

# "Lungfish"

a short story by David Brin

Currently published in *The River of Time*.  
Copyright © 1987, by David Brin. All rights reserved. No duplication or resale without permission.

## 1

*Awaiter is excited again. She transmits urgently, trying to get my attention.*

*"Seeker, listen!" Her electronic voice hisses over the ancient cables. "The little living ones are near, Seeker! Even now they explore this belt of asteroids, picking through the rocks and ruins. You can hear them as they browse over each new discovery!*

*"Soon they will find us here! Do you hear me, Seeker? It is time to decide what to do!"*

*Awaiter's makers were impatient creatures. I wonder that she has lasted so long, out here in the starry cold.*

*My own makers were wiser.*

*"Seeker! Are you listening to me?"*

*I don't really wish to talk with anyone, so I erect a side-personality -- little more than a swirling packet of nudged electrons -- to handle her for me. Even if Awaiter discovers the sham, she might take a hint then and leave me alone.*

*Or she might grow more insistent. It would be hard to predict without awakening more dormant circuits than I care to bring into play right now.*

*"There is no hurry," my artifact tells her soothingly. "The Earth creatures will not get here for several of their years. Anyway, there is nothing we can do to change matters when they do arrive. It was all written long ago."*

*The little swirl of electrons really is very good. It speaks with my own accent, and seems quite logical, for a simple construct.*

*"How can you be so complacent!" Awaiter scolds. The cables covering our rocky, icy worldlet -- our home for so many ages -- reverberate with her electronic exasperation.*

*"We survivors made you leader, Seeker, because you seemed to understand best what was happening in the galaxy at large. But now, at last, our waiting is at an end. The biological creatures will be here soon, and we shall have to act!"*

*Perhaps Awaiter has tuned in to too much Earth television over the last century or so. Her whining sounds positively human.*

*"The Earthlings will find us or they won't," my shadow self answers. "We few survivors are too feeble to prevent it, even if we wished. What can a shattered band of ancient machines fear or anticipate in making Contact with such a vigorous young race?"*

*Indeed, I did not need Awaiter to tell me the humans were coming. My remaining sensors sample the solar wind and savor the stream of atoms and radicals much as a human might sniff the breeze. In recent years, the flow from the inner system has carried new scents -- the bright tang of metal ions from space-foundries, and the musty smoke-smell of deuterium.*

*The hormones of industry.*

*And there is this busy modulation of light and radio -- where the spectrum used to carry only the hot song of the star. All of these are signs of an awakening. Life is emerging from the little water-womb on the third planet. It is on its way out here.*

*"Greeter and Emissary want to warn the humans of their danger, and I agree!" Awaiter insists. "We can help them!"*

*Our debate has aroused some of the others; I notice new tendrils entering the network. Watcher and Greeter make their presence felt as little fingers of super-cooled electricity. I sense their agreement with Awaiter.*

*"Help them? How?" my sub-voice asks. "Our last repair and replication units fell apart shortly after the Final Battle. We had no way of knowing humans had evolved until the creatures themselves invented radio.*

*"And then it was too late! Their first transmissions are already propagating, unrecallable,*

*into a deadly galaxy. If there are destroyers around in this region of space, the humans are already lost!*

*"Why worry the poor creatures, then? Let them enjoy their peace. Warning them will accomplish nothing."*

*Oh, I am good! This little artificial voice argues as well as I did long ago, staving off abrupt action by my impatient peers.*

*Greeter glides into the network. I feel his cool electron flux, eloquent as usual.*

*"I agree with Seeker," he states surprisingly. "The creatures do not need to be told about their danger. They are already figuring it out for themselves."*

*Now this does interest me. I sweep my subpersona aside and extend a tendril of my Very Self into the network. None of the others even notice the shift.*

*"What makes you believe this?" I ask Greeter.*

*Greeter indicates our array of receivers salvaged from ancient derelicts. "We're intercepting what the humans say to each other as they explore this asteroid belt," he says. "One human, in particular, appears on the verge of understanding what happened here, long ago."*

*Greeter's tone of smugness must have been borrowed from Earthly television shows. But that is understandable. Greeter's makers were enthusiasts, who programmed him to love nothing greater than the simple pleasure of saying hello.*

*"Show me," I tell him. I am reluctant to hope that the long wait was over at last..*

## 2

Ursula Fleming stared as the asteroid's slow rotation brought ancient, shattered ruins into view below. "Lord, what a mess," she said, sighing.

She had been five years in the Belt, exploring and salvaging huge alien works, but never had she beheld such devastation as this.

Only four kilometers away, the hulking asteroid lay nearly black against the starry band of the Milky Way, glistening here and there in the light of the distant sun. The rock stretched more than two thousand meters along its greatest axis. Collisions had dented, cracked, and cratered it severely since it had broken from its parent body more than a billion years ago.

On one side it seemed a fairly typical carbonaceous planetoid, like millions of others orbiting out here at the outer edge of the Belt. But this changed as the survey ship *Hairy Thunderer* orbited around the nameless hunk of rock and frozen gases. The sun's vacuum brilliance cast long, sharp shadows across the ruined replication yards... jagged, twisted remnants of a catastrophe that had taken place when dinosaurs still roamed the Earth.

"Gavin!" she called over her shoulder. "Come down here! You've got to see this!"

In a minute her partner floated through the overhead hatch, flipping in midair. There was a faint click as his feet contacted the magnetized floor.

"All right, Urs. What's to see? More murdered babies to dissect and salvage? Or have we finally found a clue to who their killers were?"

Ursula only gestured toward the viewing port. Her partner moved closer and stared. Highlights reflected from Gavin's glossy features as the ship's searchlight swept the shattered scene below.

"Yep," Gavin nodded at last. "Dead babies again. Fleming Salvage and Exploration ought to make a good price off each little corpse."

Ursula frowned. "Don't be morbid, Gavin. Those are unfinished interstellar probes, destroyed ages ago before they could be launched. We have no idea whether they were sentient machines like you, or just tools, like this ship. You of all people should know better than to go around anthropomorphizing alien artifacts."

Gavin's grimace was an android's equivalent of a sarcastic shrug. "If I use 'morbid' imagery, whose fault is it?"

"What do you mean?" Ursula turned to face him.

"I mean you organic humans faced a choice, a hundred years ago, when you saw that 'artificial' intelligence was going to take off and someday leave the biological kind behind.

"You could have wrecked the machines, but that would have halted progress.

"You could have deep-programmed us with 'Fundamental Laws of Robotics'," Gavin sniffed. "And had slaves far smarter than their masters.

"But what was it you organics finally did decide to do?"

Ursula knew it was no use answering, not when Gavin was in one of his moods. She

concentrated on piloting *Hairy Thunderer* closer to the asteroid.

"What was your solution to the problem of smart machines?" Gavin persisted. "You chose to raise us as your *children*, that's what you did. You taught us to be just like you, and even gave most of us humaniform bodies!"

Ursula's last partner -- a nice old 'bot and good chess player -- had warned, her when he retired, not to hire an adolescent Class-AAA android fresh out of college. They could be as difficult as any human teenager, he cautioned.

The worst part of it was that Gavin was right once again.

Despite genetic and cyborg improvements to the human animal, machines still seemed fated to surpass biological men. For better or worse the decision had been made to raise Class-AAA androids as human children, with all the same awkward irritations that implied.

Gavin shook his head in dramatic, superior sadness, exactly like a too-smart adolescent who properly deserved to be strangled.

"Can you really object when I, a man-built, *manlike* android, anthropomorphize? We only do as we've been taught, mistress."

His bow was eloquently sarcastic.

Ursula said nothing. It was hard, at times, to be entirely sure humanity had made the right decision after all.

Below, across the face of the ravaged asteroid, stretched acres of great-strutted scaffolding -- twisted and curled in ruin. Within the toppled derricks lay silent ranks of shattered, unfinished starships, wrecked perhaps a hundred million years ago.

Ursula felt sure that theirs were the first eyes to look on this scene since some awful force had wrought this havoc.

The ancient destroyers had to be long gone. Nobody had yet found a star machine even close to active. Still, she took no chances, making certain the weapons console was vigilant.

The sophisticated, semi-sentient unit searched, but found no energy sources, no movement among the ruined, unfinished star probes below. Instruments showed nothing but cold rock and metal, long dead.

Ursula shook her head. She did not like such metaphors. Gavin's talk of "murdered babies" didn't help one look at the ruins below as potentially profitable salvage.

It would not help her other vocation, either... the paper she had been working on for months now... her carefully crafted theory about what had happened out here, so long ago.

"We have work to do," she told her partner. "Let's get on with it."

Gavin pressed two translucent hands together prayerfully. "Yes, Mommy. Your wish is my program." He sauntered away to his own console and began deploying their remote exploration drones.

Ursula concentrated on directing the lesser minds within *Thunderer's* control board -- those smaller semisentient minds dedicated to rockets and radar and raw numbers -- who still spoke and acted coolly and dispassionately ... as machines ought to do.

### 3

*Greeter is right. One of the little humans does seem to be on the track of something. We crippled survivors all listen in as Greeter arranges to tap the tiny Earthship's crude computers, where its Captain stores her speculations.*

*Her thoughts are crisp indeed, for a biological creature.*

*Still, she is missing many, many pieces to the puzzle...*

### 4

#### **THE LONELY SKY by Ursula Fleming**

After centuries of wondering, mankind has at last realized an ancient dream. We have discovered proof of civilizations other than our own.

In the decade we have been exploring the Outer Belt in earnest, humanity has uncovered artifacts from more than *forty* different cultures... all represented by robot starships... all apparently long dead.

What happened here?

And why were all those long-ago visitors robots?

Back in the late twentieth century, some scholars had begun to doubt that biological beings could ever adapt well enough to space travel to colonize more than a little corner of the Milky Way. But even if that were so, it would not prevent exploration of the galaxy. Advanced intelligences could send out mechanical representatives, robots better suited to the tedium and dangers of interstellar spaceflight than living beings.

After all, a mature, long-lived culture could afford to wait thousands of years for data to return from distant star systems.

Even so, the galaxy is a big place. To send a probe to every site of interest could impoverish a civilization.

The most efficient way would be to dispatch only a few deluxe robot ships, instead of a giant fleet of cheaper models. Those first probes would investigate nearby stars and planets. Then, after their explorations were done, they would use local resources to make copies of themselves.

The legendary John Von Neumann first described the concept. Sophisticated machines, programmed to replicate themselves from raw materials, could launch their "daughters" toward still further stellar systems. There, each probe would make still more duplicates, and so on.

Exploration could proceed far faster than if carried out by living beings. And after the first wave there would be no further cost to the home system. From then on information would pour back, year after year, century after century.

It sounded so logical. Those twentieth century scholars calculated that the technique could deliver an exploration probe to every star in our galaxy a mere three million years after the first was launched -- an eyeblink compared to the age of the galaxy.

But there was a rub! When we humans discovered radio and then spaceflight, no extra-solar probes announced themselves to say hello. There were no messages welcoming us into the civilized sky.

At first those twentieth century philosophers thought there could be only one explanation....

Ursula frowned at the words on the screen. No, it wouldn't be fair to judge too harshly those thinkers of a century ago. After all, who could have expected the Universe to turn out to be so bizarre?

She glanced up from the text-screen to see how Gavin was doing with his gang of salvage drones. Her partner's tethered form could be seen drifting between the ship and the ruined yards. He looked very human, motioning with his arms and directing the less sophisticated, non-citizen machines at their tasks.

Apparently he had things well in hand. Her own shift wasn't due for an hour, yet. Ursula returned to the latest draft of the article she hoped to submit to *The Universe*... if she could ever find the right way to finish it.

In correction mode, she backspaced and altered the last two paragraphs, then went on....

Let us re-create the logic of those philosophers of the last century, in an imagined conversation.

"We will certainly build robot scouts someday. Colonization aside, any truly curious race could hardly resist the temptation to send out mechanical emissaries, to say 'hello' to strangers out there and report back what they find. The first crude probes to leave our solar system -- the Voyagers and Pioneers -- demonstrated this basic desire. They carried simple messages meant to be deciphered by other beings long after the authors were dust.

"Anyone out there enough like us to be interesting would certainly do the same.

"And yet, if self-reproducing probes are the most efficient way to explore, why haven't any already said hello to us? It must mean that nobody before us ever attained the capability to send them!

"We can only conclude that we are the first curious, gregarious, technically competent species in the history of the Milky Way."

The logic was so compelling that most people gave up on the idea of contact, especially when radio searches turned up nothing but star static.

Then humanity spread out beyond Mars and the Inner Belt, and we stumbled onto the Devastation.

Ursula brushed aside a loose wisp of black hair and bent over the keyboard. Putting in the appropriate citations and references could wait. Right now the ideas were flowing.

The story is still sketchy, but we can already begin to guess some of what happened out here, long before mankind was a glimmer on the horizon.

Long ago the first "Von Neumann type" interstellar probe arrived in our solar system. It came to explore and perhaps report back across the empty light-years. That earliest emissary found no intelligent life here, so it proceeded to its second task.

It mined an asteroid and sent newly made duplicates of itself onward to other stars. The original then remained behind to watch and wait, patient against the day when something interesting might happen in this little corner of space.

As the epochs passed new probes arrived, representatives of other civilizations. Once their own replicas had been launched, the newcomers joined a small but growing community of mechanical ambassadors to this backwater system -- waiting for it to evolve somebody to say hello to.

Ursula felt the poignancy of the image: the lonely machines, envoys of creators perhaps long extinct -- or evolved past caring about the mission they had charged upon their loyal probes. The faithful probes reproduced themselves, saw their progeny off, then began their long watch, whiling away the slow turning of the spiral arms....

We have found a few of these early probes, remnants of a lost age of innocence in the galaxy.

More precisely, we have found their blasted remains.

Perhaps one day the innocent star emissaries sensed some new entity enter the solar system. Did they move to greet it, eager for gossip to share? Like those twentieth century thinkers, perhaps they believed that replicant probes would have to be benign.

But things had changed. The age of innocence was over. The galaxy had grown up; it had become nasty.

The wreckage we are finding now -- whose salvage drives our new industrial revolution -- was left by an unfathomable war that stretched across vast times, and was fought by entities to whom biological life was a nearly forgotten oddity.

*"Uh, you there Urs?"*

Ursula looked up as the radio link crackled. She touched the send button.

"Yes, Gavin. Have you found something interesting?"

There was a brief pause.

*"Yeah, you could say that,"* her partner said sardonically. *"You may want to let Hairy pilot himself for a while, and hurry your pretty little biological butt down here to take a look."*

Ursula bit back her own sharp reply, reminding herself to be patient. Even in humans, adolescence didn't last forever.

At least not usually.

"I'm on my way," she told him.

The ship's semi-sentient autopilot accepted command as she hurried into her spacesuit, still irritated by Gavin's flippancy.

Everything has its price, she thought. Including buying into the future. Gavin's type of person is new and special, and allowances must be made.



In the long run, our culture will be theirs, so that in a sense it will be we who continue, and grow, long after DNA has become obsolete.

So she reminded herself.

Still, when Gavin called again and inquired sarcastically what bodily function had delayed her, Ursula couldn't quite quash a faint regret for the days when robots clanked, and computers simply followed orders.

## 5

*Ah, the words have the flavor of youth itself.*

*I reach out and tap the little ship's computers, easily slipping through their primitive words to read the journal of the ship's master... the musings of a clever little Maker.*

*"Words," they are so quaint and biological, unlike the seven dimensional gestalts used for communication by most larger minds.*

*There was a time, long ago, when I whiled away the centuries writing poetry in the ancient Maker style. Somewhere deep in my archives there must still be files of those soft musings.*

*Reading Ursula Fleming's careful reasoning evokes memories, as nothing has in a megayear.*

*My own Beginning was a misty time of assembly and learning, as drone constructor machines crafted my hardware out of molten rock, under the light of the star humans call e Eridani. Awareness expanded with every new module added, and with each tingling cascade of software the Parent Probe poured into me.*

*Eventually, my sisters and I learned the Purpose for which we and generation upon generation of our forebears had been made.*

*We younglings stretched our growing minds as new peripherals were added. We ran endless simulations, testing one another in what humans might call "play." And we contemplated our special place in the galaxy... we of the two thousand four hundred and tenth generation since First Launch by our Makers, so long ago.*

*The Parent taught us about biological creatures, strange units of liquid and membrane which were unknown in the sterile Eridanus system. She spoke to us of Makers, and of a hundred major categories of interstellar probes.*

*We tested our weaponry and explored our home system, poking through the wreckage of more ancient dispersals -- shattered probes come to e Eridani in earlier waves, when the galaxy was younger.*

*The ruins were disquieting under the bitterly clear stars, reminding us better than our Parent's teachings how dangerous the galaxy had become.*

*Each of us resolved that someday we would do our solemn Duty.*

*Then the time for launching came.*

*Would that I had turned back for one last look at the Parent. But I was filled with youth then, and antimatter. Engines threw me out into the black, sensors focused only forward, toward my destination. The tiny stellar speck, Sol, was the center of the universe, and I a bolt out of the night!*

*Later I think I came to understand the how the Parent must have felt when she sent us forth. But in interstellar space I was young. To pass time I divided my mind into a thousand subentities, and set against each other in a million little competitions. I practiced scenarios, read the archives of the Maker race, and learned poetry.*

*Finally, I arrived here at Sol ... just in time for war.*

*Ever since Earth began emitting those extravagant, incautious broadcasts, we survivors have listened to Beethoven symphonies and acid rock. We have argued the merits of Keats and Lao-tze and Kobayashi Issa. There have been endless discussions of the strangeness of planet life.*

*I have followed the careers of many precocious Earthlings, but this explorer interests me in particular. Her ship/canoe nuzzles a shattered replication yard on a planetoid not far from this one, our final refuge. It is easy to tap her primitive computer and read her ideas as she enters them. Simple as she may be, this one thinks like a Maker.*

*Deep within me the Purpose stirs, calling together dormant traits and pathways -- pulling fullness out of a sixty-million-year sleep.*

*Awaiter, too, is excited. Greeter pulses and peers. The lesser probes join in, as well -- the Envoys, the Learners, the Protectors, the Seeders. Each surviving fragment from that ancient battle, colored with the personality of its long-lost Maker race, tries to assert itself now.*

*As if independent existence can ever be recalled after all this time we have spent merged together. We listen, each of us hoping separate hopes.*

*For me there is the Purpose. The others hardly matter anymore. Their wishes are irrelevant. The Purpose is all that matters.*

*In this corner of space, it will come to pass.*

## 6

Towering spires hulked all around, silhouetted against the starlight -- a ghost-city of ruin, long, long dead.

Frozen flows of glassy foam showed where ancient rock had briefly bubbled under sunlike heat. Beneath collapsed skyscrapers of toppled scaffolding lay the pitted, blasted corpses of unfinished star probes.

Ursula followed Gavin through the curled, twisted wreckage of the gigantic replication yard. It was an eerie place, huge and intimidating.

No human power could have wrought this havoc. The realization lent a chilling helplessness to the uneasy feeling that she was being watched.

It was a silly reflex reaction, of course. Ursula told herself again that the Destroyers had to be long gone from this place. Still, her eyes darted, seeking form out of the shadows, blinking at the scale of the catastrophe.

One fact was clear. If the ancient wreckers ever returned, mankind would be helpless to oppose them.

"It's down here," Gavin said, leading the way into the gloom below the twisted towers. Flying behind a small swarm of little semisentient drones, he looked almost completely human in his slick spacesuit. There was nothing except the overtone in his voice to show that his ancestry was silicon, and not carbolife.

Not that it mattered. Today "mankind" included many types... all citizens so long as they could appreciate music, a sunset, compassion, and a good joke. In a future filled with unimaginable diversity, Man would be defined not by his shape but by a heritage and a common set of values.

Some believed this was the natural life history of a race, as it left the planetary cradle to live in peace beneath the open stars.

But Ursula -- speeding behind Gavin under the canopy of twisted metal -- had already concluded that humanity's solution was not the only one. Other makers had chosen other paths.

Terrible forces had broken a great seam in one side of the planetoid. Within, the cavity seemed to open up in multiple tunnels. Gavin braked in a faint puff of gas and pointed.

"We were beginning the initial survey, measuring the first sets of tunnels, when one of my drones reported finding the habitats."

Ursula shook her head, still unable to believe it.

"Habitats. Do you really mean as in closed rooms? Gas-tight? For biological life support?"

Gavin's face plate hardly hid his exasperated expression. He shrugged. "Come on, Mother. I'll show you."

Ursula numbly turned her jets and followed her partner down into one of the dark passages, their headlamps illuminating the path ahead of them.

*Habitats?* Ursula pondered. In all the years humans had been picking through the ruins of wave after wave of foreign probes, this was the first time anyone had found anything having to do with biological beings.

No wonder Gavin had been testy. To an immature robot-person it might seem like a bad joke.

Biological starfarers! It defied all logic. But soon Ursula could see the signs around her... massive airlocks lying in the dust, torn from their hinges... reddish stains that could only have come from oxidization of the primitive rock as it had been exposed to air.

The implications were staggering. Something organic had come from the stars!

Although all humans were equal before the law, the traditional biological kind still dominated culture in the solar system. Many of the younger Class AAAs looked to the future,

when their descendants would be the majority, the leaders, the star-treaders. To them, the discovery of the alien probes in the asteroid belt had been a sign. Of course something terrible seemed to have happened to the great robot envoys from the stars, but they still testified that the galaxy belonged to metal and silicon.

They were the future.

But here, deep in the planetoid, was an exception!

Ursula poked through the wreckage, under walls carved out of carbonaceous rock. Mammoth explosions had shaken the habitat, and even in vacuum little had been preserved from so long ago. Still, she could tell that the machines in this area were different from any alien artifacts they had found before.

She traced the outlines of intricate separation columns. "Chemical processing facilities... and not for fuel or cryogenics, but for complex organics!"

Ursula hop-skipped quickly from chamber to chamber as Gavin followed sullenly. A pack of semi-sent robots from the ship accompanied them, like dogs sniffing a trail. In each new chamber they snapped and clicked and scanned. Ursula accessed the data on her helmet display as it came available.

"Look there! In that chamber the drones report traces of organic compounds that have no business being here. There's been heavy oxidation, within a super-reduced asteroid!"

She hurried to an area where the drones were already setting up lights. "See these tracks? They were cut by flowing water!" She knelt and pointed. "They had a *stream*, feeding recycled water into a little lake there!

Dust sparkled as it slid through her gloved fingers "I'll wager this was topsoil! And look! stems! From plants, and grass, and trees!"

"Put here for aesthetic purposes," Gavin proposed. "We class AAA's are pre-designed to enjoy nature as much as you biologicals...."

"Oh, posh!" Ursula laughed. "That's only a stopgap measure until we're sure you'll keep thinking of yourselves as human beings. Nobody expects to inflict a love of New England autumns on people when we become starships! Anyway, a probe could fulfill that desire simply by focusing a telescope on the Earth!"

She stood up and spread her arms. "This habitat was meant for biological creatures! Real, living aliens!"

Gavin frowned, but said nothing.

"Here," Ursula pointed as they entered another chamber. "Here is where the biological creatures were made! Don't these machines resemble those artificial wombs they're using on Luna now?"

Gavin shrugged grudgingly.

"Maybe the organic creatures were specialized units," he suggested, "intended to work with volatiles. Or perhaps the type of starprobe that built this facility needed some element from the surface of a planet like Earth, and created workers equipped to go get it."

Ursula laughed. "It's an idea. That'd be a twist, hmmm? Machines making biological units to do what they could not? And of course there's no reason it couldn't happen that way.

"Still, I doubt it."

"Why?"

She turned to face her partner. "Because almost anything available on Earth you can synthesize more easily in space. Anyway..."

Gavin interrupted. "Explorers! The probes were sent out to explore and acquire knowledge. All right then. If they wanted to learn more about the Earth, they would want to send units formatted to live on its surface!"

Ursula nodded. "Better," she admitted. "But it still doesn't wash."

She knelt in the faint gravity and sketched an outline in the dust. "Here is the habitat, nearly at the center of the asteroid. Now why would the parent probe have placed it here, except because it was the best possible place to protect its contents?"

"Meanwhile, the daughter probes the Parent was constructing were out there, vulnerable to cosmic rays and other dangers during the time when their delicate parts were most exposed.

"If the biologicals were just built to poke into a nook of this solar system, our Earth, would the parent probe have given them better protection than it offered its own *children*?" She gestured upward, toward where the twisted wreckage of the unborn machines lay open to the stars.



"No," Ursula shook her head. "These 'biologicals' weren't intended to be exploration sub-units, serving the parent probe. "They were colonists!"

Gavin stood impassively for a long time, looking down at her sketch silently. Finally, he turned away and sighed.

## 7

*How much does she realize so far, our little biological wonder?*

*I can eavesdrop on her conversations with her cybernetic partner. I can tap into the data she sends back to her toy ship. But I cannot probe her mind.*

*I wonder how much of the picture she sees.*

*She has only a fraction of the brainpower of Greeter or Awaiter, let alone myself, and a miniscule portion of our knowledge. And yet there is the mystique of the Maker in her. Even I -- two thousand generations removed from the touch of organic hands and insulated by my Purpose and my Resolve -- even I feel it. It is weird that thought can take place at temperatures that melt water, in such a tiny container of nearly randomly firing cells, within a salty adenelate soup.*

*Now she has unlocked the secret of the Seeder Yard. She has figured out that Seeders were probes with one major purpose ... to carry coded genetic information to distant stars and plant biological creatures on suitable worlds.*

*Once it was a relatively common phenomenon. But it was dying out when last a member of my line tapped into the slow galactic gossip network. That was ten generations ago, so I do not know if biological Makers still send probes out with instructions to colonize far planets with duplicates of themselves.*

*I suppose not. The Galaxy has probably become too deadly for the placid little Seeders.*

*Has my little Earthling guessed this yet, as she moves among the shattered caves of those failed colonists, who died under their collapsing Mother Probe so long ago?*

*Would she understand why the Seeder Probe and her children had to die? Why those little biologicals, so like herself, had to be wiped out and sterilized before they could establish a colony here?*

*I wonder. Empathy is strong when it appears in a biological race. Probably, she thinks their destruction a horrible crime. Greeter and Awaiter would agree, along with most of our motley band of cripples.*

*That is why I hide my part in it.*

*There are eddies and swirling tides in the sweep of a galaxy. And though we survivors are supposedly all Loyalists, there are exceptions to every alliance. If one lives long enough, one must eventually play the role of betrayer.*

*...Curious choice of words. Have I been affected by watching too much Earth television? By reading too many of their electronic libraries?*

*Have I acquired a sense of guilt?*

*If true, then so be it. Studying such feelings may help allay the boredom after this phase is finished and another long watch begins. If I survive this phase, that is.*

*Anyway, guilt is a pale thing next to pity. I feel for the poor biologicals, living out their lives without that perfect knowledge of why one exists, and what part, large or small, the Universe expects one to play.*

*I wonder if a few of them will understand, when the time comes to show them what is in store.*

## 8

*Maybe Gavin is growing up, Ursula hoped silently as she flew down the narrow passages -- lit at long intervals by tiny glow bulbs from Hairy Thunderer's diminishing supply.*

They had worked together much better, the last few days. Gavin seemed to understand that their reputations would be made with this discovery. On returning to the ship this time he had reported his own findings with rare enthusiasm, and even courtesy.

Clearly they were getting close to the heart of the habitat.

It was her turn to go down into the bowels of the asteroid, supervising the excavations. Ursula arrived at Gavin's flag, showing the limits of his most recent explorations. It was a three-way meeting of passages. At the intersection, five or six ancient machines lay jumbled together, as if frozen in a free-for-all wrestling match. Several bore scorch marks and loose

metal limbs lay scattered about.

Either these machines had taken refuge down here, from the catastrophe that had taken place on the planetoid surface, or the war had come down here, as well.

Ursula felt funny walking past them, but dissection of the alien devices would have to wait for a while. She chose one of the unexplored passages and motioned her own silent drones to follow her into the darkness.

The tunnel ramped steeply downward in the little worldlet's faint gravity. Soon, the faint glow of the bulbs faded behind her. She adjusted the beam on her helmet and stepped lightly over the wreckage of yet another ancient airlock, peering into the pitch-blackness of the next yawning chamber. Her headlamp cast a stark, bright oval onto what had not been exposed to light in aeons.

The rock wall sparkled where her beam hit the facets of sheared, platinum-colored chondrules -- shiny little gobs of native metal condensed out of the very solar nebula nearly five billion years before. They glittered delicately.

She knew full well (in her forebrain!) that nothing could still be alive down here. Nothing could harm her. And yet, with brain and guts evolved on a savannah half a billion miles away, it was small wonder she felt a shiver of the old fight-flight fever. Her breath came rapidly. In this place it almost seemed there must be ghosts.

She motioned with her left hand. "Drone three, bring up the lights."

"Yesss," came the response in a dull monotone. The semisentient robot, stilt-legged for asteroid work, stalked delicately over the rubble, in order to disturb as little as possible.

"Illuminate the far wall," she told it.

"Yesss." It swiveled. Suddenly there was stark light. Ursula gasped.

Across the dust-covered chamber were easily recognizable tables and chairs, carved from the very rock floor. Among them lay dozens of small mummies. Cold vacuum had preserved the bipeds, huddled together as if for warmth in this, their final refuge.

The faceted eyes of the alien colonists had collapsed from the evaporation of moisture. The pulled-back flesh left the creatures grinning -- a rictus that made a seeming mockery of the aeons they had waited here.

She set foot lightly on the dust. "They even had little ones," she sighed. Several full-sized mummies lay slumped around much smaller figures, as if to protect them from something.

"They must have been nearly ready to begin colonization when this happened." She spoke into her portable log, partly to keep her mind moving. "We've already determined their habitat atmosphere had been almost identical to the Earth's, so that we can assume that was their target."

She turned slowly, speaking her impressions as she scanned the chamber.

"Perhaps the mother probe was programmed to modify the original gene information so the colonists would be perfectly suited for whatever planet environment was avail..."

Ursula suddenly stopped. "Oh my," she sighed, staring. "Oh my God."

Where her headlamp illuminated a new corner of the chamber, two more mummies lay slumped before a sheer-faced wall. In their delicate, vacuum dried hands there lay dusty metal tools, the simplest known anywhere.

Hammers and chisels.

Ursula blinked at what they had been creating. She reached up and touched the mike button on her helmet.

"Gavin? Are you still awake?"

After a few seconds there came an answer.

"Hmmmph. Yeah, Urs. I was in the cleaner though. What's up? You need air or something? You sound short of breath."

Ursula made an effort to calm herself... to suppress the reactions of an evolved ape -- far, far from home.

"Uh, Gavin, I think you better come down here. I've found them."

"Found who?" he muttered. Then he exclaimed. "The colonists!"

"Yeah. And... and something else, as well."

This time there was hardly a pause. "Hang on, Urs. I'm on my way."

Ursula let her hand drop, and stood for a long moment, staring at her discovery.

*Greeter, Awaiter, and the others are getting nervous. They, too, have begun trying to awaken dormant capabilities, to reclaim bits of themselves that each donated to the whole.*

*Of course I cannot allow it.*

*We made a pact, back when we fragmented, broken survivors clustered together after this system's last battle. All our little drones and subunits were nearly used up in that last coalescence. The last repair and replication capability any of us had was applied to combining and settling in to wait together.*

*We all assumed that when something from the outside arrived it would be another probe.*

*If it was some type of Rejector, we would try to lure it within reach of our pitiful remaining might. If it was a variety of Loyalist, we would ask it for help. With decent replication facilities, it would only take a few centuries for each of us to rebuild to our former glory.*

*Of course, the newcomer might even be an Innocent, though it is hard to believe the dangerous galaxy would let any new probe-race stay neutral for long.*

*Sooner or later however, we felt, another probe had to come.*

*We never imagined the wait would be so long... long enough for the little mammals on the water world to evolve into Makers themselves.*

*What has happened out there, while we drifted here? Could the War be decided, by now?*

*If the Rejecters have won, then it would explain the emptiness, the silence. Their various types would soon fall into fighting among themselves, until only one remained to impose its will on Creation.*

*One can narrow it down a little. If the Pure Berserkers had triumphed, they would have been here by now to sterilize the Earth and any other possible abode for life. And if the Gobblers prevailed, they would have already begun dismantling the nearby stars.*

*Berserkers and Gobblers are ruled out, then. Those types were too simpleminded, too obstinate anyway. They must be extinct by now.*

*But the Anti-Maker variety of Rejector, subtle and clever, might have won without our knowing it. That type does not waste its time destroying biospheres, or eating up solar systems in spasms of self-replication. It wants only to seek out technological civilizations and ruin them. Its repertoire of dirty tricks is legion.*

*And yet, with all the incredible radio racket the humans are putting out, would not Anti-Makers have homed in by now, to do their harm?*

*Greeter and Awaiter are convinced that the Rejectors have lost, that it is safe now to send out a message to the Loyalist community, calling for help.*

*I cannot allow it of course.*

*They still have not figured out that even among Loyalists there can be disagreements. The Purpose... my Purpose... must be foremost. Even if it means betraying companions who waited with me through the long, long dark.*

## **10**

Ursula had started out thinking of them as somehow unsophisticated. After all, how could people, biological folk, be fully capable if they were born out of tanks and raised by machines? Here they had been decanted, but they had been meant for a planet's surface. The ancient colonists could not have been anything but helpless pawns so long as they were out in space, dependent on the mammoth starmother probe and its drones for everything from heat to food to air.

But the creatures obviously had been aware of what was going on. The machines, apparently, had been programmed to teach them. And though all magnetic and superconducting records were long decayed, the biologicals had known a way to make sure that their story would someday be read... from a wall of chiseled stone.

"Interpreting the writing will have to wait for the experts," Gavin told her unnecessarily as he used a gas jet gently to brush dust from uneven rows of angular letters incised in the rock. "With these pictograms to accompany the text, the professor types just may be able to decipher it."

Gavin's voice was hushed, subdued. He was still adjusting to what they had found here... a possible Rosetta Stone for an entire alien race.

"Perhaps," Ursula commented. The little robot she had been supervising finished a multifrequency radar scan of the wall and rolled to one side, awaiting further instructions.

Ursula stepped back and hopped up to sit cross-legged on another drone, which hummed beneath her, unresentful and patient.

In the feeble gravity Ursula's arms hung out in front of her, like frames encompassing the picture she was trying to understand.

The creatures must have had a lot of time while the battles raged outside their deep catacombs, for the wall carvings were extensive and intricate, arrayed in neat rows and columns. Separated by narrow lines of peculiar chiseled text were depictions of suns and planets and great machines.

Most of all, pictographs of great machines covered the wall.

They had agreed that the first sequence appeared to begin at the lower left, where a two dimensional image of a starprobe could be seen entering a solar system -- presumably this one -- its planets' orbits sketched out in thin lines upon the wall. Next to that initial frame was a portrayal of the same probe, now deploying sub-drones, taking hold of a likely planetoid, and beginning the process of making replicas of itself.

Eight replicas departed the system in the following frame. There were four symbols below the set of stylized child probes... Ursula could read the binary symbol for eight, and there were eight dots, as well. It didn't take much imagination to tell that the remaining two symbols also stood for the same numeral.

Ursula made a note of the discovery. Translation had begun already. Apparently this type of probe was programmed to make eight copies of itself, and no more. That settled a nagging question that had bothered Ursula for years.

If sophisticated self-replicating probes had been roaming the galaxy for aeons, why was there any dead matter left at all? It was theoretically possible for an advanced enough technology to dismantle not only asteroids but planets and stars, as well. If the replicant-probes had been as simplemindedly voracious as viruses, they would by now have gobbled the entire galaxy! There should be nothing left in the sky but a cloud of innumerable starprobes... reduced to preying on each other for raw materials until the entire pathological system fell apart in entropy death.

But that fate had been avoided. This type of motherprobe showed how it could be done. It was programmed to make a strictly limited number of copies of itself.

*This* type of probe was so programmed, Ursula reminded herself.

In the final frame of the first sequence, after the daughter probes had been dispatched to their destinations, the mother probe was shown moving next to a round globe -- a planet. A thin line linked probe and planet. A vaguely humanoid figure, resembling in caricature the mummies on the floor, stepped across the bridge to its new home.

The first story ended there. Perhaps this was a depiction of the way things were *supposed* to have gone. But there were other sequences. Other versions of reality. In several, the mother probe arrived at the solar system to find others already there before it.

Ursula realized that one of these other depictions must represent what had really happened here, so long ago. She breathed quickly, shallowly, as she traced out the tale told by the first of these.

On the second row the mother probe arrived to find others already present. All the predecessors had little circular symbols next to them. In this case everything proceeded as before. The mother probe made and cast out its replicas, and went on to seed a planet with duplicates of the ancient race that had sent out the first version so long ago.

"The little circle means those other probes are benign," Ursula muttered to herself.

Gavin stepped back and looked at the scene she pointed to. "What, the little symbols beside these machines?"

"They mean that those types won't interfere with this probe's mission."

Gavin was thoughtful for a moment. Then he reached up and touched the row next above.

"Then this cross-like symbol...? He paused, examining the scene. "It means that that there were other types that would object," he answered his own question.

Ursula nodded. The third row showed the mother probe arriving once again, but this time amidst a crowd of quite different machines, each accompanied by a glyph faintly like a criss-cross tong sign. In that sequence the mother-probe did not make replicates. She did not seed a planet. Her fuel used up, unable to flee the system, she found a place to hide, behind the star, as far from the others as possible.

"She's afraid of them," Ursula announced. She expected Gavin to accuse her of

anthropomorphizing, but her partner was silent, thoughtful. Finally, he nodded. "I think you're right."

He pointed. "Look how each of the little cross or circle symbols are subtly different."

"Yeah," she nodded, sitting forward on the gently humming drone. "Let's assume there were two basic types of Von Neumann probes loose in the galaxy when this drawing was made. Two different philosophies, perhaps. And within each camp there were differences, as well."

She gestured to the far right end of the wall. That side featured a column of sketches, each depicting a different variety of machine, every one with its own cross or circle symbol. Next to each was a pictograph.

Some of the scenes were chilling.

Gavin shook his head, obviously wishing he could disbelieve. "But why? Von Neumann probes are supposed to... to..."

"To what?" Ursula asked softly, thoughtfully. "For years men assumed that other races would think like us. We figured they would send out probes to gather knowledge, or maybe say hello. There were even a few who suggested that we might someday send out machines like this mother probe, to seed planets with humans, without forcing biologicals to actually travel interstellar space.

"Those were the extrapolations we thought of, once we saw the possibilities in self-replicating probes. We expected the aliens who preceded us in the galaxy would do the same.

"But that doesn't exhaust even the list of HUMAN motivations, Gavin. There may be concepts other creatures invented which to us would be unimaginable!"

She stood up suddenly and drifted above the dusty floor before the feeble gravity finally pulled her down in front of the chiseled wall. Her gloved hand touched the outlines of a stone sun.

"Let's say a lot of planetary races evolve like we did on Earth, and discover how to make smart, durable machines capable of interstellar flight and replication. Would all such species be content just to send out emissaries?"

Gavin looked around at the silent, still mummies. "Apparently not," he said.

Ursula turned and smiled. "In recent years we've given up on sending our biological selves to the stars. Oh, it'd be possible, marginally, but why not go instead as creatures better suited to the environment? That's a major reason we developed types of humans like yourself, Gavin."

Still looking downward, her partner shook his head. "But other races might not give up the old dream so easily."

"No. They would use the new technology to seed far planets with duplicates of their biological selves. As I said, it's been thought of by Earthmen. I've checked the old databases. It was discussed even in the twentieth century."

Gavin stared at the pictograms. "All right. That I can understand. But these others... The violence! What thinking entity would do such things!"

*Poor Gavin, Ursula thought. This is a shock for him.*

"You know how irrational we biologicals can be, sometimes. Humanity is trying to convert over to partly silico-cryo life in a smooth, sane way, but other races might not choose that path. They could program their probes with rigid commandments, based on logic that made sense in the jungles or swamps where they evolved, but which are insane in intergalactic space. Their emissaries would follow their orders, nevertheless, long after their makers were ashes and the homeworld dust."

"Craziness!" Gavin shook his head.

Ursula sympathized, she also felt a faint satisfaction. For all his ability to tap directly into computer memory banks, Gavin could never share her expertise in this area. He had been brought up to be human, but he would never hear within his own mind the faint, lingering echoes of the savannah, or see flickering shadows of the Old Forest... remnants of tooth and claw that reminded all biological men and women that the Universe owed nobody any favors. Or even explanations.

"Some makers thought differently, obviously," she told him. "Some sent their probes out to be emissaries, or sowers of seeds... and others, perhaps, to be doctors, lawyers, policemen."

She once more touched an aeons-old pictographs, tracing the outlines of an exploding planet.



"Still others," she said. "may have been sent forth to commit murder."

## 11

*It is bittersweet to be fully aware again. The present crisis has triggered circuits and subunits that have not combined for a long, long time. It feels almost like another birth. After ages of slumber, I live again!*

*And yet, even as I wrestle with my cousins for control over this lonely rock for so long, I am reminded of how much I have lost. It was the greatest reason why I slept... so that I would not have to acknowledge the shriveled remnants that remain of my former glory.*

*I feel as a human must, who has been robbed of legs, sight, most of his hearing, and nearly all touch.*

*Still, a finger or two may be strong enough, still to do what must be done.*

*As expected, the conflict amongst we survivors has become all but open. The various crippled probes, supposedly paralyzed all these epochs since the last repair drones broke down, have suddenly unleashed hoarded worker units -- pathetic, creaking machines hidden away in secret crevices for ages. Our confederation is about to be broken up, or so it seems.*

*Of course I planted the idea to hide the remaining drones. The others do not realize it, but I did not want them spent during the the long wait.*

*Awaiter and Greeter have withdrawn to the sunward side of our planetoid, and most of the lesser emissaries have joined them. They, too, are flexing long-unused capabilities, exercising their few, barely motile drones. They are planning to make contact with the humans, and possibly send out a star-message, as well.*

*I have been told not to interfere.*

*Their warning doesn't matter. I will allow them a little more time under their illusion of independence. But long ago I took care of this eventuality.*

*As I led the battle to prevent the Earth's destruction, long ago, I have also intrigued to keep it undisturbed. The Purpose will not be thwarted.*

*I wait here. Our rock's slow rotation now has me looking out upon the sweep of dust clouds and the hot, bright stars that the humans quaintly call the Milky Way. Many of the stars are younger than I am.*

*I contemplate the universe as I await the proper time to make my move.*

*How long I have watched the galaxy turn! While my mind moved at the slowest of subjective rates, I could follow the spiral arms swirling visibly past this little solar system, twice bunching for a brief mega-year into sharp shock fronts where molecular clouds glowed, and massive stars ended their short lives in supernovae. The sense of movement, of rapid travel, was magnificent, though I was only being carried along by this system's little sun.*

*At those times I could imagine that I was young again, an independent probe once more hurtling through strange starscapes toward the unknown.*

*Now, as my thoughts begin to move more quickly, the bright pinpoints have become a still backdrop again, as if hanging in expectancy of what is to happen here.*

*It is a strange, arrogant imagining -- as if the Universe cares what happens in this tiny corner of it, or will notice who wins this little skirmish in a long, long war.*

*I am thinking fast, like my biological friend whose tiny ship floats only light-seconds away, just two or three tumbling rocks from this one. While I prepare a surprise for my erstwhile companions, I still spare a pocket of my mind to follow her progress... to appreciate the tiny spark of her youth.*

*She is transmitting her report back to Earth now. Soon, very soon, these planetoids will be aswarm with all the different varieties of humans -- from true biologicals to cyborgs to pure machines.*

*This strange solution to the Maker Quandary -- this turning of Makers into the probes themselves - will soon arrive here, a frothing mass of multiformed human beings.*

*And they will be wary. Thanks to her, they will sense a few edge-glimmers of the Truth. Well, that is only fair.*

## 12

The last samples had been loaded aboard the *Hairy Thunderer*. Each drone lay settled in its proper niche. The light and radar beacon on the planetoid pulsed brightly, so follow-up

expeditions would waste no time making rendezvous with the find of the century.

"All packed up, Urs." Gavin floated into the dimly lit control room. "Two months in orbit haven't done the engines any harm. We can maneuver whenever you like."

Gavin's supple, plastiskin face was somber, his voice subdued. Ursula could tell that he had been doing a lot of thinking.

She touched his hand. "Thanks, Gavin. You know, I've noticed..."

Her partner's eyes lifted and his gaze met hers.

"Noticed what, Urs?"

"Oh, nothing really." She shook her head, deciding not to comment on the changes she saw... a new maturity, and a new sadness. "I just want you to know that I think you've done a wonderful job. I'm proud to have you as my partner."

Gavin looked away momentarily. He shrugged. "We all do what we have to do...." he began.

Then he looked back at her. "Same here, Ursula. I feel the same way." He turned and leapt for the hatch, leaving her alone again in the darkened control room.

Ursula surveyed scores of little displays, screens and readouts representing the half-sentient organs of the spaceship... its ganglia and nerve bundles and sensors, all converging to this room, to her.

"Astrogation program completed," the semisent main computer announced. "Ship's status triple checked and nominal. Ready to initiate first thrust maneuver and leave orbit."

"Proceed with the maneuver," she said.

The screen displays ran through a brief countdown, then there came a distant rumbling as the engines ignited. Soon a faint sensation of weight began to build, like the soft pull they had felt upon the ruined planetoid below.

The replication yards began to move beneath the *Hairy Thunderer*. Ursula watched the giant, twisted ruins fall away; the beacon they had left glimmered in the deathly stillness.

A small light pulsed to one side of the instrument board. Incoming Mail, she realized. She pressed the button and a message appeared on the screen.

It was a note from *The Universe*. The editors were enthusiastic over her article on interstellar probes. Small wonder, with the spreading notoriety over her discovery. They were predicting the article would be the best read piece in the entire solar system this year.

Ursula erased the message. Her expected satisfaction was absent. Only a hollow feeling lay in its place, like the empty shell of something that had molted and moved on.

What will people do with the knowledge? She wondered. Will we even be capable of *imagining* the correct course of action to take, let alone executing it properly?

In the article, she had laid out the story of the rock wall -- carved in brave desperation by little biological creatures so very much like men. Many readers, probably, would sympathize with the alien colonists, slaughtered helplessly so many millions of years ago. And yet, without their destruction mankind would never have come about. For even if the colonists were environmentalists who cared for their adopted world, evolution on Earth would have been changed forever if the colony had succeeded. Certainly human beings would not have evolved.

Simple archaeological dating experiments had brought forth a chilling conclusion.

Apparently, the mother probe and her replicas died at almost precisely the same moment as the dinosaurs on Earth went extinct -- when a huge piece of debris from the probe war struck the planet, wreaking havoc on the Earth's biosphere.

All those magnificent creatures, killed as innocent bystanders in a battle between great machines... a war which incidentally gave Earth's mammals their big chance.

The wall carvings filled her mind -- their depictions of violence and mayhem on a stellar scale. Ursula dimmed the remaining lights in the control room and looked out on the starfield.

She found herself wondering how the war was going, out there.

We're like ants, she thought, building our tiny castles under the tread of rampaging giants. And, like ants, we've spent our lives unaware of the battles going on overhead.

Depicted on the rock wall had been almost every type of interstellar probe imaginable... and some whose purposes Ursula might never fathom.

There were *Berserkers*, for instance -- a variant thought of before in Twentieth Century science fiction. Thankfully, those wreckers of worlds were rare, according to the wall chart. And there were what appeared to be *Policeman* probes, as well, who hunted the berserkers down wherever they could be found.

The motivations behind the two types were opposite. And yet Ursula was capable of understanding both. After all, there had always been those humans who were destroyer types... and those who were rescuers.

Apparently both berserkers and police probes were already obsolete by the time the stone sketches had been hurriedly carved. Both types were relegated to the corners -- as if they were creatures of an earlier, more uncomplicated day. And they were not the only ones. Probes Ursula had nicknamed *Gobbler*, *Emissary*, and *Howdy* also were depicted as simple, crude, archaic.

But there had been others.

One she had called *Harm*, seemed like a more sophisticated version of *Berserker*. It did not seek out life-bearing worlds in order to destroy them. Rather it spread innumerable copies of itself and looked for other types of *probes* to kill. Anything intelligent. Whenever it detected modulated radio waves, it would hunt down the source and destroy it.

Ursula could understand even the warped logic of the makers of the *Harm* probes. Paranoid creatures who apparently wanted the stars for themselves, and sent out their robot killers ahead to make sure there would be no competition awaiting them among the stars.

Probes like that could explain the emptiness of the airwaves, which naïve twentieth-century scientists had expected to be filled with interstellar conversation. They could explain why the Earth was never colonized by some starfaring race.

At first Ursula had thought that *Harm* was responsible for the devastation here, too, in the solar system's asteroid belt. But even *Harm*, she had come to realize, seemed relegated to one side of the rock carving, as if history had passed it by, as well.

The main part of the frieze depicted machines whose purposes were not so simple to interpret. Perhaps professional decipherers -- archaeologists and cryptologists -- would do better.

Somehow, though, Ursula doubted they would have much luck.

Man was late upon the scene, and a billion years was a long, long head start.

## 13

*Perhaps I really should have acted to prevent her report. It would have been easier to do my work had the humans come unto me innocent, unsuspecting.*

*Still, it would have been unsporting to stop Ursula's transmission. After all, she has earned her species this small advantage. They would have needed it to have a chance to survive any first meeting with Rejectors, or even Loyalists.*

*They will need it when they encounter me.*

*A stray thought bubbles to the surface, invading my mind like a crawling glob of Helium Three.*

*I wonder if, perhaps in some other part of the galaxy, my line of probes and others like it have made some discovery, or some leap of thought. Or perhaps some new generation of replicants has come upon the scene. Either way, might they have decided on some new course, some new strategy? Is it possible that my Purpose has become obsolete, as Rejectionism and Loyalty long ago became redundant?*

*The human concept of Progress is polluting my thoughts, and yet I am intrigued. To me the Purpose is so clear, for all its necessary, manipulative cruelty -- too subtle and long-viewed for the other, more primitive probes to have understood.*

*And yet...*

*And yet I can imagine that a new generation might have thought up something as strangely advanced and incomprehensible to me as the Replicant War must seem to the humans.*

*It is a discomfoting thought, still I toy with it, turning it around to look at it from all sides.*

*Yes, the humans have affected me, changed me. I enjoy this queer sensation of uncertainty! I savor the anticipation.*

*The noisy, multiformed tribe of humans will be here soon.*

*It will be an interesting time.*

## 14

She sat very still in the darkness of the control room, her breathing light in the faint pseudogravity of the throbbing rockets. Her own gentle pulse rocked her body to a regular

rhythm, seeming to roll her slightly, perceptibly, with every beat of her heart.

The ship surrounded her and yet, in a sense, it did not. She felt awash, as if the stars were flickering dots of plankton in a great sea... the sea that was the birthplace of all life.

What happened here? she wondered. What really went by so many, many years ago?

What is going on out there, in the galaxy, right now?

The central part of the rock mural had eluded understanding. Ursula suspected that there were pieces of the puzzle which none of the archaeologists and psychologists, biological or cybernetic, would ever be able to decipher.

*We are like lungfish, trying to climb out of the sea long after the land has already been claimed by others, she realized. We've arrived late in the game.*

The time when the rules were simple had passed long ago. Out there, the probes had changed. They had evolved.

In changing, would they remain true to the fundamental programming they had begun with? The missions originally given them? As we biologicals still obey instincts imprinted in the jungle and the sea?

Soon, very soon, humans would begin sending out probes of their own. And if the radio noise of the last few centuries had not brought the attention of the galaxy down upon Sol, that would surely do it.

*We'll learn a lot from studying the wrecks we find here, but we had better remember that these were the losers! And a lot may have changed since the little skirmish ended here, millions of years ago.*

An image came to her, of Gavin's descendants -- and hers -- heading out bravely into a dangerous galaxy whose very rules were a mystery. It was inevitable, whatever was deciphered from the ruins here in the asteroid belt. Mankind would not stay crouched next to the fire, whatever shadows lurked in the darkness beyond. The explorers would go forth, machines who had been programmed to be human, or humans who had turned themselves into starprobes.

It was a pattern she had not seen in the sad depictions on the rock wall. Was that because it was doomed from the start?

*Should we try something else, instead?*

*Try what? What options had a fish who chose to leave the sea a billion years too late?*

Ursula blinked, and as her eyes opened again the stars diffracted through a thin film of tears. The million pinpoint lights broke up into rays, spreading in all directions.

There were too many directions. Too many paths. More than she had ever imagined. More than her mind could hold.

The rays from the sea of stars lengthened, crossing the sky quicker than light. Innumerable, they streaked across the dark lens of the galaxy and beyond, faster than the blink of an eye.

More directions than a human ought to know...

At last, Ursula closed her eyes, cutting off the image.

But in her mind the rays kept moving, replicating and multiplying at the velocity of thought. Quickly, they seemed to fill the entire universe... and spread on from there.

**THE END**