EL DORADO

by TOM LIGON

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Illustration by Vincent Di Fate

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Heroes don't always fit the expected image....

Victor Gendeg let his eyes adjust as he studied the jumbled ball of dirty ice before him. It was illuminated only by starlight, especially by one bright star about 3.3 light-days away, and his eyes strained to make out any detail. He leaned so close to the window that his breath frosted it. He wiped the white deposit away and held his breath to gaze at it again.

"Computer, voice log on."

"That must be it. Classic exit jumble. Definitely had a collision with a smaller, denser object."

He checked the magnetometer. Was it just beginning to show a trace of a magnetic field as he approached it?

"Yes! Magnetic. This *has* to be it!" He glanced at the monitors, which showed the object so much clearer than naked human eyes could, then turned back to the window to gain a more personal connection with the planetesimal. "Eureka! Right freakin' where you're supposed to be! Sumbitch thought you were pretty sneaky, hiding out in the Oort Cloud, didn't ya? Well, Victor Gendeg tracked your banged-up ass down! Four billion years of ducking and hiding, but your ass is *mine* now, baby. I am so freakin' rich the damn Astrofellers are gonna envy me. I have *found* El Dorado!"

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The solar system was young when Jupiter and Saturn migrated into a 2:1 orbital resonance. It was an interesting time for all of the other bodies there. Chaos reigned until the two giants moved beyond that dance. The two largest bodies in the system other than the Sun played tug of war in a game Jupiter won and all of the small bystanders lost.

Two of the worst losers were minor rocky planets, each with a small core of iron and other metals, and mantles that had already turned to solid stone. They were set on a collision course. It would not happen for hundreds of millions of years, but it was inevitable.

When it happened, both bodies shattered their rocky outer layers, exposing their metal cores. Pieces showered away from the impact in many directions, some into the depths of space, some into the inner system, where they would eventually meet a dramatic end. Some pelted the third planet and its moon, part of what its later inhabitants would call the "late heavy bombardment." Many simply formed a belt, shepherded into shape by resonance with Jupiter and a few other significant orbs. One of the cores stayed safely in the belt, covered in a thick layer of rubble from the collision, some its own, and some from the other unfortunate body. The other was in an elliptical orbit that flirted dangerously with the dominant gas giant. It was similarly covered with debris, and had an entourage of orbiting fragments of the same sort.

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Victor waited impatiently for his small ship to maneuver to a gentle landing on the icy body. The magnetometer was unambiguous now. This ball of ice had an iron core, no doubt about it at all. Here, in one body, was everything needed to build a new city in space. A city? "Hell, I could build a whole bloody *nation* with that mutha! That thing must be as big as any core ever discovered. There must be more metal in that thing than ever was squeezed out of Earth's crust. And man, look at the ice readings. The collision must have distilled this thing like a damn refinery! Juicy, dripping, soaking damned *full* of deuterium and helium-3. I am so freakin' rich I'm gonna be the damned emperor of this god-forsaken blighted wasteland. And with medical technology today, heck, they're increasing life expectancy faster than a person ages! If you've got the money, maybe you can live forever! Imagine, Victor, the Immortal Emperor of Oort! Ah, life is *sweet!*"

He glanced at his communications panel nervously. More chatter on the net showed on the display. With objects out in the Cloud averaging tens of millions of kilometers apart, on the order of a light-minute, voice communications were rare. Instead, most messages were text with attachments, in the form of e-mail and forum posts. The other slackers operating out here were all gaga over the beam of radio signals coming from a couple of light-decades away. Let them waste their time.

"So what if there's somebody saying 'hi' out there? As long as it keeps their

attention off me until I can validate my claim. Dumb bastards haven't got a clue where I've snuck off to. Let's take a minute or two and keep it that way." He sprang ever so gently over to his comm panel in the gravity that almost was not there, and settled in front of the keyboard.

Victor had scheduled the last stop of his flight plan as a visit to a rather boring little ball of ice that had drifted near Rendezvous 3 Station, a mere sixteen million kilometers away. The other net participants expected he would land his little explorer and have his robots bore into it and see if it held any worthwhile ices or rock dust. They would expect his communications to be sporadic, but would expect an occasional check-in. The last thing Victor wanted was a rescue party to come after him, so he left a communications relay and his transponder on the little comet, taking only enough ice from it that he could afford a long, hard blast of compressed gas to move him well away from the body. And then, when far enough away that nobody was likely to notice, he goosed the fusion reactors to a low burn, and fed a rich dose of reaction mass into the relativistic electron beam that generated his thrust, and snuck away to investigate the more distant object only he recognized as special.

Had anyone been deliberately monitoring, the ploy would not have worked. But there were only a handful of ships operating out of Rendezvous. No traffic control system was needed, and the ships generally stayed in touch voluntarily. The volume of space they explored was vast and lonely, and they had no one to depend on but each other.

"Yeah, like I figured. The idiots are all looking for little green men instead of exploring. Well, hell, guess I would too if I didn't have the discovery of a thousand lifetimes a few kilometers away. They'll probably think I'm a doofus if I don't chime in. Better read up. Huh? Crap! Well, no damned wonder they're so worked up."

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Rockhound: SEARCHER, WHERE YOU AT FELLA? THE SETI LEAGUE HAS INCOMING FOR YOU.

Searcher: JUST GOT IT ROCKDOG. HOLD YOUR HORSES, THIS IS A BIG MUTHA FILE, AND ENCRYPTED. SO, LET'S SEE IF I CAN TELL YOU ABOUT IT ... YEAH, IT'S NOT CLASSIFIED, THEY JUST WANT ME TO SEE IT FIRST. HEY, IT'S FROM DR. SETI HIMSELF! UH ... HOLY CRAP, DOG, THE LEAGUE'S ANALYSIS TEAM IS ACTUALLY STARTING TO MAKE A LITTLE SENSE OUT OF THAT SIGNAL. IT EVIDENTLY CONTAINS SOME KIND OF ROSETTA STONE. THE TROUBLE IS, WITH

THE ROSETTA STONE WE KNEW ONE OF THE LANGUAGES. WITH THIS ONE, THEY ONLY HAVE A VAGUE IDEA OF A FEW WORDS BECAUSE THEY'RE ACCOMPANIED BY PICTURES. WTF!?? BUT HE SAYS THEY THINK THE TRANSMISSION IS—HOLD ON TO YOUR HELMET—A *religious* TRACT! ROFL!

Iceman: AAARGH! JUST OUR LUCK! WE GOT NEIGHBORS AND THEY'RE BLOODY DAMNED REORGANIZED BORN-AGAIN SEVENTH-DAY ALIEN EVANGELISTS!

ANYBODY HEARD FROM WIENER LATELY? THAT BOY NEEDS TO GET HIS HEAD OUT OF THE ICE MORE AND LOOK AROUND. ALL THIS GOING ON AND ALL HE CAN THINK ABOUT IS MAKING HOLES. DON'T 'PRECIATE HOW SPECIAL THIS PLACE IS.

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"Victor, dammit. Not Winner. Not Wiener." But Victor kept the sentiment to himself. The delight the other prospectors took in his objections to the nickname was the very reason they insisted on it.

Wiener: I'M HERE, ICE. BEEN DOWN THE BORE FREEING A STUCK 'BOT.

Iceman: YOU MAKE US NERVOUS, KID. LEAVE IT, SEND IN ANOTHER ONE. UNLESS, OF COURSE, IT FOUND SOMETHING GOOD. YOU FIND SOME METAL?

Iceman: WIENER? WHERE'D YOU GO, BOY?

Wiener: SORRY. GOT BUSY FIXING SOMETHING AND WASN'T WATCHING THE SCREEN. ASTRONOMER METAL MAYBE, NOT ENGINEER METAL. THIS BALL OF ICE HAS ENOUGH SILICON CARBIDE IN IT TO SET UP A SANDPAPER FACTORY. IT'S EATING UP HARDWARE.

Iceman: SCREW THAT. THERE ARE A TRILLION OTHER TARGETS UP HERE, AT LEAST HALF OF THEM A BETTER BET. YOU BEEN OUT A LONG TIME. COME ON BACK TO RENDEZVOUS AND RUN SOME LAPS IN GRAVITY.

Iceman: OH WEEEE-NER? DURN, THE BOY HAS A SHORT ATTENTION SPAN.

Wiener: GOT BUSY AGAIN. I CAN'T SPARE THE 'BOT. YOU EVER TRY GETTING WARRANTY REPAIRS DONE UP HERE? I ALMOST HAVE IT FREE, JUST CAME UP FOR SOME TOOLS. LOOK, I KNOW SOME OF YOU OLD FARTS GOT NOTHING BETTER TO DO THAN STARE AT A SCREEN WAITING FOR CHAT, BUT CUT ME SOME SLACK IF I DON'T ALWAYS GET RIGHT BACK TO YOU, OKAY?

Iceman: UNDERSTOOD. WELL, GET BACK HERE BEFORE YOUR BONES TURN TO MUSH. OF COURSE, IF THAT HAPPENS, THAT'S A SWEET LITTLE RIG YOU FLY. I'M SURE I'LL FIND A TAKER FOR HER.

Wiener: I'M GETTING MY EXERCISE POINTS. I THINK YOU JUST WANT ANOTHER STOOL KEPT WARM IN YOUR BAR.

Iceman: LOL! WELL, THAT TOO. BUT TRUST ME, TUGGING ON RUBBER BANDS HALF AN HOUR A DAY AIN'T THE SAME AS GRAVITY, EVEN THE ARTIFICIAL KIND. THAT'S HOW COME I DON'T GO OUT ANYMORE, I WAS SCREWING UP MY WHOLE MUSCULAR-SKELETAL WHO-HAH. THE CLOUD HAS BEEN HERE A THIRD THE AGE OF THE UNIVERSE. IT'LL KEEP. NO GOOD STRIKING IT RICH IF YOU'RE NOTHING BUT A SACK OF RUBBER. COME ON BACK WHEN YOU GET A CHANCE AND WE'LL ALL RAISE A TOAST TO GETTING A PHONE CALL FROM ET.

Wiener: I WILL SOON, BUT I'VE GOT BILLS TO PAY. C U LATER.

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The core made thousands of orbits before the fateful encounter. It finally came too close to Jupiter. The giant tugged on it, changing its direction. The hundreds of tiny pieces of debris orbiting the core swung off into a spiral string of pearls, but generally tagged along behind the larger body, as it made one final loop around the gas giant. The next pass was very close, nearly a plunge into the deep atmosphere and oblivion. Instead, it swung sharply around the ponderous planet, and, like a skater grabbing a handle on a moving Zamboni, changed its direction. It acquired more velocity in the direction of Jupiter's orbit, but also was pitched to an angle above the ecliptic. In this maneuver, two things happened. First, the core acquired more speed, almost enough to escape the Sun's gravity entirely. Second, the huge tidal forces tugged at the covering of debris. Some pieces came free, and the core acquired spin as the resulting imbalance swung into the steep gradient of Jupiter's gravity well. As it departed the big planet, more and more pieces of rock flew off from the equator, and other pieces tumbled to replace those lost. Some of the escapees crashed back to the surface, knocking off more pieces. Others escaped the feeble gravity of the core and began spreading out from it. All were heading in roughly the same direction, toward the cold, dark, almost empty outer reaches of the solar system.

Victor could barely contain his excitement as the ship settled the last few meters to the surface of the icy planetoid, and held his breath as he felt the soft crunch of the pads settling into the texture of old snow. While the computer ran

the shutdown sequence, he turned to the robot panel and made ready to deploy a borebot.

In minutes, the intelligent drill head was grinding its way into the ice. As it went, it heated the spoil, vaporizing the most volatile gasses and using them to blast the snowy spoil out via a flexible duct. The solid portion of the spoil was ejected out over the surface of the body, and made an unusual ballistic snowstorm in that direction. Part of the snow would eventually circle the planetoid and shower the ship with a gentle dusting of white flakes. The resulting ring would eventually be visible, but by that time, Victor's claim to the object would be solid. Some of the gas was processed through a permselector. The valuable deuterium and helium-3 were saved, along with samples of the less volatile materials. Victor studied the analyses with greedy eyes.

"Good stuff. Sweet stuff. Some tar on the surface and the usual mix of dust, but so far this one is mostly ice. Easy digging, but we'll probably hit harder ice soon. Long way to go to the core. Oh, mama would have been so proud! Her boy's gonna be the richest mutha in the system."

An audio annunciator on the 'bot panel beeped to indicate the borebot had just passed one hundred meters of depth. Victor tossed his head in mirth. "Oh yeah? Well, you're probably right, I am a potty-mouth. But you don't mind, do you? You've been with prospectors before. No, I don't always talk like this, usually just when I'm alone."

A hydraulic cylinder in the belly of the ship groaned a little as it adjusted to the increasing load. Victor grinned. "Oh, you think you count as company, do you? Now you want to be my friend, now that I'm the richest son of a bitch since this core's brother was found. Hell, probably richer'n that, because that rock was so freakin' dry it made the Sahara look soggy. Yeah, now everybody will want to be Victor Gendeg's buddy. But you? Well, I don't even own you. You're leased. I guess that makes you a whore, doesn't it? A lousy damned painted lady whose pimp rents her out to any prospector that shows a fancy to her. You do realize the second thing I gotta do when we get back, right after I file my claim, is get my hooks in a bigger ship, don't you?"

A pressure regulator hissed back in the life support system as it replenished itself with comet gas.

"Well, don't worry, you're a pretty little thing. Maybe I'll make Ice an offer, and keep you anyway. Maybe I'll build me a palace and put you up on top as a spire, and come up here and look out the windows and survey my empire."

He glanced at the analyzer. “Mmmm, interesting little pocket. Olivine, plus some boron and aluminum. I do believe this ball of junk has got a little of everything. But we’re nowhere near the good stuff.”

Victor opened a drawer and extracted a cushioned sack, from which he drew a curious piece of material, half rock, half metal. “Computer, cabin video log on. Hello, little buddy, do you know where you are? I think we just found your mama. And we couldn’t have done it without you!”

With his free hand, he slipped his sippy-cup into a water dispenser. “We now have fresh water from El Dorado. Time for a toast.” He removed the cup from the dispenser, tipped it, and opened the valve. A small blob of water formed, which he shook loose. It dropped gently toward the flake of asteroid. “You get the first taste.” When the drop hit the stone, he put the cup to his lips and took a sip, then grimaced a little. “Ugh, needs more dissolved oxygen, and maybe a touch of whiskey. But it is now official, little friend: We’re one with El Dorado.”

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The core sailed out into the dark reaches of the solar system, out into the freezing realm where ice, not rock, dominated. But the distance between the icy bodies was so great that the space might as well have been empty. The original string of tiny moons that accompanied it to Jupiter had long since drifted far away. Thousands of the pieces of rubble that had been stripped from its surface still tagged along, most no larger than a pebble. It had now lost most of its velocity, but the tug from the star that had fostered its birth was all but gone as well. Had it picked up just a little more kinetic energy from its last encounter with Jupiter, it would have sailed into interstellar space. Instead, it arched slowly amid the scattered ice, reached a near standstill, and then turned and headed back in. An invisible trace of frost covered the core and its companions on that first million-plus-year foray into the Oort Cloud.

But after two thousand passes, the frost was significant. And with each return to the inner system, the frost melted and found its way into cracks. And on each return to the icy darkness, the moisture froze again, a little deeper inside. Eventually the ice freed pieces entirely, although they lay where they were in the tenuous gravity. And once in a while, during a pass through the inner system, or after the rare impact of a tiny fragment of comet, one of those pieces would be ejected from the surface. These often joined the entourage of small bits and pieces orbiting the core. They replenished that population, as other pieces were nudged further away by continued gravitational encounters.

The core was leaving a trail of breadcrumbs to follow.

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"Look at this thing!" Victor held the odd stone up as if to show it to the ship. "You got any idea what this thing is? This, my new tin friend, is the key to a treasure chest. One of many, but an important one. That hunk of iron down in this ice ball is the largest piece left of a little planet that got smashed all to crap about four billion years ago. Folks have found pieces of this thing all the hell over the solar system. Pieces of it formed some of the craters on the Moon. They've found chunks on Mercury, Mars, and every moon of every outer planet except Pluto, which is okay since Pluto is not a planet this month. The asteroid belt is *lousy* with it. Lots of pieces in Jupiter's Trojan points, too. But the neat thing, the really neat thing, is that there are pieces of it zipping in and out of the Oort cloud.

"You're in the prospecting business. You've been a prospector's painted lady before. You know that everybody out here wants to find metal, the good engineering kind, and 'tain't much to be found. No, granted, a little piece like this, with only a few hundred grams of iron globbed on one side, is not going to build many fleets. But little pieces like these are clues to where the big pieces are. They're so important, the government gives grants to guys like me to track them down and figure out their history.

"I found this little piece coming in from the cloud to the inner system. I had a pretty good idea of where to look because of where all the other pieces have been found. One look at this rock, and every expert identified it as a flake off the core/mantle interface. A little analysis of the cosmic ray damage to the faces tells us about how long ago it came off the core. That narrowed down the time when we know the core was still orbiting freely. And nobody was finding any younger pieces.

"It has been no big secret that all these pieces came from the same parent, and that it must be looping thru the Oort Cloud. People have been back-calculating the trajectories for decades, hoping to figure out exactly where it is. They've worked out just when each close star pass occurred; all the interactions with the inner planets and ice giants; they've even figured exactly when—3.748212 billion years ago—this thing crossed Jupiter's path once too often and got pitched out of the inner system. We know where it ought to be; close enough that a radar search should turn it up. But it's not there.

"So I got to asking myself, how could a big iron cannonball that ought to

reflect radar like nobody's business just vanish? Everybody else was looking for missing perturbations in the orbital mechanics. Me, I realized most of those supposed perturbations were too small to matter. The orbital period of this core was a little over a million years, so it didn't have but a few thousand passes thru the inner system, and we have the perturbations in the inner system nailed down. The Oort Cloud isn't chaotic, it is wonderfully predictable. Once we got all the close star passages cataloged, and mapped all the ice giants, the chances of a missing perturbation started getting pretty small. The fragments, like this one, were all coming in where they should be. There was no missing perturbation. So I started looking for the event that was so unlikely, nobody seriously considered it. The possibility that the cannonball hit a snow bank way out here somewhere.

"There's another class of fragments folks are very interested in. The folks living down in the asteroid belt need volatiles as badly as the folks out here need metal, only there are a whole lot more people in the belt. So what do they do? They chase down the little minor comets that scream through on a regular basis. And what do they find? Lo and behold, a lot of the little comets come from common parents, too. But, comets are a different department, and nobody seemed to make the connection.

"So all I had to do was look up the database of all the comet fragments and their extrapolated parents, compare that to the possible orbits of the core, and figure out where the collision could have taken place. And I got a match, but it was nearly a billion years ago. I couldn't know exactly what happened in the collision, but I did know what direction the core hit from. The comets had all radiated on that same heading, and that told me it was a dead-center hit. Because of that, I knew what range of changes would occur in the orbit of the object that was hit. I knew that the resulting object would be denser than in should be, a couple of oddball orbital parameters that gave me a belt in which it could reside, what class of object it was, and that it should show evidence of a particular type of hit. That narrowed the possibilities down to a few thousand known bodies. Looking at those, I could see if their masses fit the oddballness of those orbital parameters. That got me down to a few hundred candidates."

The ship's plumbing gurgled as it switched the flow of liquid gas from a full storage tank to one that was empty. Victor grinned and nodded.

"What led me to this one? Simple, really. Two of the best candidates were closest to this outpost. I could afford to reach it."

He looked at the clock. "I'd better ping the net so they know I'm still alive."

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Searcher: OKAY, GUYS, DR. SETI JUST SENT A NEW UPDATE ON THE TRANSLATION. I'M STARTING TO GET JUST A LITTLE ALARMED. THE LITTLE FERRY TEAM STILL THINKS IT IS A RELIGIOUS TRACT, BUT IT DOESN'T SOUND LIKE THEY'RE TRYING TO CONVERT US. MORE LIKE HELLFIRE AND DAMNATION. THEY'VE MANAGED TO TRANSLATE A FEW PHRASES. ONE SEEMS TO TRANSLATE ROUGHLY AS "CORRUPTION OF CREATION." ANOTHER IS "LOOK THIS WAY" FOLLOWED BY SOMETHING THEY CAN'T MAKE OUT, THEN "SEE YOUR DAMNATION." NEAR THE END OF THE MESSAGE THEY SAY, "CONSUMED IN FIRE."

Rockhound: I USED TO HAVE A NEIGHBOR THAT TENDED TO SAY STUFF A LOT LIKE THAT WHEN I WAS A KID.

Iceman: WELL, AS LONG AS THEY'RE OVER THERE AND WE'RE OVER HERE, I'M NOT TOO WORRIED.

Frosty: FROSTY CHECKING IN. I'M HEADING BACK WITH A FULL LOAD OF VOLATILES BUT NOTHING SPECIAL. MAN, ALL MY LIFE I'VE WANTED TO GET A CALL FROM ET. AND NOW HE TELLS US TO GO TO HELL? WHAT DID WE EVER DO TO HIM?

Rockhound: HEY, FROST, GOOD TO HEAR FROM YOU. MAYBE OLD ET HAS BEEN PICKING UP OUR TELEVISION BROADCASTS. EVEN I FIND SOME OF THOSE PRETTY OFFENSIVE.

Wiener: WIENER CHECKING IN. MAMA TOLD ME NOT TO ARGUE ABOUT RELIGION, SO I'LL STAY OUT OF IT. I'LL BE FILING A CLAIM WHEN I GET IN. OUT.

Iceman: WE'LL BE LOOKING FOR YOU, KID. DECIDED TO OPEN THAT SANDPAPER FACTORY AND SETTLE DOWN?

Searcher: ANY OF YOU GUYS EVER DO THE CALCULATIONS ON HOW FAR OUT YOU COULD PICK UP A BROADCAST TELEVISION SIGNAL? IT'S PRETTY DISMAL. AT TWENTY LIGHT-YEARS, YOU'D NEED THIS HUGE HIGH-GAIN ANTENNA ABOUT THE SIZE OF A PLANET, AND IT WOULD HAVE TO BE DIRECTED STRAIGHT AT US, SCANNING A BROAD RANGE OF FREQUENCIES. AND YOU STILL PROBABLY COULDN'T EXTRACT ANY INFORMATION FROM THE SIGNAL. WE SETIZENS HAVE BEEN LOOKING FOR A SIGNAL LIKE THAT FOR OVER A CENTURY. EVERY FEW DECADES WE PICK UP A SNIPPET OF SOMETHING THAT LOOKS LIKE A SIGNAL AND THERE'S A LITTLE EXCITEMENT, BUT WE'VE NEVER GOTTEN ANYTHING CLEAR, CONTINUOUS, AND UNAMBIGUOUS. NOT UNTIL THIS SIGNAL

CAME BLASTING IN. I'M WONDERING IF MAYBE THEY PICKED UP OUR RADAR PINGS, FROM ALL THE MAPPING WE'VE BEEN DOING OUT HERE.

Iceman: SO HOW COME THIS IS SO STRONG IF OURS WOULD BE SO HARD TO DETECT?

Searcher: BEST GUESS, THEY'VE GOT A HIGH-GAIN ANTENNA THE SIZE OF A PLANET POINTED AT US, AND THEY'RE CRANKING A FEW BILLION WATTS OUT OF IT. AND WE'VE GOT A BUNCH OF DECENT-SIZED DEEP-SPACE ANTENNAS POINTED AT EVERY HABITABLE-LOOKING STAR WITHIN ABOUT SEVENTY LIGHT-YEARS, WITH SOME FAIRLY SOPHISTICATED LISTENING EQUIPMENT ON EACH ONE. WE DON'T KNOW WHAT THEY DETECTED, BUT THERE IS NOT MUCH DOUBT THE MESSAGE IS MEANT FOR US, BECAUSE IT IS DEFINITELY BEING BEAMED STRAIGHT AT US. BIG PART OF MY MISSION IS TO COMPARE SIGNAL STRENGTH HERE TO MEASUREMENTS WE ARE GETTING AT THIS DISTANCE AT RIGHT ANGLES. ITS COMING RIGHT DOWN OUR THROATS HERE IN THE VICINITY OF RENDEZVOUS, STRAIGHT FROM THAT LITTLE YELLOW STAR OVER YONDER, RIGHT TOWARD OUR LITTLE YELLOW STAR, WITH THIS OUTPOST RIGHT ON THE LINE, GIVE OR TAKE A FEW HUNDRED MILLION KILOMETERS.

Rockhound: STILL SOUNDS LIKE MY NEIGHBOR. IT SEEMED TO OFFEND HIM THAT WE JUST EXISTED.

Searcher: LATEST UPDATE. THEY DECIDED TO TAKE "LOOK THIS WAY" LITERALLY. THEY CALLED SOME FRIENDS AND PUT A BIG TELESCOPE ON IT, AND THEY SEE A NEW CLASS OF OBJECT THEY CAN'T UNDERSTAND, RIGHT IN THE GLARE OF THAT STAR THE SIGNAL IS COMING FROM. VERY HOT GAMMA RAYS. THEY'RE ASKING TO GET ONE OF THE LARGE DEEP-SPACE ARRAYS TRAINED ON IT TO SEE IF THEY CAN GET A BETTER LOOK. CALL ME PARANOID, BUT I'VE GOT THIS CREEPY FEELING THAT MAYBE ET HAS LAUNCHED SOME KIND OF DOOMSDAY WEAPON. A BIG BALL OF ANTIMATTER MAYBE? IT SOUNDS LIKE IT IS PRETTY FAR OUT, BUT WHO KNOWS? GUYS, I'D LIKE YOU TO BE READY IN CASE THEY ASK US TO DO SOMETHING LIKE SETTING UP TO TAKE MEASUREMENTS OR EVEN MOUNT SOME KIND OF DEFENSE.

Rockhound: COUNT ON ME.

Iceman: RENDEZVOUS 3 STATION IS AT YOUR DISPOSAL.

Violet: VIOLET CHECKING IN. YOU BOYS KNOW I ALWAYS DO WHATEVER I'M ASKED.

Frosty: ANYTHING YOU NEED, ASK.

Crusty: CRUSTY CHECKING IN. I'M PRETTY FAR EAST. YOU HAVE MY COORDINATES IN CASE I'M IN A POSITION TO DO ANYTHING.

Stinky Pete: STINK CHECKING IN. I'M NORTH A COUPLE OF AU. AT YOUR DISPOSAL.

Searcher: I'M TRANSMITTING THE ENCRYPTION KEY FOR THE SETI LEAGUE MESSAGES. I HEREBY MAKE YOU GUYS HONORARY MEMBERS. FEEL FREE TO READ MY MAIL.

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The core passed thru the Oort cloud nearly three thousand times before it crossed paths with an ancient, pristine, primordial snowball. The icy body was large, sufficiently so to be round and to have formed differentiated layers. It might arguably pass as a Pluto-class dwarf planet by some definitions. It was about to change to a classification all its own.

Neither body was moving especially fast relative to the other, and their feeble gravities accelerated the approach only a little. The collision was gentle by astronomical standards. The core plunged into the snowball virtually dead on, lodging near the center. Displaced ice propagated ahead of the core, and ejected a shower of icy chunks on the opposite side, much as a bullet hitting a ripe melon might eject a spray at the exit wound. The remaining energy of the collision became heat, not a great amount, but to a body used to hovering near absolute zero, it was like being stabbed with a hot poker. Gas spewed from the fissures as the material around the core melted and boiled.

The object froze again within a few millennia, preserving scars that would be unchanged in a billion years.

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Victor crosschecked the readings from the borebot with those from probes he had dispatched to orbit El Dorado. Despite an unexplained background neutrino noise, he could tell exactly where the core was, and it was a beauty. The ice it was buried in was a bonus, not a nuisance, for, although volatiles were relatively plentiful in the Cloud, the distance between bodies was hardly trivial, and nobody likes to haul water from a distant well. Some miners liked the shielding deep ice provided.

The borebot was nearing the core, grinding through hard ice that now produced odd pieces of rock and metal. He slowed its pace as the sensors indicated that there were only a few meters to go. The sampling instruments displayed a forest of new peaks.

"EDS shows iron, nickel, aluminum, copper, yada, yada, gold, silver, platinum, the works! It's like getting a chemistry set for Christmas. I am so disgustingly *rich."*

The robot panel beeped and he looked at the display. "Starting to make contact. Okay, stop boring and just clean up with the lasers. Nice and easy."

The borebot finished exposing the metallic core, then backed off to allow the surface to be imaged. Victor studied the image proudly, his eyes glancing to the piece in his hand for comparison. The texture was amazingly similar. The shape ... His eyes focused on one spot of the borebot's field of view, and he leaned closer to be sure. He traced his finger around one feature of the image.

"Borebot two, zoom image to the indicated area. Scan holographically. Okay, now cut a forty centimeter core at the indicated position, depth ten centimeters, and transport it to the surface."

He held the piece in his hand up at arm's length, and compared it again to the image. "Can't be. That would just be too weird for words."

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Searcher: ALL NET ALERT! THE LATEST TRANSLATION IS IN. "CORRUPTION OF CREATION, ABOMINATION OF THE WORD, LOOK THIS WAY. THE HYDROGEN SUCKING LIGHT-CHASER COMES. SEE YOUR DAMNATION APPROACH, UNSTOPPABLE. YOU ARE TO BE CONSUMED IN THE FIRE OF YOUR OWN STAR. OUR OBLIGATION TO WARN IS FULFILLED. PREPARE TO DIE." THE SETI LEAGUE SAYS THEY ARE NOW CHECKING WITH EVERYONE THEY KNOW TO SEE IF "HYDROGEN-SUCKING LIGHT-CHASER" MIGHT MEAN A BUSSARD RAMJET.

Violet: SO YOU WERE RIGHT. THEY DID LAUNCH SOMETHING AT US. DO YOU SUPPOSE THEY CAN ACTUALLY TARGET EARTH FROM THAT FAR AWAY?

Iceman: OH, NICE. THEY'RE GENOCIDAL MANIACS, BUT AT LEAST THEY'RE ETHICAL!

Rockhound: WHAT'S THIS ABOUT A BUSSARD RAMJET? I THOUGHT THOSE WERE JUST SCIENCE FICTION GADGETS. AND I THINK I ALSO READ THAT THE IDEA

WOULD NOT WORK. SOMETHING ABOUT EXCESSIVE DRAG.

Searcher: NEGATIVE, ROCKDOG. ACCORDING TO MY DATABASE, THE IDEA WAS PUBLISHED BY DR. ROBERT W. BUSSARD IN 1960, IN A SCIENTIFIC JOURNAL CALLED *Astronautica Acta*. BACK IN THE LAST MILLENNIUM, THERE WERE A FEW PAPERS ON FLAWED DESIGNS THAT COULDN'T WORK, BUT THERE IS STILL SERIOUS WORK GOING ON IN THE FIELD. GIVE ME A MINUTE TO READ THIS.

Rockhound: I LIKE YOUR ANTIMATTER IDEA BETTER.

Searcher: ROCK, THE LATER STUDIES DETERMINED THAT THE DRAG OBJECTION CAN BE OVERCOME IF THE ENGINE DOES NOT ACTUALLY BRING THE HYDROGEN UP TO SHIP SPEED. A WORKABLE VERSION WOULD USE RELATIVISTIC FLOW DYNAMICS TO COMPRESS THE FUEL EXTERNAL TO THE SHIP AND CAUSE IGNITION, SOMETHING LIKE A SCRAMJET.

Rockhound: SO WHY HAVEN'T WE BUILT ONE?

Searcher: WE STILL DON'T KNOW HOW TO BUILD A REACTOR THAT FUSES ORDINARY HYDROGEN TO PRODUCE USEFUL ENERGY.

Iceman: WHAT ARE WE LOOKING FOR AND HOW DO WE STOP IT?

Rockhound: WHAT ABOUT ANTIMATTER? WOULDN'T AN ANTIMATTER ROCKET ALSO "CHASE LIGHT"?

Searcher: I'VE GOT ANOTHER MESSAGE COMING IN. ROCK, AN ANTIMATTER ROCKET STILL OBEYS THE ROCKET EQUATION. TO APPROACH LIGHT SPEED AS CLOSELY AS A RAMJET CAN, THE FUEL TO PAYLOAD MASS RATIO WOULD HAVE TO BE PHENOMENAL, AND THE PROJECTILE WOULD BE A FEATHERWEIGHT BY THE END OF THE FLIGHT. A RAMJET WOULDN'T LOSE MASS; IN FACT RELATIVITY SAYS IT *gains* MASS. MAYBE A LOT OF IT. BUT THERE'S ALSO A HYBRID DESIGN, ONE THAT USES ANTIMATTER FUEL BUT SCOOPS UP HYDROGEN TO REACT AGAINST IT AND SERVE AS REACTION MASS.

Rockhound: THERE YOU GO; MAYBE WE'RE BOTH RIGHT. BESIDES, WITH ANTIMATTER, IT DOESN'T MATTER IF IT IS GOING FAST, IT'S JUST BAD NEWS IF IT TOUCHES YOU.

Searcher: OKAY, THE NEW MESSAGE IS IN. THE ABSTRACT SAYS THEY HAVE CONFIRMED THAT THE SPECTRUM OF THE NEW OBJECT IS CONSISTENT WITH BROADBAND THERMAL EMISSIONS, IONIZED HYDROGEN, AND ELECTRON/ POSITRON ANNIHILATION, BLUESHIFTED TO 0.992 C.

Rockhound: I HATE TO SAY I TOLD YOU SO, BUT SEE, ANTIMATTER! IF WE CAN SEE IT, WE SHOULD BE ABLE TO STOP IT. ANY CHUNK OF MATTER WOULD DO THE JOB.

Searcher: POSITRONS DON'T NECESSARILY MEAN IT'S AN ANTIMATTER PROJECTILE. PROTON-PROTON FUSION WOULD HAVE TO BE THE FIRST STEP IN USING PLAIN HYDROGEN FOR PROPULSION, ASSUMING THEY USE FUSION AT ALL. MOST OF THE USEFUL ENERGY FROM P-P FUSION IS FROM A POSITRON THAT IS EMITTED WHEN ONE PROTON CHANGES TO A NEUTRON. AND READ MY TRANSMISSION AGAIN ... THAT'S 99.2% OF THE SPEED OF LIGHT! I THINK THAT THING IS AN INTERSTELLAR RAMJET. AND I'M NOT SURE WE *can* STOP IT. GIVE ME A MINUTE OR TWO TO DO SOME NUMBER CRUNCHING.

Rockhound: YOU CRUNCH, I'LL CATCH UP ON MY RAMJET READING.

Searcher: YEAH, JUST AS I FEARED. LET'S SAY WE CAN SEE THIS AS A TINY SPECK AT ONE LIGHT-YEAR AWAY. AT THAT SPEED, IT WOULD BE LESS THAN THREE DAYS BEHIND THE LIGHT. IT IS A LOT CLOSER THAN IT APPEARS. A *lot!* I DON'T THINK THERE WOULD BE TIME TO REACT. DAMNATION, THIS INFORMATION IS AT LEAST 3.3 DAYS OLD DUE TO THE TRANSMISSION TIME. WE'RE CLOSER TO THIS THING THAN EARTH, BUT WE'RE WORKING ON OLD DATA.

Iceman: HOW FAR AWAY ARE THEY SEEING IT WITH THAT BIG TELESCOPE?

Rockhound: IS THAT THE TELESCOPE THEY'VE BEEN USING TO SPOT EARTH-SIZED PLANETS AROUND STARS?

Searcher: THEY DON'T HAVE A DISTANCE YET, BUT IF IT REALLY IS GOING THAT FAST, IT WILL APPEAR TO GET BRIGHT FAST. MAYBE WE DON'T NEED A TELESCOPE WITH A 10-KILOMETER APERTURE ANY MORE. EVERYBODY, YOU KNOW THE STAR WE'RE GETTING THE TRANSMISSION FROM. PUT YOUR TELESCOPES ON IT AND SEE IF YOU SPOT SOMETHING THAT SHOULDN'T BE THERE. I KNOW ALL YOU PROSPECTORS HAVE FANCY SPECTROMETERS. CAN ANY OF YOU PICK UP HOT GAMMAS?

Iceman: THE STATION CAN. I KNOW WIENER'S SHIP HAS A GAMMA SCOPE, TOO, BECAUSE I INSTALLED IT MYSELF. I'M ON IT.

Frosty: I HAVE IT ON MINE.

Violet: I HAVE THAT CAPABILITY. I'LL HAVE A LOOK.

Rockhound: MINE'S BROKEN BUT I THINK I CAN FIX IT. SEARCHER, IF THE RAMJET IS ACCELERATING FOR THE WHOLE FLIGHT, THAT MEANS IT ISN'T GOING AT A CONSTANT SPEED FOR THAT WHOLE LAST LIGHT-YEAR. IT WOULD ACTUALLY BE GOING FASTER NOW. THERE WOULD BE LESS TIME THAN YOU THINK.

Searcher: I HOPE YOU'RE WRONG, ROCK, BUT YOU'RE ALMOST CERTAINLY RIGHT, AND WE BETTER PLAN THE FASTEST RESPONSE WE CAN SCRAPE TOGETHER. WE GOTTA GET A HEAD START ON THE DATA. I'VE BEEN LOOKING AT MY DATABASE, AND HERE'S WHAT I FIND. THIS JUST NUMBS MY MIND. BUSSARD'S OWN ANALYSIS OF THE RAMJET CONCEPT SAID IT WOULD PROBABLY MAX OUT AT ABOUT 99.9999% OF LIGHT SPEED. CAN YOU GET YOUR MINDS AROUND THAT NUMBER? LET'S BET THAT IS WHAT IT WILL BE DOING WHEN IT GETS HERE. HE ALSO DID A SPECULATION THAT A REALLY BIG RAMJET, AT THAT SPEED, COULD BE USED TO TRIGGER AN EXPLOSION OF A *star,* NOT JUST A PLANET. LET ME READ PAST THE ABSTRACT.

Stinky Pete: STINK CHECKING IN. I GOT TELESCOPES FROM LONG WAVE IR TO HOT GAMMA. THE GAMMA'S ONLY A HALF-METER APERTURE THOUGH.

Iceman: ANYBODY HEAR FROM WIENER? HE'S THE ONLY ONE WHO HASN'T CHECKED IN. HIS GAMMA SCOPE IS A POINT-EIGHT METER WITH A REALLY GOOD DETECTOR.

Frosty: I GOT A HOT GAMMA PINPOINT ON MY SCOPE ABOUT WHERE WE'RE LOOKING. REALLY DOWN IN THE NOISE AND NOT GOOD ENOUGH FOR A SPECTRUM YET. WHAT WAVELENGTHS WOULD WE SEE?

Violet: I THINK I JUST SPOTTED IT. VERY FAINT. I WOULDN'T HAVE NOTICED IT IF SOMEBODY DID NOT TELL ME IT WAS THERE. DO WE HAVE A TRAJECTORY YET?

Searcher: I'M SPEED-READING. HOPE I DON'T MISS ANYTHING IMPORTANT. BUSSARD'S SPECULATION WAS THAT AT FULL SPEED, THE RAMJET WOULD HAVE WHAT HE CALLED A FOUR-DIMENSIONAL TIME-ABLATION SHIELD. WHAT THAT MEANS IS BASICALLY THAT TIME IS MOVING SO SLOWLY ON THE RAMJET THAT IT DOESN'T EVEN KNOW IT HAS HIT A STAR UNTIL IT HAS PENETRATED ALMOST TO THE CORE, TO ABOUT 0.02 OF THE STAR'S RADIUS FROM THE CENTER. THE SHIP HAS ESSENTIALLY BEEN CONVERTING ENERGY INTO EQUIVALENT MASS EVER SINCE IT STARTED APPROACHING THE SPEED OF LIGHT, SO THE ENERGY RELEASED WHEN IT FINALLY VAPORIZES IS STUPENDOUS. STARS WORK BECAUSE THEY HAVE VERY STABLE STEADY-STATE COMPRESSION FORCES

BALANCED AGAINST RADIATION PRESSURE WORKING ON THEIR CORES, WHERE THE FUSION IS ACTUALLY TAKING PLACE. AN EXPLOSION OF THIS MAGNITUDE TOTALLY SCREWS UP THIS BALANCE. BUSSARD CALCULATED THE EFFECT OF THE RAMJET EXPLODING WOULD BE TO OVERHEAT A LARGE LOCAL AREA OF THE CORE, WHICH WOULD ESSENTIALLY UNDERGO SOMETHING LIKE A SUPERNOVA IMPLOSION. THAT, IN TURN, BLOWS UP THE STAR. A WEAPON LIKE THAT WOULDN'T JUST KILL EARTH, IT WOULD KILL EVERYTHING IN THE WHOLE SOLAR SYSTEM! DAMN, THESE GUYS MUST REALLY HATE US.

Rockhound: DAMN BUSSARD TO HELL FOR DREAMING THAT THING UP!

Searcher: ROCK, JUST A GUESS, BUT I'D BE WILLING TO BET GOOD MONEY THAT BUSSARD NEVER VISITED THE STAR SYSTEM THAT LAUNCHED THIS THING. IF NOBODY HAD DREAMED UP THIS IDEA, HOW WOULD WE EVER REALIZE WHAT THAT THING WAS AND MAYBE HAVE A CHANCE TO STOP IT? AND FURTHERMORE, IT TURNS OUT HE'S THE GUY WHO INVENTED THE P-B11 POLYWELL REACTOR THAT RUNS YOUR SHIP, AND WE MIGHT NOT EVEN BE UP HERE WITH A CHANCE TO DO ANYTHING IF NOT FOR HIM. ICE, YOU ASKED HOW TO STOP IT? BUSSARD FIGURED A 200-KM ASTEROID IN THE PATH OF THE THING OUGHT TO DO THE TRICK, IF YOU COULD INTERCEPT IT FAR ENOUGH OUT. THAT SHOULD DESTROY THE SHIP ITSELF, ALTHOUGH I SUSPECT THE FRAG COMING OFF THE COLLISION WOULD NOT BE TOO PEACHY TO BE AROUND.

Iceman: ASTEROIDS ARE IN SHORT SUPPLY OUT HERE, SEARCHER. WOULD AN ICE BALL OF EQUIVALENT MASS DO THE JOB? THE TROUBLE IS, THERE ARE ABSOLUTELY NO MASS DRIVERS OUT HERE LIKE THEY USE TO MOVE ASTEROIDS WITH. LET'S SEE, AN ASTEROID LIKE THAT WOULD BE, SAY, 5 X 1018 KILOGRAMS. SO, LET'S SAY WE HAVE 24 HOURS, FROM A STANDING START, YEAH, WE MIGHT MOVE A BODY OF THAT MASS ABOUT HALF ITS DIAMETER IF WE REDLINED THE REACTORS AND PUMPED REACTION MASS FROM THE BODY ITSELF.

Searcher: I'M HAVING A BRAIN FART GUYS. HONESTLY, I JUST PASSED GAS AND IT GAVE ME A WILD IDEA. AN INTERSTELLAR RAMJET IS DESIGNED TO COLLECT INTERSTELLAR HYDROGEN, AT SOMETHING LIKE MAYBE ONE ATOM PER CUBIC CENTIMETER, RIGHT? AND HYDROGEN IS ACTUALLY A PRETTY PATHETIC FUSION FUEL. IT IS HARD TO LIGHT OFF, IT'S THE REACTION RATE LIMITER IN STARS, AND IT ONLY PRODUCES ABOUT 1 MEV OF USEABLE ENERGY FROM THAT POSITRON. THE SAME SHOULD BE TRUE OF THE RAMJET. THE DEUTERIUM-DEUTERIUM FUSION CHAIN MAKES ABOUT 27 TIMES THAT, AND IT LIGHTS OFF A HELL OF A LOT EASIER! WE'VE GOT DEUTERIUM, AND WE CAN MOVE IT RELATIVELY QUICKLY. SO ANYBODY HERE UP TO CALCULATING WHAT WOULD HAPPEN WHEN YOU PUT A HUNDRED TONS OF DEUTERIUM, AND MAYBE

SOME HELIUM-3 FOR GOOD MEASURE, AT MAYBE A MILLION TIMES THE DENSITY OF INTERSTELLAR HYDROGEN, IN THE PATH OF A MACHINE DESIGNED TO EAT AND BURN INTERSTELLAR HYDROGEN?

Iceman: SO YOUR HOPE IS THAT THE COLLECTION SYSTEM WILL DIRECT THAT SLUG OF FUEL INTO THE SHIP ITSELF, AND SET IT OFF? YOU'RE PROBABLY OVERSTATING THE YIELD A LITTLE SEARCHER. I SUSPECT ONLY THE FIRST STEP IN THE CHAIN WILL OCCUR. THE PROMPT D-D REACTION WOULD ONLY PRODUCE ABOUT THE ENERGY OF ... 2000 MEGATONS OF TNT. YEAH, THAT MIGHT JUST DO THE TRICK. IT WOULD BE LIKE DUMPING A LITER OF LIQUID NITROGLYCERINE INTO THE AIR INTAKE OF AN INTERNAL COMBUSTION ENGINE, TIMES TWO TRILLION OR SO.

Searcher: LET'S HOPE IT'S ENOUGH. I'M TRYING TO COMPREHEND THE MASS AND ENERGY OF THAT RAMJET. THE DEUTERIUM EXPLOSION MIGHT BE NO MORE THAN A HICCUP IN COMPARISON.

Iceman: YOU MAY BE RIGHT. WE'RE THINKING NEWTONIAN PHYSICS. BUT IN RELATIVITY, F = M.A BECOMES F = g3.M.A. g IS THE LORENZ FACTOR, WHICH AT 0.999999 C IS 707. CUBING IT GIVES 3.536E+08. IT IS OVER 350 *million* TIMES HARDER TO AFFECT THIS THING'S SPEED THAN IT WOULD BE AT LOW VELOCITY! NO WONDER BUSSARD FIGURED IT WOULD TAKE SUCH A LARGE OBJECT TO KILL THIS THING.

Rockhound: I BELIEVE WE'RE ALL FLYING MARK III EXPLORERS. THE RESCUE POD IS THE WHOLE COCKPIT, COMPUTERS AND ALL. THE SHIP IS BRAINDEAD WITHOUT IT. WE CAN'T SET UP AN UNMANNED MISSION UNLESS WE CAN MAKE IT BACK TO RENDEZVOUS FIRST.

Searcher: THERE'S NO TIME ROCK. AND I THINK IT WOULD TAKE A MONTH TO PROGRAM THESE SHIPS TO DO A RELIABLE AUTOMATED INTERCEPT. ANYBODY GOT ANY QUESTIONS ABOUT THE MATH?

Iceman: TWENTY-ONE BILLION SOULS IN THE INNER SYSTEM, EIGHT OF US OUT HERE. DOESN'T TAKE A ROCKET SCIENTIST TO FIGURE THAT MATH OUT, SEARCHER. I JUST FOUND SOMETHING IN MY DATABASE. IT TURNS OUT THAT AN OUTFIT CALLED DRAPER LABS TOOK A SERIOUS LOOK AT THE RAMJET WEAPON IDEA. THEY CALCULATED THAT THE THING CAN'T TURN WORTH CRAP. IT HAS TO BE LOCKED ONTO ITS FINAL TRAJECTORY FROM SOMEWHERE BETWEEN 1 AND 1.5 PARSECS BEFORE IMPACT. THAT'S A MINIMUM OF 3.3 LIGHT-YEARS. WE'VE GOT THAT GOING FOR US. IF WE CAN DETERMINE ITS TRAJECTORY INSIDE THAT RANGE, WE CAN BET IT WILL STAY ON IT.

Rockhound: SAYS HERE THE SHIP MAY NOT BE A BIG TARGET, BUT IT COLLECTS FUEL BY PROJECTING A FIELD OUT IN FRONT OF IT, SORT OF A FUNNEL. THE WIDER THE FUNNEL, THE MORE AREA IT SWEEPS, THE MORE FUEL IT CAN GATHER. I'M SEEING ALL SORTS OF ESTIMATES FOR THE DIAMETER OF THE FIELD, BUT THIS RAMJET NEEDS TO BE VERY LARGE TO BE A STAR-KILLER. IT NEEDS ABOUT TEN SQUARE KILOMETERS OF SCOOP AREA FOR EVERY TON OF REST MASS OF THE SHIP. LET'S SAY IT IS AS MASSIVE AS AN OLD BATTLESHIP, MAYBE 60,000 TONS, THAT WOULD MAKE THE SCOOP DIAMETER SOMETHING LIKE 860 KILOMETERS. I KNOW THAT'S NOT VERY BIG COMPARED TO DISTANCES OUT HERE, BUT IT'S BETTER THAN HAVING TO HIT SOMETHING THE SIZE OF A SHIP, EVEN A BIG SHIP.

Searcher: GOOD FIND ROCK. IF YOU'RE RIGHT, THAT MEANS THE RAMSCOOP WAS DESIGNED TO PICK UP LESS THAN A KILOGRAM PER SECOND OF HYDROGEN IN INTERSTELLAR SPACE. A FULL PAYLOAD OF DEUTERIUM WILL DEFINITELY BE MORE ENERGY RELEASE, PROBABLY IN JUST MICROSECONDS, THAN IT WAS DESIGNED TO PROCESS.

Violet: FOLKS, THE FUEL HAS TO BE IONIZED. THE RAMSCOOP IS PROBABLY EITHER ELECTROSTATIC OR SOME COMBINATION OF ELECTROSTATIC AND MAGNETIC FIELDS. IT WON'T INTERACT WITH NEUTRALS, AND AT THAT SPEED, IT PROBABLY CAN'T PROJECT ANYTHING AHEAD OF ITSELF TO IONIZE NEUTRALS. BUT I'M COMING HOME WITH A NEARLY FULL LOAD OF DEUTERIUM.

Rockhound: I'VE GOT ABOUT HALF A LOAD.

Iceman: RENDEZVOUS HAS ABOUT 6,000 TONS STOCKPILED, WAITING FOR THE NEXT TANKER TO PICK IT UP. NO WAY TO CHANGE LOCATIONS, THOUGH. I'M TRANSMITTING THIS WHOLE EXCHANGE TO EARTH, BUT THERE ISN'T TIME TO WAIT FOR A REPLY. MAYBE THEY CAN MOUNT SOME KIND OF LAST-DITCH DEFENSE WITH IT. I HOPE THEY FIGURE OUT THE SAME THING, OR SOMETHING BETTER, BECAUSE THAT WOULD GIVE THEM ANOTHER THREE DAYS TO PREPARE.

Searcher: VIOLET, IF THIS THING GETS PAST US, EVERYBODY IN THE INNER SYSTEM WILL PROBABLY DIE. YOU MAY BE THE ONLY WOMAN LEFT. DON'T DO ANYTHING RASH, OKAY?

Violet: YOU GUYS KNOW I LOVE TO FLIRT AND I LOVE ALL THE ATTENTION, BUT MAYBE, BECAUSE I'M THE ONLY WOMAN WITHIN 300 AU OF HERE AND YOU HAVEN'T SEEN ANOTHER ONE IN A WHILE, YOU FORGET I'M OVER 80 YEARS OLD. FOR ME TO BE ANOTHER EVE WOULD TAKE A TEAM OF MEDICAL SPECIALISTS

THAT ARE ALL GOING TO COOK IF SOL BLOWS UP.

Rockhound: ANYBODY HAVE ANY IDEA WHY WE CAN'T TAKE THIS THING OUT JUST BY DUMPING A ROCK WITH A MASS OF A TON OR SO IN ITS PATH? AT THAT SPEED, I WOULD THINK IT WOULD EFFECTIVELY TURN WHATEVER IT HIT INTO ENERGY. I'VE ALWAYS HEARD THAT HITTING EVEN LITTLE STUFF AT RELATIVISTIC SPEEDS WOULD BE FATAL.

Iceman: YEAH, ROCK, IT WOULD CAUSE A HELLUVA BANG, IF YOU COULD HIT SOMETHING AS SMALL AS THE HULL, WHICH WOULD BE PRETTY DIFFICULT CONSIDERING IT WILL LOOK LIKE IT'S A LIGHT-YEAR AWAY JUST SECONDS BEFORE IT HITS YOU. BUSSARD WOULD HAVE BEEN A LOT BETTER AT THIS MATH THAN ME, BUT I THINK THERE'S SOMETHING IN GENERAL RELATIVITY THAT ACKNOWLEDGES THAT THE RAMJET HAS BEEN GORGING ON ENERGY FOR DECADES WHILE WE'VE BEEN SITTING ON OUR ASSES, AND THAT PROBABLY BIASES THE IMPACT RESULTS HEAVILY IN ITS FAVOR. I KNOW THERE'S AN ASYMMETRY LIKE THAT FOR TIME DILATION. AND THIS WON'T BE SOME PASSENGER SHIP BUILT LIKE A BIG CAN. IT WILL PROBABLY BE MORE LIKE A BATTERING RAM, TIMES GAMMA CUBED. IF I WERE DESIGNING IT, I'D GIVE IT ONE OF THOSE MULTI-LAYERED METEOR SHIELDS, PROBABLY MADE OF THICK ARMOR PLATE, GENEROUSLY SPACED APART BY A FRAMEWORK. YOU MIGHT VAPORIZE THE FIRST ONE AND DAMAGE THE SECOND, BUT THE BULK OF THE THING WOULD SURVIVE.

Rockhound: YEAH, BUT IT'S STILL MADE OF MATTER, RIGHT? WOULDN'T A 2,000-MEGATON BLAST AROUND THE HULL VAPORIZE IT?

Searcher: NEGATIVE, ROCK. THE ORION PROGRAM, THE ONE WHERE THEY WERE GOING TO TRY USING NUKES AS ROCKET FUEL, REFERENCED SOME DATA FROM A COUPLE OF BIKINI ISLAND TESTS. THEY PUT BIG STEEL SPHERES VERY NEAR THE CENTER OF THE BLAST, AND THEY WERE BARELY SCORCHED.

Iceman: YEAH, ORION! I SHOULD HAVE REMEMBERED! GUYS, I MAY HAVE BEEN PESSIMISTIC TOO SOON. THE EQUATION I GAVE YOU A FEW MINUTES AGO IS FOR FORCE REQUIRED *in the direction of travel*. BUT AT RIGHT ANGLES, IT'S JUST F = g.M.A. THAT'S HALF A MILLION TIMES BETTER! AND SEARCHER, LOOK UP A TEST WHERE THEY HAD A HEAVY PLUG ON TOP OF A LOW-YIELD NUKE IN ONE OF THE FIRST UNDERGROUND TESTS, AND KICKED IT TO SOMETHING LIKE SIX TIMES EARTH'S ESCAPE VELOCITY. THAT SHOULD BE IN THE ORION STUFF. IT INSPIRED THE PROJECT.

Searcher: ICE, YOU'RE RIGHT. THAT MUST BE THE PLUMBBOB PROGRAM, A

SHOT CALLED PASCAL B. IF I'M READING THIS RIGHT, THE YIELD WAS ONLY ABOUT 300 TON—JUST A POP! YOU THINK WE HAVE A CHANCE TO PUSH THIS THING ASIDE? CAN WE MAKE IT TURN IF IT CAN'T TURN ITSELF?

Iceman: HARD TO SAY. PROBABLY AT LEAST PART OF THAT STEERING PROBLEM IS THE SAME REASON WE'RE GETTING SO LITTLE WARNING: IT'S "CHASING LIGHT" AND IS HAVING TROUBLE SEEING AHEAD IN TIME. IF WE COULD GIVE IT JUST 8,726 KPH TO ONE SIDE, IT WOULD JUST MISS THE SUN. IF WE SET OFF A 2,000-MEGATON EXPLOSION IN CONTACT WITH ONE SIDE OF A BIG CHUNK OF ARMOR PLATE WITH THE MASS OF A BATTLESHIP, I'D SAY IT WOULD WORK, PROBABLY BY A BIG MARGIN. BUT AGAINST 707 BATTLESHIPS? AND WE'RE JUST GUESSING AT THE MASS OF THAT THING. BUT WITH SEARCHER'S TRICK, THE SCOOP ITSELF WILL DIRECT THE DEUTERIUM RIGHT IN AROUND THE HULL AND SET IT OFF WHERE IT COUNTS. AND SINCE IT'S ALMOST A SURE BET WE'LL HIT IT OFF-CENTER, THE FORCE WILL BE OFF TO ONE SIDE. IT WILL BE DIFFICULT ENOUGH JUST TO FIGURE OUT THE TRAJECTORY, SO I'M NOT WORRIED WE'LL HIT IT DEAD CENTER. I THINK TEDDY ROOSEVELT SAID, "DO WHAT YOU CAN, WITH WHAT YOU HAVE, WHERE YOU ARE." I THINK THAT'S WHAT WE HAVE.

Searcher: ICE, DO YOU READ HEINLEIN? "ALWAYS LISTEN TO EXPERTS. THEY'LL TELL YOU WHAT CAN'T BE DONE AND WHY. THEN DO IT." YOU'RE RIGHT, IT WILL BE HARD TO HIT. BUT WE CAN ASSUME IT IS AIMED NEARLY DEAD CENTER OF THE SUN, PROBABLY WITHIN ONE FIFTIETH OF THE SUN'S RADIUS, AND WE KNOW IT CAN'T TURN ITSELF. EVEN IF IT HITS THE SUN BUT DOESN'T GET THAT CLOSE TO THE CORE, MAYBE THAT'S GOOD ENOUGH. AS I SEE IT, OUR BEST BET IS TO GET ON A STRAIGHT LINE BETWEEN WHERE WE SEE THAT THING NOW AND DEAD CENTER OF SOL. MOST OF US ARE PRETTY CLOSE RIGHT NOW. STINK AND CRUSTY, MAYBE YOU SHOULD START IN.

* * * *

"Computer, cabin video log on." Victor waited for the record indicator to light up and turned toward the camera. "This is definitely worth recording for posterity. In my library is an old classic TV series, in which one of the characters says, 'do not confuse coincidence with fate.' A little while ago, the borebot cut this core sample and sent it up here." He tilted up a circular disc larger than a dinner plate, with a globular surface that was missing a small patch. "Watch this."

Victor picked up the flake of asteroid he had found a decade earlier in the inner system. Gently, he matched it up with a divot missing from the disc. The fractured surfaces matched up perfectly.

Victor smiled up at the camera. “Up to now, I’ve been able to think that good detective work is what led me here. Good luck played a role. It did take a little luck to find this flake, but even that was mostly orbital mechanics and a systematic radar search. After all my homework, there was about a one in a hundred chance that this object would be El Dorado, but that’s not enough of a coincidence to impress a poker player. But to bore right down to this huge ball of iron, expose a three-meter diameter patch of it, and find the exact spot where the flake originated? Man, that’s not coincidence, that’s *destiny!”*

He glanced at his watch. “Damn, I haven’t been on the net in over a day. They probably think I’m dead! I’ve got enough for a solid claim, and the forms are ready to file. I wonder if it’s time to let the cat out of the bag?”

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Searcher: ALL NET ALERT! EARTH JUST SENT THEIR BEST TRAJECTORY ESTIMATE. THEY’LL SEND REFINEMENTS AS FAST AS THEY COME IN. LOOKS LIKE WE’RE ALMOST ON THE LINE, JUST AS WE THOUGHT.

THEY FIGURED OUT EVERYTHING WE DID, AND MORE. THEY’VE GOT EVERY SHIP THAT CAN REACH THE TRAJECTORY MOVING OUT FOR AN INTERCEPT. THEY’RE ALSO GOING TO TRY DEUTERIUM RELEASE, BUT THEY’RE AFRAID IT WON’T WORK. THEIR ANALYSTS THINK THE RAMSCOOP WILL BE TURNED OFF SOME TIME BEFORE IT HITS THE SUN, TO BE SURE IT DOESN’T WASTE KINETIC ENERGY INTERACTING UNNECESSARILY WITH THE CORONA AND PHOTOSPHERE. MOST OF THE SHIPS ABLE TO MAKE AN INTERCEPT ARE WITHIN ABOUT FOUR AU OF THE SUN. THAT’S ABOUT HALF A LIGHT-HOUR. IN RAMJET TIME, THAT WOULD BE MORE LIKE TWO AND A HALF SECONDS, SO THERE IS A GOOD CHANCE IT WILL BE SWITCHED OFF BY THEN. AND IF WE CAN FIGURE OUT THE DEUTERIUM TRICK ON SHORT NOTICE, THE DESIGNERS COULD TOO, AND THEY WOULD SWITCH THE THING OFF BEFORE THEY THOUGHT THERE WAS A SERIOUS THREAT. THE BET IS THAT IT WON’T WORK.

SO THEIR MAIN STRATEGY IS TO GET EVERY SOLID OBJECT THEY CAN INTO THE PATH OF THAT THING, GIVE OR TAKE THE PROJECTED UNCERTAINTY. THEY’RE GOING TO MAKE IT RUN THE GAUNTLET, AND MAXIMIZE THE CHANCES FOR A DIRECT HIT. BUT THE TRAJECTORY IS WAY ABOVE THE ECLIPTIC. IT ISN’T COMING IN THROUGH THE KUIPER BELT AND ASTEROID BELT, AND THERE ARE NOT MANY HEAVY OBJECTS THEY COULD EVEN HOPE TO MOVE INTO ITS PATH, AND ONLY THREE BIG MASS DRIVERS ANYWHERE CLOSE. BASICALLY, THEY DON’T STAND A SNOWBALL’S CHANCE IN HELL OF GETTING A 200-KILOMETER ASTEROID INTO

THE PATH OF THAT THING.

SO THEY ARE DOING IT WITH SHIPS. THEY'VE GOT HUNDREDS OF THEM CONVERGING ON THE TRAJECTORY. THEY ARE EVEN INSTRUCTING THE SHIPS TO TURN BROADSIDE TO IT. THE ODDS OF A DIRECT HIT ARE STILL NOT GOOD. THE TROUBLE IS, ALL THIS IS TOO CLOSE IN. IF THEY MANAGED TO GET A SMALL ASTEROID IN ITS PATH, IT MIGHT MEAN THEY TURN A RIFLE SHOT AT POINT BLANK RANGE INTO A SHOTGUN BLAST AT POINT BLANK RANGE. SAME OUTCOME. BUT THAT THING WILL PROBABLY GO THROUGH A FREIGHTER LIKE A BULLET THROUGH TISSUE PAPER.

FRIENDS, THERE IS NOTHING BETWEEN US AND THEM. WE MAY BE FAR ENOUGH OUT TO KILL IT IN TIME. THERE'S A MUCH BETTER CHANCE THE RAMSCOOP WILL STILL BE TURNED ON OUT HERE, AS THEY GO FOR A LAST BURST OF ENERGY IN THE SLIGHTLY DENSER GAS AS THEY COME OUT OF INTERSTELLAR SPACE. THEY PROBABLY DON'T EXPECT WE WOULD HAVE ANYONE IN POSITION THIS FAR OUT. IT'S THE MOST FANTASTIC SHEER DUMB LUCK WE *are* HERE. AND IF WE CAN MANAGE TO BLAST THAT THING SIDEWAYS, MAYBE THEY'LL HAVE A CHANCE.

* * * *

Victor reviewed the backlog of forum messages in shock. He finally regained his senses enough to begin processing the bad news. In the time he had been ignoring them, the news had gone from discovery of an almost comical rant from too far away to matter, to a serious doomsday threat. He glanced at the ship status display.

"I wonder if those jackasses are trying to punk me? Aretoo, get your sorry mechanical behind in gear and go dust the snow off the telescope dome."

"Command not valid," the robot panel complained.

"Aretoo, remove foreign material from telescope dome."

"Command accepted," the panel declared, and the display showed a maintenance robot scurrying down the trunk rail toward the telescopes.

Victor opened a data file attached to one of Searcher's posts, and transmitted the spherical coordinates to the gamma ray telescope. The coordinates would be easily in view at this point in El Dorado's rotation. A minute later, the robot reported the task was completed. Victor opened the dome and activated the telescope. The image quickly began integrating, and resolved a

steady, bright pinpoint of hard gammas just where the incoming object should be. There was enough signal for a decent spectrum.

"I thought they said this thing was barely detectable. This scope is not *that* much better than the others. If those top peaks are supposed to be positron annihilation gammas, what's the blueshift? Um, works out to about 0.02, which would be 0.9992c. Could they be faking this? I don't see how. Jeez, they must be right, that thing is *screaming* in, way faster than it looked just a few hours ago.

"Computer, connect the spectra from the IR, visible, and UV scopes with the x-ray/gamma spectrum, and correct for blueshift of 0.02." Victor studied the display. "Interesting. That doesn't look like it's all heat. Computer, model and remove blackbody spectrum. Uh-huh, and there's a cutoff at the upper end. Reminds me of the electron-cyclotron resonance spectrum in a magnetic grid corner cusp, actually. This is *way* too sophisticated for those guys to fake. But what kind of field would cause ECR at a nanometer? Damn, it would take around ten million teslas. That's only an order of magnitude short of the polar field of a neutron star! So, you monster, you do use a magnetic field for at least part of your ramscoop operation.

"What the hell would something like that be *made* of, anyway? A nickel-iron structure would be crushed by a field that strong. In fact, it's more than a million times stronger than a field that would levitate diamagnetic materials, so it would probably tear carbon fiber to shreds.

"How fast would something like this expand? It would only be seven hours behind the light it emitted a light-year out! And if it's doing six nines of light ... that drops to half a minute! It will blossom from a pinpoint to as big as the moon in a heartbeat, as if it were coming in faster than light!

"So next, I suppose I'm expected to push off from here and go out and take up position to try and stop that damned thing. Screw that shit! Nobody has said it, exactly, but I'd say it is a safe bet what they're talking about would be fatal. The odds are I won't be close enough anyway. Nobody else out here has as much to lose as I do. Let one of those other poor bastards do it, since they're all so eager to die."

Another updated trajectory came in. The estimated error cone was tighter now, definitely centered west of the station. El Dorado was near the center.

"Shit, what are the odds that thing is gonna hit my pot of gold?" He ran the calculation. "Slim. Close to zero, in fact. It'll probably pass about a hundred

thousand klicks east of here. Odds are better I can use it to shield me when that thing goes by. Damn, that's a lot of gamma rays! And Ice was right: Even if I wanted to push this thing into the most probable path, no way do I have enough impulse, not by a factor of a thousand at least, so they can't blame me for not trying."

Victor paused to think. "They can't blame me for not trying to push El Dorado. They'd blame me for not getting out there to try to stop this thing. My tanks are chock full of high-grade fusion fuel, and the best projection is just a few hours east of me. So if I just let this thing go by and do nothing, and Earth gets cooked, and then I come in and file a claim on El Dorado, they'll know I was right there and just watched it go by. Man, if I think I'm short on friends now, imagine afterwards."

A motor down in the bowels of the ship growled as the borebot was raised back into its bay.

"Says you!" Victor glowered at nothing in particular. "You forget, my tin friend, that if we try to stop that thing, you fry with me. So let's not even go there. The fact is, I'll be so rich, those toads will be kissing my ass anyway."

Victor froze. "Or ... wait. Shit, my whole damned business model is screwed to hell! If the inner system is destroyed, what do I do for a customer base?" He paused to think again.

A nasty smile formed on his face. "But I'd still be sitting on top of the richest find the Oort Cloud has ever produced. There are what, four exploration outposts out here, plus that deep exploration ship, *Nemesis,* out about a quarter light-year on the ecliptic? The inverse square law is the best shielding, so they say. The other outposts will probably get thru this without a scratch, and that ship certainly will. So humanity will survive. We'll just start over out here. It will take a few generations before it means much, but I'll still be the richest man in the system. And if I have a chance of stopping that thing, it looks like at least three other ships have about the same chance. Maybe Earth won't be destroyed after all. I'll pay for a really nice statue in honor of whoever intercepts it."

"Aaargh! There aren't many medical doctors out here! I wonder how long it would take us to re-create the life extension technology they have in-system?"

The last forum exchange with Violet crossed his mind. "Hell, there's another hole in my plan. I don't even know if there are any women of childbearing age out in the Cloud at all. Because of the radiation hazards, most women with the itch to

come out and explore wait until those days are behind them."

A valve deep in the ship hissed loudly, venting gas in preparation for decoupling the borebot's umbilical.

"Yeah?" Victor replied, "So what if I am a piece of shit? Now shut up and get back to work."

* * * *

Searcher: I GUESS YOU GUYS ARE WATCHING THESE TRAJECTORY UPDATES. THEY ARE RAPIDLY CONVERGING WEST OF RENDEZVOUS. ALL OF THIS INFORMATION FROM EARTH IS OLD NEWS. WE'LL PROBABLY BE TOO FAR BEHIND IF WE DEPEND ON THEM MUCH LONGER. AT THIS POINT, I'D SAY WE HAVE TO TREAT THIS LIKE ANY OTHER VISUAL INTERCEPTION, JUST WITH REALLY BIZARRE VELOCITIES. THAT THING IS GOING TO SUDDENLY START LOOMING LARGE, PROBABLY IN A FEW HOURS, AND WHEN IT HAPPENS, IT WILL BARELY BE POSSIBLE TO REACT. WHEN YOUR TARGET IS NOT MOVING RELATIVE TO YOUR FIELD OF VIEW, ONLY BLOSSOMING IN YOUR VIEW SCREEN, YOU'RE ON AN INTERCEPT COURSE. TRY TO STAY CENTERED ON IT THE BEST YOU CAN. PETE, CRUSTY, IT LOOKS LIKE YOU GUYS ARE OFF THE HOOK. YOU CAN'T POSSIBLY GET HERE IN TIME. ICE, DOESN'T LOOK LIKE RENDEZVOUS WILL BE IN PLAY, EITHER. HAS ANYBODY HEARD FROM WIENER? THAT THING WILL PROBABLY PASS WEST OF THAT LITTLE ICE BALL HE'S EXPLORING, AND HE PROBABLY COULD GET THERE IN TIME. HE SHOULD HAVE FULL TANKS BY NOW.

* * * *

Victor stared at the core sample disk. Hatred burned in his eyes. The latest trajectory update was still on his screen, with the estimate of the launch date, the same year Victor had been born.

"It's not fair. You stupid chunk of inanimate matter, you suckered me out here, didn't you? Both of you. You and my flaky little buddy sitting in that divot. Man, I should have lashed myself to a mast and not let you two sirens seduce me. But that wouldn't have helped, would it? I'd probably be back in the belt and I'd fry with everyone else. So it's my fault. I should have picked Rendezvous 2 instead of Rendezvous 3. But then I'd never find El Dorado, and I'd just be a poor, lonely ice miner, living out my years out in the dark and cold and wishing there were some women around."

Victor continued to stare at the disk, as the wheels ground furiously in his

mind.

"How the hell did you get out here, you stupid ball of iron? Did God do it? Could some all-powerful, all-knowing son of a bitch have foreseen all this? I mean, this all started over four billion years ago. Life on Earth—and the other world too, I suppose—couldn't have been more than slime in mud puddles, if it even existed then! How could anyone, even an omniscient being, know this would happen, now, here? Even if God is a magnificent billiards player, how could He possibly predict the future, when creatures with free will are involved?"

He placed his head in his hands, sobbing. "What's the matter with your aim, God? Did you miss? Is that it? Yeah, admit it. You were off a tiny hundred thousand kilometers after the billiards shot of all time! So you lure me out here to fix the problem, is that it?"

He inhaled sharply, as if startled, and then sighed. "No, that was never the plan, was it? You put El Dorado here for us, but it was up to us to take the final step. That's it, isn't it? You lousy son of a bitch!"

Victor thought some more, then picked up the core sample disk and placed it in a sample transporter. "Computer, jettison this. Maybe somebody will find it and make a memorial out of it."

"Command one accepted," the 'bot panel replied. "Command two not understood."

"Computer, disregard command two. Prepare for departure. Disregard my metaphysical ramblings. The problem is not that I can't tell the difference between coincidence and fate, the problem is that I can't tell the difference between *destiny* and fate."

* * * *

Wiener: VICTOR GENDEG CHECKING IN. SORRY GUYS, I'VE BEEN SANDBAGGING. I'M IN PRIME POSITION, WELL TO THE WEST OF WHERE YOU EXPECTED ME. I HAVE A FULL LOAD OF ABOUT 90 PERCENT DEUTERIUM, 10 PERCENT HELIUM-3. I AM TRANSMITTING MY STATE VECTOR AND MY LOGS. IN MY LOGS, YOU WILL FIND THE STATE VECTOR, ASSAY, AND CLAIM APPLICATION FOR THE BODY I WAS REALLY EXPLORING. IT WILL PROBABLY SURVIVE WHATEVER IS COMING, AND YOU'LL WANT TO GET OVER HERE AND CHECK IT OUT. PLEASE GIVE IT TO EVERYONE I FAILED TO APPRECIATE WHEN IT WOULD HAVE MATTERED. I THINK THAT WOULD INCLUDE THE WHOLE HUMAN RACE.

ANYWAY, REVIEW THE LOGS, AND YOU'LL KNOW THAT I'M NO DAMNED HERO. FATE JUST PICKED ME FOR THIS.

* * * *

"Computer, commence live broadcast of voice and data."

Victor scanned the operations manual on computer display. "To whoever is listening, I'm trying to dump my deuterium tanks, but they got cold a few seconds after I opened the valves, and now nothing is coming out. The tank heaters aren't adequate for this much flow. Shit, every space ship in the movies has a self-destruct. How come there's no way to blow this sucker up? The damned engineers made it foolproof. If only I had a nuke! All I have are some little mining charges."

He looked at the telescope display. Every minute, the glowing disk with the fiery speck in the center grew larger. "Hell of a lot of hard gammas. I wonder if Violet was wrong? Maybe the gammas will ionize the gas, if I can get it expelled in time." He closed the vent valves, brought up a stern view of the ship, and touched points on the aft ends of the storage tanks. "Aretoo, plant a five kilogram mining charge on each of the following points. Emergency safety protocol override."

"This instruction violates your lease and insurance provisions," the computer warned.

"I accept the liability, and my deductible is on deposit," Victor growled at the machine. "I'm the freaking money-grubbing MBA around here. You are just a rental. I don't really give a shit what you think. I'm not in a particularly good mood right now."

"Emergency safety protocol override accepted. Unintelligible commands ignored." The robot panel display showed the maintenance robot racing to its final mission.

He looked back at the telescope display. "Looks like we're still about dead center. I think Ice is probably right ... it makes more sense to try to concentrate the blast a little off to one side. If we stick with the assumption the thing will aim for dead center of the Sun, the error cone is pretty small this close in. Computer, display Earth's location relative to the Sun, with celestial axes. Show object's trajectory." He nodded. "Computer, show target with celestial axes." He held up one hand with fingers projected to visualize the relative orientations. "Now, time for a wild guess. Computer, adjust interception point to ten kilometers southeast

of the trajectory error cone center."

Victor shook his head as he felt the thrusters kick in. "I'm fooling myself thinking that thing is that accurate. If only there were more time! Dammit, I don't know how long it would take for the gammas to ionize this much gas at this density. This is basically going to be a liquid hydrogen dump. It will probably be a fog of droplets for a while. Hell, I don't even know the density. Just gotta dump it and hope.

"Damn, how fast would the field fall off with distance? I figured ten million teslas near the center, but a magnetic field will fall off as the cube of distance. Near the center, it ought to be a steep funnel, and the energy stored in the field itself will be incredible. A few hundred kilometers out, it will be too weak to handle a big mass of ions. The electric field won't fall off as fast, but the Debye lengths in a dense cloud will mean most of the ions won't even see the field. The release has to be almost right down its throat. If anybody is listening, you need to get as close as you can."

A few minutes later, the maintenance robot indicated the task was complete, there was a trace of pressure in the tanks again, and the ship was braking to the new position. Victor swung Iceman's leased ship around and pointed the stern at the rapidly approaching disk of hellish radiation, then typed a command on his console. The ship shuddered and lurched forward. He checked the display. A dense mass of frigid liquid and gas boiled behind the ship, the globs subdividing more with each second, obscuring his view of the approaching ramjet.

"I gotta get some heat into that stuff to vaporize it, and ionize what I can. Maybe the ionization doesn't need to be complete. The density is certainly high enough for a few minutes that collisions will make a cascade ionization, especially when it gets slammed by that scoop and sucked in. Computer, reactors to full emergency power. Set reaction mass flow to maximize output of ions at one hundred electron volts. We're going to light that cloud up."

"Command accepted. Reactors at twenty gigawatts. Full thrust in two seconds, one, fire. Unintelligible command ignored." An alarm sounded a second later. "External gamma radiation is exceeding shielding limits. Cabin radiation dangerously high."

Victor strained against the acceleration as the ship blasted away from the cloud of boiling fusion fuel. "All I can say is that this damned well better work. How far ahead would that thing be able to detect this release? A fraction of a second in ship-time, I'll bet. Could it switch off the ramscoop in time? What am I

babbling about? Of *course* this is going to work. Why else would I be here? I can't possibly miss. God, if you're listening, if you let me into Heaven, there better be a thousand virgins waiting for me. And if you send me to Hell, Satan's going to wish he never got whoever launched this thing to worship him. 'Tis a far, far better thing I do...."

* * * *

The recording ended. "That's when we lost his transmission in the radio noise." Iceman pressed a button on the bar's holographic projector. "Here's what happened a few seconds later. How long did we calculate the ramscoop would be? Yet relativity has foreshortened it to almost a flat disk. Looks kinda like a cosmic flyswatter, doesn't it? It was probably quick. Most of his pain he had already gotten through.

"Keep watching. You can see I had to switch telescopes in quick succession, since the emissions changed to redshift as it passed. As near as I can tell, he missed the hull by all of about two kilometers. Absolutely a miraculous job of targeting. You can see that the core flared up, but it isn't really obvious that anything useful happened. I'll speed it up. Now, you see the ramscoop field is disintegrating and the core is starting to break up. Looks like there are about three main pieces, six smaller ones, and a cloud of little stuff. The yield was a lot higher than we thought, probably because the big magnets he detected were storing a few gigatons of energy themselves, and they ruptured on the same side as the deuterium blast. The trajectory changed just about a thousandth of a degree, just enough that those big pieces will clear Sol."

Frosty swirled his glass and sniffed Ice's best cognac. "Any idea how the inner system is going to fare? They've still got one hell of a lot of debris heading their way at nearly the speed of light. I imagine a pea-sized piece would hit like a nuke."

Ice nodded. "That's for sure. But very little of it will hit the Sun, and he managed to scatter most of it away from Earth. They could still catch hell, no doubt, but most of them will live. We'll start finding out in less than a week."

Crusty ran his fingers through his long, white hair, then stood up from his barstool to speak. "Now that you good folk have seen and heard his logs, I'd like a little agreement. I say we edit out everything but a few choice quotes, and just release the good stuff to the press. Those recordings just have too much private information. Pretty obvious that the guy was reluctant. Well, I don't mind telling you I felt some guilty relief when Searcher told me I was too far out to take a shot

at that thing. Being fearless is just stupid. Don't confuse that with being brave. And nobody says you have to *like* a choice like that. I'll bet the reason Pete is still out there is he feels guilty he couldn't help."

Rock shook his head. "Man, I'd hate to have had a camera on me. I would have been too ashamed of how I felt to ever admit to a recording if I made one. I guess Victor felt so ashamed of how he felt, he had to tell us. I think that says something about his character.

"I threw the switch to dump my tanks, cursing my bad luck and shaking like a leaf, and had the same problem Victor did. As soon as the liquid deuterium started boiling, the temperature dropped and the pressure went away. The tanks are just not designed for a fast dump. I got preoccupied trying to figure out a solution, when I realized too late I wasn't on the path. And then I just started crying like a baby, half because I had failed, half because I was relieved. What they say about the stink of fear, I tell you, that's *real!* I had to toss that jumpsuit."

"You guys were all hauling deuterium." Searcher swirled his snifter glumly. "All I had was inert reaction mass for the electric propulsion system. I could have gotten in position, but it probably wouldn't have done any good. But all those guys in the inner system were doing it. Why didn't I? I sure was willing enough to talk all of you into doing it."

"I'll tell you why I didn't," Violet confessed. "I told myself it was because I couldn't reach the intercept point in time, but the truth is, I could have. I couldn't have stopped there, and my targeting wouldn't have been precise, but I could have tried to release my payload in time. But I hesitated too long because, in the back of my head, I knew I had the excuse that I might be the only woman left if we failed. Me and my shriveled-up eggs. I'm a great-grandmother, with another generation on the way. I've got two kids, five grandkids about Victor's age, and they've got nine kids between them. I should have been thinking about protecting them."

"You would have had the same problem ... you couldn't have dumped your payload fast enough," Rock pointed out.

"I should have died trying," Violet declared, staring at her glass.

Frosty shook his head. "You guys don't get it, do you? Search, let's say you managed to get right in front of that ship and it ripped through you? What would you accomplish?"

Searcher started to open his mouth, and Frosty held up his hand. “Shut up and hear the truth. You would probably have knocked off some little dingus that was a critical part of the ramscoop generating equipment, and it never would have picked up Victor’s load of deuterium. It would still have hit the Sun, but nobody would be able to see it coming any more, so all later attempts at defense would fail. And Violet, you probably would have given it a burp of gas, just enough to trigger it to shut down. Same result.”

Rock protested, “But I had a decent chance...”

“Shush, fool,” Frosty snarled. “You were on the wrong side of it, with only half a load of deuterium, not a clue how to deploy it, and I’ll bet with a half-assed repair to your telescope. You would probably have been so far off-center the slug of dense gas would have locally overloaded the ramscoop and not been collected. No telling what kind of trouble you would have caused. No, sir, none of you were *supposed* to stop that thing. It wasn’t in the plan.”

Violet raised an eyebrow. “Damn, Frosty, did you just get religion?”

Frosty sighed. “Good question. Ever since Searcher proposed that deuterium release, I’ve been looking at the whole problem of taking in that much gas at once. It just doesn’t make any sense. Yeah, Victor shoved it right down its throat, right where the ramscoop field would be strongest. But it was a hundred tons in maybe a microsecond, not a kilogram in a second like it was designed for. I don’t understand why it didn’t just blast right thru the field. I’ve looked at what the field intensity should have been, how much energy it would store, relativistic effects, and it just don’t add up. It’s like the ramscoop was made of diamond fiber or something. Like maybe there was something else holding it together.

“One thing is for sure, right there at the end, Victor sure did seem convinced that what he was doing was bound to work. How many of the rest of you could say you would have gone out with a feeling like that?”

Frosty surveyed the room. “Thought so. Me neither. We’re all sitting here kicking ourselves because we thought we might have had a chance, but we failed. Just think of all those poor heroes pissing themselves in the inner system, knowing they were doing too little, too late. Imagine being *sure* you were going to fail. Victor was blessed, my friends. *Blessed.”*

Ice raised his glass. “I can’t tell you how many years I hoped to stumble on that damned asteroid core. And don’t any of you deny it ... you did too. He actually had his hands on the prize. Fate stuck a knife in him and gave it a sharp

twist. So what if he bitched and fumed all the way? He didn't have to be dragged kicking and screaming. He did what needed to be done, on his own. He did it brilliantly, in fact, no pun intended. All anyone else really needs to know is that he gave up more than most people ever dream of for the good of the entire human race. Regardless of whether he would approve or not, I raise a toast to a true hero."

* * * *

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