wanted a little more time in which to be sure that we would not betray their trust as that other alien race did. I gave my solemn promise as the representative of Earth that no reinforcements would come in the meantime. And within forty-eight hours after receiving its copy of my report to the Frontier Corps, the ERB had you and thirty men and a hundred tons of supplies on the way to Deneb.

"Just what do you suppose the natives thought of my truthfulness--of the truthfulness of any human--when that cruiser dropped down out of the sky and men and equipment began rolling out of it?"

"I see," Beeling said acidly. "You were the innocent victim of unfair circumstances. But, as the ERB informed the Supreme Council, you had accomplished nothing concrete in your six months here and this world was too badly needed by Earth to permit any more cautious delays. Despite anguished wails of protest from the Frontier Corps we p--rsuaded the Supreme Council to transfer command of this outpost to the ERB. I was dispatched at once to analyze the situation, to remedy whatever mistakes you had made, and to gain the cooperation of the natives as quickly as possible.

"I trust"--the acidic dislike increased--"that properly explains my presence here."

Loper lifted his ears toward the door and Rider heard the squeak of saddle leather.

"I hope your plans work out the way you think," he said. "Selsin is

here."

* * *

Selsin was so big that his bulk in the doorway half darkened the --oom as he came through. He was seven feet tall, black as coal, with muscles that bulged and rippled as he walked. He had the thin, curved nose and pointed ears of a devil, while his green, glittering eyes under slanting brows added to his satanic appearance.

His bristling blue-gray head was bare; he had left his helmet on his saddle, together with his rifle and sword, as a gesture of peaceful intention.

"Chief Selsin!" Beeling rose, smiling. "You honor us. I'm sorry there was no one to meet you--I told my aide--"

"It is of no importance." Selsin spoke in accented Terran. "I came to hear you, not your assistant."

"Ah--of course. Will you sit down?"

Selsin did so, the chair creaking under his weight. He waited for Beeling to speak, regarding him with a mocking half smile. The smile was meaningless--the cheek muscles of the natives were different from those of humans and caused their lips to turn upward at the corners--but it could be rather disconcerting to a human at first.

Beeling cleared his throat. "I see you came alone. At the end of our brief meeting yesterday I requested that all nine of you tribal chiefs come again this afternoon so I could tell all of you that I am here to help you."

"You told us that yesterday," Selsin said. "I came today to hear your

proof."

"Ah--of course."

Beeling looked down at the Analysis Sheets, a touch of uncertainty in his manner. It's all right, Rider thought as he watched him, to speak of handling the natives as one would handle children--but it's a little hard to hang on to that conception when the child is a three-hundred-pound black devil sitting two yards in front of you.

Beeling looked up from the Analysis. "We want the friendship of your race," he said to Selsin, "and your race needs our friendship. We are here on your world only to help you"--stern reproof came into Beeling's voice--"and yet you foolishly prepare to attack us with your puny rifles!"

Selsin's expression did not change. He answered in the emo--ionless manner of one stati--g unalterable facts:

"We do not, we have never, wanted war. But the promise your world made to mine was a lie and your second ship came, bringing more men and great stacks of strange objects which we fear are weapons--and which you are now guarding as one would guard weapons. We do not know how many more of your ships may be on the way, now, with still more men and weapons. We can only hope that if we must fight for our world, we have not waited too long."

"Your suspicions are baseless, your plans are foolhardy," Beeling said with admonishing sternness. "Consider, friend Selsin; think of the terrible price an attack would cost you. You would meet certain defeat--and you would forever forfeit our friendship and our gifts!"

Selsin's black face seemed to turn even darker and his teeth flashed i-- a quick snar--. "Forty years ago we were offered friendship and

gifts, as you are doing, by another alien race--the gini-deglin, the three-eyed --nes. They needed metal to repair their ship and we used all our supply of charcoal to smelt the ores we had mined for them, for they told us they were very grateful and would within a year bri--g us an atomic furnace so we would never have to hoard charcoal again. Then, on the day they finished repairing their s--ip, they turned their weapons on us. They butchered thirty, to take along as fresh meat. Three others were killed with a gas that would not mar their appearance, so they could be stuffed and placed in a museum. A man, a woman, and a child--and the child was my sister!"

Selsin leaned toward Beeling, his devil's face ugly with the hatred the memory aroused.

"To them we were --nly animals who had served their purpose. Their pretense of friendship was a lie--we should have killed them all when their ship crashed!"

Beeling's chair squealed as he shoved it back and his hand pawed a-- the buttons of his blouse, reaching in for the concealed blaster. His hand closed around the butt of it and he held it there, still concealed, as he appraised Selsin with wary thoughtfulness. Rider spoke quickly, before he could say or do something that would destroy the last faint hope of regaining Selsin's trust.

"The three-eyed-ones kill and take --pecimens from every world they visit, Chief Selsin. Someday our ships will meet them and they will want some humans as specimens, too. They are already our enemies as well as yours."

Selsin settled back in his chair and his anger faded.

"We have thought of that," he said. "We had hoped that your race would be our ally should they ever return. But now--does it matter

whet--er a race is killed for food and specimens or killed to get it out of the way for worldwide mining operations?"

Rider told Selsin again, for what would probably be the last time, why his world was needed by humans:

"Earth's policy strictly forbids colonizing a world against the wishes of its inhabitants. This world is doubly forbidden--beryllium is present in the dust over all its surface, in a form that would be fatal to humans within--two years.

"But we need domed repair and refueling bases here for our exploration, survey and colonization ships bound for worlds farther on. This is the only world within three hundred light-years that has metal for repairs, and that has the --are earths and elements that make our ships' hyperspace drives possible. You have such an abundance on this world that fifty centuries from now we would have used less than one-tenth of one percent, yet that small amount is so necessary to us that if we cannot have it we will have to abandon all further exploration in this sector of space."

When he had finished Selsin sat still and thoughtful, his green eyes unwaveringly on Rider's as though trying to see inside Rider's mind and know that he spoke without deceit. Rider had the feeling that Selsin's suspicions were wav--ring before an almost desperate desire to believe.

Then Beeling, his composure regained, jerked his chair back to the desk with another noisy squeal. He cleared his throat in a profound manner, ready to resume the talk with Sels--n, and Rider crossed his fingers with a wordless prayer that something would happen to interrupt him before he could again anger Selsin.

* * *

The interruption came: a signal beep from the radio beside the hyperspace communicator, the call from Laughing Girl at the Sea Cliffs.

Rider stepped to the radio, reaching past the scowling Beeling to turn the volume to maximum. A muffled roaring filled the room when he did so, static grinding and crashing through it.

"Go ahead, Girl," he said into the transmitter.

"A awrfur storm come, Boss"--Laughing Girl's voice was hard to hear through the roaring--"from off the sea--a wind that tear down the detector and scatter our record tapes and I try to find them but it are so dark with brack crouds and rain and then the sea come in and things are in it, things that--"

A louder --oaring drowned out her voice. He waited, knowing that she was frightened. Whenever she was scared and faced with problems too great for her, she called him "Boss" and talked in the quick, rushing manner of a child.

Her voice came in again:

"--and then they see me rooking for the record tapes and they run after me, awrfur big things with craws and beaks, a--d they are stirr coming and I have no prace to hide. Terr me what to do, Boss--"

"Run to the cliffs!" he ordered, in his mind the vision of the lumbering horde of two-ton Elephant Crabs closing in on her. "Climb as far as you can up that crevice in the cliffs--they're too big to follow you in--and wait for me."

"Wirr you come for me soon--before the Big Tide?"

"I'll be there. Now, run!"

"Okay, Boss--I run."

He lifted his hand to the switch, then paused as he heard deep, jarring sounds through the wind's roaring. Four seconds later there was a loud crashing, a snap, and sudden silence. The monsters had smashed the transmitter in their pursuit of Laughing Girl.

He switched off his own transmitter and said in answer to Beeling's questioning, irritated look, "A local tornado. Sometimes one will precede the Big Tide and push a small tide ahead of it."

"They awrfur crose behind her," Loper said. He looked at Beeling with worry and accusation in his eyes. "We are supposed to go after her yesterday but you say, 'No.' Now, maybe awready they are catch her and kirr her."

Beeling glanced at Loper with the same momentary curiosity he had exhibited before, then he gave his full attention to Selsin. He began in a tone of smooth sincerity:

"You are an exceptionally intelligent person, Chief Selsin, or you would never have risen to your position as leader. Therefore, I know you are far too wise to betray the trust of your people in you by making the wrong choice of the two kinds of future offered your world.

"Should you refuse to cooperate with us, we would be forced to reroute our ships through other sectors of space and your world would see no mor-- of us for centuries to come. You would continue to stagn--te here--you are --o doubt aware that the resources of your world are such that you can never leave it without our help. Your unlimited wealth of minerals is of no use to you--you have no coal deposits, no tree--, nothing but scrawny shrubs with which to make a

meager supply of charcoal for smelting. There is no oil on your world; you have no fuel for steam engines or internal combustion engines. Your environment will force you to remain in a state of barbarism, nomads in animal skins, with priva--ion your only known way of life.

"This we can alter for you, in wondrous ways beyond your imagining. We will give you atomic furnaces, processing plants, manufacturing machinery. W-- will help you build factories that will produce not only all the things you need but also luxuries beyond counting--the very same luxury goods our own society uses! And we will give you costl--ss and unlimited power for your--factories and homes and vehicles by showing you how to get it out of a rock which is to be found all over your world; a magic rock we call --uranium' but for which you probably don't even have a name."

* * *

Beeling paused, as though for effect. He was smiling at Selsin, very sure of himself.

"Choose, Chief Selsin! Will you condemn your race to a future of poverty and stagnation by refusing to cooperate with us? Or will you give them all the achievements and luxuries of a civilization three thousand years in advance of theirs--will you be the wise leader and accept this tremendous payment which we offer for merely your race's friendship?"

Selsin stood up, on his face an anger and hatred such as Rider had never seen. He looked down at Beeling and gave his answer in words that came like the spitting of a tiger:

"My people's insignificant friendship is not for sale today, human!"

Beeling gaped in incredulous disbelief.

"You--refuse?"

Selsin turned to Rider.

"We believed your promise, until your reinforcements came. Even then we still had a faint hope that you humans were sincere. Now I know we were wrong. It is better so."

"You know we can't prove our good intentions," Rider answered. "Not here and now, in this room."

"I realize that. But I wanted to know the attitude of your superior toward my race. As he regarded us, so likely would all the others who would follow him. My people and I wanted to kn--w if we would be regarded with respect, or if we would be dismissed as an inferior species to be used for human purposes.

"I learned. We are backward ba--barians, simple savages who can be bought and then ignored."

Through the anger on Selsin's face something like regret showed for a moment, something like a look of farewell.

"I do not think it is your fault--but you are one of them and responsible with them. This is our world and we will live here and fight here and die here--but we will be no race's inferiors here."

Then the regret was gone as Selsin turned back to Beeling.

"You will be given until sunrise tomorrow to recall your ship and leave this world. If you and all the other humans are not gone by then, we will have no choice--but to remove you."

Then, not waiting for an answer, Selsin strode to the door.

Beeling half rose, still gaping with amazement. "Wait--"

* * *

The door closed behind Selsin's broad back and Beeling ordered sharply, "Call him back, Rider! Something is wrong--he didn't understand my offer."

Rider listened to Selsin's dragon-beast departing in a fast trot. "He understood you," he said to Beeling. "But you cooked our goose by not understanding him."

"He failed to comprehend," Beeling said flatly. "Or else--and I'll have that question put to the computer--he's bluffing, trying to extort still more from us. --n either case, he knows we can't leave here; he knows the Special Missions cruiser has gone back to Earth and the Frontier ship can't receive our signals."

"He didn't believe that explanation yesterday and he doubly doesn't today."

"Something is wrong," Beeling said again. "The Analysis showed the natives to want all the things I offered him. They don't even have wooden-wheeled carts--and yet, instead of the grateful acce--tance that the Analysis predicted, the native's reaction was one of irrational enmity."

"Didn't you know the Analysis was meaningless drivel?" he asked.

Beeling jerked up his head with a shocked expression, as though Rider had uttered an obscene heresy. "What do you mean by that?"

"All your calculations are based on the assumption that the species being studied is as emotionlessly logical as one of your computers.

That worked once, with that ant-like race on Medusa, and it was played up by the ERB politicians until now most of the Supreme Council believes the ERB claim that relations with alien life forms has been reduced to an exact science by the ERB and the slow methods of the Frontier Corps are worthlessly obsolete. But the ERB has failed on every world since Medusa, even though you've kept the fact covered up, and now you've failed here. I tried to tell you from the day you --ame, that Selsin and his race are proud individualists and it would be a fatal mistake to try to convert them into ma--hematical equations."

Beeling smoothed the Analysis under his fingers. "We made a mistake; the mistake of depending upon a Frontier Corps layman to procure adequate data for our Analysis, among which would have been Selsin's emotional instability. It is a mistake that will not happen again. I can assure you."

"I suppose you'll send a full report of this to Earth, at once?"

"A most complete report. Why do--you ask?" Beeling answered.

"Because in the morning you're going to die, and I, and all those kids out there, and you can--try to prevent such a thing happening again by telling not the ERB but the Supreme Council exactly what caused it."

"I assure you, the ERB will properly present the facts to the Council."

"No--not the true facts. You know that, Beeling."

-- "General Beeling. And what are you trying to--say--are you asking me to omit mention of the incompetence on your part that created this situation?"

"I'm asking you to tell the Council that you followed all the rules in the

ERB textbooks and did exactly what the Analysis told you to do and that you and everyone here is going to die because you did so. Tell them that if a form of life behaved according to absolutely predictable rule and logic it wouldn't be anything intelligent--it would be a veg--table."

Beeling smoothed out the Analysis sheets again. "Do you really think I might give my superiors hysterical nonsense like that?"

He knew that further argument would be useless. He had already explained to Beeling that a Frontier Corpsman, or any man first meeting an alien race, had to base his actions upon the reactions of the natives; he had to develop something like a sixth sense in detecting their emotions and let that be his guide or he would become enmeshed in misunderstandings that would result in death for him and the loss of the new world for Earth.

Beeling had refused to listen and had laughed outright when Rider told him the Altairians were far better than any human sixth sense; that all Frontier and ERB ships should carry Altairians and that the ERB's erroneous classification of the Altairian race as "Animals" unjustly condemned them to continuing half-starvation on their rocky, barren world by denying them the assistance that Earth's empire gave to all needy forms of life that had been classified as "Intelligent inhabitants."

* * *

Loper moved restlessly, sensing his emotions and disturbed by them. He spoke with the suddenness and frankness of a child:

"Once Sersin awrmost berieve us, Captain. He come in thinking with question and uncertain, and hoping very much we are his friends but afraid we not be. Then you terr how we need his friendship and not

ever harm his race even if they not want to be our friends. Sersin rook at you he awrmost happy, awrmost ready to berieve you, then Generar Beering speak about awr the things humans have that Sersin's race don't have and say very proud, 'We give you awr these things for mer'rey your friendship,' and Sersin get mad and not hope at awr anymore, and when he reave he thinking of fighting and kirring. He not rike, but he know it ha--e to be. Why it have to be?"

"You have the animal well coached," Beeling observed. "Its ability--to relate a witnessed incident proves your claim that Altairians are telepathic, I presume?"

"Loper was aware of Selsin's emotions before he ever walked into this room. It isn't telepathy; it's a highly developed sense of empathy. It serves the same purpose."

"I'm afraid your naive trust in the animal's power of--"

* * *

Beeling never finished the sentence. A drum was suddenly beating along the near s--de of the valley; a hard, fast stuttering that rose sharp and clear above the whining of the wind.

"What is that?" Beeling demanded.

"A signal drum, sending the word around the circumference of the valley."

"The word?" For an instant Beeling's face registered blankness. "Do you mean they really intend to attack us?"

"Good Lord--haven't you realized that yet?"

Beeling chewed his lip, his face thoughtful, then shook his head. "You

must be wrong. The Analysis showed that they wouldn't dare attack us."

"The Analysis also showed you how to win Selsin's friendship--remember?"

Beeling looked thoughtful again. "If your guess is correct, we'll have to prepare an impenetrable defense system. How many heavy weapons do you have here, and what kind?"

"The ship's blasters are always the prime defense weapons of a Frontier unit. There are a few other weapons on the ship, too--but now everything is on the other side of the sun. There's one hand blaster in my room, and we have the ten blasters your men brought."

"One?--you have one blaster here?" Beeling glared, "I thought you had a supply of weapons--must every action of a Frontier man be one of mindless bungling?"

"I was trying to make friends with the natives, not kill them."

"Eleven hand blasters to stand off thousands of bloodthirsty savages . . ." Beeling chewed his lip again. "How long can we hold the natives off with eleven blasters?"

"About as long as a snowball would remain firm in hell."

"We need the ship--how incredibly stupid of you to send it away. Our lives are in the balance--"

"Rook!" The voice of Loper interrupted, from where he had moved to the north window. "A smoke signar are going up, too."

Beeling swung with such haste that he knocked the Analysis sheets

off the desk. A tall, black column of smoke was standing up from the high hill at the valley's head. It could be seen for miles, despite the angle at which the wind was making it lean, and it was rolling blacker and higher by the second.

"That will be to summon all the reserve forces from the highlands," Rider said. "They think we're well armed and they'll hit us with everything they have."

Beeling's nervous--movement as he turned back to Rider changed abruptly to decision.

"There's only one thing we can do--evacuate. We'll use the helicopter."

Rider shook his head. "The helicopter is small, for scouting, and can't carry more than three. It's five hundred miles to the nearest safe refuge, the Northern Islands, and the helicopter carries fuel for seven hundred miles. It would be a one-way trip."

"We'll go as soon as you can check the helicopter f--r the flight."

"We?"

"Colonel Primmer has had only a few hours flying time and I have had none. You will be our pilot."

He shook his head. "I'm as afraid to die in the morning as the next man but I'll be damned if I could--run like that."

Annoyance passed across Beeling's face. "You will obey my order and forget the heroic ideals. It would be only stupid for all to die when some can be saved with the helicopter."

"I agree. But why not let everybody cut cards or draw straws so all

would have the same chance?"

"T--is Field Installation is not a gambling casino. Furthermore, there is an ERB regulation which reads: 'In times of critical danger and limited transportat--on the unit commander will arrange for the survival of his command in the order o-- each individual's importance to the unit as a whole.' "

"I see," he said, and thought: So in the ERB you do even your running by the book?

* * *

Beeling began hastily scribbling a note. "This is an order to Colonel Primmer, authorizing you to go past the helicopter guards. Make sure you overlook nothing in preparing it for the trip."

"I have other things to do. Primmer can check it."

Beeling stopped writing and his face hardened dangerou--ly under its pink softness. "As commander of this outpost and your superior officer, I can have you locked up in chains for insubordination if I wish to. Would you prefer that?"

"It still wouldn't force me to be your pilot. Anyway, you needn't worry about my absence--the helicopter is easily enough handled that Primmer can land you safely at your destination."

He saw that the sun was setting, already a bright, molten silver on the horizon, and he turned to Loper.

"Run to the storage shed and get me that coil of small rope. I'm ready to start."

"Where are you going?" Beeling demanded, suspicion in his eyes and his hand reaching inside his blouse.

Loper ran to the door, using both paws to turn --he knob. He slammed it shut behind him and Rider saw him race past the window, where the spinning, wind-blown dust half obscured the ground. It was a good thing, he thought, that the Altairians were immune to beryllium poisoning. Loper and Laughing Girl would never see any other world again . . .

"Where are you going?"

"The Sea Cliffs," he answered.

"Do you think you can hide from the natives there?"

"Not to hide. To keep my promise to Laughing Girl. The Big Tide is coming and she can't escape it."

Beeling stared, as though he had babbled gibberish.

"You--you're going to walk forty miles through beryllium dust, through armed natives and man-killing beasts, to save an animal--and yet you refuse to lift a hand to help save the lives of your fellow human beings?"

"Or, to be specific, the lives of you and Primmer. That's right."

He went to the corner where his remaining possessions lay and swung the still-full canteen from his shoulder. He kicked his respirator to one side--he would never need it again--and picked up the long-bladed knife.

He shoved the knife in his belt and said to Beeling, "I'm leaving my blaster for the others to use."

Beeling withdrew his own blaster from his blouse and laid it on the desk with the muzzle pointing toward Rider. His hand continued to rest on it as he stared at Rider with cold savage calculation.

The door banged open and a gust of wind scattered the pages of the Analysis across the floor as Loper plunged through. The coil of rope was in his mouth and he was panting from his running as he dropped it at Rider's feet.

"Are you ready to go, Captain--can we hurry now, prease?"

"Just a minute, Rider--"

Beeling reached out with the transmitter key in his left hand and unlocked the hyperspace communicator. His right hand did not leave the blaster.

"You might be interested in knowing what my report will be," he said. He flipped on the signal switch.

"I suppose I already know," Rider answered. "I ask you to overlook our personal differences and tell them the real cause behind tomorrow's massacre. It could go a long way toward saving the lives of others in the future."

Beeling nodded, smiling. "Such a report is precisely what I have in mind. I feel they should know how your blundering Frontier Corps methods had stirred the natives into such a murderous anti-human frenzy that my ERB unit arrived too late to remedy the situation. I shall point out that every world lost by the ERB was due to the incompetence of the Frontier men who preceded the ERB units there and created hatred and distrust among the natives. I shall point out the tragic mistake of continuing to permit Frontier Corps laymen to try

to assume the duties of ERB specialists and I shall urge the Supreme Council let this be the last bloody sacrifice by passing the Harriman Proposal now before it; the proposal that would dissolve the Frontier Corps and pla--e all its ships and men under ERB supervision.

"And it is my duty"--Beeling's smile was as vindictive as the--sting of a wasp--"to report your actions of this afternoon; your flagrant insubordination, your flat refusal to assist in transporting others to safety, your desertion in time of danger, your flight to the Sea Cliffs, leaving the rest of us to do the fighting."

It required a few seconds for Rider to comprehend--the extent of Beeling's mal--ce, then he said, "I thought you were only inexperienced and too blind to see. I didn't know the half of it, did I?"

"It should be obvious to you what my report will do to the Frontier Corps when it's read before the Supreme Council."

It was very obvious. Beeling's report would be the climax of the ERB's all-out effort to absorb the Frontier Corps. The already delicately balanced scales would be tipped, the Harriman Proposal would be passed, and the Corps would cease to exist . . .

"Do you still want to go to the Sea Cliffs?" Beeling asked.

He saw Beeling's prime objective. Beel--ng was still afraid to let the inexperienced Primmer be his--pilot.

"Suppose I should decide to be your pilot?" he asked.

"I certainly couldn't report you as a deserter. In fact, I might find it possible to forget to mention several of the facts concerning you and the Frontier Corps."

He did not reply at once and Beeling added, "What is the welfare of an animal compared with your life and the existence of the Frontier Corps to which, I understand, you and the others have dedicated your lives?"

Loper made a whining sound, looking up at Rider with his face twisted in apprehension.

"What are he mean?" Then he read the answer in the conflicting emotions of the two men and his question came like a despairing whimper. "Are it have to be that way?"

* * *

The hyperspace communicator blinked an orange light and said in a metallic voice:

"Extraterrestrial Relations Board, Communications Center."

Beeling spoke into the transmitter: "Connect me with General Supervision, Classified AA circuit." He turned to Rider. "Which will you take, Rider?"

It seemed to him that he could see the two alternative courses of events with vivid clarity. He could see the dissolution of the Frontier Corps, his name in the records as a coward who had run in vain--and he could see Laughing Girl crouching cold and scared in the --revice, trusting him to come for her before the black ti--e rushed out of the dawn to kill her, knowing in her child-like mind that he would be there in time as surely as she and Loper had raced to him in time that night on Vulcan when he lay injured and helpless under the cliff and the moon wolves were gathering around him for the kill . . .

"Office of General Supervision," the communicator said. "Classified

AA. Give us your report."

"A moment, please," Beeling said to it. To Rider he said, "I give you exactly ten seconds--which will it be?"

Which would it be? Death and infamy at the Sea Cliffs--and know that to the end he had done what seemed right and just to him? Or life and safety and an unmarred record on the Northern Islands, while Laughing Girl died still waiting for him and he knew he was a coward no less than Beeling?

"Now!"

There was the brittle snap of ultimatum in Beeling's single word. He gave his answer:

"I'm going to the Sea Cliffs."

For a moment Beeling sat rigid, so sure had he been that the answer would be the one he wanted. Then he leaned forward, his lips thin and white with the intensity of his hatred and his words half choking in his throat:

"You fool--you incredible fool! I can legally shoot you down where you stand as a deserter!"

The muzzle of the blaster tilted up. Loper's eyes went fire-bright with understanding and his claws ripped at the floor as he threw himself back, into position to leap at Beeling's throat. Rider reached for the knife in his belt, warned by Loper's action and knowing he would never live to throw it. Beeling, in the insanity of his rage, was going to fire-- * * *

"Sir, the natives are--"

Primmer burst into the room and the scene froze. Primmer gawked at Beeling's blaster, at Rider's hand reaching for the knife, then he seized his own blasters and leveled them waveringly on Rider.

"Don't touch that knife!" he commanded. He turned his red face to Beeling. "What is it, sir--what is he trying to do?"

Slowly, almost regretfully, Beeling let his grip on the blaster relax.

"A little matter of desertion," he said to Primmer. He spoke to Rider. "I've changed my mind. You are experienced in eluding danger on alien worlds and you might have a go--d chance of hiding from the natives until a ship comes to pick you up. I hope so. I want you to live, to sit in your death row cell and read about the end of the Frontier Corps before they take you out and hang you as a deserter and a coward."

He motioned toward the door with a quick jerk of the blaster. "Now go! Get out of this room!"

Rider picked up the coil of rope and started toward the door, Beeling's blaster following him. Primmer spoke in protest:

"But General Beeling! As a deserter he should be held for proper punishment, sir--"

Beeling silenced him with a --ard look and turned to the communicator. He began his report:

"General --avid A. Beeling, Unit Twenty, Deneb Five. Subjects: Impending attack of native armies, due to erroneous reports and general incompetence of Frontier Corps commander Captain Harold Rider; Report of Captain Rider's rebellion and desertion on eve of attack; Details of dangerous impracticability of Frontier Corps

methods and--"

The words faded away, drowned by the wind, as Rider and Loper went down the street.

"He rie," Loper said. "They can't berieve him, can't ever hang you, can they?"

He smiled a little. "No, they won't be able to hang me."

He angled across the street, toward the edge of the da--ger-brush thicket, and passed not far from one of the guards. It was the red-haired boy, facing the enemy lines with his weapon, a crate hammer, gripped tightly in his hand. Rider saw the code number on the supplies he guarded: XG-B-193.

"I'll be damned," he said.

"What are he guarding?" Loper asked.

"Exchange items and good-will gifts that the ERB has designated as suitable for barbaric cultures of this type-- He's supposed to fight to the death to --rotect three thousand pounds of glass beads, hand mirrors, and bright red toy magnets."

They went into the thicket and the camp was hidden from view. The winding course of an old animal trail led in the desired direction and they followed it until it skirted the base of a small hill. He climbed to t--e top of it, with Loper at his heels, and looked back at the camp. There was a great deal of activity around the helicopter and he could distinguish Primmer standing to one side and directing the refueling operations.

He looked to the southeast, along his route to the sea, and along the

rocky ridge that lay like a barrier between he saw the natives waiting and watching.

"I think," Loper said, "that they not want us to pass. I think we fight there, Captain."

"You'll stay here, on this hill," he said.

"Stay?" Loper jerked up his head in surprise and defiance. "No!"

"That's an order. I want you to watch the camp until after it's all over with tomorrow."

"I not stay safe whire you fight arone!" Loper braced his forepaws wide-apart and stubborn on the ground. "I not do it!"

* * *

He sat down on a sun-blackened boulder. "Listen, Loper--listen to the reasons why you have to help me:

"The government of Earth is four hundred light-years away and they will have to believe Beeling's story; that the natives are treacherous and hate all humans and that the Frontier Corps goaded them into massacring the entire camp. The natives are honest in their fear and distrust of humans--they think they are fighting for their worl----and there will be no one after tomorrow to tell them they are wrong.

"Except you and Laughing Girl. They might listen to you Altairians since you know humans well and yet aren't human. You must tell them that Earth never takes a world by force, that even Beeling meant well but did not understand, and that all the things I told them Earth would do for them would have been done. And you must stay here until after tomorrow morning and watch the camp so that when a ship comes

from Earth to investigate you can tell the officers exactly what happened here and what caused it to happen. It will be too late to save the Frontier Corps but if they will listen to you it might not be too late for them to see the mistakes that have been made and start over again."

The rigid stubbornness was gone from Loper, understanding and dark misery in its place. "It wrong--everything are happen awr wrong and I never see you again!"

"Yes," he said, "everything is all wrong and shot to hell. I'm trying to salvage the remains the best I can and I have to have your help."

"I do everything you say, Captain."

"For some time this will be your world and Laughing Girl's. Maybe for all your lives. So be friends with the natives and don't blame them for what they did. Remember that."

"Yes, sir. I remember."

He looked at the sunset's violet afterglow and stood up. "I'll have to hurry or I won't get there in time. Good luck, Loper."

"Good-bye, Captain. I--I sorry."

He turned and went down the hill and across the flat beyond. He looked back when he was almost to the ridge and saw Loper still staring forlornly after him.

* * *

He reached the foot of the ridge and climbed its steep slope. Three natives were waiting for him on top, their long rifles in their hands and the smiles on their faces. The one in the center was Resso, a sub-

chief in Selsin's tribe.

"Where would you go, human?" Resso asked in the native language.

"-- would go to the sea," he answered in the same language, and told them why. "I ask permission to pass," he said.

Resso rubbed the breach of his rifle, his eyes thoughtful and hard. "Between here and the sea are many by-paths. You might lose your way and be troublesome for us to find in the morning."

He took the long knife --rom his belt, spun it in the air and caught --t by the blade. The three rifles centered on him as he did so.

"This is my only weapon," he said to Resso. "I think I can put it in your throat before I can be killed--but I ask you to let me save the Altairian first and match it against your rifles tomorrow."

Resso spit on the ground. "Tomorrow I will make you eat it before I kill you."

Rider felt a great sense of relief--Resso was going to let him pass . . .

"I want to ask a favor of you," he said to Resso. "That the Altairians not be harmed."

Surprise showed on Resso's face. "Why should we harm the furry ones? They are only your slaves and not responsible for what humans do."

"Then you promise?"

Resso took a step forward, glowering in quick anger. "Do you have the insolence to question what I say? Be on your way--run, human, and find your hiding place!"

He went, walking past them with the glum thought: This makes Ignominious Exit Number Two. I hope my last one, tomorrow, will have at least a little dignity to it . . . * * *

The desert was miles of red iron sand, across which rocky ridges lay like a hundred randomly flung barriers. Some of the ridges were of limestone, honey-combed with natural caves. These he would have to avoid at all costs since they were the lairs of the ten-foot sand hounds.

He was no more than well started when dark came. He had no light and without a blaster he would not dare to use one if he had it. It would att--act the attention of sand hounds for miles around.

For the greater part, his way was along relatively clear stretches of the wind-packed sand and his progress was fairly fast. At intervals, however, he came to dense and wide-spreading thickets of the poison-thorned desert vegetation and these he had to bypass with time consuming detours.

Once he almost walked upon a band of wild dragon-beasts, grazing silently in the starlight. Only the good fortune of the wind being in his favor prevented them from detecting him and charging. He had to backtrack and then climb a long ridge to get around them. It cost him an hour of time.

The last of the clouds disappeared from the eastern sky as the storm went its way across the Southern Gulf. He was grateful that it had not swerved inland and turned the dim starlight into total darkness. His time margin would be small, at best.

Shortly before midnight he stopped on a sand dune, to rest for the first time. It was there that he saw a tiny, distant red spark; a signal

fire on the hill north of camp. --t blinked for several minutes in a code he did not understand, then went out.

When it did not reappear at the end of two more minutes he got up and resumed his journey to the sea.

Not long afterward the sk-- to the east turned pale; a whiteness that grew swiftly brighter and obscured the eastern stars. It was the dawn of the three moons; the moons that brought the Big Tide with them.

They lifted above the horizon in a flying wedge formation, flooding the desert with cold, white light. He could see well, then, and he hurried faster down the long slopes that led to the sea.

The bright moonlight greatly increased the danger o-- being seen by a sand hound and he had not gone far when one screamed from somewhere behind him. He stopped, and looked back.

He could not see it but he saw something else when he looked to the rocky ridge west of him; flitting shadow-shapes that seemed to be dragon-beasts were keeping pace with him. He wondered if it would be Resso and the others, making certain he would not be hard to find when morning came. They were gone from view before he could be sure he had not imagined seeing them.

He hurried on again. The character of the desert had changed as the elevation decreased and a dry, wiry grass was replacing most of the vegetation. He changed his course slightly so that he could walk down the center of a shallow valley where it grew the thickest, listening for the sand hound to scream again.

It did so, much closer than before. Two more answered it from farther back, then a third. Which made four of them racing toward him, each of them like a reptilian ten-foot greyhound with the claws of a tiger

and the teeth and jaws of a young tyrannosaurus.

He lighted the grass at his feet, then started two more fires on each side of the first one. Within that short time the tinder-dry grass was burning in a solid wall of flame, pushed down the valley by the wind at increasing speed and spreading wider as it went.

* * *

He had to run to get in front of it and then run still faster to keep ahead of it. Through the choking smoke he could see nothing except the red blaze of fire behind him but he heard the sand hounds screeching in frustration beyond it. The sound of their fury faded as he ran on, and then was gone.

A mile farther on he angled to the left, to the rim of the valley where the grass was too thin to burn, and there he rested until his hard panting had subsided. Then he walked on again; to hurry faster and faster as the three moons neared the zenith. Shortly after they had passed the zenith it would be sunrise and the Big Tide would reach the Sea Cliffs.

He saw no more of the phantom dragon-beasts, but the smoke from the valley he had fired lay like a pall across the desert and visibility was limited.

The eastern sky was lightening with the first glow of dawn when he saw the distant gleam of moonlight on the ocean. The delays during the night had been greater than he had thought--there would be no time margin, at all.

He went the rest of the way in a fast trot, the rope ready in his hand.

The sea to the east was flat and calm when he reached the ragged

top of the Sea Cliffs but the pale violet of dawn had turned into a vivid blue-white. Sunrise and the Big Tide were at hand.

He looked down over the edge of the cliffs, down the sheer face of them where the crevice reached up for two hundred feet before it dwindled into nothing, and saw the red-shelled horrors grouped in a thick mass at the bottom. Laughing Girl was above them, wedged tightly in the crevice as far up it as she had been able to climb. It had not been far; the groping claws of the topmost Elephant Crabs were cracking together only inches below her.

He had already tied a series of knots in the end of the rope so she could grip it firmly between her teeth. He dropped the knotted end over the cliff and gave the rope a flip to guide it toward the crevice.

He glanced again to the east, at the calm, flat sea, and in that instant its horizon abruptly swelled and lifted up and became a mountain rushing toward him.

The Elephant Crabs were spilling apart, scrambling to positions of safety where they could anchor themselves against the rough rock surface and be protected by the thick armor of their shells. Laughing Girl was suddenly alone in her refuge, a small black huddle that watched the coming of the Big Tide in frozen helplessness.

The rope was snaking down the crevice as fast as he could play out the coils. He whistled at her as the rope neared her. She jerked up her head, almost falling in her surprise, and greeted him in her native language; a word that was like the joyous yelp of a pup. Then the end of the rope reached her and she seized it between her teeth.

* * *

He hauled up on the rope, bringing it back hand over hand, while

Laughing Girl clawed at the rock to help all she could. She disappeared from his sight where the cliff became vertical and the thin, hard rope was almost impossible to grip tightly as her full weight went upon it.

The tide raced inward as he struggled with the rope; the forefront of an oceanic plateau. Between it and the cliffs the beach and sea below lay like a valley, then a narrow basin, then suddenly a vanishing canyon--

* * *

Laughing Girl's head popped into view and she came--pawing and scrambling over the edge of the cliff. She dropped the rope and leaped toward him in ecstatic welcome.

"You come for me! You--"

The tide struck the cliffs with a thunderous roar, making the earth shake. He seized Laughing Girl by the scruff of the neck and dropped flat to the ground, where he could lock his free arm around a projection of rock. A solid mass of water was flung high into the air by the impact, to descend upon them with a smashing force that knocked the breath from his lungs and bruised his face against the rocks. He held grimly to the rock and Laughing Girl as the mass of water poured back over the cliff, ripping and tearing at him as it tried to take them with it.

They staggered erect as it drained away and ran. A second mass of skyward-flung water came too late to do more than drench them. They stopped a little farther on, along the top of a low ridge.

Behind them the sea growled and rumbled as it surged against the cliffs. Laughing Girl looked back, trembling a little.

"I thought you had forgot me, Boss. I was scared, and I wait and wait . . ."

"Everything is all right, now," he said. "You won't ever have to go under the Sea Cliffs again."

He was tired, weak with near-exhaustion. He wiped the salty water from his face and saw, as something that was no longer of importance, that the sun was up. His job was done, his last duty carried out, and the thing that would happen next was something inevitable and beyond his control. He saw that his knife was gone, washed into the sea--but that no longer mattered, either.

"You will go home now," he said to Laughing Girl. "Don't wait for me. Loper will probably be starting on his way to meet you in a few minutes. He'll tell you about the things that have happened in the past two days. From now on the two of you will do whatever he thinks is best for you."

Her eyes were wide in alarm before he had finished, anxious and questioning.

"What are wrong, Boss? What are going to happen to you--prease, what are wrong?"

* * *

A slow, muffled thudding came from the east and he looked into the bright blaze of the sun to see the dragon-beasts trotting down the ridge toward him. There were six of them and even against the sun he could see the gleam of battle --elmets and the long rifles across the saddles.

"Go home!" he ordered. "Right now!"

She looked from the approaching war party back to him and flung up her head in defiance as Loper had done.

"No! You know they come to kirr you--I can terr. I stay!"

"There are things you don't yet understand, Girl," he said. "For my sake, go now. Run."

"I--" She hesitated, her sense of duty and sense of loyalty conflicting. The loyalty won. "No! I not go!"

He could not permit her to stay. When the natives shot him down she would attack them with a fury that only her own death could stop.

He stepped forward and hit her; a hard, open-handed blow alongside the jaw that sent her rolling. She got to her feet with amazement and hurt in her eyes and he made his tone harsh and ugly:

"I'll not order you but this one more time--go home!"

She obeyed, her tail drooping as she started across the swale. She stopped once, to look back at him, and he motioned her on with a curt gesture.

She was gone from sight when the natives reached him. Resso was not with them--it was Selsin who rode in the lead.

They stopped before him in a semi-circle and regarded him silently, the mocking smiles on their faces.

"It is sunrise," Selsin said.

"It is," he agreed.

"We followed you last night. I wanted to know if you told the truth about going to save the furry one."

"And now," he said, "I want to know if Resso told the truth when he said she and her mate would not be harmed."

"He did."

There was nothing --ore to say, then. He waited, wondering if they were deliberately delaying his execution in the hope of seeing him weaken under the tension.

Selsin spoke again:

"Your superior and his aide escaped in the flier shortly after you left. The fire signal at midnight said they had landed on one of the Northern Islands and were firing steadily at a school of bladder fish. They seemed to think the fish were an attacking party."

He had the impression that Selsi-- and the others were amused. He could understand why--but for himself there was only a sick feeling of shame and the thought: So they wouldn't even leave those kids their blasters?

"It is sunrise," Selsin said again, "and there is no reason to wait any longer. Do you have anything to say?"

"Nothing," he answered, and braced himself for the impact of the bullets.

But the long rifles were not lifted. Instead, Selsin swung down from the saddle and came up to him.

"The furry one--Loper--came t-- me before dark and told me what you had said to him on the hill. Didn't you know that what you were doing

was more proof of good inte--tions than all the promises in the world?"

"I don't understand," he said.

"You claimed from the beginning that humans respected other forms of life and kept their promises to them--but words are only little noises. You proved what you had claimed when you spent what was to be the last night of your life in keeping the promise you had made to a being who was far less human than even my own race."

"But the camp--" He did not dare believe what Selsin's statements impli--d. "They were to be killed at sunrise--"

"I ordered the attack postponed until your actions could be judged. Now, there will be no attack."

* * *

He tried to see past Selsin's meaningless smile, wishing he had let Laughing Girl stay--so she could tell him if they were only taunting him before they killed him.

"You will ride one of the dragon-beasts, if you are ready now," Selsin said. "When you call Earth from your camp today, I will speak to them, too. I want no more misunderstandings."

"What will you tell them?" he asked.

"The truth of it all, and how the fat one boasted and insulted my race, and then ran. I will offer the friendship of my race under the condition that no more of his kind ever be sent here and that you, or others of your choice, be in charge of all operations here.

"I suppose," Selsin added, "that your Supreme Council would like to hear what I have to tell them?"

There was a flash of black across the swale and he saw Laughing Girl running toward them; disobeying his order, after all, and come back to fight beside him. But now she was running with her tail up, her white teeth grinning, and happiness like something tangible about her.

She was an Altairian--she knew that everything was sudde--ly all right. There could be no doubt whatever about Selsin's sincerity, about the future that lay ahead for all of them.

Even for Laughing Girl's race, although she did not yet know it. Loper, in his simple wisdom, had made it possible for Earth to regain the friendship of a badly needed world. The Council, in return, could do no less than to promptly overrule the ERB's classification of the Altairians as "Animals."

"The Supreme Council," he sa--d in--answer to Selsin's question, "is going to be delighted by what you have to tell them. Let's go."

No Species Alone

Editor's note: There is a strong moral component in most of Godwin's stories. Courage, by itself, is never enough. There also has to be an underlying sense of empathy for other creatures. In Godwin's univ--rse, selfishness is perhaps the ultimate sin. We've seen that theme appear many times in his stories. And, here again:

The morning was, to Jim Hart, exactly like any other June morning but for the presence of Gwe----eight weeks was not yet long enough for him to take her as fully for granted as he would in t--e months and years to come. She hummed to herself as she finished wiping the breakfast dishes. Out on the porch Susie and six of the kittens, having just lapped up their own breakfast, were engaged in the after-meal practice of making themselves neat and clean as is the manner of cats. The sky was a flawless sapphire blue with the touch of the sun as warm and gentle as a benediction while the meadowlarks filled the air with their soft melodies.

There was nothing about the morning's soft beauty to presage sudden and vicious peril.

He checked to make sure he had his surveying compass as he stood in the doorway then glanced across the brush-and-tree-dotted flat that extended to the mouth of the canyon a thousand feet away. There the flat broke abruptly along the high, steep bank, a trail leading from the cabin to the break. There was no sign of the pup along the trail, which meant Flopper had gone on up the canyon--he had made so many trips to the uranium prospect that spring that Flopper knew as well as he where they were going for the day.

Gwen wiped the last dish and came over to stand beside him, her

head leaned against his shoulder.

"So it's off for the day you go again." She sig--ed. "I'm glad this is the last day of it."

"Less than a day--I'll be back by noon. Also, from now on we're all set--I found that uranium myself and it's good. My company will take it without a doubt and then I'll be a well-to-do uranium property owner rather than just an employed mining engineer. Doesn't that sound like a bright and pleasant future for us?"

"It sounds wonderful," she agreed. "You can be home all the time and every young wife should have a man around the place--preferably her husband. And another thing--" She looked at the cat and kittens. "If you had to go back to work and they sent you off to South America or somewhere--what would become of them?"

"You gave yourself responsibility when you picked them up. You shouldn't be so soft-hearted. 'Poor little things--out by this lonely road and it's raining and they're cold and hungry and have no home.' That's what you said, and now we have to buy a case of canned milk every month for them. If I had my own way--"

"You did," she pointed out sweetly. "You said, 'Don't just stand there--let's lo--d 'em in the car and be going.' "

"Well--" He considered his defense. "I was weak that night."

"And the pup, Flopper?" she demanded.

"Another weak spell--like the day I finally consented to marry you."

"You consented?" She straightened with indignation. "You consented?"

"Mm-hmm." He nodded with grave seriousness. "I felt sorry for you."

"Why, you--you--" She stuttered, and tried again. "You consented? You--"

"Please, Gwen, do you have to keep repeating everything I tell you, over and over?"

"You told me--I didn't--I mean--oh!" She struck a small fist against his arm. "You're just trying to make me mad again--why are you always doing that?"

"Practice," he said succinctly and put his arm around her shoulders to draw her close to him. "When we have our first big fight, we don't want to be amateurs, you know."

"One of these days," she said, "you're going to really make me mad," but the threat of her words was belied by th-- way she once again rested her head against his shoulder. "Now, admit the truth--you wanted to give Flopper a home and you wanted to give Susie and the kittens a home, didn't you?"

"O.K.--I admit it," he said. "It seems to be a human characteristic to want pets around. Illogical--but human nature."

"Logic, fooey!" She turned her head and made a fa--e at him. "A computing machine is infallibly logical-- but do you think I'd ever want to marry one?"

He raised his brows. "I certainly hope not, that would be ridiculous. Also, you'd get bored with life-with-an-adding-machine."

"I'd sue it for divorce on grounds of mental cruelty. Imagine how life would be if you had to always be logical in everything you did and

never did anything because you wanted t--, like going swimming and playing games --nd giving homes to lost dogs and cats and--and--" She broke off to stare past him, toward the mouth of the canyon. "Look--" She pointed, sudden excitement in her voice. "There alongside the trail--the spotted kitten. He wasn't here for breakfast--there he is now. Susie got h--r fourth one yesterday and now he's found one!"

He followed her gaze and saw the half-grown spotted kitten some three hundred feet away and perhaps fifty feet to one side of the trail--As he watched the kitten circled a few steps, carefully keeping its eyes on whatev--r it was circling as it did so. It was, he saw, holding some--hing at bay in a small area free of brush but was not yet making an effort to kill it.

"It's another one," he said, turnin-- back into the cabin. "I'll kill it on my way to work."

He went into the bedroom and came back with a .38 automatic pistol in his hand. "I used to be a pretty good shot with one of these," he remarked in explanation. --A --hovel would do just as well, but I think I'll see if--I've lost the ability to hit the broad side of a barn."

"Do a good job," she said. "As soon as I sweep and do--a few o--her t--ings, I'm going up to the creek to get some watercress for salad. I hope--" She frowne-- worriedly. "I hope this is the last one--I'm afraid of the things."

"Susie would have had this one by now if it hadn't been for her having to take time off to drink her breakfast milk and wash her face. The wind's in the wrong direction for her to smell it yet, but she'd have spotted it before it got much closer to the cabin." He stepped off the porch and started up the trail. "I'll be back about noon. B-- careful when you go after that watercress and don't wear those idiotic

cutaway moccasins."

"I won't," sue answered, for once not disputing his opinion of her footwear.

He was still a--hundred feet from the spotted kitten when he heard the low, dry buzz. It was a rattlesnake, as he had known it would be. It was coiled, its head weaving restlessly, and the kitten was watching it with cold intentness. The rattlesnake turned away from the kitten as he came up to them and tried to slither away to the cover of the nearest bush. The kitten darted around in front of it, just beyond striking range, and cut off its retreat.

The snaked stopped, to coil and wait with its head poised to strike. The kitten stood before it as motionless as a little statue, only a faint tr--mo-- to the end of its tail to indicate any emotion. That, and its eyes. They were, as Hart observed on previous such occasions, quite wide and green --nd mercilessly cold. There was always something--different about the look in a cat's eyes when it watched a snake; a concentration, a hair-trigger alertness, and an icy, implacable hatred. Yet, despite the kitten's alertness, there was an air of calmness in the way it watched the snake, almost contempt. It knew instinctively that the snake was deadly dangerous but that instinctive knowledge was outweighed by the other instinctive knowledge; the knowledge that the snake was afraid of it and would never dare to deliberately come within striking range. The rattlesnake would never dare approach the kitten; it had but one desire--to escape.

* * *

The two were motionless for a few seconds with the snake waiting to strike, its triangular head, two-thirds as wide as Hart's hand, poised and ready. Then the snake broke and tried to dart away from the

kitten. The kitten flashed in front of it, still just out of striking range, and the snake stopped to coil and squirm in indecision, its red tongue flickering in and out and its buzzing rising --igher and higher in pitch as its agitation increased.--

Hart looked back toward the cabin and saw that Susie and the kittens were still on the porch. He raised his voice and called to her: "Susie--snake!"

He had taught her to recognize the word and she was off the porch at once, to come trotting up the trail with the five kittens stringing out behind her and Gwen standing in the doorway, shading her eyes against the sun with one hand as she watched.

He turned back to the snake. It wouldn't be long--not after Susie got there.

The snake's head was weaving restlessly as it tried to evade the stare of the kitten and find a way to escape. It tried again to dart away, and again the kitten flashed in front of it to cut off its retreat. The snake stopped, unable to reach the safety of the bush, unable in its fear to pass near the kitten. Its fear was visibly increasing and so was its hate; a vicious, reptilian hatred for the half-grown kitten that stood before it. But, greater than the hatred was the fear; the old, old instinctive fear of a cat that was common to all snakes.

It was strange, the way snakes feared cats. One strike with that broad head and there would be enough venom in the kitten's body to kill a dozen like it, yet the snake did not dare to strike. Should the kitten come within striking range, it would strike--but it was afraid to approach the kitten with the purpose of striking it. There was something about the way the kitten stared at it, the cold lack of fear, that the snake could not understand and feared. And the longer the kitten stared at the snake, the greater the snake's fear would

become.

There were animals that enjoyed an immunity from the bite of a rattlesnake; a hog, protected by its fat, could kill a rattlesnake; a band of sheep, protected by their wool, would blindly trample a rattlesnake to death. Some animals could kill rattlesnakes; a deer could, some small, fast dogs could. But the rattlesnake fe--red none of these, would try to strike any of them. Yet the kitten, completely vulnerable with neither wool nor fat to protect it, did not fear the snake and knew the snake feared it. It was something peculiar to cats and snakes; an inherent hatred and enmity that went back to the dawn of creation.

Susie trotted up and took in the scene with one swift glance. The kitten relaxed as he turned the job over to the more capable paws of his mother and she stood a moment just beyond striking range, studying the snake. It coiled closer, afraid to try to escape from her for such an action would render it vulnerable by forci--g it to uncoil, knowing in its tiny reptilian mind that in the lean, wise old cat before it was Death.

Susie paused only briefly in her appraisal of it, then she stepped forward with her eyes fixed on the wide-jawed head and her body as tense as a coiled spring. She calmly, deliberately, came within striking range --nd waited for it to strike at her, one forepaw slightly lifted. The snake struck, then; the very thing Susie had intended for it to do. Its head flicked forward in a motion too fast for Hart to see and at the same time, and even faster, there was the flash of Susie's paw. That, and her backward leap.

It was a blur of movement too swift for human eyes to follow but in that split-second the snake had struck, its fangs had encountered only thin air where Susie had been and, simultaneously, it had felt the sharp rip of her claws down its venomous head. Then they were poised again, as before, but this time there were three slashes down the top

of the snake's head from which blood was beginning to ooze.

She moved in on it again, her pupils two razor-edge slits in eyes that were like hard emeralds. She came within range and the--snake struck again. It was the same as before; the invisibly swift stab of the white fangs was too slow to equal the speed of the slashing claws. There were more bloody furrows down the snake's head when the blur of movement was over. The next time there would be still more, and it would go on until the snake's head was half torn from its body and it was dead. It could end no other way; it was not the nature of a cat to permit a snake to live.

There was insane fury, now, to the quick coiling of the snake, the high, shrill buzzing of its tail and the frantic flickering of its head. It was reaching the stage where its rage and fear was nothing short of madness and it would deliberately attack anything in the world--except a cat. Hart threw a cartridge into the chamber of the .38. He had no desire to see anything die a slow death, not even a rattlesnake. Although, it seemed to him, there was something downright splendid about the way Susie--and all other cats--could put the fear of Eternity into man's traditional enemy, the serpent.

As Susie began easing back within range of the snake Hart lined the sights on its head and pulled the trigger. The snake's head smashed to the ground at the impact of the bullet and the cats jumped back in startled surprise at the crack of the pistol.

Susie looked at the dead, writhing snake with a sudden and complete lack of interest, gave Hart a look that seemed to contain definite disgust and went over to sit in the shade of a bush.

"Sorry, Susie--I know you didn't really need any help," he apologized.

The kittens were crowding around the snake, attacking it in emulation

of their mother's fight with it. They were only kittens, but they were learning. By the time they were grown he and Gwen would have a very efficient crew to rid the place of rattlesnakes. Susie, alone, had killed four in the past two months that he knew of for certain--and one of them had crawled into the cabin while Gwen was gone, to lay coiled under the butane range. Had it not been for the vigilance of Susie, it would still have been there when Gwen returned to prepare dinner, her bare, brown legs the target for its striking fangs. By that one act, alone, Susie had far more than repaid them for giving her and her kittens a home.

He picked the snake up on the end of a stick and tossed it far out in the brush. The kittens watched it arc through the air and fall from sight; with the snake no longer there, they lost interest in the past events and wandered over to join their mother. He hefted the pistol in his hand, wondering whether to take it with him or take it back to the cabin. Deciding one was as much trouble as the other, he waved to Gwen who was still watching from the doorway and started up the trail.

He was some distance up it when he looked back to see the ubiquitous spotted kitten following him--or following in so far as necessary delays to inspect interesting scents and insects along the trail would permit. The red kitten was watching the spotted one, apparently with half a mind to go, too. He went on--they wouldn't follow him very far up the can--on, anyway. Perhaps as far as the creek; perhaps they'd change their minds and return to the cabin.

At the edge of the sagebrush flat the trail went down into the canyon, following along the side of the steep wall --n a gentle grade.--He made his way along the narrow trail, which was sixty feet above the floor of the canyon at its highest point, and down to the bottom of the canyon. It was as he started up the canyon that he first detected the

odor. It was very faint, so faint that he could not place it. His thoughts were upon the survey he would make that morning and he was hardly conscious of it, though a part of his mind noted it and was vaguely disturbed by it. He walked on, past the place along the creek where Gwen would gather the watercress, and there an almost imperceptible bree--e drifted down from the up-canyon. It brought the odor stronger and he stopped, the vague uneasiness in his mind suddenly awakening to wary alertness.

It was the odor of a snake.

He looked about him, but there was nothing to be seen. He knew he could not have gotten any of the odor of the snake he had killed on his clothes, and the odor coming down the canyon was not quite that --f a rattlesnake; it was fully as offensive and reptilian, but different.

He shook his head, puzzled, and walked on. Two hundred feet farther on the canyon swung in a bend and the trail took a shortcut through a thick growth of junipers. Here the odor became definitely stronger and a creepy feeling ran up his spine. He kept his eyes on the ground, watching where he was stepping as he went through the heavy underbrush. There was no doubt about the odor; while not quite like that of a rattlesnake, it was certainly the odor of some kind of a snake. Or several snakes, judging by the strength of it.

He stepped out of the thicket of trees and brush to the sandy bed of the canyon and looked up. There, not fifty feet in front of him, was Flopper--and the thing he had smelled.

* * *

The Slistian scout ship drifted down through the darkness, silently, undetected. Sesnar watched the little that the viewscreen could show in the darkness, hi-- eighteen-foot snake-like body coiled in the

concave pilot's chair before the control board, and patiently heard the thoughts that emanated from the spherical device beside him.

"Is there any evide--ce of intelligent life in the immediate vicinity?" the thought from the transmitter sphere asked.

"None," Sesnar's own thought replied. "I'm descending over an isolated section of the western part of the continent. The instruments indicate considerable mineralization in this area under me, including uranium. There are the lights of some kind of a small city in the far distance, but that is all."

The sphere made no comment and Sesnar asked, "Shall I sterilize the area in which I shall land?"

It required the usual two seconds for the sphere to project his thought through a hundred lightyears of space to his superior on Slistia and another two seconds for the reply to come back. "No. Although your observations have shown no great technological knowledge on the part of the natives, they may possess means of detecting your use of the sterilizer ray. They do possess the atomic and hydrogen bombs, we know, and the discovery upon their planet of an alien spaceship equipped with such a weapon as the sterilizer ray would most certainly cause them to attempt to interfere with your preliminary surveys and your capture of some of the natives for examination and study. When you are near the surface you shall proceed toward the area the instruments show to contain radioactive ores, flying low and watching for evidences of habitation, such as the lights of individual dwellings."

Sesnar duly acknowledged the order.

It did not seem strange to him that he, alone, should have been dispatched to make the preliminary survey of the new world while the

nine members of the psychologist-strategist board remained upon Slistia to direct his most detailed activities by means of the thought transmitter sphere. It was merely coldly logical. No Slistian could foretell the degrees of civilization, if any, on a world a hundred lightyears away. Such a world might possess defensive weapons unknown to the Slistians. Such a thing had never happened--and no Slistian doubted ultimate Slistian victory--but the preliminary survey would disclose the weapons, if any, that the natives possessed; would disclose the resources of the new world, including the vital radioactive ores, and would provide specimens of the native intelligent life for study and ultimate vivisection. The weapons of the Slistians were many and deadly, with the hypnotic power of the Slistian mind the most insidiously deadly weapon of all. Yet there was always the small possibility of the natives possessing deadly weapons of their own and an exploration scout, such as Sesnar, proceeded under the constant supervision of the highly learned, very systematic, psychologists-strategists of the Colonization Board. The scout ship was equipped with every needed device and instrument to survey the new world, from mapping its continents to analyzing its air and determining what harmful viruses might be present. It carried robotic equipment to mine and refine radioactive ores for powering the force field it would throw around the mineralized area; the area that would become the Slistian headquarters for their Extermination Force ships. It carried a well-equipped laboratory where the captured native specimens could be probed and questioned by Sesnar's mind until their own minds were drained dry of information. After that, they would be placed on the tables and the viewscreen overhead would permit the Colonization Board on Slistia, as well as the Extermination Force Board, to learn the physical structure of the natives as Sesnar methodically vivisected them.

* * *

It was all very logical and carefully planned. A scout ship required a considerable amount of uranium-based fuel and the supply still remaining upon Slistia and the two worlds Slistia had captured was limited. Although thought waves could be transmitted across a hundred lightyears of space in two seconds, the material body of the ship required eight months to traverse the same distance. One Slistian could, with the specially-equipped ship, do as quick and thorough a job of surveying a new planet as a crew of Slistians could do and additional Slistians, plus additional food for the eight months voyage, would have required an additional amount of fuel; fuel that would be needed by the Extermination Force ships that would follow later. It was only necessary to know that the new world possessed the radioactive ores and to learn of what m--ans of defense the natives might have.

-- The latter was very important; upon the study of the specimens of native life and their weapons would depend the strategy of the Extermination Force. They were quite efficient in ridding a world of its natives and their efficiency was due to careful planning beforehand; to equipping the Extermination Force ships with the most suitably destructive weapons for the job.

Sesnar halted the descent of the ship a few hundred feet above the surface and let it travel slowly in the direction of the uranium mineralization. He was almost to the bulk of a mountain when he saw the yellow light. He notified his superiors at once.

"There is a yellow-white rectangle of light some distance away. It's apparently artificial light from the window of a native's dwelling."

"Pass it by." The command was from Eska, head of the Colonization Board. "Take no chance of detection at this time. Pass it by and conceal your ship near the area of greatest mineralization."

Sesnar continued on his way, rising as he did so to clear the foothills of the mountain. He had gone a relatively short distance, the rectangle of light in the native's dwelling still visible behind him, when the instruments told him he was directly over the deposit of uranium. He descended to the ground, letting the robotic control scan the terrain under the ship with its radar eyes and select a safe and level spot. The ship settled to earth and he notified Eska of the fact.

There was a certain emotionless satisfaction in Eska's thought as he said, "The nearness of the native's dwelling to the uranium deposit simplifies things. Tomorrow you can accomplish both the capture of natives for study and the erection of the force field. In the meantime, you shall remain in the ship."

The latter order was not without sound reasons of caution; some creatures could see excellently in the dark and no Slistian could use its hypnotic powers on an animal it could not see.

Sesnar waited until dawn, then he reached out with the two small arms that were the only interruption of the snake-like form of his body and picked up his menta-blaster, to snap it down on the four metal studs set in the tough scales of the top of his head. He took no other weapon with him as he crawled forth from the ship; he needed no other weapon and only the most unexpected circumstances could cause him to need it, the hypnotic power of its mind serving very well to force other creatures to do as he willed.

The ship had landed in the bottom of a small canyon. There had been something in the canyon very recently, he saw, something that had dug some narrow trenches across what he presumed to be the deposit of uranium ore. He reported the fact to Eska.

"The work of the natives, obviously," Eska commented. "It would not be advisable to lift the ship at present. Reconnoiter--there should be

some kind of a path the natives have made and it will lead to the dwelling. Follow the path for a short distance and report what you find."

The thoughts of Eska, broadcast by the sphere inside the ship, came clearly to Sesnar and he obeyed the orders, pausing only long enough to try the menta-blaster on a small bush beside the path. It vanished in a puff of dust.

The menta-blaster was a Slistian achievement and one that could be used only by Slistians. It was operated by certain thought patterns, the type and intensity of the beam regulated at will. Since the thought pattern that operated it had to be very precise, it was useless to any warm-blooded animal; only a Slistian could produce the necessary pattern with the necessary machine-like precision. It was a characteristic of warm-blooded animals to be emotional to a certain extent and no emotional animal, no matter how intelligent, could be sure of suppressing its emotions sufficiently to always duplicate the rigid, precise thought pattern. Although it might seem to the warm-blooded, intelligent animal that its emotions were completely in check and its mind free of all influence from them, the emotional influence over the pure, cold logic would still be there to some slight extent, enough to prevent exact duplication of the thought pattern built into the menta-blaster.

The menta-blaster was, to the Slistians, quite unnecessary proof that cold-blooded and logical life forms were superior to warm-blooded and emotional life forms.

The path was easily found and he followed it. He had gone only a short distance when the canyon emptied into a much larger one; a canyon that led in the general direction of the native's dwelling. The path followed the creek bank down the larger canyon and there, feeding on the green vegetation beside the path, he saw the first

specimen of the planet's life.

It was a small quadruped with long ears and its sensitive ears detected the whisper in the sand of Sesnar's coming at almost the same moment he saw it. It sat up high on its hind legs to stare at him, its nose twitching, then it wheeled to bound away. He brought it under hypnotic control and it fell limply to the ground.

It was, of course, still alive and conscious; merely held helpless. Sesnar crawled to it and searched its mind. Its mind held no information of any value, its intelligence was--of a very low order. Obviously, it was not a member of the planet's intelligent form of life.

He touched the rabbit with his small, lizard-like hands, feeling the fast flutter of its heart, then ripping a sharp claw down its belly. The entrails spilled out on the ground and he observed with interest that the animal was strictly herbivorous. He reported the fact to Eska who then ordered him to release the rabbit from hypnotic control so that its reaction to pain might be observed.

At the release of hypnotic control it leaped high in the air with a thin, shrill scream, then fell back to lay flopping and kicking in the sand, its bloody entrails trailing behind it. Its efforts to escape quickly weakened and soon it could do no more than lie and watch Sesnar with intense fear in its eyes.

"A high degree of sensitivity to pain, with no desire to destroy the inflictor of the pain," Eska remarked. "No revenge instincts whatever. Should this characteristic of complete non-aggressiveness apply to the intelligent creatures, our colonization program should need relatively little aid from the Extermination Force."

Sesnar waited until the rabbit died, reporting its resistance to death. It took a remarkably long time for it to die--that is, for a warm-blooded

animal. The characteristic sensitivity to pain of warm-blooded animals was usually one of the factors that hastened their death when badly injured. When it finally stopped panting he crawled on, both he and Eska feeling well satisfied on the whole, though the high resistance to death was not to be desired.

He had not crawled very far down the canyon when he encountered the next quadruped, coming upon it suddenly where the trail swung around a sharp bend in the canyon. It was trotting up the trail toward him, unable to scent him with the breeze momentarily blowing up the canyon and he brought it under control the moment he saw it. He left it standing on its four legs and went down to it. It was considerably larger than the quadruped he had killed, shorter of ear and a different species altogether. He probed into its mind and found its intelligence to be of the third order; very high for a non-reasoning animal.

"Does its mind contain any information concerning the dominant form of life?" Eska asked.

"The dominant form is biped and this animal lives with two of them," Sesnar replied. "It exhibits an odd regard for them; an illogical emotional regard."

He went on to explain the affection of the dog for its masters and their affection for it as best he could. It was not a new thing to either Sesnar or Eska--they had observed similar attachments among other warm-blooded species--but it was impossible for them to comprehend the desire of two creatures of different species to be near each other and find pleasure in each other's company.

Eska dismissed it as of no importance. "Apparently the same as the attachment between the natives of Venda and the small animals they used to keep around before our arrival. It might be termed a symbiosis of the emotions--utterly illogical and no more than another

example of their mental inferiority. What other information does the quadruped's mind contain?"

"It isn't a mature specimen but its thoughts are quite clear. It lives with two of these bipeds--a male and a female--in the dwelling near here. The male biped is to pass this way very soon and the quadruped has a strong desire for the biped to make its appearance. It's afraid of me but it seems confident the biped will either kill me or frighten me away."

"It has no doubt of the biped's ability to destroy you?" Eska asked.

"None whatever. Although it possesses no technical knowledge, of course, and is unable to supply me with any information concerning the biped's weapons."

"I think you will find the animal's confidence in the invincibility of the biped is due to the regard of the weaker for the stronger," Eska said. "Since the actions and abilities of the biped are beyond the quadruped's intelligence to comprehend it assumes, having no experience to the contrary, that nothing can be superior to the biped it depends upon for protection.

"Now, if you have extracted all the information of value in the animal's mind, kill it and conceal yourself near the path the biped is to use. A search of the biped's mind will reveal if there are any other bipeds in the vicinity, other than the biped's mate. If not, you will capture her, too, and return with both of them to your ship. You will then throw a force field around that area and lift ship to complete your mapping of the opposite hemisphere. The minds and bodies of the biped and its mate can be studied enroute."

"The path goes through a dense thicket of small trees a very short distance ahead of me," Sesnar said. "They would afford perfect

concealment--"

He stopped as he caught the crunching of footsteps from within the trees. He reported to Eska, then watched the spot where the trail emerged fr--m the trees. In a few moments the maker of the sounds appeared.

"It is the biped."

"If it shows no hostility toward you, do not bring it under full and immediate control," Eska ordered. "Let it remain in a hypnotic semi-trance until you have questioned it. It will eventually realize you are searching its mind, of course, and when that happens you will bring it under full control and proceed in the usual manner. But, until it is awa--e of your purpose, you can extract information from it with little difficulty."

* * *

Hart thought at first that the thing must be a boa constrictor that had escaped from a circus. Then he saw the hands. The two arms sprouted from tiny shoulders like two thick bullsnakes and terminated in pale green lizard-like hands, the size of a woman's hands. The forward portion of the body was erect with the belly a glazed yellow. The head was broad and slightly domed, swaying in the air nearly six feet above the ground. There was something mounted on the snake's head; a flat object with a short tube projecting a little in front of it. He noticed it only vaguely, his attention caught by the snake's eyes.

They seemed to possess an intelligence, even at a distance, and they fascinated him. He walked forward to see them better, remembering the pistol in his pocket as something of casual importance. The eyes were quite large, dead black in color with thin orange rims. There was an intelligence behind them, an intelligence

as great as his own, and he could feel it studying him. Some instinct within him was trying to warn him--danger--but it was not until he had stopped before the snake and breathed the heavy, nauseating odor of it that the spell broke.

Snake! Men did not walk up to snakes as a hypnotized sparrow might do--but he had just done so.

He saw the intelligence in the snake's eyes for what it was, then; a cold, alien appraisal of him with the same objective detachment with which an entomologist might inspect an insect. It had not moved and there was no threat in its manner, other than the alienness of it and the way it had drawn him so irresistibly to it, but that was warning enough. He let his hand slide to his hip pocket and grasp the hard butt of the pistol-- not drawing it but wanting it ready should he need it. Until, and if, the snake made a threatening move, he would try to question it. It very obviously was not of Earth and to kill it first then ask questions later would be both uninformative and stupid. It might intend him no harm; he would wait and see and keep his hand on the pistol.

It would most likely be from another planet of the solar system. He could draw a diagram of the solar system in the sand--there were no humans near but for Gwen at the cabin--and find out which planet it came from. Venus should be the one, the second from the sun--she should be along in a few minutes--

He stopped, suddenly aware of the random thoughts. His mind spoke another one: She would be after watercress and would not be armed as he was--

He cut the thought off with the chilling realization that the snake was questioning him. It could be nothing else. As the source of a motor nerve, when touched in an exposed brain, will make the

corresponding muscle twitch, so the snake was questioning him; touching with its mind at the proper memory cells, exciting the desired memory responses.

The snake-thing wanted both him and Gwen. Why?

The implications of the question broke the hypnosis and the warning instinct screamed frantically: Kill it--while you can!

His arm jerked to whip the pistol from his pocket--and froze. His entire body was abruptly as motionless and powerless as though locked in a vice. He could not move--he had heeded the warning too late.

* * *

"The biped has an intelligence of the first order," Sesnar reported. "It became aware of my control before I had completed the questioning and attempted to kill me the moment it r--alize-- my intentions. I put it under full control before it could harm me, of course."

"Determine its full resistance to questioning while under muscular control," Eska ordered.

His entire body from the neck down was separated from the control of his brain. He was standing before the snake and could see it watching him, smell the odor of it; he was normal and the sensory nerves were functioning as always. He could feel the weight of the pistol in his pocket and his fingers could feel the butt of it as they held it half drawn from the pocket. The sensory nerves were functioning normally but his commands to his muscles were being cut off. His mind could formulate the commands and try to send them with all its power but nothing happened. Somewhere in his brain where the pure thought was transformed into a neural impulse, the snake had seized

control. At that relay station his own commands were being cut off and the snake's commands substituted.

* * *

He had made a grave mistake; he had underestimated his opponent. He had reached for the pistol with his mind wide open, with his intention plain ther-- for the snake to read. He should have kept the th--ught subdued, should have covered it over with other, stronger, thoughts. He had learne-- a lesson--perhaps it would not be t--o late. Physically he was helpless but his mind was still his own. His only resistance to the snake would have to be mental for the time being. In the en--, if he made no more mistakes, he might win the game of wits and kill it before it killed him and Gwen.

A question came from the snake's mind, not the touching at the memory cells as before but a direct question.

"What is the percentage of uranium in the ore samples at your dwelling?"

It was, he realized, a test of his ability to withstand questioning. The snake would not care what the percentage might be--it was a test, the first won.

"Why do you want to know?" he asked.

The--snake's answer was to touch quickly at the memory cells where the informatio-- lay and to repeat over and over: The percentage--the percentage--

Three point one four one five nine,--he thought rapidly, and multiply by the diameter and you have the circumference. The circumference is--the percentage--the percentage-- The thought was insistent,

demanding an answer-- The circumference is pi times the diameter and how do you like those onions?

The reply from the snake was a greater insistence upon an answer. The percentage--the percentage--the percentage-- It hammered at his mind and the answer was there, eager to respond to the snake's touch and make itself heard. It was there, just below the level of expression, and he fought to keep it there, submerged, while he covered it over with other thoughts.

According to the semanticists, a thought cannot be conceived clearly without its conversion to words. Not necessarily spoken, but the thought conceived with the aid of the semantic expressions to outline it, to detail and clarify it. Forty-one percent, expressed in words, is a very definite part of the whole. Forty-one percent as a thought unaccompanied by the proper semantic equivalent is an indefinite minor proportion. He could not block the snake from probing at his memory cells but he could let the answer the probing evoked remain a wordless thought, an impression in his mind that was not clear even to himself, by keeping the answer below the level of semantic expression and covering it up with other thoughts of his own making and spoken aloud.

The percentage--the percentage-- It was coming harder, with the full force of the snake's mind behind it, and he met it with--every evasion he could contrive. He recited mathematical formulae to it, he told it an Aesop fable, he gave it portions of the federal mining laws. The question flicked relentlessly at his mind--the percentage--the percentage--and his words that kept the answer submerged came more swiftly and louder as the moments went by, his concentration became more intense.

He was telling it of the crystallographic structure of tourmaline when it was abruptly out of his mind, to stand silently before him as though

meditating.

"Well," he asked, his voice dropping to normal pitch, "did you find out anything?"

It gave no indication that it heard him.

* * *

"Its resistance to questioning is unexpectedly high," Sesnar reported. "As with all warm-blooded animals, its means of communication is vocal and I left--its vocal org--ns uncontrolled that it might accompany its answer with the semantic expressions that would give the answer the greatest clarity. It exhibited conside--able cunning --y taking adva--tage of the freedom of its vocal organs to use--them to speak other thoughts and keep the answer I desired submerged."

"Pain will break its resistance," Eska replied. "The combination of pain plus control --ill quickly d--stroy its abi--ity to keep the answer submerged. Use your menta-blaster with care, however--the biped must not be so severely injured that it will be unfit for complete questioning and physical study when you take it and its mate to the ship. Use the Type 4 beam."

* * *

He had won! The power of the snake's mind, great as it was, had not been great enough to force him to answer. It was only the first victory--he was still held as powerless as before--but it had been a victory. There would be other tests but he knew, now, that the snake-thing was incapable of hypnotizing a human. It could only assume control of the body, not of the mind.

Flopper was standing fifteen feet to one side of him, held by the

same control. Or even more so--Flopper could not turn his head. He could move his eyes but that was all. Flopper was watching him now, fear in his eyes and a look of hopeful expectancy; a faith that his master would destroy the thing before them. It was pathetically humorous; he was the pup's god and a pup knows that its god can --o anything.

Then the snake was speaking to his mind again, very concisely, very menacingly.

"You will tell me the percentage of uranium in the ore samples. You will tell me at once and with no attempts to submerge the answer."

Well, here we go again, he thought. H-- had an unple--sant premonit--on that this time it would not be so easy--but he would soon find out.

"Go to hell," he said.

The tube on the snake's head glowed a deep violet and something like the blades of incandescent knives stabbed into his chest and began to cut slowly across it. It was a searing, burning pain that ripped down his stomach and up his neck, to explode like a white light in his brain. The question was coming again--the percentage--the percentage--lashing at his mind like a whip through the glare of pain. The percentage--the percentage-- The pain intensified and tore at every nerve in his body while the question goaded incessantly: The percentage--the percentage-- He fought against it and the white glare engulfed his brain until the question was no longer a question but a knife thrusting again and again into his mind while he was an entity composed of pain and spinning in a hell-fire of agony, writhing blind and mindless in the white glare while the question stabbed at him--the percentage--the percentage--

It was meaningless, as meaningless as his own thought in return:

thirty-five percent--thirty-five percent-- Meani--gless. He had been going to fight something--he couldn't remember what it was. His mind was blinded by the pain and he couldn't remember--nothing existed but pain, unbearable pain . . .

The chaos faded slowly and the white glare melted away. The knife was no longer in his brain and the tube on the snake's head was cry--tal white again. He knew, then, that he--had lost.

His heart was pounding violently and his chest was an intolerable aching and burning. He looked down at it. Something like a row of sharp knives had cut halfway across it. The cuts were not bleeding--the knives had cauterized as they cut . . .

* * *

"The biped'-- resistance was greater than expected," Sesnar said. "I was forced to cut and burn it rather severely, but it will still be able to serve our purpose."

"Proceed to the place where the biped's mate is to come," Eska ordered. "If she is there, return with both of them to your ship. If not, continue on to the dwelling and get her. Nothing is to be gained by waiting and there is always the slight possibility that other bipeds might make an unexpected appearance. The sooner you can return to the ship with the two natives and erect the force field, the better."

* * *

There was a command from the snake to turn and step forward. He started to turn, t--en, even as the movement was begun, there came another command from the snake: Stop.

He stopped and stood motionless. The snake was looking beyond

him, at something in the junipers behind him. Its full attention, but for its control over him, seemed to be on whatever it saw. The seconds went silently by as the snake stared and as they passed he felt an almost imperceptib--e lessening o-- the control;--a faint tremor to his arm and hand as he tried to force them to obey his--will. Somethi--g in the junipers was loosening the snake's control over him.

A brief glow of dim red came from th-- tube on the --nake's head, existing barely long enough to be seen and then vanishing. With its vanishing the control weakened to the point where he could move his arm. It was like fighting against the drag of quicksand, but he could move it. He dropped his eyes to the target, the glistening yellow belly where he could bring th-- pistol up wi--h the minimum--amount of movement.

The pistol was almost free of his pocket when the snake abruptly --eturned its attent--on to him; seizing control with a savagery that ri--ped at his muscles like an electric shock. His fingers flew open and the pistol dropped ba--k into his pocket. His hand was jerked around and slammed against his side. The snake permitted his knotted muscles to relax, then, but the tightening of his chest muscles had torn at the wounds and for what seemed a long time a sickness and a blackness swirled around him, the bulging eyes of the snake seemed to advance and retreat through it.

The blackness dispersed, though the sickness remained, and the dizziness left him. The snake was n--t moving and he could, for the first time, sense vague thoughts impinging upon its mind. Apparently the thing in the junipers had so disturbed the snake that it was unconsciously letting some of its own thoughts come through with the control. There was a distinct impression that it was communicating with another of its kind but there was no clue as to the identity of the thing in the junipers.

"A small animal suddenly appeared in the trees behind the biped," Sesnar said. "That is, I think it was an animal."

"You think it was an animal?" Eska's thought was a cold hiss. "What is the meaning of this? You were not sent on this mission to indulge in guessing--determine if it's an animal."

"I tried to--and I couldn't!"

"Explain yourself. I sense an agitation in your mind. Explain!"

"This animal is different to any we've ever encountered--if it is an animal," Sesnar said, his agitation becoming more evident as he spoke. "I cannot determine what it is because I not only cannot control it--I cannot enter its mind!"

Eska was silent for a while. "This is incredible," he said at last. "It cannot be! The mathematics of Kal, as well as our own centuries of colonization of alien worlds, have irrefutably proven that no warm-blooded creature can resist the power of the Slistian mind!"

"This one did."

"Perhaps," suggested Eska, "it is such a low form of life that it has no mind to enter, existing solely by instinct as the mollusks do."

"It is physically far too high on the evolutionary scale to not possess an intelligence," Sesnar said. "It has the appearance of an animal but that is all I can learn about it. I cannot control it, I cannot enter its mind, and--" Sesnar paused, as though dreading to reveal the rest. "It disturbs my mind!"

"Impossible!" Eska stated flatly. "No creature can disturb the mind of a Slistian."

"This one did," Sesnar repeated. "It disturbs me so that I cannot project the thought pattern into my menta-blaster. I tried to kill it, but despite my efforts to produce a full-force blast I was able to activate the menta-blaster for but a moment and then at such low intensity that the creature never felt it."

"Your menta-blaster must have developed a defect," Eska said. "I refuse to believe that any creature could so affect a Slistian. Is the creature still in view?"

"No. It vanished when I tried to activate the menta-blaster and is now watching me from the concealment of the trees."

"How do you know it is?"

"I can sense it watching me."

"Your menta-blaster has no doubt become defective," Eska said again. "Test it. Lower your head behind the protection of the biped and test it."

Sesnar dropped his head lower and his eyes searched for a suitable target. They fell on the quadruped, still motionless under his control. It would serve the purpose admirably and it was of no other use to him. With the biped's body between himself and the thing in the trees the disturbance was gone from his mind. He felt the familiar thought patterns come easily: --ype I, quarter force--fire!

* * *

Confused thoughts swirled in Hart's mind. Why had the snake not killed whatever it saw behind him? It had starte-- to do so--there had been the first dim glow from the tube on its head--and then it had stopped? Why? The snake had been disturbed by what it saw--why

h--dn't it eliminated it?

He turned his head as far as he could but the trees were directly behind him and he could not see them. Neither could he tell what it might have been by Flopper's reaction; the pup's back was to the trees, too.

The faith was still in Flopper's eyes. He was afraid of the thing before them and could not understand the awful paralysis that held him, but he knew with all his dog's heart that his master would help him. Then the snake dropped its head to the level of Hart's chest and looked directly at the pup. Frantic, imploring appeal flashed into Flopper's eyes as he sensed what was coming.

There was a blue-white flash from the tube on the snake's head an-- a crackling sound. A puff of dust hid Flopper from view for a moment. When it cleared he was lying on the ground, broken and still, a tiny trickle of blood staining his mouth.

"The blaster functions perfectly, the thought patterns are produced without effort, when I am not under the direct gaze of the thing in the trees," Sesnar reported.

"Proceed with the biped toward its dwelling," Eska ordered. "Permit it to retain its weapon--should the other thing appear again, force the biped to kill it."

* * *

It had killed Flopper!

Hart felt sick with the futility of his hatred for the stinking, scaly thing before him; he wanted, more than he had ever wanted anything in his life, to reach the pistol and empty it into the glazed belly, to watch the

snake fall and then tramp its head into a shapeless mass. He wanted--but the command came to turn and he was doing so.

He turned and began the walking back down the trail, the snake slithering along beside him. They passed the limp little bundle of black and white fur that had been Flopper and went on, bypassing the shortcut through the junipers and following the sandy canyon bed. Was the thing still afraid of what it had seen in the trees? His chest was a sheet of fire and his heart was slugging heavily. Then the trees were behind them and they were back on the trail again, passing by the place where Gwen had intended to g--t the watercress. Were they going to the cabin? They came to the place where the trail climbed out of the canyon and his heart pounded harder as the-- started up it. There was a limit to the injury and pain a--man could stand, no matter how hard he might fight to ignore it, and he --ad withstood injury and pain to such an extent that his body could take little more of it.

They were climbing up the grade and the snake could have but one reason for going to the cabin. It wanted Gwen; it wanted a pair of specimens of the native life to study; specimens that it would crush and examine as emotionlessly as he would crush and examine a specimen of ore. It hadn't told him, but he knew. It would force him to stand there where the trail came out on top of the bank and motion to Gwen to come to him. She might even now be starting out to gather the watercress; she would be able to see him easily from the cabin and she would come without question when he motioned her to do so. She had no reason to suspect any danger.

He would have to do something--what? His breath was coming harsh and labored and a blur kept trying to form before his eyes. It was hard to think, yet he had to think. He had to do something, and quickly. He was weakening and his time for action was running short--

Stop.

He stopped, the snake beside him, and wondered why they had done so. It was looking up the trail, up at the top of the climb, and --e shook his head to clear the blur away from his eyes. There was something gray there--

Kill it!

He saw what it was as his hand obediently reached for the pistol. It was one of the gray kittens. Why didn't the snake kill it? He thought of the rattlesnake he had killed so long ago and he knew what it was the snake-thing had seen in the trees, knew why its cold, merciless mind had --een so disturbed.

Kill it!

Kill it--he must kill the kitten because the snake was afraid of it! The snake couldn't kill it! There was a flooding of hope through him. He had a plan, now; held deep and vague in his mind as he brought the sights of the pistol in line with the kitten's face. There was no time to inspect the plan, not even the hazy sub-conversion inspection it would have to be. He had been ordered to kill the kitten and his muscles were no longer his own; he could not disobey. His mind was his own, however, and he could--

The front sight was on the kitten's head, outlined in the rear sight, and he made his thought sharp and clear: This pistol shoots low; I must draw a coarse bead. Another thought tried to make itself heard: No--no--it shoots high. He drowned it out with the one of his own creating: Shoots low--draw a coarse bead. The front sight came up in obedience to the thought he was making sharp and clear, the snake unable to read the thought he was keeping submerged. The sight loomed high in the notch of the rear sight and he pressed the trigger. The startled kitten vanished in the brush beside the trail as the bullet

snapped an inch over its head.

I did it! There was exultation in the thought--it was difficult to keep it hidden. There was a plan that would work--it would have to work--

"What is your plan?"

The snake's question came hard and cold and the tentacles flicked at his mind--the plan--the plan--

His hope became despair. He had let part of his thoughts get through to the surface, and now the snake knew of them--the plan--t--e plan--The tube was coming in line with his chest again. He would, in the end, tell the snake what it wanted to know--his mind would be sent spinning into the glare of pain and it would no longer be his own. But if he could delay i-- for a while . . .

"I'll tell you," he said calmly. The snake waited, the tube still in line with his chest. "Cats--they chase mice," he went on, his mind two things; a frenzied effort to think and to talk calmly to the snake with one --art of it and a desperate planning in the darkness of sub-conversion with the other part. "Cats chase mice and I was going to yell at them--Susie--SNAKE!"

At his shout he expected, with the part of his mind he was keeping hidden from the snake, that the tube would flash violet again as the snake detected the subterfuge. But it had not--not for the moment, at least. Su--ie would come, she had to--

"They always chase these mice and the reason I sent for them--" The snake wouldn't let him talk nonsense for long--Susie would have to come soon-- "I sent for them because the mice scared the farmer's wife when the clock--" What if she had gone back to the cabin? What if there was nothing to hear him but the gray kitten?-- "struck one. I--"

"You are hiding something."

The tube flashed violet and his mind went reeling into the white glare --here the tentacles lashed like whips--the plan--the plan-- Something was saying: You are a snake and snakes are afraid of cats. I called Susie so you couldn't use the tube--so I could kill you before you could kill Gwen and --e--. . .

His mind came out of the glare again, out of the blinding--intensity of pain. Vision returned and he saw the snake before him, with the tube once again crystal white. It knew, now, of his plan--he had resisted the questioning as long as he could and all he could do now was hope that Susie had heard him, that she was coming and had not returned to the cabin, after all. The cabin was too far away for her to have heard his call from there . . .

The snake was watching the top of the trail, its little hands fidgeting. He followed the snake's gaze, to find the trail empty. Susie--Susie--he thought--don't fail us now. It's Gwen and me and maybe every human on Earth if--this thing isn't killed. Hurry, Susie, and help me--help me so I can kill it--

Then something appeared at the top of the trail, somet--ing gra--. Susie!--She had heard him! She came down the trail without pausing, flowing along low to the ground with her eyes fix--d on the snake. She stopped eight feet short of them, her eyes stone-hard and unwavering in their stare.

Kill it.

There was a hint of emotion to the command this time; a touch of urgency where, before, the commands o-- the snake had been as dispassionate as its own hard-scaled face.

Again his hand brought up the pistol, but this time his will was delaying it a little. Not much, but a little. Susie was not a kitten; she was a mature cat with a mature cat's cont--mpt --or snakes. A cat, even a kitten, instinctively knows the difference between a harmless snake, such as a garter snake, and a poisonous snake, such as a rattlesnake. A small kitten will kill a garter sna--e but it will not tackle a rattlesnake until it has acquir--d the necessary strength, speed and experience. For all its size, the sn--ke-thing before Susie was still a snake; a snake w--thout fangs. It could not ha--m her except by physical force and to do so it would have to move faster --han she did. All her experience had taught her that no snake could ever equal her own lightning coo--dination. The --ffect of her stare upon the snake would be far stronger than that of a kitten; that it was stronger was made evident by the manner in which his hand was bringing u-- the pi--tol so --lowly. She could not harm the snake, but such would not be necessary. She had only to sit there and torment its --ind with her cold stare--in the end the snake-thing's mind and will would break, its fear would become so complete that it would lose all control over him. And then--he would kill the thing--

Kill it!

The command was more urgent and he was raisi--g the pistol faster despite his efforts to hold it back. It would take time for her stare to fully affect the thing and it was not going to permit that. The sights were coming in line with Susie's face--all his will could not halt the movement and he was going to kill her. When he shot her, he would destroy the only hope for survival--when he pulled the trigger he would be killing himself and Gwen a-- sur--ly as tho--gh the muzzle was against their own heads. He tried the subterfuge of thinking the gun shot low, but it failed. His hand b--ought the front sight d--wn low in the notch of the rear sight and his finger tightened on the trigger. He concentrated on the movement of the finger, forgetting everything

else in the effort to delay the squeeze of the trigger. The command came again: Kill-- It broke and he felt the control lessen.

It came once more, but differently: Kill them!

Them? The pistol had dropped and was no longer in line with Susie. He looked up the trail and saw why; the two gray kittens were trotting down the trail. They stopped beside their mother, one on each side of her, and their eyes as coldly upon the snake as hers.

No further command came for the time and the snake's hands fluttered with greater nervousness. The pistol was still in his hand but the muzzle had dropped toward the ground. There were six green eyes watching the snake now, and it was getting worried.

It would try again--it would have to try again, and soon. It took a little time for the stare of a cat to break a snake and the snake knew it. It was a snake and there was something about the impenetrable mind of a cat that it feared--but it was intelligent and it knew it could still escape if it acted quickly enough . . .

Gravel rattled down the face of the cliff his back was against. He twisted his neck to look up and saw the yellow kitten making its way along the ledge over his head. The kitten stopped just over him and there were eight cold eyes watching the snake. Three kittens to go, he thought, and then someone is going to get hurt. There was another yellow one and the red one, and the far-ranging spotted one should have been --he one the snake saw in the trees--it should be coming up the trail any moment.

More gravel fell from the ledge above him; the --ther yellow one. The s--ake was darting its glance from the kittens on the ledge to Susie and the two beside her and did not see the spotted one trot up the trail and stop near the end of its long, thin tail. The red one was at the

spotted one's heels and stopped beside it.

There was a trembl--ng to his legs as the control lessened. The snake was breaking--he could not raise the gun to shoot the snake; it could not force hi-- to shoot the cats. He felt an elation through the sickness and pain. The snake would break soon, would break and turn to flee. When it did the control would vanish and he would kill it. He would empty the pistol into the mottled green coils of it . . .

"Drop the weapon!"

His hand tried to spread open to drop the pistol and he tried to force it to clench the pistol tighter. If he dropped the pistol, the snake would scoop it up and use --t to kill the cats--but his fingers were obeying the command, they were spreading apart.

He spoke quickly: "Did you know there are two more at your tail?"

It had the affect he had hoped for; the snake flicked its glance toward the two kittens, then there was a flurry of movement as it whipped its tail away from them and closer about its body.

His grip was firmer on the pistol and for the first time he smiled at the snake. "Disconcerting, aren't they?"

* * *

"There are seven of the creatures," Sesnar reported. "I am not sure whether or not they can harm me physically--they display a complete lack of fear as though t--ey might possess some power to destroy me of which I am unaware. The biped has now become a menace; I am losing control of it and when my control weakens sufficiently it intends to kill me. It is too strong for m-- to wrest the weapon from its hand but it is rapidly weakening from the effects of its injuries. As soon as it

weakens sufficiently, I shall take the weapon away from it. Since the biped's primitive weapon operates by manual control, I can use it to kill the other creatures. I am now going to release the biped of all control but for the hand that holds the weapon. This will cause it to feel the full extent of its injuries and reduce it to helplessness very quickly. My control, itself, is steadily deteriorating but the biped is so severely injured th--t I have no doubt it will be helpless long before my control over it is completely gone."

* * *

He was standing with his back to the cliff, his feet spread a little, when the control over everything but his hand suddenly vanished. His knees turned to rubber and he fell back against the cliff. He had not realized, while his muscles were under the absolute control of the snake, just how weak he was. His back bumped against the cliff and he braced his feet, sh--ving as hard as his weakness would permit against the cliff to keep himself standing. It was not enough and he began to drop, his backbone scraping along the rough rock face. For a moment a fold in his shirt caught on a projection and supported him, then it slipped off and he dropped to the ground in a squatting position. It seemed he dropped with a terrible jar and the hell-fire rippled across his chest. The sickness flooded over him and the blur clouded his eyes. He put all his will into one thought: Hold tight to the pistol!

The bl--r faded away and he could see the snake, its head now above him. He was sitting with his legs doubled under him and his heart was a small flub-flub within him. He was sweating the cold sweat of shock and the hand that held the pistol was no longer tan but an odd grayish color. He watched it and waited, hoping the spell would pass before the snake realized how weak he was.

The worst of it did pass and a little color came back to his hand. His

heart, relieved of the burden of supplying his legs with blood, began to beat a little stronger and the blackness that had hovered around him --ithdrew.

The snake was in a close coil a few feet before him, the coils sliding and slithering together and the snake-like arms a succession of nervous ripplings.

"Afraid, aren't you?" he asked. "You need a dog--cats run from dogs." He kept his mind free of information-giving surface thoughts and went on to bait it. "You could easily control a dog and force it to chase all these cats away."

The snake asked the question he had expected. "What is a dog?"

"The animal you killed was a dog."

He regretted that the snake's expressionless face prevented his seeing the effect of the disclosure but the thought would be galling bitterness in the snake's mind. It had no emotions--but one. There was one emotion it had to have; the fear of death. Without that a species would never survive. It was afraid, now, and the greater its fear became, the weaker its control over him would become. He would have no time to spare; the blackness had merely withdrawn a little way and it kept threatening to swoop back over him. He would have to fight it off as best he could and at the same time do what he could to increase the snake's fear.

"Cats," he said to it. "You're afraid of them and they're not afraid of you. Do you know why they're not afraid of you?"

"Why?" The question was like a quick hiss, intense in its desire to know.

"Ask them," he answered. "They know; they can tell you. Ask them--look at them, go into their minds and learn why they don't fear you. Go ahead--go into their minds--"

A wisp of the darkness reached out to cloud his eyes and he waited for it to pass, holding tight to the pistol. The darkness withdrew and he repeated: "Go ahead--go into their minds. Burn them like you did me--make them tell you--go ahead--try it." He smiled up at the snake, twisted and mirthless. "They know what's going on in your mind; they know how they're breaking you without ever touching you. Why don't you go into their minds and learn why they hate you and hold you in contempt? Look into their eyes--go deep into their minds and see what you find . . ."

The cloud came again and he let his voice trail off to concentrate on holding to the pistol.

* * *

"The biped has not weakened yet?" Eska asked.

"It is weakening very rapidly, though not yet helpless," Sesnar replied.

"We dare take no risks--this absurd situation must be remedied at once," Eska informed him. "The thought pattern of your menta-blaster is on file and will be given to myself and the other eight members of the Colonization Board present here. The recording projector--is being set up now. As soon as the last connections are made the pattern of your blaster will be projected to you with the power of the nine minds of the Board behind it. Since none of us are under the influence of the creatures before you, the pattern projection will be of absolute precision and irresistible power. Your own mind need serve only as the carrier. The final connections are being made now and you will receive the pattern projection at any moment."

* * *

He shook his --ead, trying to drive the darkness away. It withdrew, slowly and reluctantly, hovering near to close in on him again. His time was running out--all his will and determination could not much longer hold unconsciousness at bay. Time--he needed more time. Susie and the kittens were doing the best they could but their only weapon was the green stare of their eyes. In the end they would break the snake--but he would have to be there to kill it when they did so. If he lost consciousness all would be lost; the snake would use the pistol to kill the cats, it would go on to the cabin where Gwen was . . .

He needed time and he could not have it. He would have to bring it all to a showdown fast--in the little time he did have. Maybe if the--cats were closer . . .

He called to Susie. His voice was a vagu-- mutter and he tri--d again, making it clear. "Susie, come here--snake, Susie--snake!"

She came at his call, with the same silent, flowing motion. She stopped close beside him, so nea-- that her whiskers tickled the back of his ha--d that held the p--stol as--she stared up at the snake's head and the writhing arms of it.

* * *

"The biped has called the largest of the creatures to its side," Sesnar reported. "I can see nothing about the creature capable of harming me but I sense a distinct menace--an utter lack o-- fear. It must possess some means of harming me of which I am unaware, otherwise it would not display this complete lack of fear. The effect of its stare upon my control over the biped is considerably greater at this close range and I am afraid to delay any longer. I am sure the

biped has now weakened sufficiently for me to wrest the weapon--from its grasp. I cannot wait any longer or my control over it will be completely gone. Project my menta-blaster pattern as soon as possible but I must take the biped's weapon now and kill it and the other creatures."

"The connections have been made and the charge is building up in the relay now," Eska said. "The moment it reaches full potential you will receive the pattern."

* * *

The snake settled lower in its coils until its head was barely a foot higher than his own. "I wish to talk to you," it said, leaning forward a little toward him. "I intend you no harm."

Subterfuge! The foreknowledge of the snake's intention was an electric shock through the haze of pain and sickness. Subterfuge--it was trying to put him off guard a little before it snatched the pistol from his hand.

The showdown had come.

He moved wit-- all the desperate quickness his weakness would permit, trying to bring his left hand--over in time to help his still-controlled right hand hold onto the pistol. The movement was hardly begun when the hand of the snake flashed out. At the same moment it --rdered with all the force at its command: "Release the weapon!"

Susie reacted then, instinctively and instantaneously. It was beyond her ability to understand that the snake wanted only the pistol; that it wanted no contact with her. She had been waiting and watching, her eyes and body coo--dinated like a perfect machine and ready to act at the lightning-fast instant of her command. The snake-like arm

darted toward her, as a rattlesnake would strike, and she replied to its --hreat as sh-- would to the strike of a rattlesnake. Its hand was yet four inches from the pistol when her paw made its invisibly swift slash and the razor-sharp claws laid the soft-scaled hand open in four long gashes.

It flipped its body back at the slash of her claws and the control was suddenly gone, something like a scream coming through the channel where it had been. It was soundless but it was terror, complete and absolute.

--ow! The glazed yellow belly was before him and the control was gone. He brought the pistol up, spurred by the frantic fear that the snake would resume control when victory was only a split second away. Up, where the sickening glaze was so near him--up and in line-- The pistol barked, vicious and savage, and the snake lurched from the impact, a small, round hole in the glaze. Up and fire--up and fire-- It was as he had wanted it to be when the snake held him helpless; as he raised the pistol and fired, raised and fired, the little black holes ran up the glazed belly while the snake kept lurching from the impacts and leaning farther backward, out over the edge of the trail. There were six of the little black holes in it when it toppled over and fell into the canyon below.

He heard the thump of it as it hit the bottom and he crawled to the rim of the trail to look down at it. It was lying in the sand of the canyon floor, twisting aimlessly, sometimes the dark green back up and sometimes the glistening yellow belly up.

It was twisting and turning as all dead sna--es do; it was going nowhere; it was no longer a menace.

He turned away from it and saw that Susie and all the kittens were lined up beside him, looking down at the thing they had helped kill.

"I think," he said to them, "that the hungry old cat and the scrawny kittens we gave a home to one cold, rainy night have repaid us."

* * *

He was still in the hospital nine months later--with release a month away--when Earth's first spaceship was completed and the christening ceremony held. The snake-thing's ship had possessed every conceivable kind of weapon as well as the hyper-space drive and the military had been given orders, and unlimited priority, to create a Hyperspace Interceptor Fleet. There had been tapes and records in the ship that had left no doubt as to the snake-thing's mission. Industry had combined genius and mass-production to do the impossible; it had turned out the first complete and fully armed interceptor in less than nine months.

Gwen made her daily visit on the afternoon of the day of the ship's christening.

"This one will be the flagship, I guess you'd call it," she said. "Now that they're tooled up for production, they say they'll be turning out a ship a week."

"The things might try again," he said. "I don't think they will for some time; when Susie struck the snake it let its mind go wide open to my own mind for a moment--not only its mind but I could sense the thoughts of the other ones that it was in communication with--and they were afraid. Even the others were afraid, afraid because the on--here was ter--orized by something it couldn't control or understand. I think these snake-things got where they are by pure, unemotional l--gic; they --appened to be an older form of life than the ones on the worlds they conquered and their knowledge of physical things, such as weapons, was greater. I suppose they had plans for ultimately

conquering every habitable world in the galaxy. They were utterly without mercy in their plans; they, alone, were entitled to life because they, alone, had developed methods of destroying all other forms of life. They knew all about physical laws and they made use of their knowledge to devise weapons that made them invincible. But they overlooked what I like to think is a law higher than any they knew: the law that no species alone, is entitled to survival."

Gwen smiled at him. "The law that causes people to feel sorry for lost and hungry dogs and cats and want to give them a home. It's a good law, and it doesn't have to be written down for people; it's just our nature like it was the nature of that snake-thing to be cold and logical in everything it did."

"And its cold logic caused it to die," he said, "with it, even as it died, still wondering at our illogical affection for other cr--atures. And speaking of --ther creatures; how is Susie taking all the publicity and fame?"

"She's completely unphotogenic, and bewildered besides. She just wants to keep on being a common cat and she can't understand why all those people keep coming to see her and take her picture."

"Well--after all, she can't know just how important was the thing she and the kittens did. That thing was a snake and she was a cat; she just did the usual, normal thing for a cat to do."

"She was wanted at the ship's christening today, too," Gwen said. "They wanted her there to go out over all the television channels. I had to put my foot down flat on the idea, though."

"Why?"

Gwen smiled again. "Because she was too busy today doing

something else that is the usual, normal thing for a cat to do--she was having kittens."

The Gulf Between

Editor's note: The backdrop to all of Godwin's stories is a universe which is cold and pitiless. Mo--e so than any demon, because it is a lack of mercy which stems from the fact that the universe simp--y does not care. Technical advances, whatever their benefits, do not fundamentally change that bleak reality. In different ways, that theme stands at the center of the last two stories in this anthology.

1

He was dying!

The fear flooded over him again, dark and smothering and made worse by his inability to move. His doctor was standing near him, watching over him with dark, patient eyes, knowing that he was dying. When a man is dying, there should be comfort in the presence of a doctor who knows how to save his life. His doctor knew he was dying and had already done the thing that should have saved him from death; the doctor had informed the pilot of his condition by means of the letters on the pilot's communications panel. They had leered at him for an endless eternity: OBSERVER DYING OF EFFECTS OF FULL ACCELERATION. IMMEDIATE REDUCTION OF ACCELERATION IS SUGGESTED.

His doctor watched him die with dark, brooding eyes and suggested to the pilot that the acceleration be reduced.

But the pilot's seat was empty.

He was the pilot, and the doctor knew it . . .

Lieutenant Knight flattened himself behind the outcropping on the windswept ridge and raised his head to stare across the small basin at Hill 23, looming red-scarred and forbidding in the Korean rain; deceptively, ominously quiet, as though daring Company C to resume its vain battering at it.

"Don't look dangerous, does it?" Sergeant Wenden asked, his bush of black and gray beard close to the ground as he crawled up beside Knight. "Real --alm and peaceful. Good old Hill Twenty-three--all we gotta do is take it."

The blue of the Pacific gleamed beyond Hill 23; if they could take the hill it would destroy one of the last remnants of one of the last enemy beachheads on the Korean coast. It would not be difficult--if Cullin would only wait another day until Company B came up.

"I have an idea they won't want to give that hill up," the sergeant went on. "It's their last one; their backs are to the sea and they're goin' to argue about givin' --t up."

Knight did not answer, studying the terrain of the hill and the basin that lay between; planning the best route for the Fourth Platoon, the best way to give them a fighting chance.

"Yep, real calm and peaceful," the loquacious sergeant repeated. "I wonder if their snipers know we're lookin' over the ridge at 'em?"

His answer came a half second later; a spurt of rock dust as a bullet struck between them, and a shrill scream as it ricocheted away.

"Reckon they do," he grunted, dropping his whiskers low and scuttling backward from the crest of the ridge. Knight followed, and they slid to the bottom of the small gulch that ran behind the ridge.

"Of course," the talkative sergeant remarked philosophically, biting off a chew of tobacco, "bullets'll be snappin' all around us in another hour, but there ain't no reason to invite one of 'em to hit us any sooner than it has to."

Knight started back down the muddy gulch and the sergeant tramped beside him, paying no attention to his silence. "The other guys are about ready to call this war a draw, I hear. Except for Korea, here, neither us nor them is makin' any headway and they say the chances of an armistice is real good. I hope so; I've had all the war I want and

I've already got it figgered out how I'm gonna settle down in Florida and raise chickens--or somethin'. Wish they'd declare the armistice right now--they're dug in on that hill and the Fourth is goin' to have one hell of a time tryin' to be the decoy and draw their fire and not all of us get killed." He scowled at Knight, his philosophical attitude turning to wrath. "A lot of men are goin' to die real soon, and for no reason. Company B will be up tonight--why can't we wait until tomorrow?"

Knight shrugged. "Orders."

"Yeah--orders!" The sergeant snorted disgustedly. "Our Captain Cullin wants his company to take that hill today, then he c--n tell battalion headquarters to not bother about sendin' up any support, that he done took the hill all by himself. Then, he figgers, regimental headquarters will be so impressed by his ability to do so much with so few men that they'll re--ommend he be raised to major. And then"--the sergeant spat viciously--"he'll have a whole battalion to give orders to, 'stead of only a company!"

Knight half heard the sergeant as they walked along, his thoughts occupied with the suicidal role his men would have to play. They would be the decoy, as the sergeant had said, deliberately and perhaps fatally drawing the concentration of enemy fire upon themselves.

" . . . I'm a Regular Army man," the sergeant was saying. "I've been in this game for thirty years, but I ain't never seen an officer like Cullin. All he thinks about is himself and his own glory. He made it plain to us what he was when he took over this company. 'A soldier is only as good as his ability to obey orders,' he says. 'You men are going to be soldiers,' he says, 'and there will be no questioning of any order given you. I want, and I shall have, absolute obedience and discipline,' he says--"

Decoy.

It would be senseless, needless slaughter of the Fourth Platoon. It would enable the rest of the company to take the hill but the premature attack was not necessary; the enemy had their backs to the Pacific and they could retreat no farther. They could retreat no farther and they certainly would not dare attack.

Why had Cullin chosen the Fourth Platoon as the decoy? Was it because of the hatred between himself and Cullin? The Fourth was his platoon; by sending it on a suicide mission Cullin could add the savor of revenge to the sweet taste of glory.

The Fourth was his platoon, and between himself and the men of the Fourth was t--e bond that months of common danger had welded; the bond--of brothers-in-arms that is sometimes greater than that of brothers-by-blood. They did not give his gold second-lieutenant's bars any parade-ground respectful salutes; instead, they respected him as a man, as Blacky who slogged through the mud and rain beside them, who ate the rations they ate, who knew the--r names and moods, who was one with the hard veterans of combat and the nervous young repl--cements. Not Lieutenant Knight; just Blacky, to whom someone would sometimes come on the eve of battle and say: "This address here--it's Mary's. If I'm not so lucky this time, I wish you would write her a few words. Just tell her I wanted to see her again but that I . . . well, just say that I said . . . that I said--Aw, hell, Blacky--you'll know what to say."

He would sit by the light--of a gasoline lantern in t--e nights following the battle and write the letters; not alone for the one who had asked him to but for all who had been "not so lucky." They were hard to write, those letters. Soon, now, if he, himself, were not among those not so lucky, he would have more of them to write--far more than ever before.

" . . . What would you say caused it, Blacky?" the sergeant was asking.

"What?" Knight brought his mind back to the present. "How was that?"

"I say, you take a man like Cullin--what do you reckon makes him act that way? You oughta know--you knowed him when you was both kids, didn't you?"

"I've known him most of my life, from the time we were each six years old," Knight answered. "He was always a lot like he is now--even as a kid he wanted to boss the other kids and make them do things for him. I don't know why he hasn--t matured emotionally as well as physically. A psychiatrist might be able to trace it back to something--I'm a computer engineer, misplaced in the infantry, and not a psychiatrist."

"Well, if I was one of these psychiatrists, I'd sure ask him if he didn't once have a set of wooden soldiers he liked to play with better than anything else. That's the kind of soldiers he wants us all to be--wooden dummies that don't dare move unless he says to."

They came to the mouth of the gulch and Knight stopped beside a splintered tree. "I have to go over to where he has his headquarters for a last-minute briefing," he told the sergeant. "It's a little over an hour, yet, so everybody might as well take it easy till then. I'll be along in a few minutes."

The sergeant craned his neck to stare past Knight with sudden and baleful interest. "Here he comes now, down from the Second. Guess he's makin' the rounds personally this time." He scowled at the approaching captain then hurried away, his course such that only his

long, fast steps prevented a face-to-face meeting.

* * *

Knight waited beside the tree and Captain Cullin strode up to him; a big man, heavier than Knight and almost as tall, with an arrogant impatience to the arch of his n--se and a relentless drive in the set of this thick jaw and the iciness of his eyes.

He stopped before Knight, with a glance after the rapidly disappearing sergeant, and sai-- acidly: "If th-- men in my company could be relied upon to display as much determination when sent on a mission as your sergeant just now displayed to avoid saluting me, I would think I had a first-class combat unit."

"He's a good man--none better," Knight said. "He just didn't happen to feel like going in for any such melodrama as: 'We, who are about to die, salute yo--!' "

"Very witty," Cullin said coldly. "Although your wit, in its implications, is rather melodramatic, itself. But suppose we talk of something a little more important--the action of your platoon in taking that hill. I've mov--d the attack up half an hour. The other platoons are alre--dy taking up positions as advanced as possible until your own platoon draws the enemy fire."

"I just came down from off the ridge," Knight said. "I know the lay of the land and I --ave your orders as given to me by Lieutenant Nayland; to attack as best we can along the southwestern floor of the hill and keep the enemy occupied while the other three platoons close in on their flanks. But--the strategy is your own, so I'm listening if you have anything to add. From you, I get the dope straight from the horse's mouth."

Cullin stared at Knight, hard lines running along his jaw and the hatred burning deep back in his eyes.

"I want to remind you, Knight," he s--id at last, "that you are my subordinate officer. An officer's promotions are usually in direct ratio to his ability, and we received our second-lieutenant's bars at the same time--remember? I'm a captain, now, in command of a company; you're still a second lieutenant in charge of a platoon. I'm your commanding officer and you keep that fact in mind at all times. You will restrain your wit, confine yourself to obeying orders and extend me the same courtesy I demand of my other platoon leaders. Is that clear?"

"Very clear," Knight replied. "Your orders have been, and will be, obeyed. When in the presence of others I'll continue to observe every rule of military courtesy, as I have in the past. But I've known you too long and too well to have any desire to go through those antics when you and I are alone."

"Discipline is not an antic," Knight. "The purpose of discipline is to condition the soldier into efficient obedience. You will obey me with full military courtesy and you will not presume an equality with me because of our past friendship."

"Our past friendship is a long way past, and I'm sure neither of us has any desire to ever renew it. I would like to ask you a question, though--why do we attack today when Company B will be up tonight?"

"For a very good reason--because I've ordered it," Cullin said flatly.

"That's all?" Knight asked.

"That's sufficient. It isn't required of you to seek any other reason."

" 'Theirs not to reason why--' . . . that's what you want, isn't it?"

"That's what I intend to have."

"By waiting for B's support you might not win any major's oak leaves but you could save a lot of lives. There's no hurry about taking that hill--the enemy isn't going anywhere."

"Keep your advice to yourself, Knight. Casualties are to be expected in any combat unit and this company will remain a combat unit as long as I am in command of it."

"Then give your orders," Knight said with brittle resignation. "I'll see that they're followed, regardless of what I think of them."

"See that you do. This is what I want out of your platoon, and I won't tolerate any deviation from these orders--"

The Cold Equations

Editor's note: And here we come to the end, the backdrop of reality that Godwin never forgot. There are times I think "The Cold Equations" may be the greatest science fiction story ever written. But it's not a story I read very often. And I'm glad that I started, at the age of thirteen, with The Survivors.

He was not alone.

There was nothing to indicate the fact but the white hand of the tiny gauge on the board before him. The control room was empty but for himself; there was no sound other than the murmur of the drives--but the white hand had moved. It had been on zero when the little ship was launched from the Stardust; now, an hour later, it had crept up. There was something in the supplies closet across the room, it was saying, some kind of a body that radiated heat.

It could be but one kind of a body--a living, human body.

He leaned back in the pilot's chair and drew a deep, slow breath, considering what he would have to do. He was an EDS pilot, inured to the sight of death, long since accustomed to it and to viewing the dying of another man with an objective lack of emotion, and he had no choice in what he must do. There could be no alternative--but it required a few moments of conditioning for even an EDS pilot to prepare himself to walk across the room and coldly, deliberately, tak-- the life of a man he had yet to meet.

He would, of course, do it. It was the law,--stated very bluntly and definitely in grim Paragraph L, Section 8, of Interstellar Regulations: Any stowaway discovered in an EDS shall be jettisoned immediately following discovery.

It was the la--, and there could be no appeal.

* * *

It was a law not of men's choosing but made imperative by the circumstances of the space frontier. Galactic expansion had followed the development of the hyperspace drive and as men scatter--d wide across the frontier there had come the problem of contact with the isolated first-colonies and exploration parties. The huge hyperspace cruisers were the product of the combined genius and effort of Earth and were long and expensive in the building. They were not available in such numbers that small colonies could possess them. The cruisers carried the colonists to their new worlds and made periodic visits, running on tight schedules, but they could not stop and turn--aside to visit colonies scheduled to be visited at another time; such a delay would destroy their schedule and produce a confusion and uncertainty that would wreck the complex interdependence between old Earth and the new worlds of the frontier.

Some method of delivering supplies or assistance when an emergency occurred on a world not scheduled for a visit had been needed and the Emergency Dispatch Ships had been the answer. Small and collapsible, they occupied little room in the hold of the cruiser; made of light metal and plastics, they were driven by a small rocket drive that consumed relatively--little fuel. Each cruiser carried four EDS's and when a call for aid was received the nearest cruiser would drop into normal space long enough to launch an EDS with the needed supplies or personnel, then vanish again as it continued on its course.

The cruisers, powered by nuclear convert--rs, did not use the liquid rocket fuel but nuclear converters were far too large and complex to permit their installation in the EDS. The cruisers were forced by

necessity to carry a limited amount of the bulky rocket fuel and the fuel was rationed with care; the cruiser's computers determining the exact amount of fuel each EDS would require for its mission. --he computers considered the course coordinates, the mass of the EDS, the mass of pilot and cargo; they were very precise and accurate and omitted nothing from their calculations. They could not, however, foresee, and allow for, the added mass of a stowaway.

* * *

The Stardust had received the request from one of the exploration parties stationed on Woden; the six men of the party already being stricken with the fever carried by the green kala midges and their own supply of serum destroyed by the tornado that had torn through their camp. The Stardust had gone through the usual procedure; dropping into normal space to launch the EDS with the fever serum, then vanishing again in hyperspace. Now, an hour later, the gauge was saying there was something more than the small carton of serum in the supplies closet.

He let his eyes rest on the narrow white door of the closet. There, just inside, another man lived and breathed and was beginning to feel assured that discovery of his presence would now be too late for the pilot to alter the situation. It was too late--for the man behind the door it was far later than he thought and in a way he would find terrible to believe.

There could be no alternative. Additional fuel would be used during the hours of deceleration to compensate for the added mass of the stowaway; infinitesimal increments of fuel that would not be missed until the ship had almost reached its destination. Then, at some distance above the ground that might be as near as a thousand feet or as far as tens of thousands of feet, depending upon the mass of ship and cargo and the preceding period of deceleration, the

unmissed increments of fuel would make their absence known; the EDS would expend its last drops of fuel with a sputter and go into whistling free fall. Ship and pilot and stowaway would merge together upon impact as a wreckage of metal and plastic, flesh and blood, driven deep into the soil. The stowaway had signed his own death warrant when he concealed himself on the ship; he could not be permitted to take seven others with him.

He looked again at the telltale white hand, then rose to his feet. What he must do would be unpleasant for both of them; the sooner it was over, the better. He stepped across the control room, to stand by the white door.

"Come out!" His command was harsh and abrupt above the murmur of the drive.

It seemed he could hear the whisper of a furtive movement inside the closet, then nothing. He visualized the stowaway cowering closer into one corner, suddenly worried by the possible consequences of his act and his self-assurance evaporating.

"I said out!"

He heard the stowaway move to obey and he waited with his eyes alert on the door and his hand near the blaster at his side.

The door opened and the stowaway stepped through it, smiling. "All right--I give up. Now what?"

It was a girl.

* * *

He stared without speaking, his hand dropping away from the blaster

and acceptance of what he saw coming like a heavy and unexpected physical blow. The stowaway was not a man--she was a girl in her teens, standing before him in little white gypsy sandals with the top of her brown, curly head hardly higher than his shoulder, with a faint, sweet scent of perfume coming from her and her smiling face tilted up so her eyes could look unknowing and unafraid into his as she waited for his answer.

Now what? Had it been asked in the d--ep, defiant voice of a man he would have answered it with action, quick and efficient. He would have taken the stowaway's identification disk and ordered him into the air lock. Had the stowaway refused to obey, he would have used the blaster. It would not have taken long; within a minute the body would have been ejected into space--had the stowaway been a man.

He returned to the pilot's chair and motioned her to seat herself on the boxlike bulk of the drive-control units that set against the wall beside him. She obeyed, his silence making the smile fade into the meek and guilty expression of a pup that has been caught in mischief and knows it must be punished.

"You still haven't told me," she said. "I'm guilty, so what happens to me now? Do I pay a fine, or what?"

"What are you doing here?" he asked. "Why did you stow away on this EDS?"

"I wanted to see my brother. He's with the government survey crew on Woden and I haven't seen him for ten years, not since he left Earth to go into government survey work."

"What was your destination on the Stardust?"

"Mimir. I have a position waiting for me there. My brother has been

sending money home all the time to us--my father and mother and I--and he paid for a special course in linguistics I was taking. I graduated sooner than expected and I was offered this job on Mimir. I knew it would be almost a year before Gerry's job was done on Woden so he could come on to Mimir and that's why I hid in the closet, there. There was plenty of room for me and I was willing to pay the fine. There were only the two of us kids--Gerry and I--and I haven't seen him for so long, and I didn't want to wait another year when I could see him now, even though I knew I would be breaking some kind of a regulation when I did it."--

I knew I would be breaking some kind of a regulation-- In a way, she could not be blamed for her ignorance of the law; she was of Earth and had not realized that the laws of the space frontier must, of necessity, be as hard and r--lentless as the environment that gave them birth. Yet, to protect such as her from the results of their own ignorance of the frontier, there had been a sign over the door that led to the section of the Stardust that housed the EDS; a sign that was plain for all to see and heed:

UNAUTHORIZED PERSONNEL
KEEP OUT!

"Does your brother know that you took passage on the Stardust for Mimir?"

"Oh, yes. I sent him a spacegram telling him about my graduation and about going to Mimir on the Stardust a month before I left Earth. I already knew Mimir was where he would be stationed in a little over a year. He gets a promotion then, and he'll --e based on Mimir and not have to stay out a year at a time on field trips, like he does now."

There were two different survey groups on Woden, and he asked, "What is his name?"

"Cross--Gerry Cross. He's in Group Two--that was the way his address read. Do you know him?"

Group One had requested the serum; Group Two was eight thousand miles away, across the Western Sea.

"No, I've never met him," he said, then turned to the control board and cut the deceleration to a fraction of a gravity; knowing as he did so that it could not avert the ultimate end, yet doing the only thing he could do to prolong that ultimate end. The sensation was like that of the ship suddenly dropping and the girl's involuntary movement of surprise half lifted her from the seat.

"We're going faster now, aren't we?" she asked. "Why are we doing that?"

He told --er the truth. "To save fu--l for a little while."

"You mean, we don't have very much?"

He delayed the answer he must give her so soon to ask: "How did you manage to stow away?"

"I just sort of walked in when no one was looking my way," she said. "I was practicing my Gelanese on the native girl who does the cleaning in the Ship's Supply office when someone came in--with an or--er for supplies for the survey crew on Woden. I slipped into the closet there after the ship was ready to go and just before you came in. It was an impulse of the moment to stow away, so I could get to see Gerry--and from the way you keep looking a-- me so grim, I'm not sure it was a very wise impulse.

"But I'll be a model criminal--or do I mean prisoner?" She smiled at

him again. "I intended to pay for my keep on top of paying the fine. I can cook and I can patch clothes for everyone and I know how to do all kinds of useful things, even a little bit about nursing."

There was one more question to ask:

"Did you know what the supplies were that the survey crew ordered?"

"Why, no. Equipment they needed in their work, I supposed."

Why couldn't she have been a man with some ulterior motive? A fugitive from justice, hoping to lose himself on a raw new world; an opportunist, seeking transportation to the new colonies where he might find golden fleece for the taking; a crackpot, with a mission--

Perhaps once in his lifetime an EDS pilot would find such a stowaway on his ship; warped men, mean and selfish men, brutal and dangerous men--but never, before, a smiling, blue-eyed girl who was willing to pay her fine and work for her keep that she might see her--brother.

* * *

H-- turned to the board and turned the switch that would signal the Stardust. The call would be futile but he could not, until he had exhausted that one vain hope, seize her and thrust her into the air lock as he would an animal--or a man. The delay, in the meantime, would not be dangerous with the EDS decelerating at fractional gravity.

A voice spoke from the communicator. "Stardust. Identify yourself and proceed."

"Barton, EDS 34G11. Emergency. Give me Commander Delhart."

There was a faint confusion of noises as the request went through the proper channels. The girl was watching him, no longer smiling.

"Are you going to order them to come back after me?" she asked.

The communicator clicked and there was the sound of a distant voice saying, "Commander, the EDS requests--"

"Are they coming back after me?" she asked again. "Won't I get to see my brother, after all?"

"Barton?" The blunt, gruff voice of Commander Delhart came from the communicator. "What's this about an emergency?"

"A stowaway," he answered.

"A stowaway?" There was a slight surprise to the question. "That's rather unusual--but why the 'emergency' call? You discovered him in time so there should be no appreciable --anger and I presume you've informed Ship's Records so his nearest relatives can be notified."

"That's why I had to call--you, first. The stowaway is still aboard and the circumstances are so different--"

"Different?" the commander interrupted, impatience in his voice. "How can they be different? You know you have a limited supply of fuel; you also know the law, as well as I do: 'Any stowaway discovered in an EDS shall be jettisoned immediately following discovery.' "

There was the sound of a sharply indrawn breath from the girl. "What does he mean?"

"The stowaway is a girl."

"What?"

"She wanted to see her brother. She's only a kid and she didn't know what she was really doing."

"I see." All the curtness was gone from the commander's voice. "So you ca--led me in the hope I could do something?" Without waiting for an answer he went on. "I'm sorry--I can do nothing. This cruiser must maintain its schedule-- the life of not one person but the lives of many depend on it. I know how you feel but I'm powerless to help you. I'll have you connected with Ship's Records."

* * *

The communicator faded to a faint rustle of sound and he turned back to the girl. She was leaning forward on the bench, almost rigid, her eyes fixed wide and frightened.

"What did he mea--, to go through with it? To jettison me . . . to go through with it--what did he mean? Not the way it sounded . . . he couldn't have. What did he mean . . . what did he really mean?"

Her time was too short for the comfort of a lie to be more than a cruelly fleeting delusion.

"He meant it the way it sounded."

"No!" She recoiled from him as though he had struck her, one hand half upraised as though to fend him off and stark unwillingness to believe in her eyes.

"It will have to be."

"No! You're joking--you're insane! You can't mean it!"

-- "I'm sorry." He spoke slowly to her, gently. "I should have told you before--I should have, but I had to do what I could first; I had to call the Stardust. You heard what the commander said."

"But you can't--if you make me leave the ship, I'll die."

"I know."

She searched his face and the unwillingness to believe left her eyes, g--ving way slowly to a look of dazed terror.

"You--know?" She spoke the words far apart, numb and wonderingly.

"I know. It has to be like that."

"You mean it--you really mean it." She sagged back against the wall, small and limp like a little rag doll and all the protesti--g and disbelief gone. "You're going to do it--you're going to make me die?"

"I'm sorry," he said again. "You'll never know how sorry I am. It has to be that way and no human in the universe can change it."

"You're going to make me die and I didn't do anything to die for--I didn't do anything--"

He sighed, deep and weary. "I know you didn't, child. I know you didn't--"

"EDS." The communicator rapped brisk and metallic. "This is Ship's Records. Give us all information on subject's identification disk."

He got out of his chair to stand over her. She clutched the edge of the seat, her upturned face white under the brown hair and the lipstick standing out like a blood--red cupid's bow.

"Now?"

"I want your identification disk," he said.

She released the edge of the seat and fumbled at the chain that suspended the plastic disk from her neck with fingers that were trembling and awkward. He reached down and unfastened the clasp for her, than returned with the disk to his chair.

"Here's your data, Records: Identification Number T837--"

"One moment," Records interrupted. "This is to be filed on the gray card, of--course?"

"Yes."

"And the time of the execution?"

"I'll tell you later."

"Later? This is highly irregular; the time of the subject's death is required before--"

He kept the thickness out of his voice with an effort. "Then we'll do it in a highly irregular manner--you'll hear the disk read, first. The subject is a girl and she's listening to everything that's said. Are you capable of understanding that?"

There was a brief,--almost shocked, silence, then Records said meekly: "Sorry. Go ahead."

He began to read the disk, reading it slo--ly to delay the inevitable for as long as possible, trying to help her by giving her what little time he could to recover from her first ter--or and let it resolve into the calm of acceptance and resignation.

"Number T8374 dash Y54. Name: Marilyn Lee Cross. Sex: Female. Born: July 7, 2160. She was only eighteen. Height: 5-3. Weight: 11--. Such a slight weight, yet enough to add fatally to the mass of the shell-thin bubble that was an EDS. Hair: Brown. Eyes: Blue. --omplexion: Light. Blood Type: O. Irrelevant data. Destination: Port City, Mimir. Invalid data--"

He finished and said, "I'll call you later," then --urned once again to the girl. She was huddled back against the wall, watching him with a look of numb and wondering fascination.

* * *

"They're waiting for you to kill me, aren't they? They want me dead, don't they? You and everybody --n the cruiser wants--me dead, don't you?" Then the numbness broke and her voice was that of a frightened --nd bewildered child. "Everybody wants me dead and I didn't do anything. I didn't hurt anyone--I only wanted to see my brother."

"It's not the way you think--it isn't that way, at all," he said. "Nobody wants it this way; nobody would ever let it be this way if it was humanly possible to change it."

"Then why is it! I don't understand. Why is it?"

"This ship is carrying kala fever serum to Group One on Woden. Their own supply was destroyed by a tornado. Group Two--the crew your brother is in--is eight thousand miles away across the Western Sea and their helicopters can't cross it to help Group One. The fever is invariably fatal unless the serum can be had in time, and the six men in Group One will die--unless this ship reaches them on schedule. These little ships are always given barely enough fuel to

reach their destination and if you stay aboard your added weight will cause it to use up all its fuel before it reaches the ground. It will crash, then, and you and I will die and so will the si-- men waiting for the fever serum."

It was a full minute before she spoke, and as she considered his wo--ds the expression of numbness left her eyes.

"Is that it?" she asked at last. "Just that the ship doesn't have enough fuel?"

"Yes."

"I can go alone or I can take seven others with me--is that the way it is?"

"That's the way it is."

"And nobody wants me to have to die?"

"Nobody."

"Then maybe--Are you sure nothing can be done about it? Wouldn't people help me if they could?"

"Everyone would like to help you but there is nothing anyone can do. I did the only thing I could do when I called the Stardust."

"And it won't come back--but there might be other cruisers, mightn't there? Isn't there any hope at all that there might be someone, somewhere, who could do something to help me?"

She was leaning forward a little in her eagerness as she waited for his--answer.

"No."

The word was like the drop of a cold stone and she again leaned back against the wall, the hope and eagerness leaving her face. "You're sure--you know you're sure?"

"I'm sure. There are no other cruisers within forty light-years; there is nothing and no one to change things."

She dropped her gaze to her lap and began twisting a pleat of her skirt between her fingers, saying no more as her mind began to adapt itself to the grim knowledge.

* * *

It was better so; with the going of all hope would go the fear; --ith the going of all hope would come resignation. She needed time and she could have so little of it. How much?

The EDS's were not equipped with hull-cooling units; their speed had to be reduced to a moderate level before entering the atmosphere. They were decelerating at .10 gravity; approaching their destination at a--far higher speed than the --omputers had calculated on. The Stardust had been quite near Woden when she launched the EDS; their present velocity was putting them nearer by the second. There would be a critical point, soon to be reached, when he would have to resume deceleration. When he did so the girl's weight would be multiplied by the gravities of deceleration, would become, suddenly, a factor of paramount importance; the factor the computers had been ignorant of when they determined the amount of fuel the EDS should have. She would have to go when deceleration began; it could be no other way. When would that be--how long could he let her stay?

"How long can I stay?"

He winced involuntarily from the words that were so like an echo of his own thoughts. How long? He didn't know; he would have to ask the ship's computers. Each EDS was given a meager surplus of fuel to compensate for unfavorable conditions within the atmosphere and relatively little fuel was being consumed for the time bein--. The memory banks of the computers would still contain all data pertaining to the course set for the EDS; such data would not be erased until the EDS reached its destination. He had only to give the computers the new data; the girl's weight and the exact time at which he had reduced the deceleration to .10.

"Barton." Commander Delhart's voice came abruptly from the communicator, as he opened his mouth to call the Stardust. "A check with Records shows me you haven't completed your report. Did you reduce the deceleration?"

So the commander knew what he was trying to do.

"I'm decelerating at point ten," he answered. "I cut the decelera--ion at seventeen fifty and the weight is a hundred and ten. I would like to stay at point ten as long as the computers say I can. Will you give them the question?"

It was contrary to regulations for an EDS pilot to make any changes in the course or degree of deceleration the computers had set for him but the commander made no mention of the violation, neither did he ask the reason for it. It was not necessary for him to ask; he had not become commander of an interstellar cruiser without both intelligence and an understanding of human nature. He said only: "I'll have that given the computers."

The communicator fell silent and he and the girl waited, neither of them speaking. They would not have to wait long; the computers

would give the answer within moments of the asking. The new factors would be fed into the steel maw of the first bank and the electrical impulses would go through the complex circuits. Here and there a relay might click, a tiny cog turn over, but it would be essentially the electrical impulses that found the answer; formless, mindless, invisible, determining with utter precision how long the pale girl beside him might live. Then a second steel maw would spit out the answer.

The chronometer on the instrument board read 18:10 when the commander spoke again.

"You will resume deceler--tion at nineteen ten."

She looked toward the chronometer, then quickly away from it. "Is that when . . . when I go?" she asked. He nodded and she dropped her eyes to her lap again.

"I'll have the course corrections given you," the commander said. "Ordinarily I would never permit anything like this but I understand your position. There is nothing I can do, other than what I've just done, and you will not deviate from these new instructions. You will complete your report at nineteen ten. Now--here are the course corrections."

The voice of some unknown technician read them to him and he wrote them down on the pad clipped to the edge of the control board. There would, he saw, be periods of deceleration when he neared the atmosphere when the deceleration would be five gravities--and at five gravities, one hundred and ten pounds would become five hundred fifty pounds.

The technician finished and he terminated the contact with a brief acknowledgement. Then, hesitating a moment, he reached out and

shut off the communicator. It was 18:13 and he would have nothing to report until 19:10. In the meantime, it somehow seemed indecent to permit others to hear what she might say in her last hour.

* * *

He began to check the instrument readings, going over them with unnecessary slowness. She would have to accept the circumstances and there was nothing he could do to help her into acceptance; words of sympathy would only delay it.

It was 18:20 when she stirred from her motionlessness and spoke.

"So that's the way it has to be with me?"

He swung around to face her. "You understand now, don't you? No one would ever let it be like this if it could be changed."

"I understand," she said. Some of the color had returned to her face and the lipstick no longer stood out so vividly red. "There isn't enough fuel for me to stay; when I hid on this ship I got into something I didn't know anything about and now I have to pay for it."

She had violated a man-made law that said KEEP OUT but the penalty was not of men's making or desire and it was a penalty men could not revoke. A physical law had decreed: h amount of fuel will power an EDS with a mass of m safely to its destination; and a second physical law had decreed: h amount of fuel will not power an EDS with a mass of m plus x safely to its destination.

EDS's obeyed only physical laws and no amount of human sympathy for her could alter the second law.

"But I'm afraid. I don't want to die--not now. I want to live and nobody

is doing anything to help me; everybody is letting me go ahead and acting just like nothing was going to happen to me. I'm going to die and nobody cares."

"We all do," he said. "I do and the commander does and the clerk in Ship's Records; we all care and each of us did what little he could to help you. It wasn't enough--it was--almost nothing--but it was all we could do."

"Not enough fuel--I can understand that," she said, as though she had not heard his own words. "But to have to die for it. Me, alone--"

How hard it must be for her to accept the fact. She had never known danger of death; had never k--own the environments where the lives of men could be as fragile and fleeting as sea foam tossed against a rocky shore. She belonged on gentle Earth, in that secure and peaceful society where she could be young and gay and laughing with the others of her kind; where life was precious and well-guarded and there was always the assurance that tomorrow would come. She belonged in that world of soft winds and warm suns, music and moonlight and gracious manners and not on the hard, bleak frontier.

"How did it happen to me, so terribly quickly? An hour ago I was on the Stardust, going to Mimir. Now the Stardust is going on without me and I'm going to die and I'll never see Gerry and Mama and Daddy again--I'll never see anything again."

He hesitated, wondering how he could explain it to her so she would really understand and not feel she had, somehow, been the victim of a reasonlessly cruel injustice. She did not know what the frontier was like; she thought in terms of safe-and-secure Earth. Pretty girls were not jettisoned on Earth; there was a law against it. On Earth her plight would have filled the newscasts and a fast black Patrol ship would have been racing to her rescue. Everyone, everywhere, would have

known of Marilyn Lee Cross and no effort would have been spared to save her life. But this was not Earth and there were no Patrol ships; only the Stardust, leaving them behind at many times the speed of light. There was no one to help her, there would be no Marilyn Lee Cross smiling from the newscasts tomorrow. Marilyn Lee Cross would be but a poignant memory for an EDS pilot and a name on a gray card in Ship's Records.

"It's different here; it's not like back on Earth," he said. "It isn't that no one cares; it's t--at no one can do anything to help. The frontier is big and here along its rim the colonies and exploration parties are scattered so thin and far between. On Woden, for example, there are only sixteen men--sixteen men on an entire world. The exploration parties, the survey crews, the little first-colonies--they're all fighting alien environments, trying to make a way--for those who will fo--low after. The environments fight back and those who go --irst usually make mistakes only once. There is no margin of safety along the rim of the frontier; there can't be --ntil the way is made for the others who will come later, until the new worlds are tamed and settled. Until then men will have to pay the penalty for making mistakes with no one to help them because there is no one to help them."

"I was going to Mimir," she said. "I didn't know about the frontier; I was only going to Mimir and it's safe."

"Mimir is safe but you left the cruiser that was taking you there."

She was silent for a little while. "It was all so wonderful at first; there was plenty of room for me on this ship and I would be seeing Gerry so soon . . . I didn't know about the fuel, didn't know what would happen to me--"

Her words trailed away and he turned his attention to the viewscreen, not wanting to stare at her as she fought her way through the black

horror o-- fear toward the calm gray of acceptance.

* * *

Woden was a ball, enshrouded in the blue haze of its atmosphere, swimming in space against the background of star-sprinkled dead blackness. The great mass of Manning's Continent sprawled like a gigantic hourglass in the Eastern Sea with the western half of the Eastern Continent still visible. There was a thin line of shadow along the right-hand edge of the globe and the Eastern Continent was disappearing into it as the planet turned on its axis. An hour before the entire continent had been in view, now a thousand miles of it had gone into the thin edge of shadow and around to the night that lay on the other side of the world. The dark blue spot that was Lotus Lake was approaching the shadow. It was somewhere near the southern edge of the lake that Group Two had their camp. It would be night there, soon, and quick behind the coming of night the rotation of Woden on its axis would put Group Two beyond the reach of the ship's radio.

He would have to tell her before it was too late for her to talk to her brother. In a way, it would be better for both of them should they not do so but it was not for him to decide. To each of them the last words would be something to hold and c--erish, something that would cut like the blade of a knife yet would be infinitely precious to remem--er, she for her own brief moments to live and he for the rest of his life.

He held down the button that would flash the grid lines on the viewscreen and used the known diameter of the planet to estimate the distance the southern tip of Lotus Lake had yet to go until it passed beyond radio range. It was approximately five hundred miles. Five hundred miles; thirty minutes--and the chronometer read 18:30. Allowing for error in estimating, it could not be later than 19:05 that the turning of Woden would cut off her brother's voice.

The first border of the Western Continent was already in sight along the left side of the world. Four thousand miles across it lay the shore of the Western Sea and the Camp of Group One. It had been in the Western Sea that the tornado had originated, to strike with such fury at the camp and destroy half their prefabricated buildings, including the one that housed t--e medical supplies. Two days before the tornado had not existed; it had been no more than great gentle masses of air out over the calm Western Sea. Group One had gone about their routine survey work, unaware of the meeting of the air masses out at sea, unaware of the force the union was spawning. It had struck their camp without warning; a thundering, roaring destruction that sought to annihilate all that lay before it. It had passed on, leaving the wreckage in its wake. It had destroyed the labor of months and had doomed six men to die and then, as though its task was accomplished, it once more began to resolve into gentle masses of air. But for all its deadliness, it had destroyed with neither malice nor intent. It had been a blind and mindless force, obeying the laws of nature, and it would have followed the same course with the same fury had men never existed.

Existence required Order and there was order; the laws of nature, irrevocable and immutable. Men could learn to use them but men could not change them. The circumference of a circle was always pi times the diameter and no science of Man would ever make it otherwise. The combination of chemical A with chemical B under condition C invariably produced reaction D. The law of gravitation was a rigid equation and it made no distinction between the fall of a leaf and the ponderous circling of a binary star system. The nuclear conversion process powered the cruisers that carried men to the stars; the same process in the form of a nova would destroy a world with equal efficiency. The laws were, and the universe moved in obedience to them. Along the frontier were arrayed all the forces of

nature and sometimes they destroyed those who were fighting their way outward from Earth. The men of the frontier had long ago learned the bitter futility of cursing the forces that would destroy them for the forces were blind and d--af; the futility of looking to the heavens for mercy, for the stars of the galaxy swung in their long, long sweep of two hundred million years, as inexorably controlled as they by the laws that knew neither hatred nor compassion.

The men of the frontier knew--but how was a girl from Earth to fully understand? H amount of fuel will not power an EDS with a mass of m plus x safely to its destination. To himself and her brother and parents she was a sweet-faced girl in her teens; to the laws of nature she was x, the unwanted factor in a cold equation.

* * *

She stirred again on the seat. "Could I write a letter? I want to write to Mama and Daddy and I'd like to talk to Gerry. Could you let me talk to him over your radio there?"

"I'll try to get him," he said.

He switched on the normal-space transmitter and pressed the signal button. Someone answered the buzzer almost immediately.

"Hello. How's it going with you fellows now--is the EDS on its way?"

"This isn't Group One; this is the EDS," he said. "Is Gerry Cross there?"

"Gerry? He and two others went out in the helicopter this morning and aren't back yet. It's almost sundown, though, and he ought to be back right away--in less than an hour at the most."

"Can you connect me through to the radio in his 'copter?"

"Huh-uh. It's been out of commission for two months--some printed circuits went haywire and we can't get any more until the next cruiser stops by. Is it something important--bad news for him, or something?"

"Yes--it's very important. When he comes in get him to the transmitter as soon as you possibly can."

"I'll do that; I'll have one of the boys waiting at the field with a truck. Is there anything else I can do?"

"No, I guess that's all. Get him there as soon as you can and signal me."

He turned the volume to an inaudible minimum, an act that would not affect the functioning of the signal buzzer, and unclipped the pad of paper from the control board. He tore off the sheet containing his flight instructions and handed the pad to her, together with pencil.

"I'd better write to Gerry, too," she said as she took them. "He might not get back to camp in time."

She began to write, her fingers still clumsy and uncertain in the way they handled the pencil and the top of it trembling a little as she poised it between words. He turned back to the viewscreen, to stare at it without seeing it.

She was a lonely little child, trying to say her last good-by, and she would lay out her heart to them. She would tell them how much she loved them and she woul-- tell them to not feel badly about it, that it was only something that must happen eventually to everyone and she was not afraid. The last would be a lie and it would be there to read between the sprawling, uneven lines; a valiant little lie that would

make the hurt all the greater for them.

Her brother was of the frontier and he would understand. He would not hate the EDS pilot for doing nothing to prevent her going; he would know there had been nothing the pilot could do. He would understand, though the understanding would not soften the shock and pain when he learned his sister was gone. But the others, her father and mother--they would not understand. They were of Earth and they would think in th-- manner of those who had never lived where the safety margin of life was a thin, thin line--and sometimes not at all. What would they think of the faceless, unknown pilot who had sent her to her death?

They would hate him with cold and terrible intensity but i-- really didn't matter. He would never see them, never know them. He would have only the memories to remind him; only the nights to fear, when a blue-eyed girl in gypsy--sandals would come in his dreams to die again-- * * *

He scowled at the viewscreen and tried to force his --houghts into less emotional channels. There was --othing he could do to help her. She had unknowingly subjected herself to the penalty of a law that recognized neither innocence nor youth nor beauty, that was incapable of sympathy or leniency. Regret was illogical--and yet, could knowing it to be illogical ever keep it away?

She stopped occasionally, as though trying to find the right words to tell them what she wanted them to know, then the pencil would resume its whispering to the paper. It was 18:37 when she folded the letter in a square and wrote a name on it. She began writing another, twice looking up at the chronometer as though she feared the black hand might reach its rendezvous before she had finished. It was 18:45 when she folded it as she had done the first letter and wrote a name and address on it.

She held the letters out to him. "Will you take care of these and see that they're enveloped and mailed?"

"Of course." He took them from her hand and placed them in a pocket of his gray uniform shirt.

"These can't be sent off until the next cruiser stops by and the Stardust will have long since told them about me, won't it?" she asked. He nodded and she went on, "That makes the letters not important in one way but in another way they're very important--to me, and to them."

"I know. I understand, and I'll take care of them."

She glanced at the chronometer, then back at him. "It seems to move faster all the time, doesn't it?"

He said nothing, unable to think of anything to say, and she asked, "Do you think Gerry will come back to camp in time?"

"I think so. They said he should be in right away."

She began to roll the pencil back and forth between her palms. "I hope he does. I --eel sick and scared and I want to hear his voice again and maybe I won't feel so alone. I'm a coward and I can't help it."

"No," he said, "you're not a--coward. You're afraid, but you're not a coward."

"Is there a difference?"

He nodded. "A lot of difference."

"I feel so alone. I never did feel like this before; like I was all by myself and there was nobody to care what happened to me. Always, before, there was Mama and Daddy there and my friends around me. I had lots of friends, and they had a going-away p--rty for me the night before I left."

Friends and music and laughter for her to remember--and on the viewscreen Lotus Lake was going into the shadow.

"Is it the same with Gerry?" she asked. "I mean, if he should make a mistake, would he have to die for it, all alone and with no one to help him?"

"It's --he same with all along the frontier; it will always be like that so long as there is a frontier."

"Gerry didn't tell us. He said the pay was good and he sent money home all the time because Daddy's little shop just brought in a bare living but he didn't tell us it was like this."

"He didn't tell you his work was dangerous?"

"Well--yes. He mentioned that, but we didn't understand. I always thought danger along the frontier was something that was a lot of fun; an exciting adventure, like in the three-D shows." A wan smile touched her face for a moment. "Only it's not, is it? It's not the same at all, because when it's real you can't go home after the show is over."

"No," he said. "No, you can't."

Her glance flicked from the chronometer to the door of the air lock then down to the pad and pencil she still held. She shifted her position slightly to lay them on the bench beside her, moving one foot out a little. For the first time he saw that she was not wearing Vegan

gypsy sandals but only--cheap imitations; the expensive Vegan leather was some kind of grained plastic, the silver buckle was gilded iron, the jewels were colored glass. Daddy's little shop just brought in a bare living-- She must have left college in her second year, to take the course in linguistics that would enable her to make her own way and help her brother provide for her parents, earning what she could by part-time work after classes were over. Her personal possessions on the Stardust would be taken back to her parents--they would neither be of much value nor occupy much storage space on the return voyage.

* * *

"Isn't it--" She stopped, and he looked at her questioningly. "Isn't it cold in here?" she asked, almost apologetically. "Doesn't it seem cold to you?"

"Why, yes," he said. He saw by the main temperature gauge that the room was at precisely normal temperature. "Yes, it's colder than it should be."

"I wish Gerry would get back before it's too late. Do you really think he will, and you didn't just say so to make me feel better?"

"I think he will--they said he would be in pretty soon." On the viewscre--n Lotus Lake had gone into the shadow but for the thin blue line of its western edge and it was apparent he had overestimated the time she would have in which to talk to her brother. Reluctantly, he said to her, "His camp will be out of radio range in a few minutes; he's on that part of Woden that's in the shadow"--he indicated the viewscreen--"and the turning of Woden will put him beyond contact. There may not be much time left when he comes in--not much time to talk to him before he fades out. I wish I could do something about it--I would call him right now if I could."

"Not even as much --ime as I will have to stay?"

"I'm afraid not."

"Then--" She straightened and looked toward the air lock with pale resolution. "Then I'll go when Gerry passes beyond range. I won't wait any longer after that--I won't have anything to wait for."

Again there was nothing he could say.

"Maybe I shouldn't wait at all. Maybe I'm selfish--maybe it would be better for Gerry if you just told him about it afterward."

There was an unconscious pleading for denial in the way she spoke and he said, "He wouldn't want you to do that, to not wait for him."

"It's already coming dark where he is, isn't it? There will be all the long night before him, and Mama and Daddy don't know yet that I won't ever be coming back like I promised them I would. I've caused everyone I love to be hurt, haven't I? I didn't want to--I didn't inten-- to."

"It wasn't your fault," he said. "It wasn't your fault. They'll know that. They'll understand."

"At first I was so afraid to die that I was a coward and thought only of myself. Now, I see how selfish I was. The terrible thing about dying like this is not that I'll be gone but tha-- I'll never see them again; never be able to tell them that I didn't take them for granted; never be able to tell t--em I knew of the sacrifices they made to make my life happier, and I knew all the things they did for me and that I loved them so much more than I ever told them. I've never told them any of those things. You don't tell them such things when you're young and your life is all before you--you're afraid of sounding sentimental and silly.

"But it's so different when you have to die--you wish you had told them while you could and you wish you could tell them you--re sorry for all the little mean things you ever did or said to them. You wish you could tell them that you didn't really mean to ever hurt their feelings and for them to only remember that you always loved them far more than you ever let them know."

"You don't have to tell them that," he said. "They will know--they've always known it."

"Are you--sure?" she asked. "How can--you be sure? My people are strangers to you."

"Wherever you go, human nature and human hea--ts are the same."

"And they will know what I want them to know--that I lov-- them?"

"They've always known it, in a way far better than you could ever put in words for them."

"I keep remembering the t--ings they did for me, and it's the little things they did that seem to be the most important to me, now. Like Gerry--he sent me a bracelet of fire-rubie-- on my sixteenth birthday. It was beautiful--it must have cost him a month's pay. Yet, I remember him more for what he did the night my kitten got --un over in the street. I was only six years old and he held me in his arms and wiped away my tears and told me not to cry, that Flossy was gone for just a little while, for just long enough to get herself a new fur coat and she would be on the foot of my bed the very next morning. I believed him and quit crying and went to sleep dreaming about my kitten coming back. When I woke up the next morning, there was Flossy on the foot of my bed in a brand-new white fur coat, just like he had said--she would be.

"It wasn't until a long time later that Mama told me Gerry had got the pet-shop owner out of bed at four in the morning and, when the man got mad about it, Gerry told him he was either going to go down and sell him the white kitten right then or he'd break his neck."

"It's always the little things you remember people by; all the little things they did because they wanted to do them for you. You've done the same for Gerry and your father and mother; all kinds of things that you've forgotten about but that they will never forget."

"I hope I have. I would like for them to remember me like that."

"They will."

"I wish--" She swallowed. "The way I'll die---- wish they wouldn't ever think of that. I've read how people look who die in space--their insides all ru--tured and exploded and their lungs out between their teeth and then, a few seconds later, they're all dry and shapeless and horribly ugly. I don't want them to ever think of me as something dead and horrible, like that."

"You're their own, their child and their sister. They could never think of you other than the way you would want them to; the way you looked the last time they saw you."--

"I'm still afraid," she said. "I can't help it, but I don't want Gerry to know it. If he gets back in time, I'm going to act like I'm not afraid at all and--"

The signal buzzer interrupted her, quick and imperative.

"G--rry!" She came to her feet. "It's Gerry, now!".

* * *

He spun the volume control knob and asked: "Gerry Cross?"

"Yes," her brother answered, an undertone of tenseness to his reply. "The bad news--what is it?"

She answered for him, standing --lose behind him and leaning down a little toward the communicator, her hand res--ing small and cold on his shoulder.

"Hello, Gerry." There was only a faint quaver to betray the careful casualness of her voice. "I wanted to see you--"

"Marilyn!" There was sudden and terrible apprehension in the way he spoke her name. "What are you doing on that EDS?"

"I wanted to see you," she said again. "I wanted to see you, so I hid on this ship--"

"You hid on it?"

"I'm a stowaway . . . I didn't know what it would mean--"

"Marilyn!" It was the cry of a man who calls hopeless and desperate to someone already and forever gone from him. "What have you done?"

"I . . . it's not--" Then her own composure broke and the cold little hand gripped his shoulder convulsively. "Don't, Gerry--I only wanted to see you; I didn't intend to hurt you. Please, Gerry, don't feel like that--"

Something warm and wet splashed on his wrist and he slid out of the chair, to help her into it and swing the microphone down to her own level.

"Don't feel like that--Don't let me go knowing you feel like that--"

The sob she had tried to hold back choked in her throat and her brother spoke to her. "Don't cry, Marilyn." His voice was suddenly deep and infinitely gentle, with all the pain held--out of it. "Don't cry, sis--you mu--tn't do that. It's all right, honey--everything is all right."

"I--" Her --ower lip quivered and she bit into it. "I didn't want you to feel that way--I just wanted us to say good-by because I have to go in a minute."

"Sure--sure. That's the way it will be, sis. I didn't mean to sound the way I did." Then his voice changed to a tone of quick and urgent demand. "EDS--have you called the Stardust? Did you check with the computers?"

"I called the Stardust almost an hour ago. It can't turn back, there are no other cruisers within forty light-years, and there isn't enough fuel."

"Are you sure that the computers had the correct data----ure of everything?"

"Yes--do you think I could ever let it happen if I wasn't sure? I did everything I could do. If there was anything at all I could do now, I would do it."

"He tried to help me, Gerry." Her lower lip was no longer trembling and the short sleeves of her blouse wer-- wet where she had dried her tears. "No one can help me and I'm not going to cry any more and everything will be all right with you and Daddy and Mama, won't it?"

"Sure--sure it will. We'll make out fine."

Her brother's words were beginning to come in more faintly and he turn--d the volume control to maximum. "He's going out of range," he

said to her. "He'll be gone within another minute."

"You're fading out, Gerry," she said. "You're going out of range. I wanted to tell you--but I can't-- now. We must say good-by so soon--but maybe I'll see you again. Maybe I'll come to you in your d--eams with my hair in braids and crying because the kitten in my arms is dead; maybe I'll be the touch of a breeze that whispers to you as it goes by; maybe I'll be one of those g--ld-winged larks you told me about, singing my silly head off to you; maybe, at times, I'll be nothing y--u can see but you will know I'm there beside you. Think of me like that, Gerry; always li--e that and not--the other way."

Dimmed to a whisper by the turning of Woden, the answer came back:

"Always like that, Marilyn--always like that and never any other way--"

"Our time is up, Gerry--I ha--e to go, now. Good--" Her voice broke in mid-word and her mouth tried to twist into crying. She pressed her hand hard against it and when she spoke again the words came clear and true:

"Good-by, Gerry."

Faint and ineffably poignant and tender--the last words came from the cold metal of the communicator:

"Good-by, little sister--".

* * *

She sat motionless in the hush that followed, as though listening to the shadow-echoes--of the words as they died away, then she turned away from the communicator, toward the air lock, and he pulled down

the black lever beside hi--. The inner door of the air lock slid swiftly open, to reveal the bare little cell that was waiting for her, and she walked to it.

She walked with her head up and the brown curls brushing her shoulders, with the white sandals stepping as sure and steady as the fractional grav--ty would permit and the gilded buckle-- twinkling with little lights of blue and red and crystal. He let her walk alone and made no move to help her, knowing she would not want it that way. She stepped into the air lock and turned to face him, only the pulse in her throat to betray the wild beating of her heart.

"I'm ready," she said.

He pushed the lever up and the door slid its quick barrier between them, enclosing her in black and utter darkness for her las-- moments of life. It clicked as it locked in place and he jerked down the red lever. There was a slight waver to the ship as the air gushed from the lock, a vibration to the wall as though something had bumped the outer door in passing, then there was nothing and the ship was dropping true and steady again. He shoved the red lever--back to close the door on the empty air lock --nd turned away, to walk to the pilot's chair with the slow steps of a man old and weary.

Back in the pilot's chair he pressed the signal button of the normal-space transmitter. There was no response; he had expected none. Her brother would have to wait through the night until the turning of Woden permitted contact through Group One.

It was not yet time to resume deceleration and he waited while the ship dropped endlessly down--ard with him and the drives purred softly. He saw that the white hand of the supplies closet temperature gauge was on zero. A cold e--uation had been balanced and he was alone on the ship. Something shapeless an-- ugly was hurrying ahea-

- of him, going to Woden where its brother was waiting through the night, but the empty ship still lived for a little while with the presence of the girl who had not known about the forces that killed with neither hatred nor malice. It seemed, almost, that she still sat small and bewildered and frightened on the metal box beside him, her words e- - ingly clear in the void she had left behind her:

I didn't do anything to die for--I didn't do anything--