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Jack McDevitt: Promises to Keep

illo for Jack Faust

What is the spirit that moves us to explore the unknown? Is it strong enough to keep us interested in the space program, especially when what we see through the TV camera may not be as dramatic as what we can see at the movies? "Promises to Keep," set in the same universe as "Melville on Iapetus" (November 1983), takes a thoughtful look at these questions.

extracted from her prop bag. Somewhere here, locked away among insurance papers and the deed to the house, is the tape of the original telecast, but I've never played it. In fact, I've seen it only once, on the night of the transmission. But I know the words, Cathie's words, read by Victor Landolfi in his rich baritone, blending the timeless values of the season with the spectral snows of another world. They appear in schoolbooks now, and on marble.

Inside the card, in large, block, defiant letters, Iseminger had printed "SEPTEMBER!" It is a word with which he hopes to conquer a world. Sometimes, at night, when the snow sparkles under the hard cold stars (the way it did on Callisto), I think about him, and his quest. And I am very afraid.

I can almost see Cathie's footprints on the frozen surface. It was a good time, and I wish there were a way to step into the picture, to

I received a Christmas card last week from Ed Iseminger. The illustration was a rendering of the celebrated Christmas Eve telecast from Callisto: a lander stands serenely on a rubble-strewn plain, spilling warm yellow light through its windows. Needle-point peaks rise behind it, and the rim of a crater curves across the foreground. An enormous belted crescent dominates the sky.

In one window, someone has hung a wreath.

It is a moment preserved, a tableau literally created by Cathie Perth

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toast the holidays once more with Victor Landolfi, to hold onto Cathie Perth (and not let go!), and somehow to save us all. It was the end of innocence, a final meeting place for old friends.

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We made the Christmas tape over a period of about five days. Cathie took literally hours of visuals, but Callisto is a place of rock and ice and deadening sameness: there is little to soften the effect of cosmic- indifference. Which is why all those shots of towering peaks and tumbled boulders were taken at long range, and in half-light. Things not quite seen, she said, are always charming.

Her biggest problem had been persuading Landolfi to do the voice-over. Victor was tall, lean, ascetic. He was equipped with laser eyes and a huge black mustache. His world was built solely of subatomic particles, and driven by electromagnetic. Those who did not share his passions excited his contempt; which meant that he understood the utility of Cathie's public relations function at the same time that he deplored its necessity. To participate was to compromise one's integrity. His sense of delicacy, however, prevented his expressing that view to Cathie: he begged off rather on the 'press of time, winked apologetically, and straightened his mustache. "Sawyer will read it for you," he said, waving me impatiently into the conversation.

Cathie sneered, and stared irritably out a window (it was the one with the wreath) at Jupiter, heavy in the fragile sky. We knew, by then, that it had a definable surface, that the big planet was a world sea of liquid hydrogen, wrapped around a rocky core. "It must be frustrating," she said, "to know you'll never see it." Her tone was casual, almost frivolous, but Landolfi was not easily baited.

"Do you really think," he asked, with the patience of the superior being (Landolfi had no illusions about his capabilities), "that these little pieces of theater will make any difference? Yes, Catherine, of course it's frustrating. Especially when one realizes that we have the technology to put vehicles down there...."

"And scoop out some hydrogen," Cathie added.

He shrugged. "It may happen someday."

"Victor, it never will if we don't sell the Program. This is the last shot. These ships are old, and nobody's going to build any new ones. Unless things change radically at home."

Landolfi closed his eyes. I knew what he was thinking: Cathie Perth was an outsider, an ex-television journalist who had probably slept her way on board. She played bridge, knew the film library by heart, read John Donne (for style, she said), and showed no interest

whatever in the scientific accomplishments of the mission. We'd made far-reaching discoveries in the fields of plate tectonics, planetary climatology, and a dozen other disciplines. We'd narrowed the creation date down inside a range of a few million years. And we finally understood how it had happened! But Cathie's televised reports had de-emphasized the implications, and virtually ignored the mechanics of such things. Instead, while a global audience watched, Marjorie Aubuchon peered inspirationally out of a cargo lock at Ganymede (much in the fashion that Cortez must have looked at the Pacific on that first bright morning), her shoulder flag patch resplendent in the sunlight. And while the camera moved in for a close-up (her features were illuminated by a lamp Cathie had placed for the occasion in her helmet), Herman Selma solemnly intoned Cathie's comments on breaking the umbilical.

That was her style: brooding alien vistas reduced to human terms. In one of her best-known sequences, there had been no narration whatever: two space-suited figures, obviously male and female, stood together in the shadow of the monumental Cadmus Ice Fracture on Europa, beneath three moons.

"Cathie," Landolfi said, with his eyes still shut, "I don't wish to be offensive: but do you really care? For the Program, that is? When we get home, you will write a book, you will be famous, you will be at the top of your profession. Are you really concerned with where the Program will be in twenty years?"

It was a fair question: Cathie'd made no secret of her hopes for a Pulitzer. And she stood to get it, no matter what happened after this mission. Moreover, although she'd tried to conceal her opinions, we'd been together a long time by then, almost three years, and we could hardly misunderstand the dark view she took of people who voluntarily imprisoned themselves for substantial portions of their lives to go 'rock-collecting.'

"No," she said. "I'm not, because there won't be a Program in twenty years." She looked around at each of us, weighing the effect of her words. Iseminger, a blond giant with a reddish beard, allowed a smile of lazy tolerance to soften his granite features. "We're in the same class as the pyramids," she continued, in a tone that was unemotional and irritatingly condescending. "We're a hell of an expensive operation, and for what? Do you think the taxpayers give a good goddam about the weather on Jupiter? There's nothing out here but gas and boulders. Playthings for eggheads!"

I sat and thought about it while she smiled sweetly, and Victor smoldered. I had not heard the solar system ever before described in quite those terms; I'd heard people call it *vast*, *awesome*, *magnificent*, *serene*, stuff like that. But never *boring*.

In the end, Landolfi read his lines. He did it, he said, to end the distraction.

Cathie was clearly pleased with the result. She spent three days editing the tapes, commenting frequently (and with good-natured malice) on the *resonance* and *tonal qualities* of the voice-over. She finished on the morning of the 24th (ship time, of course), and transmitted the report to *Greenswallow* for relay to Houston. "It'll make the evening newscasts," she said with satisfaction.

It was our third Christmas out. Except for a couple of experiments--in-progress, we were finished on Callisto and, in fact, in the Jovian system. Everybody was feeling good about that, and we passed an uneventful afternoon, playing bridge and talking about what we'd do when we got back. (Cathie had described a deserted beach near Tillamook, Oregon where she'd grown up. "It would be nice to walk on it again, under a *blue* sky," she said. Landolfi had startled everyone at that point: he looked up from the computer console at which he'd been working, and his eyes grew very distant. "I think," he said, "when the time comes, I would like very much to walk with you.... ")

For the most part, Victor kept busy that afternoon with his hobby: he was designing a fusion engine that would be capable, he thought, of carrying ships to Jupiter within a few weeks, and, possibly, would eventually open the stars to direct exploration. But I watched him: he turned away periodically from the display screen, to glance at Cathie. Yes (I thought), she would indeed be lovely against the rocks and the spume, her black hair free in the wind.

Just before dinner, we watched the transmission of Cathie's tape. It was very strong, and when it was finished we sat silently looking at one another. By then, Herman Selma and Esther Crowley had joined us. (Although two landers were down, Cathie had been careful to give the impression in her report that there had only been one. When Basked why, she said, "In a place like this, one lander is the Spirit of Man. Two landers is just two landers.") We toasted Victor, and we toasted Cathie.

Almost everyone, it turned out, had brought down a bottle for the occasion. We sang and laughed, and somebody turned up the music. We'd long since discovered the effect of low-gravity dancing in cramped quarters, and I guess we made the most of it.

Marj Aubuchon, overhead in the linkup, called to wish us season's greetings, and called again later to tell us that the telecast, according to Houston, had been "well-received." That was government talk, of

course, and it meant only that no one in authority could find anything to object to. Actually, somebody high up had considerable confidence in her: in order to promote the illusion of spontaneity, the tapes were being broadcast directly to the commercial networks.

Cathie, who by then had had a little too much to drink, gloated openly. "It's the best we've done," she said. "Nobody'll ever do it better."

We shared that sentiment. Landolfi raised his glass, winked at Cathie, and drained it.

We had to cut the evening short, because a lander's life-support system isn't designed to handle six people. (For that matter, neither was an Athena's.) But before we broke it up, Cathie surprised us all by proposing a final toast: "To Frank Steinitz," she said quietly. "And his crew."

Steinitz: there was a name, as they say, to conjure with. He had led the first deep-space mission, five Athenas to Saturn, fifteen years before. It had been the first attempt to capture the public imagination for a dying program: an investigation of a peculiar object filmed by a Voyager on Iapetus. But nothing much had come of it, and the mission had taken almost seven years. Steinitz and his people had begun as heroes, but in the end they'd become symbols of futility. The press had portrayed them mercilessly as personifications of outworn virtues. Someone had compared them to the Japanese soldiers found as late as the 1970s on Pacific islands, still defending a world long since vanished.

The Steinitz group bore permanent reminders of their folly: prolonged weightlessness had loosened ligaments and tendons, and weakened muscles. Several had developed heart problems, and all suffered from assorted neuroses. As one syndicated columnist had observed, they walked like a bunch of retired big-league catchers.

"That's a good way to end the evening," said Selma, beaming benevolently.

Landolfi looked puzzled. "Cathie," he rumbled, "you've questioned Steinitz's good sense any number of times. And ours, by the way. Isn't it a little hypocritical to drink to him?"

"I'm not impressed by his intelligence," she said, ignoring the obvious Parallel. "But he and his people went all the way out to Saturn in those damned things--" she waved in the general direction of the three Athenas orbiting overhead in linkup "--hanging onto baling wire and wing struts. I have to admire that."

"Hell," I said, feeling the effects a little myself, "we've got the same ships he had."

"Yes, you do," said Cathie pointedly.

I had trouble sleeping that night. For a long time, I lay listening to Landolfi's soft snore, and the electronic fidgeting of the operations computer. Cathie was bundled inside a gray blanket, barely visible in her padded chair.

She was right, of course. I knew that rubber boots would never again cross that white landscape, which had waited a billion years for us. The peaks glowed in the reflection of the giant planet fragile crystalline beauty, on a world of terrifying stillness. Except for an occasional incoming rock, nothing more would ever happen here. Callisto's entire history was encapsulated within twelve days.

Pity there hadn't been something to those early notions about Venusian rain forests and canals on Mars. The Program might have had easier going had Burroughs or Bradbury been right. My God: how many grim surprises had disrupted fictional voyages to Mars? But the truth had been far worse than anything Wells or the others had ever committed to paper: the red planet was so dull that we hadn't even gone there.

Instead, we'd lumbered out to the giants. In ships that drained our lives and our health.

We could have done better; our ships could have *been* better. The computer beside which Landolfi slept contained his design for the fusion engine. And at JPL, an Army team had demonstrated that artificial gravity was possible: a *real* gravity field, not the pathetic fraction created on the Athenas by spinning the inner hull. There were other possibilities as well: infrared ranging could be adapted to replace our elderly scanning system; new alloys were under development. But it would cost billions to build a second-generation vehicle. And unless there were an incentive unless Cathie Perth carried off a miracle, it would not happen.

Immediately overhead, a bright new star glittered, moving visibly (though slowly) from west to east. That was the linkup, three ships connected nose to nose by umbilicals and a magnetic docking system. Like the Saturn mission, we were a multiple vehicle operation. We were more flexible that way, and we had a safety factor: two ships would be adequate to get the nine-man mission home. Conditions might become a little stuffy, but we'd make it.

I watched it drift through the icy starfield.

Cathie had pulled the plug on the Christmas lights. But it struck me that Callisto would only have one Christmas, so I put them back on.

Victor was on board *Tolstoi* when we lost it. No one ever really knew precisely what happened. We'd begun our long fall toward Jupiter, gaining the acceleration which we'd need on the flight home. Cathie, Herman Selma (the mission commander), and I were riding *Greenswallow*. The ships had separated, and would not rejoin until we'd rounded Jupiter, and settled into our course for home. (The Athenas are really individually-powered modular units which travel, except when maneuvering as a single vessel. They're connected bow-to-bow by electromagnets. Coils of segmented tubing, called 'umbilicals' even though the term does not accurately describe their function, provide ready access among the forward areas-of the ships. As many as six Athenas can be linked in this fashion, although only five have ever been built. The resulting structure would resemble a wheel.)

Between Callisto and Ganymede, we hit something: a drifting cloud of fine particles, a belt of granular material stretched so thin it never appeared on the LGD, before or after. Cathie later called it a cosmic sandbar; Iseminger thought it an unformed moon. It didn't matter: whatever it was, the mission plowed into it at almost 50,000 kilometers per hour. Alarms clattered, and red lamps blinked on.

In those first moments, I thought the ship was going to come apart. Herman was thrown across a bank of consoles and through an open hatch. I couldn't see Cathie, but a quick burst of profanity came from her direction. Things were being ripped off the hull. Deep within her walls, *Greenswallow* sighed. The lights dipped, came back, and went out. Emergency lamps cut in, and something big glanced off the side of the ship. More alarms howled, and I waited for the clamor of the throaty klaxon which would warn of a holing, and which consequently would be the last sound I could expect to hear in this life.

The sudden deceleration snapped my head back on the pads. (The collision had occurred at the worst possible time: *Greenswallow* was caught in the middle of an attitude alignment. We were flying backwards.)

The exterior monitors were blank: that meant the cameras were gone.

Cathie's voice: "Rob, you okay?"

"Yes."

"Can you see Herman?"

My angle was bad, and I was pinned in my chair. "No. He's back in cargo."

"Is there any way you can close the hatch?"

"Herman's in there," I protested, thinking she'd misunderstood.

"If something tears a hole out back there, we're all going to go. Keeping the door open won't help him."

I hesitated. Sealing up seemed to be the wrong thing to do. (Of course the fact that the hatch had been open in the first place constituted a safety violation.) "It's on your console," I told her. "Hit the numerics on your upper right."

"Which one?"

"Hit them all." She was seated at the status board, and I could see a row of red lights: several other hatches were open. They should have closed automatically when the first alarms sounded.

We got hit again, this time in front. *Greenswallow* trembled, and loose pieces of metal rattled around inside the walls like broken teeth.

"Rob," she said. "I don't think it's working."

The baleful lights still glowed across the top of her board.

It lasted about three minutes.

When it was over, we hurried back to look at Herman. We were no longer rotating, and gravity had consequently dropped to zero. Selma gasping, pale, his skin damp, was floating grotesquely over a pallet of ore-sample cannisters. We got him to a couch and applied compresses. His eyes rolled shut, opened, closed again. "Inside," he said, gently fingering an area just off his sternum. "I think I've been chewed up a little." He raised his head slightly. "What kind of shape are we in?"

I left Cathie with him. Then I restored power, put on a suit and went outside.

The hull was a disaster: antennas were down, housings scored, lenses shattered. The lander was gone, ripped from its web. The port cargo area had buckled, and an auxiliary hatch was sprung. On the bow, the magnetic dock was hammered into slag. Travel between the ships was going to be a little tougher.

Greenswallow looked as if she had been sandblasted. I scraped particles out of her jet nozzles, replaced cable, and bolted down mounts. I caught a glimpse of Amity's lights, sliding diagonally across the sky. As were the constellations.

"Cathie," I said. "I see Mac. But I think we're tumbling."

"Okay."

Iseminger was also on board Amity. And, fortunately, Marj Aubuchon, our surgeon. Herman's voice broke in, thick with effort. "Rob, we got no radio contact with anyone. Any sign of Victor?"

Ganymede was close enough that its craters lay exposed in harsh solar light; Halfway round the sky, the Pleiades glittered. *Tolstoi's* green and red running lights should have been visible among, or near, the six silver stars. But the sky was empty. I stood a long time and looked, wondering how many other navigators on other oceans had sought lost friends in that constellation. What had they called it in antiquity? The rainy Pleiades.... "Only *Amity*," I said.

I tore out some cable and lobbed it in the general direction of Ganymede. Jupiter's enormous arc was pushing above the maintenance pods, spraying October light across the wreckage. I improvised a couple of antennas, replaced some black boxes, and then decided to correct the tumble, if I could.

"Try it now," I said.

Cathie acknowledged.

Two of the jets were useless. I went inside for spares, and replaced the faulty units. While I was finishing up, Cathie came back on. "Rob," she said, "radio's working, more or less. We have no long-range transmit, though."

"Okay. I'm not going to try to do anything about that right now."

"Are you almost finished?"

"Why?"

"Something occurred to me. Maybe the cloud, whatever that damned thing was that we passed through. maybe it's U-shaped."

"Thanks," I said. "I needed something to worry about."

"Maybe you should come back inside."

"Soon as I can. How's the patient doing?"

"Out," she said. "He was a little delirious when he was talking to you. Anyhow, I'm worried: I think something's broken internally. He never got his color back, and he's beginning to bring up blood. Rob, we need Marj."

"You hear anything from *Amity* yet?"

"Just a carrier wave." She did not mention *Tolstoi*. "How bad is it out there?"

From where I was tethered, about halfway back on the buckled beam I could see a crack in the main plates that appeared to run the length of the port tube. I climbed out onto the exhaust assembly and pointed my flashlight into the combustion chamber. Something glittered where the reflection should have been subdued. I got in and looked: silicon. Sand, and steel, had fused in the white heat of passage. The exhaust was blocked.

Cathie came back on. "What about it, Rob?" she asked. "Any serious problems?"

"Cathie," I said, "*Greenswallow*'s going to Pluto."

Herman thought I was Landolfi: he kept assuring me that everything was going to be okay. His pulse was weak and rapid, and he alternated between sweating and shivering. Cathie had got a blanket under him and buckled him down so he wouldn't hurt himself. She bunched some pillows under his feet, and held a damp compress to his head.

"That's not going to help much. Raising his legs, I mean."

She looked at me, momentarily puzzled. "Oh," she said. "Not enough gravity."

I nodded.

"Oh, Rob." Her eyes swept the cases and cannisters, all neatly tagged silicates from Pasiphae, sulfur from Himalia, assorted carbon compounds from Callisto. We had evidence now that Io had formed elsewhere in the solar system, and been well along in middle age when it was captured. We'd all but eliminated the possibility that life existed in Jupiter's atmosphere. We understood why rings formed around gas giants, and we had a new clue to the cause of terrestrial ice ages. And I could see that Cathie was thinking about trading lives to satisfy the curiosity of a few academics. "We don't belong out here," she said, softly. "Not in these primitive shells."

I said nothing.

"I got a question for you," she continued. "We're not going to find *Tolstoj*, right?"

"Is that your question?"

"No. I wish it were. But the LGD can't see them. That means they're just not there." Her eyes filled with tears, but she shook her head impatiently. "And we can't steer this thing. Can *Amity* carry six people?"

"It might have to."

"That wasn't what I asked."

"Food and water would be tight. Especially since we're running out of time, and wouldn't be able to transfer much over. If any. So we'd all be a little thinner when we got back. But yes, I think we could survive."

We stared at one another, and then she turned away. I became conscious of the ship: the throb of power deep in her bulkheads (power now permanently bridled by conditions in the combustion chambers), the soft amber glow of the navigation lamps in the cockpit.

McGuire's nasal voice, from *Amity*, broke the uneasy silence. "Herman, you okay?"

Cathie looked at me, and I nodded. "Mac," she said, "this is Perth. Herman's hurt. We need Marj."

"Okay," he said. "How bad?"

"We don't know. Internal injuries, looks like. He appears to be in shock."

We heard him talking to someone else. Then he came back. "We're on our way. I'll put Marj on in a minute; maybe she can help from here. How's the ship?"

"Not good: the dock's gone, and the engine might as well be."

He asked me to be specific. "If we try a burn, the rear end'll fall off."

McGuire delivered a soft, venomous epithet. And then: "Do what you can for Herman. Marj'll be right here."

Cathie was looking at me strangely. "He's worried," she said.

"Yes. He's in charge now.... "

"Rob, you say you *think* we'll be okay. What's the problem?"

"We might," I said, "run a little short of air."

Greenswallow continued her plunge toward Jupiter at a steadily increasing rate and a sharp angle of approach: we would pass within about 60,000 kilometers, and then drop completely out of the plane of the solar system. We appeared to be heading in the general direction of the Southern Cross.

Cathie worked on Herman. His breathing steadied and he slipped in and out of his delirium. We sat beside him, not talking much. After awhile, Cathie asked, "What happens now?"

"In a few hours," I said, "we'll reach our insertion point. By then, we have to be ready to change course." She frowned, and I shrugged. "That's it," I said. "It's all the time we have to get over to Amity. If we don't make the insertion on time, Amity won't have the fuel to throw a U-turn later."

"Rob, how are we going to get Herman over there?"

That was an uncomfortable question. The prospect of jamming him down into a suit was less than appealing, but there was no other way. "We'll just have to float him over," I said. "Marj won't like it much."

"Neither will Herman."

"You wanted a little high drama," I said, unnecessarily. "The next show should be a barnburner."

Her mouth tightened, and she turned away from me.

One of the TV cameras had picked up the approach of Amity. Some of her lights were out, and she too looked a bit bent. The Athena is a homely vessel in the best of times, whale-shaped and snub-nosed, with a midship flare that suggests middle-age spread. But I was glad to see her.

Cathie snuffled at the monitor, and blew her nose. "Your Program's dead, Rob." Her eyes blazed momentarily, like a dying fire into which one has flung a few drops of water. "We're leaving three of our people out here; and if you're right about the air, we'll get home with a shipload of detectives, or worse. Won't that look good on the six o'clock news?" She gazed vacantly at *Amity's* image. "I'd hoped," she said, "that if things went well, Victor would have lived to see a ship carry his fusion engine. And maybe his name, as well. Ain't gonna happen, though. Not ever."

I had not allowed myself to think about the oxygen problem we were going to face. The Athenas recycle their air supply: the converters in a single ship can maintain a crew of three, or even four, indefinitely. But six?

I was not looking forward to the ride home.

A few minutes later, a tiny figure detached itself from the shadow of the Athena and started across: Marj Aubuchon on a maintenance sled. McGuire's voice erupted from the ship's speakers. "Rob, we've taken a long look at your engines, and we agree with your assessment. The damage complicates things." Mac had a talent for understatement. It derived, not from a sophisticated sense of humor, but from a genuine conviction of his own inferiority. He preferred to solve problems by denying their existence. He was the only one of the original nine who could have been accurately described as passive: other people's opinions carried great weight with him. His prime value to the mission was his grasp of Athena systems. But he'd been a reluctant crewman, a man who periodically reminded us that he wanted only to retire to his farm in Indiana. He wouldn't have been along at all except that one guy died and somebody else came down with an unexpected (but thoroughly earned) disease. Now, with Selma incapacitated and Landolfi gone, McGuire was in command. It must have been disconcerting for him. "We've got

about five hours," he continued. "Don't let Marj get involved in major surgery. She's already been complaining to me that it doesn't sound as if it'll be possible to move him. We have no alternative. She knows that, but you know how she is. Okay?"

One of the monitors had picked him up. He looked ruffled, and nervous. Not an attitude to elicit confidence. "Mac," said Cathie, "we may kill him trying to get him over there."

"You'll kill him if you don't," he snapped. "Get your personal stuff together, and bring it with you. You won't be going back."

"What about trying to transfer some food?" I asked.

"We can't dock," he said. "And there isn't time to float it across."

"Mac," said Cathie, "is Amity going to be able to support six people?"

I listened to McGuire breathing. He turned away to issue some trivial instructions to Iseminger. When he came back he said, simply and tonelessly, "Probably not." And then, cold-bloodedly (I thought "How's Herman doing?")

Maybe it was my imagination. Certainly there was nothing malicious in his tone, but Cathie caught it too, and turned sharply round. "McGuire is a son-of-a-bitch," she hissed. I don't know whether Mac heard it.

Marjorie Aubuchon was short, blond, and irritable. When I relayed McGuire's concerns about time, she said, "God knows, that's all I've heard for the last half-hour." She observed that McGuire was a jerk, and bent over Herman. The blood was pink and frothy on his lips. After a few minutes she said, to no one in particular, "Probably a punctured lung." She waved Cathie over, and began filling a hypo; I went for a walk.

At sea, there's a long tradition of sentiment between mariners and their ships. Enlisted men identify with them, engineers baby them, and captains go down with them. No similar attitude has developed in space Right. We've never had an Endeavour, or a Golden Hind. Always, off Earth, it has been the mission, rather than the ship. Friendship VII and Apollo XI were far more than vehicles. I'm not sure why that is maybe it reflects Cathie's view that travel between the worlds is still in its Kon Tiki phase: the voyage itself is of such epic proportions that everything else is overwhelmed.

But I'd lived almost three years on *Greenswallow*. It was a long time

to be confined to her narrow spaces. Nevertheless, she was shield and provider against that enormous abyss, and I discovered (while standing in the doorway of my cabin) a previously unfelt affection for her.

A few clothes were scattered round the room, a shirt was hung over my terminal, and two pictures were mounted on the plastic wall. One was a Casnavan print of a covered bridge in New Hampshire- the other was a telecopy of an editorial cartoon that had appeared in the Washington Post. The biggest human problem we had, of course, was sheer boredom. And Cathie had tried to capture the dimensions of the difficulty by showing crewmembers filling the long days on the outbound journey with bridge. ("It would be nice," Cathie's narrator had said at one point, "if we could take everybody out to an Italian restaurant now and then.") The Post cartoon had appeared several days later: it depicted four astronauts holding cards. (We could recognize Selma, Landolfi, and Marj. The fourth, whose back was turned, was exceedingly feminine, and appeared to be Esther Crowley.) An enormous bloodshot eye is looking in through one window; a tentacle and a UFO are visible through another.

The "Selma" character, his glasses characteristically down on his nose is examining his hand, and delivering the caption: Dummy looks out the window and checks the alien.

I packed the New Hampshire bridge, and left the cartoon. If someone comes by, in 20 million years or so, he might need a laugh. I went up to the cockpit with my bag.

McGuire checked with me to see how we were progressing. "Fine," I told him. I was still sitting there four hours later when Cathie appeared behind me.

"Rob," she said, "we're ready to move him." She smiled wearily. "Marj says he should be okay if we can get him over there without breaking anything else."

We cut the spin on the inner module to about point-oh-five. Then we lifted Herman onto a stretcher, and carried him carefully down to the airlock.

Cathie stared straight ahead, saying nothing. Her fine-boned cheeks were pale, and her eyes seemed focused far away. These, I thought, were her first moments to herself, unhampered by other duties. The impact of events was taking hold.

Marj called McGuire and told him we were starting over, and that she would need a sizable pair of shears when we got there to cut

Herman's suit open. "Please have them ready," she said. "We may be in a hurry."

I had laid out his suit earlier: we pulled it up over his legs. That was easy, but the rest of it was slow, frustrating work. "We need a special kind of unit for this," Marj said. "Probably a large bag, without arms or legs. If we're ever dumb enough to do anything like this again, I'll recommend it."

McGuire urged us to hurry.

Once or twice, Cathie's eyes met mine. Something passed between us but I was too distracted to define it. Then we were securing his helmet, and adjusting the oxygen mixture.

"I think we're okay," Marj observed, her hand pressed against Selma's chest. "Let's get him over there.... "

I opened the inner airlock, and pulled my own helmet into place. Then we guided Herman in, and secured him to *Greenswallow's* maintenance sled. (The sled was little more than a toolshed with jet nozzles.) I recovered my bag and stowed it on board.

"I'd better get my stuff," Cathie said. "You can get Herman over all right?"

"Of course," said Marj. "*Amity's* sled is secured outside the lock. Use that."

She hesitated in the open hatchway, raised her left hand, and spread the fingers wide. Her eyes grew very round, and she formed two syllables that I was desperately slow to understand: in fact, I don't think I translated the gesture, the word, until we were halfway across to *Amity*, and the lock was irrevocably closed behind us.

"Good-bye."

Cathie's green eyes sparkled with barely controlled emotion across a dozen or so monitors. Her black hair, which had been tied back earlier, now framed her angular features and fell to her shoulders. It was precisely in that partial state of disarray that tends to be most appealing. She looked as if she'd been crying, but her jaw was set, and she stood erect. Beneath the gray tunic, her breast rose and fell.

"What the hell are you doing, Perth?" demanded McGuire. He looked tired, almost ill. He'd gained weight since we'd left the Cape, his hair had whitened and retreated, his flesh had grown blotchy,

and he'd developed jowls. The contrast with his dapper image in the mission photo was sobering. "Get moving!" he said, striving to keep his voice from rising. "We're not going to make our burn!"

"I'm staying where I am," she said. "I couldn't make it over there now anyway. I wouldn't even have time to put on the suit."

McGuire's puffy eyelids slid slowly closed. "Why?" he asked.

She looked out of the cluster of screens, a segmented Cathie, a group Cathie. "Your ship won't support six people, Mac."

"Dammit!" His voice was a harsh rasp. "It would have just meant we'd cut down activity. Sleep a lot." He waved a hand in front of his eyes, as though his vision were blurred. "Cathie, we've lost you. There's no way we can get you back!"

"I know."

No one said anything. Iseminger stared at her.

"Is Herman okay?" she asked.

"Marj is still working on him," I said. "She thinks we got him across okay."

"Good."

A series of yellow lamps blinked on across the pilot's console. We had two minutes. "Damn," I said, suddenly aware of another danger: Amity was rotating, turning toward its new course. Would Greenswallow even survive the ignition? I looked at McGuire, who understood. His fingers flicked over press pads, and rows of numbers flashed across the navigation monitor. I could see muscles working in Cathie's jaws; she looked down at Mac's station as though she could read the result.

"It's all right," he said. "She'll be clear."

"Cathie..." Iseminger's voice was almost strangled. "If I'd known you intended anything like this..."

"I know, Ed." Her tone was gentle, a lover's voice, perhaps. Her eyes were wet: she smiled anyway, full face, up close.

Deep in the systems, pumps began to whine. "I wish," said

Iseminger absolutely without expression, "that we could do something."

She turned her back, strode with unbearable grace across the command center, away from us, and passed into the shadowy interior of the cockpit. Another camera picked her up there, and we got a profile: she was achingly lovely in the soft glow of the navigation lamps.

"There is something... you can do," she said. "Build Landolfi's engine. And come back for me."

For a brief moment, I thought Mac was going to abort the burn. But he sat frozen, fists clenched, and did the right thing, which is to say, nothing. It struck me that McGuire was incapable of intervening.

And I knew also that the woman in the cockpit was terrified of what she had done. It had been a good performance, but she'd utterly failed to conceal the fear that looked out of her eyes. And I realized with shock that she'd acted, not to prolong her life, but to save the Program. I watched her face as *Amity's* engines ignited, and we began to draw away. Like McGuire, she seemed paralyzed, as though the nature of the calamity which she'd embraced was just becoming clear to her. Then it -- she -- was gone.

"What happened to the picture?" snapped Iseminger.

"She turned it off," I said. "I don't think she wants us to see her just now."

He glared at me, and spoke to Mac. "Why the hell," he demanded, "couldn't he have brought her back with him?" His fists were knotted.

"I didn't know," I said. "How could I know?" And I wondered, how could I not?

When the burn ended, the distance between the two ships had opened to only a few kilometers. But it was a gulf, I thought, wider than any across which men had before looked at each other.

Iseminger called her name relentlessly. (We knew she could hear us.) But we got only the carrier wave.

Then her voice crackled across the command center. "Good," she said. "Excellent. Check the recorders: make sure you got everything on tape." Her image was back. She was in full light again, tying up her hair. Her eyes were hooded, and her lips pursed thoughtfully.

"Rob," she continued, "fade it out during Ed's response, when he's calling my name. Probably, you'll want to reduce the background noise at that point. Cut all the business about who's responsible. We want a sacrifice, not an oversight."

"My God, Cathie," I said. I stared at her, trying to understand. "What have you done?"

She took a deep breath. "I meant what I said. I have enough food to get by here for eight years or so. More if I stretch it. And plenty of fresh air. Well, relatively fresh. I'm better off than any of us would be if six people were trying to survive on Amity."

"Cathie!" howled McGuire. He sounded in physical agony. "Cathie, we didn't know for sure about life support. The converters might have kept up. There might have been enough air! It was just an estimate!"

"This is a hell of a time to tell me," she said. "Well, it doesn't matter now. Listen, I'll be fine. I've got books to read, and maybe one to write. My long-range communications are kaput, Rob knows that, so you'll have to come back for the book, too." She smiled. "You'll like it, Mac." The

command center got very still "And on nights when things really get boring, I can play bridge with the computer."

McGuire shook his head. "You're sure you'll be all right? You seemed pretty upset a few minutes ago."

She looked at me and winked.

"The first Cathie was staged, Mac," I said.

"I give up," McGuire sighed. "Why?" He swiveled round to face the image on his screen. "Why would you do that?"

"That young woman," she replied, "was committing an act of uncommon valor, as they say in the Marines. And she had to be vulnerable." And compellingly lovely, I thought. In those last moments, I was realizing what it might mean to love Cathie Perth. "This Cathie," she grinned, "is doing the only sensible thing. And taking a sabbatical as well. Do what you can to get the ship built. I'll be waiting. Come if you can." She paused. "Somebody should suggest they name it after Victor."

This is the fifth Christmas since that one on Callisto. It's a long time

by any human measure. We drifted out of radio contact during the first week. There was some talk of broadcasting instructions to her for repairing her long-range transmission equipment. But she'd have to go outside to do it, so the idea was prudently tabled.

She was right about that tape. In my lifetime, I've never seen people so single-mindedly aroused. It created a global surge of sympathy and demands for action that seem to grow in intensity with each passing year. Funded partially by contributions and technical assistance from abroad, NASA has been pushing the construction of the fusion vessel that Victor Landolfi dreamed of. Iseminger was assigned to help with the computer systems, and he's kept me informed of progress. The most recent public estimates had anticipated a spring launch. But that single word September in Iseminger's card suggests that one more obstacle has been encountered; and it means still another year before we can hope to reach her.

We broadcast to her on a regular basis. I volunteered to help, and I sit sometimes and talk to her for hours. She gets a regular schedule of news, entertainment, sports, whatever. And, if she's listening, she knows that we're coming.

And she also knows that her wish that the fusion ship be named for Victor Landolfi has been disregarded. The rescue vehicle will be the Catherine Perth.

If she's listening: we have no way of knowing. And I worry a lot. Can a human being survive six years of absolute solitude? Iseminger was here for a few days last summer, and he tells me he is confident. "She's a tough lady," he said, any number of times. "Nothing bothers her. She even gave us a little theater at the end."

And that's what scares me: Cathie's theatrical technique. I've thought about it, on the long ride home, and here. I kept a copy of the complete tape of that final conversation, despite McGuire's instructions to the contrary, and I've watched it a few times. It's locked downstairs in a file cabinet now, and I don't look at it anymore. I'm afraid to. There are two Cathie Perths on the recording: the frightened, courageous one who galvanized a global public; and our Cathie, preoccupied with her job, flexible, almost indifferent to her situation. A survivor.

And, God help me, I can't tell which one was staged.

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