

THE BLACK HOLE

BY K. E. CHILTON

1.

Jed Bradley struggled with the torque-free wrench that had been especially designed for use in a weightless environment.

"Damn thing!" he swore. "These things never work the way they're supposed to!"

He twiddled with the knob that adjusted the amount of torque to be applied through the wrench. Too much and he would swing round the bolt. Too little and the wrench wouldn't turn the nut. It had to be just right. He moved the knob so that the setting was three, instead of the four at which he had been using it. He placed the wrench over the nut on the high-gain antenna.

"Ah! Just right", he chuckled to himself as he could feel the meshing of the gears inside the wrench. Quickly he snugged up the nut and then moved on to the others on the periphery of the antenna.

"How're ya doin', Jed?" crackled a voice on his helmet radio. It was the voice of his fellow astronaut, Scott Cooper.

"Darn near finished".

"Will ya be comin' in?"

"Pretty soon, I think. How's the signal now?"

"Ninety-five percent of full strength. Not bad for this part of the Solar System."

"Nine-oh would be good enough. I guess I've had it then. I'm coming in."

Jed fastened the wrench to the clip on his utility belt. Then, he unclipped the little propellant gun with which he was to provide thrust enough to float him gently along the side of the "Nova". With little squirts of gas he accelerated himself, gathering in his tether rope as he went. When he reached the open hatch, he stopped and looked around. At the far end of the ship, he could see the antenna, partly in shadow and partly in the weak sunlight that illuminated everything only faintly. Looking the other way, he could look past the windows of the pilot's cabin to the disc of the planet Pluto.

Pluto seemed to be no bigger than the apparent size of the antenna,

but of course it was much farther way. Still, Jed made a mental note of the polar caps and the dark spots within them.

"I must take a photo of Pluto", he thought. "Beth would like one of those for her album".

A flicker of a smile crossed his lips as he thought of his wife and family. They were back on the good warm Earth, not floating around on the outer fringes of the Solar System, maintaining communications satellites. It would be winter now, back in Geneva, New York. The lakes would all be frozen and the kids would be sliding down the hills in the great drifts of snow that fall in upstate New York.

An even larger smile appeared as he thought of Becky, his daughter. She would be a lot taller now. It had been a long time since Jed had been home and he wondered if Becky's broken arm had healed up.

He could picture them sitting before the warm glow of the fireplace in the north end of their little cottage. He had worked hard on that just finishing it before he had to report to the Cape for his final briefings on this flight.

Slowly he descended into the hatch, closing the door and securing it behind him.

"Pressurize," he said.

"Pressurize" came the answer.

Jed watched the lights on the panel as they glowed, first red, then yellow and finally green.

When the final green light extinguished itself, he reached up and undid the first of the screws that secured his space helmet. A hiss of gas could be heard as the pressure within the suit vented to match the pressure of the air in the airlock. Then, he slowly undid the other screws and removed his helmet.

Automatically, he reached up and scratched his nose. This was a problem for all astronauts. No one had solved it, right from the time of the first astronauts back in the 1960's. Each astronaut had his own method, such as scratching on one of the microphones, but none was particularly successful.

Jed opened the door that led into the interior of the Nova. Gliding through, he closed it behind him, noting its good solid "click". Air-lock doors had to be well built. He tucked his helmet into its container and then floated gently up through Nova to the control room.

Scott turned to greet him. Scott was from Michigan. Long blond locks hung down over the top of his green and yellow uniform. A big smile illuminated his freckled face.

"Nice job", he said.

"Thanks," answered Jed. "How's the comm?"

"Ninety-six".

"Great! Any chance of calling home?"

"Sure. I've got Saturn station on the box now. They can patch you right through via Synco-2."

"Well, I might call in a while, but before I do, I want to get out of this space suit."

"Yeah. It gets kinda warm in there without the air-conditioning."

"Give me a hand".

Scott helped Jed to struggle out of his silver-coated space-suit.

"You've been sweatin'."

"I wasn't sitting in here in comfort, like you! I was working!"

"Gwan! Floating around there in the great black yonder isn't work!"

"OK. Next time, you can do the EVA".

Jed floated over to the communications console. The wave form monitor showed that a carrier wave was being received. This meant that the antenna upon which he had been working was correctly aligned and could be used for receiving or sending messages. He thought for a moment, mulling over what he was going to say. He had to give his message all at once since two-way conversation was impossible. Even at the speed of light, it would take nearly 6 hours for his message to reach the Earth, and it would take the same interval for the reply to reach him at Pluto's distance from the Sun.

"Damn marvellous system," he thought, in admiration of the engineers who had thought out and constructed the Solar System Communications Network.

In the middle years of the 21st century, the network had been placed in its orbits. Each of the planets of the Solar System had two satellites in its orbit, placed so that the satellite is equidistant from the planet

and from the Sun. For Jupiter, the operation had been simple, for the Trojan Asteroids fitted the requirements exactly. Expeditions had simply placed automatic relay stations on the surfaces. The same was true for Saturn, which had an asteroid at the appropriate point preceding it in its orbit, but the satellite following sixty degrees behind the planet was a free-orbiting satellite as were all of the other satellites in the orbits of the other planets. These communications satellites, when used with the satellites in synchronous orbit around the planets themselves, allowed for communications to and from any point in the Solar System, even though the points were on opposite sides of the Sun.

Jed's call would be directed through the satellite following Saturn in its orbit, then to a satellite in the orbit of Venus and from there to an antenna on the Earth. Normal telephone circuits would send Jed's voice to his home.

"Hi, gang," Jed began. "It's been an interesting day here in the vicinity of Pluto. We had a little excitement shortly after breakfast since a meteor hit and pierced our HGA. Oh, that means High Gain Antenna. It's the antenna which is aiming my voice back to you on the Earth. I had to suit up and go outside and fix the thing. It wasn't much of a hole, about 10 centimetres across. I welded a plate together in here and then took it out to bolt it on. The carrier wave seems to indicate that it is working fine. I'm sure glad that the meteor didn't strike any of the antenna steering mechanism. That would have taken a long time to fix, if I could fix it at all.

As I look out the window, I can see Pluto. It looks like it's the size of a basketball at arm's length. I can see it's northern polar cap, since we are slightly north of Pluto's equatorial plane. The planet itself is slightly greenish, while the polar caps are white with interesting black spots scattered across them. The surface is pitted with craters, so that it doesn't look unlike Mars. The difference, of course is that Mars is red and Pluto, as I said, is green.

From out here, the Sun is reduced to being the brightest star in the sky. I can't make out a disc and I can look straight at it with no discomfort. Of course, I can't see the Earth.

Speaking of the Earth, how's winter coming along.?

I was thinking a little earlier that there must be a lot of snow around and the lake must be frozen by now. I hope that the new fireplace is working well. If you are having any difficulty with it, call Mr. Smithers.

How's that broken arm, Becky? I hope that it's coming along well. You'll have to be more careful using those old roller skates next summer.

We should be home in about eighteen months since we have finished fixing the satellites in orbit around Pluto. The people down there on the surface sure rely on those satellites for contact with home, the same as we space jockeys do. Lucky for us that we don't have a five-year stay like they do. I was just thinking the other day of how long the first expedition out here took. Twenty-two years with those old chemical rockets and gravity assist techniques! No wonder they had to take along their families! These nuclear-powered ships are a lot faster, but still the time is long. I miss you guys, but with one more trip out here, I'll have my credits in and I can stay home.

Well, gang, I have a lot to do, so I'd better get at it. We have to get the ship ready for the acceleration when we turn on the nukes. It's a lot more than we experienced in liftoff training at the Cape. Send up your answer as soon as you can. I'll tune in to Synchro in about 12 hours so that I'll catch your answer. I love you both. Good-bye for now."

Jed put the microphone back into its bracket. He turned to face Scott, who had been sitting quietly on the other side of the cabin.

"You miss them, don't ya?" asked Scott, although he knew the answer before it appeared on Jed's lips.

"I sure do".

"Why do we do it?"

"Pay's good".

"It's alright for us bachelors," quipped Scott, "but how do you married types live on what they pay us?"

"It's all a matter of budget, but you wouldn't know about that!" laughed Jed.

They loved joshing each other. Jed and Scott had been close friends ever since their training days at the astronaut school in Houston. They had qualified with nearly identical scores and had been on practically every

mission together since graduation.

"If you're through with the circuits, I've got a message for you," squawked the radio.

Jed blushed slightly. He knew that his message was being monitored by many people, but they were mostly back in the centre of the Solar System, hours away, even by radio. This reply had been immediate, so Jed knew that it had come from the surface of Pluto.

"Hello, Bill", said Jed as he picked up the microphone again.

"Hi, Jed," answered the voice.

Jed tried to imagine what Bill looked like as he stood in the radio room on Pluto Base. He was one of the unfortunates who had signed up for a five-year mission on the surface. Although they had never met, they had talked many times on the radio.

"What's up, Bill?"

"Science boys tell us there's a gravity anomaly about half a billion kilometers from here along vector 277. They think that you should have a look-see."

"Whatda ya mean, gravity anomaly!" yelled Scott, tearing the microphone from Jed's hand, "We're off for home, good old planet Earth. We didn't sign up for any 5 year stay on any forsaken planet, like you."

"You know what a gravity anomaly is," answered the voice. "It's a place where there seems to be an object with an increased gravitational force."

"I know what the Hell a gravity anomaly is. I'm not stupid. Look, Bill, we were 18 months on the voyage out here; we've been here two months fixing your bloody satellites; we'll be 18 months on the trip home. We don't wanna be another two or three months examining some bloody gravitational freak."

"Sorry, guys. The base commander, Captain Hammarstrom, has been in touch with NASA. You've got to go. It's orders from the CO."

"What CO?"

"Henderson himself".

"You mean that bloody big cheese in his office in Washington even knows e're out here?"

"I guess he does. Captain Hammarstrom got the orders on the pipe awhile ago. We were just waiting for you to finish up the repairs on your antenna before breaking the bad news to you."

"Thanks for nothing," answered Scott.

"Yeah. Don't go home. Go waltzing halfway across the Universe to see the great marvel of Nature," Jed chimed in.

"Sorry guys", came the voice of Bill, "I'd like to go home, too."

"Yeah, I'll bet you would."

"I would!"

"OK, maybe we'll stop by on the way back. Got any girls you wanta bring along?"

"Nah, only girls on Pluto are either science freaks in love with their test tubes, or they're officers' wives, fat, frowsy and forty."

"Forget it," replied Scott.

"Bon voyage guys."

"Vector 277, you say?"

"Vector 277. Much luck crew. Pluto Base out."

"Thanks Bill. IRS Nova out."

Scott turned to Jed. He did not look happy. The two friends exchanged glances and each knew what the other was thinking without saying anything. The two astronauts floated to their respective consoles, Jed to Engineering and Scott to Navigation. They busied themselves, silently laying in a course to take them along vector 277.

As they worked, the Nova came to life. Lights illuminated themselves at the console. Dials began to turn. Meters began to register currents. Away back in the rear of the ship, a dull throbbing was born. Louder and more rapid grew the throbbing. The men continued their tasks, until banks of lights grew like a forest of green along the consoles. Then, they floated, still not speaking, to padded seats in the middle of the control room. Jed sat on the left, fastening his safety constringer as he reclined. Scott took the right seat, behind the three control levers.

"You ready?" Scott asked.

"I'm ready."

"What's the status of the engines?"

"All primed and ready to fire."

"I'll bring 'er about the 277."

Scott put his hand to one of the levers and squeezed slightly. He edged the lever slightly to the right and the ship began to rotate. Slowly it turned, so that instead of the control room windows facing toward Pluto, they faced the blackness of interstellar space.

"Firing," said Scott.

The throbbing quickened. Faster and faster and louder and louder grew the life pulse of the Nova. Then there was silence. The astronauts felt their bodies being pressed backward into their seats by the invisible hand of gravity. Harder and harder the force pressed them.

"Two-oh," said Jed.

"Two-oh".

"Four-oh".

"Four-oh".

"Six-five-oh."

"Six-five-oh is enough." Scott eased forward on the levers that he held in his hands. The force eased up and then disappeared completely.

"Turn on the rear view screen, will ya Jed?" asked Scott.

"Screen on."

Both men gazed at the screen. The planet which had filled their view

finders before was now merely a first magnitude star. Scott whistled softly.

"That nuclear drive sure is something," he said, with a touch of awe creeping into his voice.

"Yeah. Whoever invented it sure was doing something."

"Seems to me it was a Chinese scientist back around the year 2090."

"God, do you know everthing?"

"Well.....not quite everything. You remember that course in the history of science, back at the training school?"

"Yeah?"

"Well, I worked on it while you were out dating the girls!"

Both men laughed. Then, they uncoupled their seat belts and floated gently up into the room. They moved to their respective consoles.

"All engines working at optimum," reported Jed.

"Right on vector 277," retorted Scott.

"Best crew in NASA is humming right along."

"Yeah. Hey, are you hungry?"

"Well, only if I can do the cooking," snickered Jed. "You know how you bachelors cook. Nothing but weiners and beans!"

"Weiners and beans.....fixed gourmet style!"

"Still weiners and beans," Jed shot back.

The ^{re} was a silence from Scott so Jed sunk his needle a little deeper into Scott's hide. "Best crew, right. But how come I get stuck with the worst cook in NASA?"

"You cook it!" ^{ic}exclaimed Scott in exasperation.

Jed moved from his console and floated through the doorway into the galley. Food preparation had come a long way from the days of the early NASA flights. Some of the original astronauts had carried lunches in liquid form in little plastic bags. Then on the original Skylab space station in the 1970's they had taken up ordinary food, frozen. After that, some scientists had suggested nutrition pills but they were withdrawn when there was nearly a revolt in the astronaut corps. At the turn of the twenty-first century, someone had invented atomic food. That's what they called it, at any rate. First, all of the water was drawn off the food and then the ^{ic}atomic structure was changed so that the food became incredibly condensed. All that the astronaut had ~~to~~ do was to reverse the process. He would put a spoonful of the food into the re-structuring

device, add a little water, press a button, and there was the food in its original form. When the device was first invented, they had tried shrinking down whole meals, but later, they processed different foods separately so that the astronauts could cook up what they wanted, and, with the advent of long interplanetary flights across the Solar System, they could pass the time by practising the culinary arts.

In the galley, Jed put on a pair of magnetic slippers. They were far different from the old boots that came in around the turn of the twenty-first century. They were an improvement over the old boots that had triangular clips on the bottoms, clips which fitted into a triangular mesh in the floor. Those were replaced by the heavy steel soled magnetic boots, but these slippers were a vast improvement on the boots. Strips of pliable magnetic chromium alloy were woven right into the fabric of the slipper. Not only did they keep you anchored to the floor, but they were downright comfortable as well.

Jed materialized a half-dozen eggs and then scrambled them in a blender. Then, he transferred them to the microwave cooker. While the eggs were heating up, he put some steak powder in the machine, added a few drops of water, and pressed the energy button. Before his eyes the powder seemed to swell and grow, until, after a few seconds, a juicy red steak occupied the chamber. He removed it and, taking the now-cooked eggs from the cooker, placed the steak in their place in the receptacle. Minutes later, the steak was cooked through, a picture of mouth-watering meat. He garnished the meal with a bit of reconstituted parsley and then put the whole thing on a vacuum plate.

"Interesting bit of manufacturing," thought Jed.

The plate looked like an ordinary plate, like the many that occupied the kitchen of their home back on the Earth, except that there was a cylindrical attachment, equal in diameter to the plate, across the bottom of the plate. Tiny holes led from the surface of the plate into the cylinder, which was depressurized. Air, trying to get into the vacuum cylinder pressed down on the food, holding it securely to the plate. This was necessary in the weightless environment of space, in order to keep the food from floating all over.

"Dinner's ready," said Jed as he walked back into the control room, carrying the plate high overhead in the fashion of a waiter in an expensive restaurant.

"If it tastes as good as it smells, I'll eat it," said Scott.

"You'd better," replied Jed as he set the plate down in front of Scott.

"Good grief! I can't eat all that. It's enough for two guys," said the surprised pilot.

"It IS for two men," replied Jed as he pulled another vacuum plate and some utensils from a drawer under his communications console. "Give me half".

Both men laughed as they transferred half of the meal to Jed's vacuum plate. Then, they sat silently, consuming the food.

When they had finished, Scott gathered up the dishes and floated off to the galley to wash them up and to replenish the vacuum. Jed leaned back in his seat and thought over what had happened so far on this mission.

He had left Geneva on a wet spring day, April 7, 2172. In a few hours he was landing on the palm-fringed airstrip at the Cape. This was the Earth's busiest airstrip, with flights of all sorts coming; aircraft bearing astronauts and their support crews from every corner of the Earth, shuttlecraft descending from the various orbiting space stations, and experimental aircraft coming in from test flights.

Jed transferred to the hovercraft which glided over the ground to the astronaut ready-room. Then, as he descended from the machine, he looked up at the white clouds and blue sky. This would be the last time that he would see them as such, for he would be more than three years in this mission. Three years; that was a very long time to be away from home, but when an astronaut had ten years in, he could retire on a first class pension.

They lifted off without a hitch. Within minutes, they made a rendezvous with Orbiting Space Station 4, to drop off two passengers to the science station there. Then they started the long acceleration towards the orbit of Pluto. Strangely, they travelled in toward the centre of the Solar System first, for Pluto was virtually on the other side of the Sun. They would use the strong attraction of the Sun's gravitational

field as a sort of cosmic slingshot to hurl them out to the fringes of the Sun's family.

They crossed the Moon's orbit in a little over an hour, and as the acceleration increased, crossed the orbit of Venus in 90 hours. In 12 days they were past the Sun and by the end of the month they crossed the orbit of the Earth again.

To avoid tedium, Jed and Scott had done many things. Scott was working on a science-fiction novel while Jed tended the hydroponic garden aboard the Nova. They had played Chess, talked via radio to other spaceships and to the bases on the various planets and moons in the Solar System. They had even argued about the theory of Relativity.

After eighteen long months, they had swung into orbit around Pluto. They had replenished the reactors in the satellites there. Satellites close to the inner planets could operate using solar power, but at this great distance, they had to be nuclear powered, and the reactors needed refueling once every twenty years. Hence Interstellar Re-fueling Ships like the Nova came into being, to replace aging atomic fuel with new stuff.

"Watcha thinking about?"

Jed snapped back to reality.

"Oh, I was just rehashing this mission. Here we've been out twenty months and now they've added another month or so to it. Now, the way I calculate it, that extra month might just about give me my flight time for pension. This may be my last flight!"

"Well, congratulations."

"This will probably do it for you, too. We've got roughly the same amount of time in."

"Hey, that's right!" said Scott enthusiastically. "That calls for a celebration. Have we got any brandy left in the medicine kit?"

Jed moved over to what the crews of spaceships called the medicine kit. Actually, it was a cupboard in which the ship's liquor supply was kept. He removed a small bottle of brandy. Carefully, he transferred its contents to two vials and topped them with two-hole rubber stoppers. Each man inserted a straw through one of the holes in the stopper and drank his drink. This sort of treatment of the brandy was necessary since handling liquids in a weightless environment was still tricky.

As he drained his vial, Scott said, "Let's have another!"

"You know Standing Order 238. Only one drink in a day."

"Well, I won't report you if you don't report me."

Alcoholism had been prevalent during the initial voyages to the far limits of the Solar System. It was a way to break up the tedium and boredom of the long missions, especially in the slow chemical rockets of the early twenty-first century. Twenty years for a return journey to Pluto! How could you keep busy on a voyage that long? Yet, Carpenter and his crew had done it.

Jed poured two more shots and put the bottle back in its cupboard. He lifted his vial high and said, "Ein Prosit".

"Cheers", replied Scott, and they drew the amber brandy into their mouths.

"This is the only way to go," chuckled Jed.

"Yeah, but where are we going? To visit some gravity anomaly along Vector 277. Wow! What a holiday!"

"How long should it take for us to get there?"

"About four days, I reckon. It might take a bit longer since we don't know its exact distance. Of course, you realize that this is going to throw our navigation all off."

"Yeah, we'll have to make a pretty large circuit."

"To get back to Pluto? I think it may be a case of you can't get there from here."

Both men settled back in their couches to digest their dinners and drinks. The ship streaked through the darkness beyond the orbit of Pluto, bearing them toward the unknown phenomenon, the Gravity Anomaly on Vector 277.

They had left the vicinity of Pluto on what was a Wednesday, based on an Earth calendar. It was now Sunday. Both astronauts had put on their dress uniforms in honour of the day. Both looked resplendant in their green uniforms with the yellow epaulets and gold trim. Scott was wearing his medal, the one he had been awarded for saving the lives of three scientists after their space station had been struck with a meteorite. It was a gold medal, emblazoned with the image of the wounded station, and a star, representing the appearance of Scott's rescue vessel.

Jed's uniform was nearly identical to Scott's except that in the place of the medal, he wore a sunburst on a chain. This gold medallion was in honour of being the first astronaut to land on a comet, back in 2165. It had been a dangerous assignment, but he had done it.

Now, Jed was sitting quietly in a corner, reading a well-worn crimson Bible. It was strange that, while people on Earth were becoming more and more atheistic, astronauts were becoming more and more religious.

Scott was working at the control and navigations consoles. He was slowing the ship, and at the same time, looking through the forward window for some sign of the gravity anomaly to which they had been sent.

"We should be seeing it soon," he said.

"What?" asked Jed, looking up from his reading.

"We should be seeing it soon."

"It seem's strange to me that we haven't seen it yet."

"Yeah," replied Scott, "you'd think that anything massive enough to upset the gravitometers on Pluto would be big enough to be seen."

"Who was it that said: 'Space is not only stranger than we imagine, but stranger than we can imagine'?"

"Somebody back in the 20th century."

"I thought that you were the expert in history," needled Jed.

"You know....."

His reply was interrupted by an alarm bell.

"Radar's picked up something behind us," said Scott.

He rotated the ship until it was flying backward.

"Where is it?"

"I don't see anything," replied Jed, as he peered through the glass.

Just then, an object appeared out of nowhere and hurtled past the ship

and its two startled passengers.

"Wow! Did you see that?" enthused Jed.

"That meteorite was really moving. Here we are moving along at six-five and that thing passed us like we were standing still. The average speed of a meteor is about one tenth of what we're doing."

"What's its hurry?" wondered Jed.

Scott turned the ship around again so that they were again flying facing forward. No trace of the meteor could be seen.

"Which way did he go; which way did he go?" said Scott, referring back to something that he had heard on a vintage television programme.

"It went thataway," came the reply.

"You see anything?"

"Nope."

"Well, I'm seeing nothing!" replied Scott, "where I should be seeing something. Look dead ahead. The stars are missing!"

"What?"

"The stars are missing, right there in that circular black patch."

"What do you make of it?"

"I don't know," answered Scott, "but we'll be mighty cautious until we find out."

The atomic engines of the Nova came to life again as Scott slowed the ship to a crawl. The alarm bell sounded again, as another particle streaked by. It rang for a third time, and then a fourth, and then began to ring continuously as a hail of stones passed them.

"I hope none of those things hit us, Scott".

"Me too."

"Look, they seem to be going right into that dark area."

"It's a black hole!" Scott yelled excitedly.

"A what?"

"A black hole! You remember your basic astronomy, don't you? Black holes. They're what's left when a star collapses in on itself. It's simple. The star shrinks down until there's nothing left except its gravitational field. The field is extremely powerful since the atoms have all collapsed and their atomic forces are cancelled. Once something is sucked into a black hole it can never get out again. Even light can't come out. The gravity is so strong that light and other forms of radiation are pulled back in. That's our gravity anomaly."

"What's on the inside?" queried Jed.

"Nobody knows. A lot of theories have been put forward but knowledge of these things is pretty limited. The nearest one was supposed to be in orbit around Epsilon Aurigae. But, here's one on our very doorstep."

"You say that once something goes in, it never comes out?"

"Yeah."

"Well," said Jed, with an expression of consternation spreading over his face, "we'd better not get too close."

"I'll put us into orbit around it at a safe distance," answered Scott. "See if you can turn off that alarm bell."

As Jed reached toward the cancellation switch, the bell stopped ringing of its own accord.

"That's strange."

"It must have been a meteor shower attracted by the gravity of the hole. I don't think that we have anything to worry about since there really isn't much debris in this section of the Solar System."

"How big do you think it is?" asked Jed.

"I'd make her about 7000 miles in diameter. Just about as big as the Earth."

Scott sat down at what looked like a typewriter and began typing on the keys.

"I'll get the computer to lay in a safe course for us. We don't know too much about these things. We'll let George do all the work."

George was the name for all automatic pilots ever since their invention back in the 1940's. The "George" aboard Nova was connected to a computer and this combination flew the ship on the long voyages across the Solar System.

"There," said Scott. "Why don't you radio in a report to NASA HQ and let them know what's going on?"

"Right," replied Jed as he sat down at the radio console.

Both men set to work, employing all of their training as scientists, as well as some of their basic astronomy. "George" set them into an orbit around this strange visitor to the vicinity of the Solar System and they settled down to a routine of measurements and observations.

Their radio channel back to the Earth was open continuously as they sent their data home. They calculated the mass of the object from their orbit around it. They determined that it had no measurable temperature. They measured its size.

After a week in orbit around the black hole, the men of the Nova were ready to come home. Jed had asked for permission to wrap things up and blast off on the return journey to the Earth. He was sitting at the communications console, waiting for his reply which would take nearly eight hours to come from the Earth, when the alarm bell rang again.

"What is it this time?" he asked.

"Look there!" yelled Scott.

"It's a comet!"

"Wowee! Look at her go. Is it going to hit the hole or is it going to be a near miss?"

"I don't know," replied Jed. "If it's a near miss that comet'll go into a hyperbolic orbit. It'll get a real gravity boost."

"Looks like a collision course."

As the comet passed them, the alarm bell ceased. Both men watched the progress of the comet. It was not the usual comet, as seen from the Earth. It did not have the beautiful long tail but was simply a potato-shaped snowball. It was similar, indeed, to the one upon which Jed had landed some years before and for which he had been decorated. To land on a comet in the vicinity of the Sun would be impossible, since the surface of the comet would be constantly breaking up due to solar radiation. But, out beyond the orbit of Jupiter, where the solar wind was no longer potent, comets lacked tails and were simple snow-balls, like this one on a collision course with a black hole.

As they watched, the comet curved toward the blackness of the hole. The head seemed to elongate as the comet suddenly accelerated. Longer and longer it grew, until it broke up into a shower of little pieces. Then, the little pieces were gone, having entered the oblivion of the black hole.

"Wowee!" exclaimed Jed. "Did you see that?"

"That's really some gravitational field. And does it ever increase. It finally got so strong that the attraction on the front of the comet was so much greater than the attraction on the back that it was torn right apart," replied Scott.

"Would that happen to a more solid object? You know how unstable comets are. Just ice, snow and a few fragments of stone, all mushed up with some gases and molecular solids."

"I'd not hazard a guess," answered Scott.

Suddenly, the radio blared, "NASA Houston to IRS Nova. We have collected nearly all of your data and it seems that you fellows have made a real scientific coup. A black hole has never been studied up close before. Your mass determination seems to be commensurate with the size, according to the theoretical boys. The math wizards have worked out that Fernando's comet may be in the area and they want you to have a look for it, in case it collides with the hole. By the way, they've worked out that the hole will not enter the Solar System but is on sort of a grazing course. Your request for permission to leave it and head for home has been granted."

"That must have been the comet we saw," remarked Jed to Scott.

"And now," the radio continued, "we have Mrs. Bradley standing by, Jed. She wants to send up her weekly message to you."

Beth's voice came over the speaker.

"Hi, dear. I hope that both you and Scott are fine up there. Becky send her love. She's at school **right now** and NASA just phoned a few minutes ago to say that they had set up this radio link with you. It seems that you and Scott are heros. First men to orbit a black hole. Newspaper reporters and TV people were here yesterday. It was all very exciting.

General Henderson phoned from Washington to say that you and Scott will have ten years and three days space time logged when you get back to the Earth. You can get your pension and retire.

Aunt Martha was here for dinner last weekend. Uncle George couldn't make it because his arthritis was bothering him. We had roast turkey with all the trimmings. A sort of an early Christmas.

We all miss you boys very much. Do you know you've been gone nearly 19 months now? Scott, you turn those engines up to nine-oh or nine-five and get the both of you back here as fast as you can. We all love you both. 'Bye for now."

"NASA Houston to IRS Nova. End of transmission," came a man's voice. Then the radio was silent except for a few crackles of static as the relays in the various communications satellites turned themselves off in reponse to the cessation of the carrier wave.

"Well, that's it. Let's head for good old planet Earth. When do we start?" asked Jed.

"No time like the present."

Scott sat down again at his navigation console and typed a message to "George", ordering him to fly them back to the Earth. What he did not notice was that he had, at one point, inadvertantly typed a minus sign where he should have typed a plus sign. When he had finished, both he and Jed strapped themselves into the curving, padded acceleration couches. Scott flipped the switch marked "Auto-pilot". The familiar throbbing began again as the atomic pile in the heart of Nova began heating up. The noise of the pumps grew louder and louder until the correct pressure was reeached. Then, the noise ceased as the pumps stopped and valves opened, spewing billions of ions out into the void, providing the action which would drive the Nova forward.

The forces of inertia pressed the astronauts back into their couches as the speed indicator showed their velocity relative to its former state.

"Four-oh".

"Four-oh," replied Scott.

"Five-oh, five-five.....six-five.....seven-five".

"Seven-five". Scott flipped another switch. The acceleration stopped as the valves closed, and gradually the two astronauts were able to get out of their couches.

"Hey, Scott!" yelled Jed. "How come the hole is getting larger?"

"What?"

"That black hole is getting larger, like we were approaching it instead of going away!"

"Impossible!" Scott floated as fast as he could to his navigation console. Quickly he typed a command. The answer flashed before him on the display

screen. He studied it for a moment.

"Good grief!"

"What?"

"I've typed a minus where I should have put in a plus. We're on a course that will take us into the black hole!"

"Well, just don't sit there do something!"

"OK keep calm. I'll enter a correction. Better sit down."

Jed sat down and watched with a feeling of helplessness as Scott typed feverishly on the keyboard. The black keys clattered as his fingers literally flew over them. Scott flipped a series of switches, and Nova lurched violently as she reversed herself one hundred and eighty degrees. The pumps throbbed again, this time into a literal roar. The noise grew to a shriek and great flames leaped from her stern as Nova battled against the invisible hand of gravity of the black hole.

"How are we doing?" asked Jed, with a note of worry creeping into his voice.

"We've slowed our acceleration toward the hole."

"Let me look at the dial. Three-oh? That's still not enough. Open her up wide."

Scott turned a knob and eased back on a lever. Still the tempest in Nova's stern grew. The whole vessel vibrated. Red lights flashed across the engineering panel.

"Two-oh.....one-five.....one.....point five," Jed called as the figures came up on the dial. "Can't you get any more gas into her?"

"Not without blowing up?"

"I'd rather risk that than fly into that thing! Give her the juice!"

"OK!" Scott pulled farther back on the lever.

"Point five," called Jed again He glanced out the window. The Sun, a faint star, seemed so remote. Home was there. If he could get out of this jam he would encounter the dangers and hazards of space no more. He glanced again at the dial. It still read point five.

"Point five," he called. "Point five and steady."

"She's wide open!" yelled Scott over the din of the engines.

"Then we're going into the black hole!"

4.

With a trail of fire spewing from her tail, IRS Nova backed inexorably toward the black hole on the fringes of our Solar System. Both pilots, Jed and Scott, tried to get every ounce of energy from the great nuclear engines. But even the full power of atomic energy was not enough to overcome the gravity of the strangest of nature's objects.

"Can't you give me any more power?" shouted Scott, over the shriek of the pumps.

"She's wide open! I've pulled the rods out all the way! We'll probably blow up before we enter the hole!" yelled Jed.

"Put the rods back in! Let's take our chances with the hole. No use committing suicide!"

Jed manipulated the buttons on his console, and the shrieking engines of the Nova faded to a whisper.

Both men strapped themselves into their acceleration couches to await their doom. They were cool, cool as only men who had faced danger all their lives could be.

"This is it, old pal", said Scott as he extended his hand to his partner. Jed took his hand and was silent. All was silent, except for the faint humming of the equipment in their control room. They sat quietly, looking out of the window, back toward the Sun, the Sun they might never see again.

The Earth was there, invisible because of the distance, some 45 astronomical units away; the good Earth, the Earth of rolling oceans flecked with white foam, the Earth with the rolling prairies and majestic mountains, the Earth with their friends and families.

Jed picked up his Bible and began to pray, "Our Father, who art in Heaven; Hallowed be thy name. Thy kingdom....."

He never finished that particular prayer, for he was interrupted by Scott.

"What's happened to the stars? All of them are turning red!"

As both men gazed through the window, their jaws dropped in amazement. The stars, indeed, were turning red.

"Wow! Look at them move away! It must be some sort of Doppler Effect!" exclaimed Scott.

"It isn't the stars. It's us!" Jed yelled back. "Look at the IGS readout!"
"Five thousand! That's faster than this ship was designed to go!"
"That's nearly seventy-five per cent of the speed of light! She'll never hold together, Scott!"

"Hey, look at you!"

"Look at yourself!" replied Jed.

"We look like something out of the hall of mirrors at a carnival."

Both men laughed as they watched each other stretch horizontally and shrink vertically.

"It's the same force that tore that comet apart", Jed calmly informed Scott.

Suddenly, there was a blinding flash and both men involuntarily closed their eyes and put their hands up to their heads. The blinding light continued but there was still no noise.

What seemed like ages passed before they opened their eyes again. Slowly, they unbuckled their seat belts and got to their feet. They crossed to the window, and with noses pressed against the glass like two little boys, looked out at the amazing scene that lay before them.

Suddenly, the bright light was back again, and again they closed their eyes. Then it was gone again. Then it was back again.

"What's going on?" questioned Jed.

"The ship's rotating near an immensely bright object," replied Scott. "I'll see if I can straighten her out."

Scott returned to his control console and typed some commands to George, the ship's computer. Gradually the flashing became less and less frequent, and then ceased altogether.

"I'll hold her with her tail toward that bright object. How fast are we going?"

Jed looked at the readout. "Still at five thousand, and moving away from the bright object."

"Put on your space-suit helmet and use the visor to protect your eyes. Give me mine, too. Then, I'll put her around tail first and we'll see if we can slow down."

Jed did as he was told and fetched the white helmets from their lockers. The two men put them on and pulled down the gold visors. Scott maneuvered the ship so that it was again facing the brilliant luminosity that poured in the windows.

"Full steam ahead!" he yelled.

Again the pumps in Nova's heart began to work, and again the tail of fire sprouted from her stern.

"Gimme a readout, will you, Jed?"

"Four thousand.....three thousand five hundred.....three".

As Jed continued the readout, Nova slowed.

"We'll hold at five-oh," Scott announced.

"One hundred.....eight-oh.....six-oh.....five-oh and steady."

"We'll not be hitting anything too hard at this speed," replied Scott.

"That was some ride. Where are we and what's that thing?" asked Jed.

"I reckon it must be the other side of the black hole, wherever that is," answered Scott.

"Do you know what that looks like to me?"

"What?"

"It looks like a quasar!" came Jed's voice. "What else is that luminous?"

"It could be, chum".

"Of course, that still doesn't explain where we are does it? All it says is that we're near a quasar."

"See if there's anything on the radio," suggested Scott.

Jed opened a radio channel but could get nothing but hissing and crackling.

"We're too close to the quasar," he said.

"Anything on the carrier wave monitor?"

"Nope."

"Well," suggested Scott, "put out an automatic Mayday."

"Right!"

He flipped several switches on the communications console.

"Well, my friend," said Scott, "it's time for a little constellation study".

"What for?"

"Let's see if we can recognize any of those stars out there."

"No use in that," answered Jed. "We're not even in the Universe that we know."

"Eh?"

"Look, Scott, this whole Universe is inside that black hole, and that includes us!"

"You mean that all of this is in that object that we orbited. It seems to go on for miles."

"That's because we have shrunk too. Time dilation or something like that."

"Gwan!"

"No, I remember some of the early studies on black holes. It seems that the Universe, that's the one with the Earth in it, could have been in a black hole itself. The density worked out right on the theoretical numbers."

"OK. What do we do then?"

"Well, you're not going to believe this, but I think that we should get some rest. Maybe if our heads are clearer, we can plan something."

"You may be right," answered Scott. "I'll programme George to push us very slowly in the direction we're going. That way, we won't drift very far and we'll still be near here, wherever that is, when we wake up."

While Scott typed his commands into the innards of George, the autopilot, Jed opened the lockers that held their beds. These were folded up into the wall, like a Murphy bed. Originally, astronauts had slept in their acceleration couches, and then in weightless free-fall in a mesh cage. However, they really weren't comfortable, so beds were installed in all NASA Craft. The bed worked on the same principle as the vacuum plates. A very slight suction through pores in the mattress held the astronaut in place and gave the sensation of being asleep in a normal earth-type environment.

Although both pilots were in bed, neither slept very much. Each mulled their situation over in his mind, thinking of the strange predicament in which they now found themselves.

Jed thought again of his home and family, now possibly in another Universe. Scott, on the other hand, felt twinges of self-recrimination, blaming himself for typing the wrong mathematical sign into the automatic pilot.

Both men dug into their memories, for their training had been long, long ago. What was it about black holes that lurked in the recesses of their minds, but could not release itself? What fact had escaped them?

After a few tortured hours, Scott arose.

"The milkman just came, old buddy. Wakey, wakey!"

"Some sense of humour," Jed shot back.

"How about some breakfast? I can think better on a full stomach."

"OK. Hold your horses."

While Jed went about fixing breakfast, Scott put the beds away and made a general cleaning of the control room. Then, both men ate in silence.

When they had finished, Jed spoke, "Got any ideas?"

"Well," replied Scott, "I've figured this out. From where we are the nearest star of a solar type appears to be four years away, even with the engines wide open."

"We haven't enough consumables to last four years."

"You don't have to remind me," frowned Scott.

"How about a non-solar-type star?"

"About three years."

"You mean it's a matter of where here, and we can't get to there?"

"Yeah, that's about it. I guess somebody somewhere will find us after we're long gone."

"If there's anyone in this universe."

"Have you still got that Mayday call out, Jed?"

"Yes, I never turned it off."

"Anything on the carrier wave receiver?"

"Not a thing."

Silence fell with a thud, as both men suddenly felt quite helpless. They looked at each other, each waiting for the other to say something. No words came.

They sat down in their respective acceleration couches. After a few minutes, Scott spoke up.

"Pump up the engines, Jed. Wherever we're not going, we might as well get there quicker."

Once again, Jed moved to the engineering console and began pushing the series of buttons that would fire Nova's engines, perhaps for the last time.

"I suppose that you're pretty angry with me for making the dumb mistake that got us into this predicament," said Scott.

Jed laughed.

"What's so funny?" inquired Scott.

Jed replied, still chuckling, "I was just thinking of two characters in some really ancient films that I once saw. There was a fat one and a thin one. I think their names were Laurel and Hardy. Anyway, the fat one was always saying, 'This is a fine mess you've gotten me into now.'"

Scott laughed ironically.

"No, I'm not mad at you, pal," Jed went on, "It's a mistake that either of us could have made."

Just then, Jed finished the sequence for starting the engines, and Nova sprang forward.

"How fast do you think we oughta go?" asked Scott.

"Fast as she can. We might as well see as much of this Universe as we can."

"Which direction?"

"My father always used to say, 'When in doubt, go straight ahead' so I guess straight ahead will do."

A silence descended on them as Nova accelerated to her maximum safe limit. The two pilots sat back in their couches to watch this new and strange Universe go by.

"Hack-hhhhhrrrrumm."

"What did you say," asked Jed.

"I was just coughing. Perhaps it's time for some more of that cough medicine."

"Right."

Jed floated over to the cupboard and withdrew the bottle of brandy.

"We might as well go out in style," he said.

The brandy was consumed quickly. Just as quickly, the two pilots were drunk.

They began to sing and tell jokes.

"Shay, ol' buddy," slurred Scott, "does yer noshe burn when y've been drinking?"

"I don't know, ol' buddy, I never tried to light it!"

They both cackled. The repartee continued.

Jed began, "What wallowsh in mud and carriesh eggsh?"

"I dunno".

"The Easter Piggie!"

Both astronauts howled at the bad joke. Then they sang some of the drinking songs they had sung back at the training school. "Roll out the Barrel", "I Belong to Glasgow," and "Four O'Clock in the Morning" were sung with great noise and little melody. They laughed and giggled.

Then Scott began, "Shay, did you hear about the idiot that swallowed a worm?"

"Worm holes!" shrieked Jed.

~~Jed~~^{Scott} looked at him, slightly befuddled, his brain not functioning too well, due to the alcohol he had consumed.

"Worm holes!" Jed yelled again.

"What about worm holes?"

"Your riddle reminded me of worm holes?"

"Well what about them?" asked Scott in a somewhat exasperated tone.

"It's the theory about black holes.....black holes, white holes and worm holes!"

"Fer cryin' out loud....will you please explain what you mean."

"It's the original theory about black holes," Jed explained. "If you went into a black hole, you'd come out through a white hole. If the white hole entered into another Universe, that was too bad. But if it came back into your own universe, it would be sort of like a worm hole, going in one place and coming out another. Sort of a space-time warp like science fiction writers have been theorizing about for the last two centuries."

The impact of this stunned Scott. He just sat there, staring straight ahead, unblinking.

"I think I'd better make some coffee," said Jed as he floated off to the galley.

Soon he was back with two vials of very hot black coffee.

As they sipped at it, Scott finally said, "We might still be in our own Universe?"

"We might be," answered Jed cautiously.

"OK, then, where are we?"

"Think it out. If we came back into our own Universe, we might be in our own galaxy or we might be in another, like the Andromeda galaxy, M-31."

"In that case, we might be zillions of light years from home," Scott said.

"I would think that, even if we came out in the nearest quasar from the Earth, we'd be too far away."

"Right," Scott agreed. A puzzled look furrowed his freckled brow.

"What's up, Scott?"

"It's not only a case of where are we, it's a case of when are we?"

"You're right," agreed Jed, "there might have been some relativistic time warp."

Scott yawned. Since yawning is catching, even in space, Jed yawned too. The alcohol was still in their veins, and although the coffee had wakened them up slightly, they were still incapable of any deep thought. Jed leaned back in his acceleration couch, and, instantly, he was asleep. Scott followed this lead, and the only sound that could be heard, aside from the faint hum of Nova's machinery, was the gentle sound of two men snoring.

5.

"Ouch", said Jed.

"Zzzzzzggggkkkkk", came the snoring of Scott.

"You and your damn medicine. Wake up!" Jed went on as he shook Scott slightly.

"Aaaaah, my head!" came the voice of Scott.

"Serves you right. That'll teach you to get drunk before lunch."

"How long've we been asleep," asked Scott.

"About three hours. Now, I've got this damn hangover and it's all your fault."

"I can't turn my head, and it feels like it has a band around it and a little green man may be tightening it up. Last time, I'll ever eat your cooking!"

"My cooking !" yelled Jed. Then he remembered that he, too, had a hangover. "Aaaaaah, my head."

"Ha, ha!"

"Shut up you, and give me your genius hangover cure. You must have learned one when you were back in training school at Houston. God knows you drank enough!"

"Shut up yourself! If I've got a hangover cure, I'm not going to share it with someone who tells me to shut up."

Then they both laughed again.

"OK, OK, Uncle Scott's hangover cure is to drink as much water as you can. Drinking dehydrates you and you need to replace ~~to~~ old water."

"That's all right," answered Jed, "except that I can't stand the pain of getting up to get any water."

"I'll get enough for the both of us," replied Scott as he unfastened his safety belt and floated off to the galley.

"Put on the coffee pot while you're in there!" yelled Jed.

Soon, Scott floated back with two large vials of cold water. They drank these as quickly as they could, and then Scott returned them to the galley where he filled them with coffee.

"Feel any better, Jed?" he asked.

"It only hurts when I move!"

"Don't move then. Aaaaah! I knew you married types couldn't hold your liquor."

"You slept longer than I did that's all!"

"No way. You and I passed out together!" came the retort.

They sipped at their coffees, feeling sensibility returning to their heads. The aroma filled the cabin and the flavour seemed delicious beyond description. Slowly, the alcoholic fog cleared from the two minds.

"What was that you were saying about worms?" queried Scott.

"Worm holes," corrected Jed.

"OK, then, worm holes."

"Well," Jed went on, "If you fall into a black hole, you come out somewhere else. If you come out in your own Universe, then it's a worm hole".

"Where did you learn that?"

"I read it somewhere," answered Jed. "It seems that this was a theory put forward back around 1975 or 1980."

"OK, that means that we are either in another Universe, as we originally thought, or, we are at some other place in our own Universe, and it seems to me that one of us said that we might be at some other time."

"Yes, that could be," answered Jed.

There was a brief silence as the implications of time and space travel dawned on the two astronauts.

"I don't know how to tell when we are, but I sure know how to find where we are," Scott said.

"How?"

"Observation."

"OK, I'll agree with that."

"What have we got in the ships library about quasars, since we are still close to one?"

"Not much," replied Jed. "These IRS ships were only meant for Solar System travel."

"Yeah, had we been on one of the 19 year runs to Alpha Centauri, we might have had a decent atlas aboard. OK, if we don't have anything on quasars, then we'll have to disregard it for the time being. Switch on the rear viewfinder and give me 500x."

"OK."

Jed threw a switch on the arm of his couch and a screen descended before them. It showed one of the aft portions of the Nova and the stars of space beyond.

"Got'er set for 500 magnifications?" demanded Scott.

"Yes."

"OK then, I'm going to rotate the ship slowly until a familiar looking star or galaxy comes into view. The galaxies will look about the same from any point in the Universe, provided that we are in the same one."

"Good idea," agreed Jed.

Scott manipulated the controls, and Nova began to swing around slowly.

"Bright white star there. There's a type M red giant."

"Type G solar star down there," said Jed.

"Spot any galaxies yet?"

"Not yet."

"Where's the best place to find one?"

"Well, if we were back in the Solar System, I'd say that you should look away from the galactic plane, which we used to call the Milky Way."

"Look out the window and see if there is a galactic plane."

Jed floated up out of his couch and made his way hand over hand to the window.

"There seems to be a general thickening down at minus six-five degrees. That might indicate the centre of the galaxy," he reported.

"OK then, we won't look in that direction".

"Look dead ahead," answered Jed.

"That your father again?"

"Could be."

"OK, then, let me look in that direction.....hey, does that look familiar?"

Jed floated back to the viewing screen to have a look.

"It looks like a galaxy with a companion."

"Dollars to doughnuts, that's M31."

"You could have fooled me. You're the genius."

"Let me do a little computing."

Scott floated over to the console and typed some figures into the the ship's computer. When the readout appeared, he smiled broadly, the happy-lines wrinkling his brow.

Change

"If that's the M31, then, according to the computer, we are really in the outer edges of our own galaxy, which would make us about 4000 light years from home."

"If...."

"Yeah, that's a big if."

"Tell you what," answered Jed, "look toward what you think to be the centre of the galaxy and see if you can see the Tea-pot."

Scott looked at him incredulously.

"The tea-pot?" he asked, with a disbelieving voice.

"It's a group of stars in the constellation of Sagittarius that take the form of an old-fashioned Tea-pot."

"Hang on then," replied Scott, still disbelieving. "I'll rotate her so the view screen is in that direction."

Nova spun again until she was facing the required direction.

"There it is!" roared Jed.

A spontaneous celebration broke out in the control room of the tiny ship. If they could have danced up and down in the weightless environment they would have.

"OK, so we're in the right galaxy. Now let's see if we can find something else we know," suggested Jed.

"What's in the opposite direction from the Tea-pot?"

Jed frowned for a minute and then answered, "A solar type star, Capella."

"And the Sun is somewhere in between?"

"Right," agreed Jed.

"OK then, let's look for two G type stars, either in the same direction or in opposite directions, but in line with the Tea-pot."

Scott swung the ship again.

"Where's that Solar type star you saw earlier?" he asked.

"Delta 23, Alpha 56," came Jed's answer.

"OK, there she is right in the middle of the view screen. Gimme max power."

Jed turned the view screen up to its maximum number of magnifications.

"Does it look like the Sun?" asked Scott.

"No, I don't think so?"

"Is it Capella?"

"It's hard to tell."

"All right," said Scott, thinking fast, "assume that that star is Capella. Where is the Sun?"

"Well, if you feed the coordinates of Capella and those of the Tea-pot into the computer, you might get an answer."

Scott typed furiously on the keyboard, and another answer appeared in green illuminated digits on the display screen. Then, Scott looked happy again.

"My dear friend," he began, "the Sun is that 8th magnitude G star now directly in the middle of your view screen."

Again, pandemonium broke loose, as both men let loose with loud cheers. Gyrating wildly in the weightlessness of the cabin, they hugged each other and patted each other on the back.

"Splendid piece of navigation!" yelled Scott.

"Wait a second," cautioned Jed.

"What's up?"

"If the Sun is 8th magnitude, it means that we are something like 40 light years away from it."

"Golly," murmured Scott softly..

Both thought for a moment. Scott ran his fingers through his blond locks and furrows appeared among the freckles.

"Well, at least we know where we are, and we've solved one of the mysteries of Astronomy, though no one but us knows yet," said Scott.

"What mystery?"

"The mystery of quasars," Scott replied. "Astronomers have wondered for years whether they are remote or local, and we've solved that. They're local objects in our galaxy and they are the 'other' side of black holes."

"That still doesn't tell us what we should do."

"No it doesn't, but....tell ya what I think, Jed, I think we should head toward Capella. It's a star not unlike the Sun. We'll never make it, of course, but it increases the chances of our bodies being found by any beings around there."

"Come on, you're pulling my leg," scoffed Jed incredulously. "What are the chances of Capella even having a planet; then what are the chances of it's being inhabited by beings who have mastered spaceflight, and then what are the chances of them finding us?"

"Two weeks ago, what were the chances of us being near Capella?"

"I see what you mean!"

6.

The two astronauts stared blankly at the view screen. The Sun, so many light years away, represented everything they had ever known: family, home, friends. The sun was a feeble flicker against the myriads of stars visible on the screen. Through the porthole, with the unaided eye, it would be invisible.

"So what do we do?" asked Scott.

"Like my father always said.....", Jed started.

"I know; I know; When in doubt, go straight ahead."

"Right! Capella or bust!"

Jed and Scott settled back into their acceleration couches, heads still aching slightly from the revelling that had gone on just a few hours before. Jed's eyes closed slowly and before many minutes had expired, he was dozing. Scott, on the other hand, sat staring at the ceiling, still thinking of his blunder that had gotten them into this fine mess.

When Jed awoke, he saw Scott, sitting at the computer console, making notes on a pad of paper.

"What's up, chum?" he asked.

"Just making a few notes on our expendables," replied Scott.

"Oh ?"

"If we're going to die out here in the end of nowhere, I'd like to know how long we've got left."

Jed was perplexed. He had never seen Scott in a mood like this. Usually, Scott was easy-going and was always the happy-go-lucky bachelor. Now he was contemplating his own death.

Jed asked quietly, "Well, how long do we have?"

"Food and water for about 5 years, if we go on short rations, and air for about 4 years if everything holds up. How's your hydroponic garden?"

"Great! Lots of good healthy plants."

"That's good. They'll eventually be our only air supply."

Jed pondered this for a minute. He had worked hard on the little hydroponic garden, but he had never thought of it as being the sole air supply.

Scott continued, "Do you think there's any chance it'll keep us alive?"

"I don't know.....Scott, this isn't like you. You never considered dying, not even at the worst of times."

"Yeah, but I never committed gradual suicide by flying into a black hole, before, either! I've got a lot of time to consider how the end will be. Will it be starvation or asphyxiation? "

"Come on, you never give up hope!"

"OK.You tell me how we're going to get back."

"I'm not sure, but let me think about it."

"There's lots of time to think," said Scott, and he turned away so that Jed could not see him.

Jed shut his eyes again, so that he did not see Scott put his head into his arms and cry.

The two friends remained silent for the better part of an hour, Jed reclining in his couch and Scott, sitting at the console with his head down on his arms. Therefore, neither noticed the eerie green glow that filled the control room. Eventually, Jed opened his eyes.

"Good Lord!"

"Mmmm?" mumbled Scott.

"Look Scott! Is there something wrong or am I seeing things? Everything is green!"

Slowly Scott looked up.

"Wowee!" he exclaimed with his characteristic word,"Everything is green!"

"What do you make of it?"

"I don't know. Not only is it coming in from the viewing screen, but it's also coming in the ports."

Jed went to the window and looked out.

"I can't see anything,"he said."It's just green."

"What happened to the stars?"

"Can't see any," answered Jed.

Scott tried all of the controls that worked the viewing screen, but no matter which television camera he selected, the screen remained filled with green.

"Yipe!" yelled Jed.

There, on the outside of the window, not 8 inches from his face, was another face! Jed's mouth dropped open in amazement.

It definitely was a face, not a reflection of his own visage. The eyes were slightly larger than normal and the nose was slightly narrower than those to which he was accustomed but, nevertheless, it was a face!

Scott was equally amazed, and though he opened his mouth, no words came out.

The face moved upwards and showed that it was attached to a neck and a body. The body was clothed in much the same manner as the two astronauts inside the Nova, in a typical flying suit, evidently zippered from top to bottom. A small insignia in the form of a star, 8 pointed, was on the right shoulder.

The being pointed with one finger to the side of Nova.

"What's he want?" asked Jed.

"What the Hell is he doing out there?" answered Scott.

"He keeps pointing to the side of the ship."

"What the Hell is he doing out there?" asked Scott again.

"I've got the feeling that none of us is 'out there'", answered his friend. "We may be 'in'".

"In?"

"In."

The being pointed again to the side of Nova.

"We may be in his ship, or something," said Jed. "That's where the green light is coming from."

"You mean, we've been captured, or something."

"It could be. Let's see how he reacts to my signal."

Jed pointed to the side of Nova and again the creature did likewise.

"What do you make of it?" said Jed.

"Dunno. Let's suppose that he wants us to open the door, which may be why he is pointing in that direction."

"What about the air? It may not be breathable, if there's any there at all."

"He looks human, except for those big eyes," said Scott.

"Do you think he's hostile?"

"I think that if he were hostile, we wouldn't be in here, wherever here is."

"That well may be," answered Jed.

Again the being outside their ship pointed to the side.

"Get out a space suit, and let's see what he does," suggested Scott.

Jed quickly got his space suit from its locker and held it up to the window before the strange alien. No expression crossed the face of the being. He simply pointed to the side of the ship again.

"Help me get this thing on," said Jed.

Jed struggled into the gleaming silver space suit, and then helped Scott to climb into his. They completed the routine checks that they always did before going EVA. Finally, they were ready.

"Here goes nothing," crackled the voice of Jed over Scott's suit radio.

The airlock lights glowed green, then yellow, and then red, as Scott manipulated the pumps which evacuated the air from the chamber. Then, as Jed cracked the hatch, the lights changed back to yellow and then green.

"Well, there's some sort of atmosphere out here," said Jed.

"Yeah, but what kind?"

Before Jed could attempt an answer, the alien being came around the curve of Nova's hull and at last the two astronauts could get a good look at him.

He was not quite as tall as they were. The tones of his skin, which were not readily apparent through the tinted glass window of their ship, were now plainly visible. He was rosy cheeked and blond. His flight suit seemed to shimmer slightly as he walked, as though it were made either of some metallic fabric or of the finest silk. On his feet were slippers, not unlike the ones that Scott and

Jed wore when they were inside the ship. The being's hands seemed long and slender as they protruded beyond the end of the flight suit's sleeves.

Jed knew from his appearance that they were dealing with something that was humanoid.

While Jed was sizing up the being, Scott took the opportunity to examine his surroundings. They, along with their ship, were sitting in the exact middle of a large grey square. But, surrounding them, there was nothing but green. Scott could not tell where the floor stopped and where the walls, indeed if there were any, began.

The being smiled broadly and held up both hands, palms forward. Both Jed and Scott replied in fashion.

"Whadda ya think?" asked Scott.

"He seems friendly."

"Might be just the first impression."

"Have you sampled the atmosphere?"

"He's breathing it."

"Yeah, but can we?"

"I'll check."

Scott closed the airvalve on his portable life support system, and then opened another valve on the front of his suit. Quickly he closed it again.

"It seems OK, at least I couldn't smell anything."

"I'll take a sniff," replied Jed.

He went through the same procedure as Scott. "Nope, I don't smell anything either," said Jed.

"Oh what the Hell.....we can't stay in these suits forever, and we can't fly anywhere so here goes."

He reached up and snapped open the fasteners on his helmet. Then, he reached up and took the helmet off and looked the alien square in the face.

The being smiled broadly again, and nodded his head.

"I'm not choking to death, at any rate," said Scott.

Jed followed suit by removing his helmet.

"This atmosphere seems a bit thick, and smells a bit medicinal," said Jed.

"Right. Well, I guess the next move is up to him."

Behind the alien, a black spot appeared in the green. It grew larger and then opened much like the iris in a camera. The being turned and strode through the opening. Once through, he turned and beckoned to the two astronauts to follow.

"He's made his move," said Jed.

"Let's go."

They followed the being through the opening. As they stepped through, the green light seemed to disappear and everything returned to its normal hue.

"Wowee!" whispered Scott.

The room which they had entered was a luxurious lounge. The walls were a pale blue colour, while a grey shaggy rug covered the floor. Clear acrylic furniture with white cushions was distributed around the room. The being sat down on one of the chairs and motioned for Scott and Jed to do likewise.

Another iris, this time in one of the blue walls, opened, and another being appeared carrying a tray. On the tray were some tall glasses, filled with a liquid. As the being set the tray down, they could see that there were two plates with some sort of food on them. Cautiously, Jed lifted one of the glasses and took a sip. The liquid was sweet, but refreshing. He tried the food. It was some sort of pastry with a strange undescrivable filling.

"How's the food, chum?" asked Scott.

"Different, but OK."

Both astronauts realized that they had not eaten for some time and ate rather more quickly than normal.

All this time, the two beings, sitting side by side, smiled widely.

When they had finished, the being that had brought in the tray took it out again. The other alien produced a piece of what looked like paper and began to make what looked like a map. Jed and Scott watched intently.

The being handed the paper to Scott. He unrolled it, and looked at the pattern of dots and lines. Some of the dots were large, some were small. A few were connected by very thin black lines. Scott studied it for a minute.

"See anything familiar?" asked Jed.

"Nope." He handed the paper back to the being, shrugged his shoulders and tried to look puzzled. The alien, still smiling broadly, turned and left the room.

"Did you notice that these fellows don't talk?" asked Jed.

"Yeah, they must communicate by telepathy or some sort of mind-rading."

"Well, their food's pretty good," said Jed as he picked up the remaining sandwich that remained on his plate. "This looks like some sort of bread, with I don't know what sort of gunk in the middle. I reckon it's their equivalent of a sandwich."

"I wonder what they're up to?"

The door opened once again, and one of the beings stepped half-way through. He beckoned for Scott and Jed to follow him. He stepped back so that Jed and Scott could get through the door. As the pair of astronauts entered the room, both came out with their favourite expressions.

"Wowee!"

"Golly!"

Both men were astounded to find themselves in what appeared to be a very large control-room. Knobs, switches, dials, and screens lined all of the walls. In front of the consoles were seats, each one containing an alien. All were dressed alike, in a sort of a blue-grey uniform, with gold braid looped over each shoulder. Around the waist of each one was a shiny metallic belt, with a glowing red stone set directly in the front. Some of the creatures had various badges and emblems on their uniforms, which the two astronauts took to be a sign of rank or, perhaps, duty. All of the aliens were smiling broadly.

"I wish they'd stop that infernal smiling", said Jed.

"Kinda makes you wonder what they've got on their minds."

"What a control room this is! Look at the number of consoles."

In the middle of the room, a spiral staircase led up to a higher level. One of the beings beckoned them to ascend. As they went up, and round and round, Jed and Scott had a complete view of the room below. It was a magnificent sight, with screen glowing in semi-darkness.

When they reached the upper level, Scott let out with another "Wowwee!" All around him and his friend was a gigantic bubble, transparent. Outside the stars glowed in all of their magnificence. The astronauts stood close to the edge of the room. They could see something of the ship in which they were being transported. But transported to where?

"It appears to be some sort of a disc," said Scott.

"You mean.....it's a saucer?"

"See for yourself".

"It sure looks like it."

The alien made a sweeping motion towards the bubble with his hand. He pointed to three different directions, and looked at the astronauts.

"Do you think he's asking us where we're from?"

"It could be.....let me see if I can pick up the tea-pot again."

Scott studied the stars carefully, looking in all directions.

"I think I've got it!" he said. He pointed to a group of stars that were sparkling in the distance.

The being brought out his star-map once again, unrolled it, and pointed to the tea-pot shaped cluster of stars.

"I think he understands," said Jed.

Scott pointed to a very small dot, just to one side of the cluster that he had previously indicated. The being smiled broadly.

"It seems that we're getting somewhere," mused Jed.

"At least he recognizes where we're from".

The being then beckoned them to descend the stairs, and then to exit back into the lounge area from which they had come. He motioned for them to sit. Then, he turned on his heel and exited back into the control chamber.

Scott looked at Jed blankly. "Well, now what?"

"It beats me", answered Jed. "We could be going for a ride home, or we could be going elsewhere."

"Perhaps we'll end up as specimens in their zoo."

"Nah, I don't think so. They realize that we are intelligent creatures."

"But we don't rate up against them. Did you get a load of that control room, or whatever it was?"

"Yeah," answered Jed. "It sure was large. A lot larger than in Nova, for instance, but not much larger than some of the projected plans for star-ships."

"Well, I'd say that this was a star-ship," said Scott. "At least, we're out here among the stars. When I was looking about upstairs there, I didn't see any nearby bright stars, which means that we're probably not in any solar system."

"That's right. If we were in some solar system or other, we'd probably have noticed the central star."

"Listen, what's that?"

A low humming filled the room. The room seemed to lurch a bit, causing Jed to sit down quickly on a chair, and making Scott stagger momentarily.

"It looks as if we just picked up some momentum. Something made this room lurch."

"Yeah," said Scott. "We didn't appear to have motion when I was looking out of the bubble."

"It would be nice to know where we're going."

"It sure would," agreed Scott. "It sure would."

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By the watches that the Earth-men wore on their wrists, two weeks went by. Jed and Scott remained guests of the alien beings in whose saucer-shaped space craft they had found themselves. The aliens seemed friendly, always smiling with bright cheery countenances, but never speaking. They served food to the two astronauts in the lounge, and escorted them to sleeping quarters just off the lounge. Jed and Scott could visit the control room, or bridge, and the observation bubble on the top of the craft.

They knew that there were other areas of the ship, for iris openings in the walls allowed the aliens to pass through, but only the doors to the aforementioned rooms opened when Jed and Scott would attempt to exit. All of the other doors remained sealed to them.

From the observation bubble, many strange sights were seen. Sometimes, the spacecraft would swing into orbit around a red giant star; sometimes a blazing blue-white star; and once in a while, a solar type star. Each time that they would approach one of the last type, they would catch each other getting excited, thinking that this might be the area of their own Sun, the area of home, the area of the Earth. But then they would catch sight of the constellation of Sagittarius, and the yellow star superimposed in front of it, and realize that they were still ~~thousands~~^{millions} of light *Chung* years from their homes and families.

At times, the craft came close to planets, orbiting around the various stars, dusky planets with green markings and white polar caps, not unlike Mars. Sometimes the saucer came close to huge striped planets which reminded the astronauts of Jupiter. Then, there were the heart-breaking times, when from the observation bubble, they would see that they were near a blue planet, a blue planet with white fluffy clouds in its atmosphere. They would get very excited, thinking that perhaps, these strange alien beings

from somewhere in the remote reaches of the galaxy had transported them home. Then the heart-break would come, as the ship would lurch ever so slightly and the planet would begin to recede into the emptiness of space, and then become invisible, as the ship raced off into the blackness of the void.

Sometimes the stars would change their colours drastically, some changing from red to blue, some becoming invisible and others appearing from seemingly nowhere. Jed correctly guessed that this was because they were travelling at velocities approaching the 300,000 km per second velocity of light. Radiation would disappear from one end of the spectrum and other radiation would appear at the other end, this effect caused by their rapid motion through the warp and weft of space itself.

The aliens never seemed to communicate to each other, and the only noises that could be heard by Jed and Scott were their own voices and the hum and whine of the machinery of the ship. From time to time, new aliens would appear, beings that Scott and Jed had never seen before. They would stand and watch the two astronauts and study their reactions. Scott assumed that they were beings who had boarded the spacecraft at its last planetary port of call and who had never seen an Earth-man before.

On the fourteenth day, by their watches, of ^{their} ~~they~~ visit upon the alien vessel they were seated comfortably in the lounge area, munching on something that was similar to a plain old Earth hot dog.

"This reminds me of a day at Yankee Stadium," said Jed.

"What?"

"This reminds me of a day at Yankee Stadium. You know...hot dogs, cold beer and baseball and all that," said Jed. "We used to drive down from Geneva two or three times each summer to see the Yankees play."

"I guess this is something like a hot dog," agreed Scott. "It's got some sort of meaty filling, and this outside portion is a bit like bread. I think I can see why you'd think it's a hot dog."

"I wonder how the Yankees are doing this year?"

"If there are any Yankees," answered Scott.

"What do you mean?"

"Well, we came through that black hole, and found that our co-ordinates in space had changed greatly. I am wondering if our time co-ordinate changed also?"

"I see what you mean. Einstein always looked at the Universe as a four-dimensional space-time continuum."

"Right," said Scott. "Length width and height were the space dimensions and time was the fourth dimension. So it's not only a case of where are we but also, when are we."

"The Earth could be in any period right now. We don't know whether we're in the past, present or future as far as Earth is concerned."

"It's too bad that these birds don't talk," said Scott. "We could sure learn a lot from them. However, when I ask them a direct question, they just smile and don't do anything."

"Yeah, I know what you mean," said Jed. "Sometimes I get sick and tired of their blasted smiling. I wish one of them would talk to us."

"You'd think that they'd try to communicate, even by some sort of sign language or picture language."

"I've already thought of that," answered Jed. "Even that doesn't get through to them."

"Of course it may be that they regard us as some sort of animals, too far below their level to even consider communications."

"Nah, I don't agree. For one thing, we communicate with animals all the time back home. You whistle for your dog, or pet your cat. Then there's the fact that they found us in space in a pretty sophisticated spacecraft. They must know that we're intelligent beings."

"That makes sense".

"Still, I wonder what they're up to?" Jed wondered aloud.

"They seem to base their activities on a thirty-hour day by our watches," answered Scott. "I've watched them come and go from the control room, and it seems that the same ones keep repeating at about thirty-hour intervals."

"Maybe their home planet has a rotation period of 30 hours."

"That's a thought," answered Scott.

"And they bring in our food and drink on a six-hour basis."

"Yeah, that would fit in with a day of that length."

"Do you know what else I've noticed?"

"No. What?"

"Well, I've been looking at the various materials used in this ship. Everything seems to be either metallic or some sort of plastic. There isn't what you'd call a natural product here. Like cotton, or silk. There just isn't any."

"What do you make of that?" asked Scott.

"I don't know. Perhaps their planet doesn't have animals or plant life as we know them."

"That may be true. But with space travel, you'd think that there would be planets where they could get natural materials. Something like the way that Syrtisite was discovered on Mars, and manufactured into things back on the Earth."

Just then, the door from the control room opened and one of the beings stepped part of the way through. He beckoned to Jed and Scott and then stepped back into the control room.

"Wonder what he wants?" asked Jed.

"Only one way to find out."

The pair followed the being, who led the way up the spiral stairway to the observation bubble at the top of the spacecraft.

"Wowee!"

"Look at that!" Jed said excitedly.

"That's the biggest doughnut I've ever seen!"

Before them in space ^{was} ~~what~~ a very large round tubular object, something like the doughnut which Scott had described.

"It's got lights on it!" said Jed.

"Yeah, and that looks like windows all the way round."

"Look there! There's a row of these saucer craft all lined up along the far edge of the thing!"

"It must be some sort of a space station," said Scott.

"It must be. It isn't too unlike the Sky-Wheel project that they had envisaged for the Earth back in the late 1900's. It would spin slowly and provide a sort of artificial gravity for anyone standing inside. All heads would be toward the middle."

"This thing's huge! It must be nearly 15 miles across!!" exclaimed Scott. "Wowee!"

"Hey, there's another of these ships coming up along side. Look at him. See! He's docking at that port right there on the side."

"Wowee!"

The alien who had escorted them to the observation bubble nudged Jed.

"What do you want?" asked Jed.

The being brought out what looked like a paper and a pencil. He made a small drawing of two circles one inside the other, looking like the doughnut-ring outside of the bubble. Then he drew a small sketch of a space-ship near the twin circles, and drew a line from the ship to the middle of the circles.

Jed looked puzzled.

The being put down his drawing implements and made a circle with the thumb and first finger of his left hand and then pushed the first finger of his right hand through it.

"Do you think he's trying to tell us that we're going to land here and go inside that thing?" asked Jed.

"It could be. Or perhaps he means that we're going to fly through the centre of it."

The alien smiled very broadly at this, as if, perhaps, he understood what Scott had said. He beckoned for them to follow him.

They retraced their steps back down through the control room and into the lounge. But instead of stopping in the lounge as the two astronauts had expected, the being kept right on going, and a door opened in front of him. From the door came an eerie green glow.

"Hey!" yelled Scott. "It's the Nova".

There, seemingly supported on nothing, sat their ship. The alien once again made the sign with his thumb and fingers and pointed to the ship. Three times he repeated this sign.

"He wants us to fly Nova through the centre of that doughnut?" asked Jed. "I wonder what for?"

"It could be that they want to show off their captives."

"I never thought of that!"

The being motioned for them to enter the Nova. They did so, quickly taking their seats at the instrument console. As they looked through the forward window, an iris-like opening appeared in the green glow before them, and through the gap, they could see the large space station, with many saucer-craft nearby.

"Well, here goes," said Scott as he threw the switches and pushed the buttons that started Nova's engines. The familiar pulsing and throbbing became louder and louder, as turbines began to whine and generators started to create the electronic lifeblood of the vessel.

"Stand by. Anchors aweigh", said Scott as he maneuvered the ship through the gap in the green glow.

"Rear screen on," said Jed.

On a television monitor, they could now see the saucer-craft on which they had travelled. In front of them lay the huge wheel.

"Through the Centre," said Scott.

"That's what he said," answered Jed.

"That's funny."

"What?"

"You can't see any stars through the centre of that thing. There's stars all around it, but there aren't any visible through the middle."

"Oh well, here goes everything."

The IRS Nova headed for the middle of the gap in centre of the wheel.

Suddenly, everything went black.

"What the....?" yelled Scott.

Just as quickly, the level of illumination returned to normal.

"Hey!" yelled Jed.

"What?"

"It's gone!"

"What's gone?"

"Everything. The wheel. The saucers. Everything just vanished."

"Impossible," answered Scott.

"Look at the monitors."

As Scott looked at the television monitors which looked out in various directions from the Nova, he could see nothing but stars.

"Where did they all go?" he asked.

"I think it's a case of where did we go," answered Jed.

"Huh?"

"Those guys have harnessed a black hole, or created one, and I think that we just flew through it!"

"Not again!" cried Scott.

"Well, let's see where we're at now."

Scott left his seat and floated over to the front window of his ship. He looked out.

"Well, I'll be.....", he blurted.

"What is it?" said Jed.

"Look here."

Jed floated over to the window and looked upward in the direction to which Scott was pointing.

There, filling a great deal of the heavens, was a huge yellow disc with white bands across its equatorial zone. Around it was a beautiful white ring, divided by a single black band into two components.

"There's only one sight like that in the Universe," said Scott.

"Saturn!"

"It must be!"

"You mean those aliens have some sort of gizmo that they can use to travel practically anywhere?"

"Yeah, they've developed some sort of space warp machine, and it looks as if we've flown through it and have been deposited near our own Sun, somewhere in the region of Saturn."

"Let me see if there's any radio noise," said Jed as he floated over to his communication console. "Hey! There's a carrier wave on my wave-form monitor!"

"See if you can raise anybody," said Scott.

Jed picked up the microphone.

"IRS Nova calling CQ,CQ,CQ", he said.

"Nova!" the speaker blared back at him. "This is Saturn moon base on Titan. Where have you been? The whole fleet's been trying to raise you for nearly two weeks!"

"IRS Nova to Titan base. You wouldn't believe me," said Jed. "You just wouldn't believe me!"

END