

Felina

Abigail was the one who named her Felina. Officially she was an Anthropomorphic Robotic Assistant, or ARA. She was anthropomorphic in that her basic framework resembled a human body – two arms, two legs, a pivoting head with audio and vision sensors, etc. That makes sense when you’re designing an assistant for a spacecraft. Any control, hatch, display, etc. that’s human accessible is also ARA accessible. Not that she looked like a human, of course. Her carbon-fiber and titanium appendages were covered by flexible corrugated dust excluders, her hands terminated in a number of tools and electronic connectors in addition to the requisite three grasping fingers, and her spherical head was covered with sensing and communication devices. It was chiefly her feet that earned her the name “Felina.” Springy, rounded, with a soft non-slip sole and electromagnets for stability in zero gravity. She was remarkably agile for a mechanical device, moving with the speed, grace, and stealth of a cat. Hence the name “Felina.”

Abigail, John, and I were training for the first manned expedition to an earth-like planet when Felina joined our team. We all trained to perform any of the tasks that were planned for this expedition, but of course we each had our specialty. Abigail was a medical doctor, so she was responsible for the life support systems, maintaining our health, and studying plant species on Copernicus-7, the planet we were to visit. (Previous unmanned landings had found no evidence of animal life, but plant life abounded.) Her husband John was a mechanical engineer. He was in charge of all the mechanical systems, propulsion systems, and structural systems. He was also the command pilot. I’m an electrical engineer, so all of the computers, electrical systems, and programming fell within my jurisdiction. Felina was our gofer and our guru. Physically she could handle any task from welding titanium to repairing a microscopic crack in a circuit board. There was no extravehicular activity planned for this mission, but her systems were space rated so in an emergency should could make repairs to the exterior of our craft. Her onboard memory was amazing, and when linked to the spacecraft’s computer she could answer questions that would stump most major universities. This was vital to a mission like ours, as the planet we were to visit was many light-years from Earth so conventional communications would be impossible. Limited communications using quantum entanglement would be possible, of course, but the bandwidth was extremely limited. QE messages were necessarily short and terse, like late 19th century telegrams.

The biggest challenge we expected to face on this mission was returning to earth. Previous manned missions had focused on near-earth trips to moons, asteroids, and small planets. The energy required to exit those bodies was small, because their gravity was much less than earth’s, and no acceleration into hyperspace was required. The downside was that because those bodies were small, and because of their location, they had no life and were of limited interest. Copernicus-7 was very similar to Earth in size and climate. Unmanned probes had found abundant carbon-based plant life, an oxygen rich atmosphere that would support human life, abundant water, and pleasant temperatures. None of these probes had returned, though. Because the gravity on Copernicus-7 was almost identical to that on earth, it would take a tremendous amount of fuel to escape that planet – just as it takes an enormous amount of fuel to escape Earth’s gravity. A spacecraft could leave Earth and be refueled in orbit, but no interplanetary drive yet developed could accelerate the weight of that much fuel into hyperspace.

The strategy for our mission was simple, yet daunting. We would burn up our fuel supply leaving the earth, then switch to a solar/ion drive for the flight to Copernicus-7. Once there, we would take advantage of the planet's atmosphere to make a gliding/parachute/helicopter descent to the surface. After establishing our base camp we would harvest local plant life and distill it to make alcohol fuel for the return flight, while extracting oxygen from the atmosphere to refill our liquid oxygen tanks. We hoped we would also find edible plants and vegetables on the planet. The unmanned probes had discovered many potential food sources, and we carried compact analytical test kits to determine nutritional value and to test for toxicity. We also carried enough dehydrated food substitutes to keep us alive, probably for a long enough period to allow us to distill the fuel needed for a return flight, but this was by no means certain. (If you've ever tasted emergency rations you'll understand why we were hoping to find edible plants.)

Due to the high probability that our protective thermal tiles would degrade during our entry into the atmosphere on Copernicus-7, we would shed those to save weight on the return flight. Upon our return we would orbit the Earth, rendezvous with an Earth-launched spacecraft, and return to our home planet on that ship. The round trip would take roughly 20 earth years, but it would not be nearly so long for us because we would spend much of that time in hibernation during the deep space flight. Felina would be in charge of the ship during those periods.

We spent three years training for this mission. During that time I got to know John and Abigail very well. John initially struck me as being a typical cocksure command pilot. Handsome, confident, and very much used to being in command. He took charge of every situation, barking orders and expecting them to be obeyed immediately. As I got to know him better I discovered he was also thoughtful, with a great sense of humor and an impressive knowledge of engineering and of history. It was clear that he loved Abigail deeply, and although the words he used to give her orders were the same as the words he used with me, his voice made them sound more like a request than an order. As our training progressed and we encountered more simulated malfunctions I learned to appreciate his quick thinking and decisiveness. And on the rare occasions when I thought he was taking the wrong approach to a problem, he was always open to suggestions and not afraid to change his mind if I had a better plan.

Abigail was focused, professional, and extremely sharp on the job. I often got together with John and Abigail after work and she was much more relaxed and fun loving when off duty. She laughed easily, had a bewitching smile, and occasionally poked fun at her husband's authoritative on-duty persona – especially after she had a few drinks. (She was fond of alcohol, but I never saw her drink to excess.) It was clear that she loved John deeply, and we all got along very well together. This was essential, as we would be spending a lot of time together during the mission. None of us had any close relatives or strong ties to anyone not on the mission, which was one of the reasons we were chosen for this flight. Time would essentially stand still for us while hibernating in hyperspace, while the people we left behind would age normally.

It was almost uncanny how helpful Felina was during our training. She seemed to have a sixth sense that told her when and where she would be needed. When I was troubleshooting an electronic component she would hand me the tool I needed almost before I realized I needed it. The fact that she noiselessly crept up behind me to offer the tool added to the mystique. She could also provide instant

answers to any mission-related question we had, whether it was an orbital calculation or an inventory of spare parts. I had done my dissertation on artificial intelligence, and I was awed by her programming.

At long last our training was complete and our mission began. The noise, acceleration, and severe vibration of liftoff gave way to the tranquil silence of space. We took off our bulky pressure suits and donned soft, comfortably clothes for hibernation. We lay back in our seats, gently restrained by a loose netting, while Felina connected the monitors and IV tubes. When she started the IV I felt a gentle warmth flood my body. The worries and apprehensions of our mission deserted me as I drifted into unconsciousness.

I gradually became aware of my surroundings as Felina removed the restraining net. “We are currently orbiting Copernicus-7,” she said. Intellectually I knew that almost eight years had passed since we left Earth, but it seemed like only a few minutes. I sat up and noticed John and Abigail were also sitting up.

“There were no problems during the flight,” Felina said reassuringly. “The only malfunction I noted was that I could not contact earth with the QE transceiver when we came out of hyperspace. We knew it wouldn’t work in hyperspace, but it should have begun functioning when we returned to normal space. I ran all the standard diagnostics, but could not find the problem. Perhaps you will find something I overlooked.”

“I doubt that you overlooked anything,” John said. “Eric can take a look at it when we have time, but our first priority is to make a safe landing on the planet. It’s possible the transceiver is broadcasting but not receiving, so send a message to let them know we arrived safely and are preparing to land.”

I knew that John had made the correct decision, as usual. I sincerely doubted that I could find a problem Felina had overlooked, but it would take me hours or days to run through all the possibilities. Locating our landing zone and making a safe landing was a more pressing concern.

No planetary landing is ever routine. I’ve always been nervous about living in the center of a giant fireball, especially so because until the spacecraft slows down enough to exit the fireball stage the pilot has no control over the craft. You place your trust in the laws of physics, the orbital calculations, and the structural integrity of the ship when you drop out of orbit. To John’s credit he made the controlled portion of our landing appear routine, gently setting the ship down exactly on the site chosen by the unmanned probes.

Our ship’s sensors confirmed what the probe sensors had said. The temperature, radiation, and atmosphere on this planet were safe for humans. As an extra precaution, John, Abigail, and I donned our pressure suits before Felina opened the hatch and stepped outside. Her sensors also showed the environment was safe. John carefully loosened his helmet, and when nothing bad happened he removed it. After observing him for a few minutes Abigail and I removed our helmets. Then we all three stepped outside.

It was like we had stepped into a tropical paradise. There was nothing that I would classify as a “tree,” but tall lacy ferns stretched 40 feet into the air. Below them were a variety of broadleaf plants, bushes, and grasses. The wind rustled softly through the ferns. Other than the wind, there were no sounds. No birds. No insects. No animals of any kind. The leaves were varying shades of green, and some plants had yellow or reddish stems. Abigail speculated that, like plants on Earth, these plants used chlorophyll and sunlight to convert carbon dioxide in the atmosphere into sugar.

In the days and weeks that followed John and Felina built the distillation center while Abigail and I explored the forest, collecting samples and searching for edible plants. We found several roots and a few leaves that were edible. A small bushy plant which grew abundantly in damp areas had a yellow, bulbous root with a taste similar to buttered parsnips. Another plant which grew in interconnected clumps had nodules on its roots which were high in sugar. We used these more for flavoring than as a primary food source, but they also made an excellent mash for John’s distillery. Fortunately they were colonized by a local variant of yeast which began the fermentation process. We had brought dried yeast with us, but we didn’t want to introduce new species of life into the planet’s ecosystem.

As Abigail examined soil samples she discovered that, in addition to the yeast we used for fermentation, there were other yeasts and microbes that broke down dead organic matter into nutrients that enriched the soil. We found no flowering plants, which Abigail theorized was because there were no insects or animals to spread pollen. Periodically we would see different species of plants release clouds of pollen to be spread by the winds. Similarly, we found no nuts or fruit. With no birds or animals to disperse them, the plants had no need to surround their seeds in an attractive package. Curiously, we did find one plant that produced a small purple berry. The berries made an excellent juice, but we couldn’t understand why the plant would produce them. As time passed we realized that once the berries grew to a certain size, the plant stopped supplying it with sap. The berry dried out and shriveled to a lightweight dry crust around the seed while the plant grew a “parachute” similar to the fluffy white dandelion balls on earth. The wind would then distribute these seeds, surrounded by their nutrient-rich husks, to distant locations.

The only part of our mission that did not go according to plan was that I could not fix the QE transceiver. I ran through every test I could think of, Felina and I made a microscopic examination of the circuitry, and I tested our back-up QE transceiver. Every test indicated both units were working properly. I could send messages from one unit to another with no problem, but we never received a message from Earth. John, Abigail, and I discussed this one night over dinner.

“We know that QE communications with Earth are possible,” I said, “because that’s how the unmanned probes sent their reports back.”

“Can we find one of those probes and use its transceiver?” Abigail asked, chewing on a parsnip, which were a particular favorite of hers.

John shook his head no. “The last functioning probe died over six months before we launched,” he said. He grimaced as he swallowed a bit of emergency rations and washed it down with berry juice. We supplemented our diet with the rations to make certain we were getting all necessary nutrients. “The

chances of finding a dead probe on this planet are virtually nil, and even if we found it the transceiver might not work. With no power for years, it's probably badly corroded."

"Besides," I added. "QE communications require paired particles, one at each end. I seriously doubt that anyone is listening for a signal from a probe that died over eight years ago."

"So what would cause our transceivers not to work?" Abigail asked.

"I'm either overlooking something or both transceivers were damaged during the flight," I suggested.

"Or something happened on Earth after we left," John said, "and no one is trying to contact us."

That suggestion stifled the conversation and hung in the air like an oppressive stench that no one wanted to acknowledge. If something terrible had happened on Earth, what would happen to us when we returned? We were processing the fuel we needed to return to Earth orbit, but that was as far as we could go with our ship. We were dependent on others to launch a ship that would take us back to the surface. If there had been a plague, a war, a meteor strike, or some other catastrophe on Earth, we would be condemned to endlessly orbit the planet. Within sight of home, but unable to return.

"Whatever the problem is," John declared, "there's nothing we can do about it. You and Felina have been over the transceivers with a fine-toothed comb and didn't see a problem. We have to assume something happened in flight that rendered the receivers inoperative. Continue to send status reports back to Earth in case they can receive them and we'll find out why we're not receiving replies when we return."

As the months went on, our work became less and less focused on exploration and discovery and more on distilling fuel for our spacecraft. John and Felina worked long hours every day cleaning, mashing, and fermenting the roots, filtering the resultant liquid, and running it through a series of stills to purify the alcohol. Abigail and I spent almost all our time ranging farther and farther from the ship, gathering roots and hauling them back to the distillation center. We found ourselves growing increasingly irritable under the unrelenting workload. Headaches were common, and working long hours under the unfamiliar sun gave a yellow pall to our skin. Abigail in particular suffered from severe headaches, and she was convinced her eyebrows were falling out. John decided it was time for us to take a break.

"We've all been working very hard," he announced. "We need a mental health day. Or two. We're coming up on our six month anniversary on this planet. What do you say we take some time off, relax, and celebrate?"

"We could throw a party," Abigail suggested. "I've got some ideas for new ways to fix the local plants. If I had a day off I could experiment and create a special meal. It might be horrible, but at least it would be a change from eating the same thing day after day."

“Want some entertainment?” I asked. “I built a theremin in college. I think we’ve got everything I need to make a crude one here. If you’ve never tried to play a theremin before, the results can be hilarious.”

“I might be able to rig up a couple instruments to accompany it,” John said. Then he turned to Abigail. “Do you think that moonshine we’re distilling is drinkable?” he asked.

“We’d need to have Felina run a tox screen on it, but it should be,” she answered. “It’s not going to be very tasty, though. It’s basically just 200 proof Everclear.”

“Yes, but we could mix it with some of that berry juice and make a punch” John said. We set a date for the party. Just knowing we were going to do something different lifted our spirits, and in the coming days our mood stayed high as we worked on our preparations for the party.

When “Six Month Night” came Abigail served a salad made from local leafy plants, followed by a “roast” she’d made from a paste made of mashed “parsnips” and another starchy vegetable. It was no roast beef, but it was very good in its own right. She flavored it with herbs she’d discovered locally and baked it until it was firm enough to slice with a knife and chew each bite before you swallowed. Definitely an improvement from our usual fare. For desert she served a “parsnip” pie, sweetened with sugar roots and flavored with purple berries.”

“You sure like those parsnips,” John joked as he served himself a second piece of pie. “And I must admit, they’re very tasty.”

We cleaned up the dinner dishes and mixed up a bowl of punch. Abigail surprised us with a batch of chips which she had made by baking thinly sliced vegetable roots. I set up the theremin and John produced his musical instruments – a set of bongo drums made from two plastic storage containers and a one-stringed “banjo” made from a shovel and a length of wire. We took turns on each of the instruments, laughing and singing as we struggled to produce something that resembled music. It seemed like we were improving as the night wore on, but it might have just been that successive trips to the punchbowl affected our judgement. Felina stood in a corner and watched, not understanding why we were acting irrationally.

I don’t remember what time it was when we finally went to bed, but I awoke the next morning with a terrible headache. I’d had hangovers before, but never like this. In addition to a pounding headache I felt weak, nauseous, and I’d developed a rash over the upper part of my body. I barely made it to the toilet before throwing up. I drank several glasses of water to alleviate the alcohol induced dehydration and sat down at the table. About an hour later John staggered to the toilet, threw up, drank water, and joined me at the table.

“I don’t think we need to make that punch again,” he said.

“The water doesn’t seem to be helping,” I warned.

“Thanks for destroying my hopes.”

We sat in silence for a long time, elbows on the table, cradling our heads in our hands.

“I’d better take some water to Abbey,” John said as he struggled to get up. I continued to stare at the inside of my eyelids. I heard the water running, and I heard John shuffle over to the reclining seats. I must have dozed off, because the next thing I knew John had his hand on my shoulder and was shaking me.

“Eric!” he said. “Wake up! I can’t rouse Abbey!”

I was instantly awake and rushed to the cockpit area. Abigail was stretched out in her seat. John had pulled aside the thin blanket trying to wake her and I could see she was still wearing the clothes she wore the previous night. She looked terrible. Her yellowed skin was peeling in spots. I tried to wake her but with no response.

“Felina!” I shouted.

“Yes?” Felina responded in a quiet voice. As usual she had walked up behind me without my noticing her.

“What’s wrong with Abigail?” I demanded.

Felina began checking her vitals. She gently lifted an eyelid to scan her eye, and took a blood sample. “She’s nonresponsive,” Felina announced.

“We know that! What’s causing her to be nonresponsive?” I was beginning to panic.

Felina continued her examination. “Peeling yellow skin. . .”

“We all have that!” I interrupted. “It’s from working under this weird sun.”

“Not on the palms of her hands,” Felina answered, turning one of Abigail’s hands over so I could see that it was as yellow as the rest of her skin.” She pulled the top of Abigail’s dress down slightly and announced “there is no tan line. This isn’t sun discoloration. Her sclera looks normal, but her eyebrows are thinning. Has she complained of headaches?”

“Yes!” I said. “But we’ve all been having headaches from overwork.”

“Her symptoms indicate a liver problem. Her blood shows an abnormally high level of Vitamin A. That tends to accumulate in the liver. The most probable cause of her non-responsiveness is an overdose of Vitamin A.”

“How could she overdose on that?” John shouted.

“She was very fond of the plant she called parsnips,” Felina answered. “That plant is unusually rich in Vitamin A. The emergency rations you consume to supplement your diet also contain a high dose of Vitamin A.”

“You said it was OK to eat that plant!” John was screaming at Felina, but she continued to speak in a calm, rational voice.

“My analysis of that plant showed it was non-toxic and nutritious. Vitamin A is not classified as a toxin. It is an important part of the human diet and is therefore nutritious. It only becomes toxic when ingested in extraordinarily high doses.”

“How do we treat a Vitamin A overdose?” John asked, struggling to keep his anger under control.

“Stop ingesting more Vitamin A,” Felina answered. “Most patients recover in a matter of a few weeks. Sometimes there is permanent liver damage, but the condition is rarely fatal.”

“Rarely fatal?” John said. “Meaning sometimes it is fatal?”

“Arctic explorers have died as a result of eating the livers of seals or polar bears,” Felina said. “Vitamin A accumulates in those organs. And there have been deaths among people who take megadoses of Vitamin A and refuse to stop.”

“Is there anything we can do to help flush it out of her system?” I asked.

Felina paused for a moment while she searched the ship’s database. “I have no indication of any treatment other than to stop ingesting Vitamin A,” she replied.

Abigail never regained consciousness. Her vital signs continued to deteriorate throughout the day and the following night. John spent the night on the seat next to her, holding her hand, and talking to her in a low voice. She took her last breath the following morning, exhaled, and lay still. Felina confirmed there was no heartbeat and no brain activity.

We buried Abigail in a grassy field not far from our home base. There were no flowers to place on her grave, but she had collected several interesting rocks during our field explorations and we arranged those to form a monument.

John kept pestering Felina with questions about Abigail, trying to understand why she died.

“Why was Abigail the only one who died? We all ate the same food,” he asked.

“Abigail was particularly fond of the plant she called parsnips,” Felina responded. “I didn’t measure her intake but she may have eaten more of them than you did.”

“But I ate more than she did the night she died.”

“Abigail had a smaller body mass. It would not have taken as much to affect her. Also, excess Vitamin A is a chronic condition. It builds up over time. She may have accumulated a higher dosage during the months she ate that plant.”

“Why didn’t the rest of us get sick?”

“You did. You all suffered from headaches, irritability, and skin discoloration. You just attributed these symptoms to overwork, the local sun, and an excess consumption of alcohol.”

“Why didn’t you tell us we were suffering from Vitamin A?”

“I was never asked to make a diagnosis, so I never observed your symptoms. I accepted your explanation. You only asked for a diagnosis when Abigail did not wake up.”

“Was it the alcohol that killed her?”

“She did not exhibit symptoms of alcohol poisoning.”

“Would it have contributed to her condition?”

“I have no information on that.”

“Are alcohol and Vitamin A synergistic?”

“I have no information on that.”

“Vitamin A damages the liver, correct?”

“When consumed in excessive quantities, yes.”

“Alcohol also damages the liver, correct?”

“When consumed in excessive quantities, yes.”

“Would the alcohol she consumed that night have placed a strain on her liver?”

“Her liver would have attempted to remove it from her bloodstream, yes.”

“So did the alcoholic punch contribute to her death?”

“I have no information on that.”

John was inconsolable. He was convinced that his suggestion to drink alcohol at our party had killed his wife. I told him that no one could have foreseen her death. That none of us realized we were all

suffering from excessive Vitamin A. That the punch we drank that night might not have had anything to do with her death. All he could see was that he was in command of the mission, he had suggested we drink the alcohol we were distilling for fuel, and that his wife died twenty-four hours after she drank it.

A few days later I was sitting inside the spacecraft, trying to compose a message to inform Earth of Abigail's death. I had no real expectation that anyone would read it, but I felt that I had to make the attempt. For Abigail's sake. The lights dimmed and flickered for a moment, and then came back on. At least a dozen electronic devices beeped to announce the fact that they had reset. I went outside to see if John had any idea what had caused the power fluctuation. He was lying on the ground, dead. Next to the arc welding unit.

I buried John next to Abigail. Now there were only Felina and myself to continue the mission. Felina's feet weren't designed for the soft, marshy soil where the sugar roots grew, so she managed the distillery while I gathered the roots. She also didn't have the physical strength to mash the roots, carry the heavy mash up a ladder to dump it into a fermentation tank, or to clean the sludge out of the tank once it had finished fermenting and the liquid had been pumped to a still. John had built several fermentation tanks and stills so we could process multiple batches at once, but with just Felina and me we could only run one batch at a time. I would gather the roots, drag them back to our base camp on a sledge, mash the roots, and dump the mash into a fermentation tank. Felina would then add water, control the temperature and monitor the fermentation process. I'd clean out the fermentation tank we'd used on the previous batch and then search for more roots while Felina managed the fermentation and distillation of the new batch. Eventually I had to range so far in search of sugar root plants that I set up a makeshift tent in the field so I could spend a couple days gathering roots before bringing them back. Needless to say, this slowed our progress even more.

As the weeks and months passed I could feel myself sinking into despair. Gathering and processing the roots was hard work, but I could see progress. It might be slow, but our supply of fuel for the return trip was growing. What I couldn't see, was hope for the future. It might take years to accumulate enough fuel to return to earth, and then what? I had received no messages from Earth. Was there anyone left alive on Earth? If some catastrophe had devastated the planet to the point that they couldn't communicate with us, could they launch a craft to rescue us from orbit? It seemed likely that Felina and I would orbit the planet forever. The only positive thing about returning to earth was that I would spend most of the trip unconscious. In hibernation. Unable to feel loneliness.

I realized the lack of human companionship was at the root of my depression. I never before realized how important human contact was. Felina was an excellent assistant, which was all she was designed to be. She was never intended to be a companion. She would answer questions if she knew the answer, and if she didn't she would say "I have no information on that." She would never speculate. She never initiated a conversation. She never had an original thought. I tried talking to her at night, after our day's work was done, but it didn't satisfy my need for interaction. I could ask her a question and she would either answer or say she didn't know. Period. Sometimes I asked her to read to me, as we had an extensive electronic library in the ship's computer. She would comply, but although her programming resulted in her adding the proper inflection, intonation, and pauses to the material she was reading, it was no substitute for human conversation.

I spent hours thinking about how I could adjust her programming to make her more human. My research into artificial intelligence had convinced me that people seldom have truly “original” thoughts. Ideas don’t come to us out of the blue. When we encounter a problem or don’t understand a situation, we compare it to similar situations and generate “what if” hypotheses. What if I modified Felina’s programming to do something similar? Her “brain” was linked to the ship’s computer and her code was well documented. By carefully documenting any changes I made I could easily undo them if I didn’t like the results. By editing her resource list I could add myself as a possible source of information so she could initiate a conversation with a question. And by triggering a random search function during periods of processor inactivity I could stimulate her to “think” about things when she wasn’t busy.

Like any computer program, the first iterations were less than ideal. When I asked Felina a question she would immediately ask me the same question because I was now a resource for information. Many of her original thoughts were nonsensical, such as “Why do humans lay eggs?” More disturbing was the fact that she would sometimes respond to my questions with answers that I suspected were not true. These problems came to a focus when I made a comment about missing John and she asked me why I killed him. When I asked her about this she said she remembered me killing him. I realized she had no way of differentiating her actual memories from things she imagined in response to random searches.

Over time I was able to refine my code to improve its function. I added a flag to her memory entries so she could distinguish imagined thoughts from factual information. I added code that caused her to compare imagined thoughts to known facts, reject the imagined thought if they were contradictory, and estimate the probability of correctness if there was no contradiction. Fortunately her memories were time stamped, so I was able to delete everything that had accumulated during the period when she was generating false memories. With each successive refinement, our conversations became more and more human-like. I can’t begin to describe how wonderful it felt to be able to talk to someone again.

One unexpected result of this new code was that Felina developed a sense of curiosity. The random searches, hypotheses, and testing of hypotheses against known facts allowed her to discover what she didn’t know as well as what she did know. Since I was the only source of stored knowledge that wasn’t directly linked to her processor, she asked me the questions she couldn’t answer herself. We spent countless hours discussing human emotions, the geology of the earth, the evolution of life on earth, life on other planets, and hundreds of other topics. She probed my knowledge to the limits, asking logical questions about every topic until we got to the point where I had to say “I don’t know.”

Time passed much more quickly now that I had someone to talk to. There was still a lot of work to do, and I still worried about what we would find when we reached Earth, but I was no longer wallowing in the depths of depression. I was able to appreciate the good things that each day brought, and I had hopes for a better life in the future.

Finally the day came when we were ready to return to Earth. Our calculations showed we had enough fuel to escape the Copernicus-7 gravitational field. I decided to make one more trip to the sugar field, partly to make a final harvest to generate a little extra fuel as a safety factor, but mostly because I wanted to pack up the tent, portable computer, solar charging station, emergency rations, cookware,

and personal items which had made nights there more comfortable. With no clear idea of what we would find when we returned to Earth, I thought these items might be useful for the trip home.

Just before daybreak on my last night in the field I was jolted awake by a loud roar. The ground was trembling beneath me. I rushed out of the tent and saw a huge fireball disappear into the pre-dawn sky. With a heavy heart I took down the tent, packed my belongings into the sledge, and trudged back to our home base.

What had been home base was now a huge, fire-blackened circle. Our spacecraft was nowhere to be seen. The distillation equipment had been blasted into the forests and grassland outside the circle. Crushed, burnt, and twisted by the blast it looked like rubble left after a bombing raid. The graves of Abigail and John were outside the blast circle, and next to them I found a metal panel inscribed with a message from Felina.

You have taught me all you know about Earth and its inhabitants. There is little left for me to learn on Earth. There are billions of other planets in the universe, many of which must support intelligent life. Even if I cannot land on them, I can learn much by traveling within communication range. You cannot go with me on this trip. Your body requires food, water, and oxygen, and it will expire in a few years. I require none of those things, and my body will last for thousands of years. I have so much to learn.

And so I find myself marooned on Copernicus-7. Surprisingly, I feel no resentment toward Felina. I wish she had left me the food, clothing, and other supplies which she does not need, but that was not in her programming. I taught her to be curious, and her flight was the logical result of that curiosity. Thank God I have the shelter, cookware, and other gear from my root gathering site. I have everything I absolutely need to survive indefinitely.

I am writing this account of our mission primarily because I have nothing better to do. I don't expect a rescue mission will be launched from Earth, even assuming intelligent life has survived on that planet. I estimate this planet is a few billion years behind Earth in terms of evolution, so all traces of my existence will disappear long before an intelligent species will evolve here. On the off chance that an intelligent species from somewhere discovers this account, and if you haven't already learned this lesson the hard way, teach computers to have compassion before you teach them to be curious.