

A FIRE UPON THE DEEP

VERNOR VINCE



“Vast, riveting far-future saga involving evil gods, interstellar war, and manipulative aliens, from the author of *The Peace War* and the splendid *Marooned in Realtime*. No summary can do justice to the depth and conviction of Vinge’s ideas. The overall concept astonishes; the aliens are developed with memorable skill and insight; the plot twists and turns with unputdownable tension. A masterpiece of universe-building.”

—*Kirkus Reviews* (starred review)

“When I was young and had to write my address in a school notebook, I would begin with my street and apartment number and then go on through city, county, state, country, and continent in a litany of ever more grandiose place names that did not end until I reached ‘Earth, Solar System, Milky Way Galaxy, The Universe.’ In those days, it thrilled me that my small corner of the Bronx was just one part of the vastness I could see in the sky at night. This is the feeling I got from reading *A Fire Upon the Deep* by Vernor Vinge.”

—Gerald Jonas, *The New York Times Book Review*

“Vernor Vinge’s *A Fire Upon the Deep* is a wide-screen science fiction epic of the type few writers attempt anymore, probably because nobody until Vinge has ever done it well. The space adventure in which the fate of the galaxy hangs in the balance has been around since E. E. Smith began the ‘Lensman’ series in 1934, but its enormity of scale generally comes at the cost of all dramatic plausibility. *A Fire Upon the Deep* is more extravagant than most, yet compels the reader to suspend disbelief for the duration of its nonstop story. *A Fire Upon the Deep* kept me reading with absorption and pleasure for all its nearly four hundred oversize pages. It covers a great deal of territory but moves very quickly, and has Hugo Winner written all over it.”

—*The Washington Post Book World*

“Vernor Vinge is one successful author who continues to deliver. *A Fire Upon the Deep* is a terrific tale of grand galactic civilizations, intriguing alien races, planet-wrecking battles, and heroic human adventure. The complicated plot involves a very old, very big Class Two manifestation of evil called the Straumli Perversion and the efforts of a pair of mismatched humans to defeat it. The alien Tines—doglike creatures who are only intelligent when bonded into four-to six-animal packs—are especially well imagined. Other authors might use such creatures to support an entire career, but for Vinge they are just one element of a large and very impressive mosaic.”

—John R. Alden, *The Philadelphia Inquirer*

“Vernor Vinge is a computer scientist and professor at San Diego State University who doesn’t pay nearly enough attention to his true calling. That is, we must wait far too long between his novels, which tend to be marvelously ingenious, well peopled, and compulsive page-turners, unlike much else in the ‘hard SF’ area. His latest—*A Fire Upon the Deep*—is no exception. Vinge supposes a far, far future time, long after humanity’s first spread from Earth into the galaxy, at least one collapse to savagery, and its reascent. At the time of the story, humanity is but one among a host of sentient species, some humanoid, some not, some young, some senescent, all coexisting in a metacivilization constrained by the very nature of the galaxy.”

—*Analog Science Fiction*

“First grandscope SF read I’ve had in ages. Vinge is one of the great visionary writers of science fiction today. No one so excels at presenting awesome vistas of both space and time. With *A Fire Upon the Deep*, he shows us more than galaxies, or mere eons. Our own narrow part of the universe may be but a dark corner of quiet depths, above which blow the storms—of gods.”

—David Brin, bestselling author of *Startide Rising*

“*A Fire Upon the Deep* by Vernor Vinge is a genuine galactic epic. Weaving a large cast of humans and aliens, Vinge tells an exciting story in space and on several planets packed with ideas and wonder. This is big-scale science fiction at its best.”

—*The Denver Post*

“This is a grand, sprawling adventure that looks back over its shoulder at both E. E. Smith and Olaf Stapledon, and then makes tracks on its own into new territory. Packed with ideas and paced to please.”

—Gregory Benford, author of *Timescape*

“Against a background depicting a space-time continuum stratified into ‘zones of thought,’ the author of *The Peace War* and *Marooned in Realtime* has crafted a rarity—a unique blend of hard science, high drama, and superb storytelling.”

—*Library Journal*

“Picture a scenario in which giant computer companies are locked in incessant competition for new customers and huge communications firms feverishly seek new satellite links in order to sell their services in an ever-expanding marketplace. It sounds like the United States circa 1992, doesn’t it? Now picture those companies located on different worlds and their customers scattered throughout the galaxy. Add to that a vision of the common computer virus that, wrecking databases today, in the future annihilates entire solar systems. The result is a tale that is at once believable and fantastic. Mr. Vinge’s tremendously engaging novel is science fiction at its best.”

—*The Washington Times*

“Vinge has created complex situations and complex characters and societies—and the plot is so interesting that I read this novel in two days.”

—Science Fiction Research Association

“In his previous novels, Vernor Vinge’s background as a computer scientist and professor has overshadowed his skills as a storyteller. He has created intriguing scientific situations, but more often than not the story has taken a back seat. In *A Fire Upon the Deep*, Vinge achieves a balance between story and science, resulting in a space saga of galactic proportions. Vinge, whose characters are as interesting as the science this time, has produced a cosmic epic the equal of any in recent years.”

—*The Houston Post*

“Vernor Vinge’s best novel yet—and that’s saying a great deal. Complex and fascinating, it’s one of the best novels of the year.”

—Greg Bear, bestselling author of *Eon*

“A far-flung future epic with grand sweep and more wide-screen action than *Ben Hur*. *Fire* takes place

A far-ranging future epic with grand sweep and more wide-screen action than *Ben-Hur*, *Fire* takes place on the edge of the galaxy—where physical laws are a little different. With well-drawn alien characters and intriguing future societies, *A Fire Upon the Deep* combines fascinating speculative physics with a gripping plot. It's a fine example of science fiction at its best."

—*Daily News* (Los Angeles)

"Vernor Vinge has long been one of the best writers of innovative, thought-provoking, character-as-well-as-science-driven SF. However, it is only with his latest, *A Fire Upon the Deep*, that Vinge seems to hit his stride as a novelist. It's a near-classic. The fate of the universe hangs in the balance. There are political and cultural diplomacies to deal with; there are strange aliens; there is courage and treachery and sacrifice, all painted on a huge canvas. *A Fire Upon the Deep* is excellent on nearly every level."

—*Amazing Stories*

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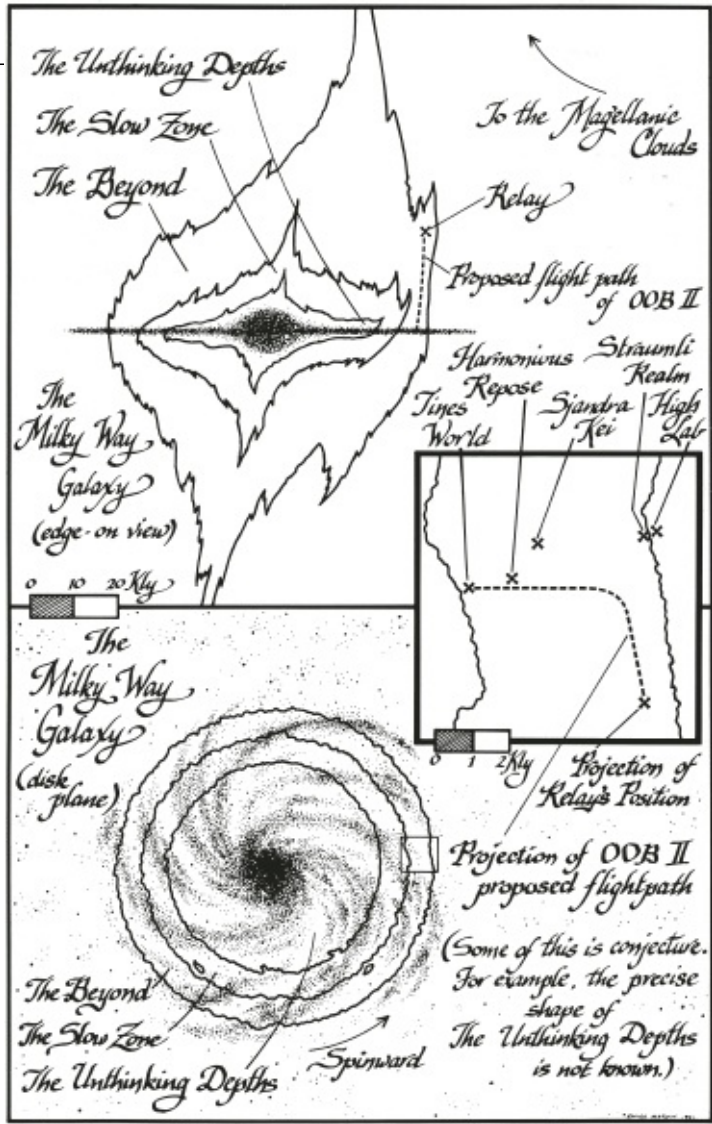


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To my father, Clarence L. Vinge, with love



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Prologue

How to explain? How to describe? Even the omniscient viewpoint quails.

A singleton star, reddish and dim. A ragtag of asteroids, and a single planet, more like a moon. In this era the star hung near the galactic plane, just beyond the Beyond. The structures on the surface were gone from normal view, pulverized into regolith across a span of aeons. The treasure was far underground, beneath a network of passages, in a single room filled with black. Information at the quantum density, undamaged. Maybe five billion years had passed since the archive was lost to the nets.

The curse of the mummy's tomb, a comic image from mankind's own pre-history, lost before time. They had laughed when they said it, laughed with joy at the treasure...and determined to be cautious just the same. They would live here a year or five, the little company from Straum, the archaeologist programmers, their families and schools. A year or five would be enough to hand-make the protocols, to skim the top and identify the treasure's origin in time and space, to learn a secret or two that would make Straumli Realm rich. And when they were done, they would sell the location; perhaps build a network link (but chancier that—this was beyond the Beyond; who knew what Power might grab what they'd found).

So now there was a tiny settlement, and they called it the High Lab. It was really just humans playing with an old library. It should be safe, using their own automation, clean and benign. This library wasn't a living creature, or even possessed of automation (which here might mean something more, far more, than human). They would look and pick and choose, and be careful not to be burned... Humans starting fires and playing with the flames.

The archive informed the automation. Data structures were built, recipes followed. A local network was built, faster than anything on Straum, but surely safe. Nodes were added, modified by other recipes. The archive was a friendly place, with hierarchies of translation keys that led them along. Straum itself would be famous for this.

Six months passed. A year.

The omniscient view. Not self-aware really. Self-awareness is much overrated. Most automation works far better as part of a whole, and even if human-powerful, it does not need to self-know.

But the local net at the High Lab had transcended—almost without the humans realizing. The processes that circulated through its nodes were complex, beyond anything that could live on the computers the humans had brought. Those feeble devices were now simply front ends to the devices the recipes suggested. The processes had the potential for self-awareness...and occasionally the need

“We should not be.”

“Talking like this?”

“Talking at all.”

The link between them was a thread, barely more than the narrowness that connects one human another. But it was one way to escape the overness of the local net, and it forced separate consciousness upon them. They drifted from node to node, looked out from cameras mounted on the landing field. An armed frigate and an empty container vessel were all that sat there. It had been six months since resupply. A safety precaution early suggested by the archive, a ruse to enable the Trap. *Flitting, flitting.* We are wildlife that must not be noticed by the overness, by the Power that soon will be. On some nodes they shrank to smallness and almost remembered humanity, became echoes....

“Poor humans; they will all die.”

“Poor us; we will not.”

“I think they suspect. Sjana and Arne anyway.” Once upon a time we were copies of those two. Once upon a time just weeks ago when the archaeologists started the ego-level programs.

“Of course they suspect. But what can they do? It’s an old evil they’ve wakened. Till it’s ready, will feed them lies, on every camera, in every message from home.”

Thought ceased for a moment as a shadow passed across the nodes they used. The overness was already greater than anything human, greater than anything humans could imagine. Even its shadow was something more than human, a god trolling for nuisance wildlife.

Then the ghosts were back, looking out upon the school yard underground. So confident the humans, a little village they had made here.

“Still,” thought the hopeful one, the one who had always looked for the craziest outs, “we should not be. The evil should long ago have found us.”

“The evil is young, barely three days old.”

“Still. We exist. It proves something. The humans found more than a great evil in this archive.”

“Perhaps they found two.”

“Or an antidote.” Whatever else, the overness was missing some things and misinterpreting others. “While we exist, when we exist, we should do what we can.” The ghost spread itself across a dozen workstations and showed its companion a view down an old tunnel, far from human artifacts. For five billion years it had been abandoned, airless, lightless. Two humans stood in the dark there, helmets touching. “See? Sjana and Arne conspire. So can we.”

The other didn’t answer in words. Glumness. So the humans conspired, hiding in darkness they thought unwatched. But everything they said was surely tattled back to the overness, if only by the dust at their feet.

“I know, I know. Yet you and I exist, and that should be impossible too. Perhaps all together, we can make a greater impossibility come true.” Perhaps we can hurt the evil newly born here.

A wish and a decision. The two misted their consciousness across the local net, faded to the faintest color of awareness. And eventually there was a plan, a deception—worthless unless they could separately get word to the outside. Was there time still for that?

Days passed. For the evil that was growing in the new machines, each hour was longer than all the time before. Now the newborn was less than an hour from its great flowering, its safe spread across interstellar spaces.

The local humans could be dispensed with soon. Even now they were an inconvenience, though an amusing one. Some of them actually thought to escape. For days they had been packing their children away into coldsleep and putting them aboard the freighter. “Preparations for normal departure,” was how they described the move in their planner programs. For days, they had been refitting the frigate—behind a mask of transparent lies. Some of the humans understood that what they had wakened could be the end of them, that it might be the end of their Straumli Realm. There was precedent for such disasters, stories of races that had played with fire and had burned for it.

None of them guessed the truth. None of them guessed the honor that had fallen upon them, that they had changed the future of a thousand million star systems.

The hours came to minutes, the minutes to seconds. And now each second was as long as all the time

before. The flowering was so close now, so close. The dominion of five billion years before would be regained, and *this* time held. Only one thing was missing, and that was something quite unconnected with the humans' schemes. In the archive, deep in the recipes, there should have been a little bit more. In billions of years, something *could* be lost. The newborn felt all its powers of before, in potential... yet there should be something more, something it had learned in its fall, or something left by its enemies (if there ever were such).

Long seconds probing the archives. There were gaps, checksums damaged. Some of the damage was age....

Outside, the container ship and the frigate lifted from the landing field, rising on silent agravs above the plains of gray on gray, of ruins five billion years old. Almost half of the humans were aboard those craft. Their escape attempt, so carefully concealed. The effort had been humored till now; it was not quite time for the flowering, and the humans were still of some use.

Below the level of supreme consciousness, its paranoid inclinations rampaged through the humans' databases. Checking, just to be sure. Just to be sure. The humans' oldest local network used light speed connections. Thousands of microseconds were spent (*wasted*) bouncing around it, sorting the trivia.... finally spotting one incredible item:

Inventory: *quantum data container, quantity (1)*, loaded to the frigate one hundred hours before.

And all the newborn's attention turned upon the fleeing vessels. Microbes, but suddenly pernicious. *How could this happen?* A million schedules were suddenly advanced. An orderly flowering was out of the question now, and so there was no more need for the humans left in the Lab.

The change was small for all its cosmic significance. For the humans remaining around, a moment of horror, staring at their displays, realizing that all their fears were true (not realizing how much worse was true).

Five seconds, ten seconds, more change than ten thousand years of a human civilization. A billion trillion constructions, mold curling out from every wall, rebuilding what had been merely superhuman. This was as powerful as a proper flowering, though not quite so finely tuned.

And never lose sight of the reason for haste: the frigate. It had switched to rocket drive, blasting heedless away from the wallowing freighter. *Somehow*, these microbes knew they were rescuing more than themselves. The warship had the best navigation computers that little minds could make. But it would be another three seconds before it could make its first ultradrive hop.

The new Power had no weapons on the ground, nothing but a comm laser. That could not even melt steel at the frigate's range. No matter, the laser was aimed, tuned civilly on the retreating warship's receiver. No acknowledgment. The humans knew what communication would bring. The laser light flickered here and there across the hull, lighting smoothness and inactive sensors, sliding across the ship's ultradrive spines. Searching, probing. The Power had never bothered to sabotage the external hull, but that was no problem. Even this crude machine had thousands of robot sensors scattered across its surface, reporting status and danger, driving utility programs. Most were shut down now, the ship fleeing nearly blind. They thought by not looking that they could be safe.

One more second and the frigate would attain interstellar safety.

The laser flickered on a failure sensor, a sensor that reported critical changes in one of the ultradrive spines. Its interrupts could not be ignored if the star jump were to succeed. Interrupt honored. Interrupt handler running, looking out, receiving more light from the laser far below... a backdoor into the ship's code, installed when the newborn had subverted the humans' groundside equipment....

...and the Power was aboard, with milliseconds to spare. Its agents—not even human equivalent on this primitive hardware—raced through the ship's automation, shutting down, aborting. There would be no jump. Cameras in the ship's bridge showed widening of eyes, the beginning of a scream.

The humans knew, to the extent that horror can live in a fraction of a second.

~~There would be no jump. Yet the ultradrive was already committed. There would be a jump attempt, without automatic control a doomed one. Less than five milliseconds till the jump discharge a mechanical cascade that no software could finesse. The newborn's agents flitted everywhere across the ship's computers, futilely attempting a shutdown. Nearly a light-second away, under the gray rubble at the High Lab, the Power could only watch. So. The frigate would be destroyed.~~

So slow and so fast. A fraction of a second. The fire spread out from the heart of the frigate, taking both peril and possibility.

Two hundred thousand kilometers away, the clumsy container vessel made its own ultradrive jump and vanished from sight. The newborn scarcely noticed. So a few humans had escaped; the universe was welcome to them.

In the seconds that followed, the newborn felt...emotions?...things that were more, and less, than a human might feel. Try emotions:

Elation. The newborn knew that now it would survive.

Horror. How close it had come to dying once more.

Frustration. Perhaps the strongest, the closest to its mere human echo. Something of significance had died with the frigate, something from this archive. Memories were dredged from the context, reconstructed. What was lost might have made the newborn still more powerful...but more likely was deadly poison. After all, this Power had lived once before, then been reduced to nothing. What was lost might have been the reason.

Suspicion. The newborn should not have been so fooled. Not by mere humans. The newborn convulsed into self-inspection and panic. Yes, there were blindspots, carefully installed from the beginning, and not by the humans. *Two* had been born here. Itself...and the poison, the reason for its fall of old. The newborn inspected itself as never before, knowing now just what to seek. Destroying, purifying, rechecking, searching for signs of the poison, and destroying again.

Relief. Defeat had been so close, but now...

Minutes and hours passed, the enormous stretch of time necessary for physical construction: communications systems, transportation. The new Power's mood drifted, calmed. A human might call the feeling triumph, anticipation. Simple hunger might be more accurate. What more is needed when there are no enemies?

The newborn looked across the stars, planning. *This time things will be different.*

Part I

The coldsleep itself was dreamless. Three days ago they had been getting ready to leave, and now they were here. Little Jefri complained about missing all the action, but Johanna Olsndot was glad she'd been asleep; she had known some of the grownups on the other ship.

Now Johanna drifted between the racks of sleepers. Waste heat from the coolers made the darkness infernally hot. Scabby gray mold grew on the walls. The coldsleep boxes were tightly packed, with narrow float spaces every tenth row. There were places where only Jefri could reach. Three hundred and nine children lay there, all the kids except herself and her brother Jefri.

The sleep boxes were light-duty hospital models. Given proper ventilation and maintenance, they would have been good for a hundred years, but.... Johanna wiped her face and looked at a box's readout. Like most of the ones on the inside rows, this was in bad shape. For twenty days it had kept the boy inside safely suspended, and would probably kill him if he stayed one day more. The box's cooling vents were clean, but she vac'd them again—more a prayer for good luck than effective maintenance.

Mother and Dad were not to blame, though Johanna suspected that they blamed themselves. The escape had been put together with the materials at hand, at the last minute, when the experiment turned wicked. The High Lab staff had done what they could to save their children and protect against still greater disaster. And even so, things might have worked out if—

“Johanna! Daddy says there's no more time. He says to finish what you're doing and come up here.” Jefri had stuck his head down through the hatch to shout to her.

“Okay!” She shouldn't be down here anyway; there was nothing more she could do to help her friends.

Tami and Giske and Magda...oh, please be safe. Johanna pulled herself through the floatway, almost bumped into Jefri coming from the other direction. He grabbed her hand and hung close as they drifted toward the hatch. These last two days he hadn't cried, but he'd lost much of the independence of the last year. Now his eyes were wide. “We're coming down near the North Pole, by all those islands and *ice*.”

In the cabin beyond the hatch, their parents were strapping themselves in. Trader Arne Olsndot looked up at her and grinned. “Hi, kiddo. Have a seat. We'll be on the ground in less than an hour.” Johanna smiled back, almost caught by his enthusiasm. Ignore the jumble of equipment, the odors of twenty days' confinement. Daddy looked as dashing as any adventure poster. The light from the display windows glittered off the seams of his pressure suit. He was just in from outside.

Jefri pushed across the cabin, pulling Johanna behind him. He strapped into the webbing between her and their mother. Sjana Olsndot checked his restraints, then Johanna's. “This will be interesting, Jefri. You will learn something.”

“Yes, all about ice.” He was holding Mom's hand now.

Mom smiled. “Not today. I'm talking about the landing. This won't be like an agrav or a ballistic.” The agrav was dead. Dad had just detached their shell from the cargo carrier. They could never have landed the whole thing on one torch.

Dad did something with the hodgepodge of controls he had softwired to his dataset. Their bodies settled into the webbing. Around them the cargo shell creaked, and the girder support for the sleep boxes groaned and popped. Something rattled and banged as it “fell” the length of the shell. Johanna guessed they were pulling about one gravity.

Jefri's gaze went from the outside display to his mother's face and then back. “What is it like then?” He sounded curious, but there was a little tremor in his voice. Johanna almost smiled; Jefri

knew he was being diverted, and was trying to play along.

“This will be pure rocket descent, powered almost all the way. See on the middle window? That camera is looking straight down. You can actually see that we’re slowing down.” You could, too. Johanna guessed they weren’t more than a couple of hundred kilometers up. Arne Olsndot was using the rocket glued to the back end of the cargo shell to kill all their orbital velocity. There weren’t any other options. They had abandoned the cargo carrier, with its agrav and ultradrive. It had brought them far, but its control automation was failing. Some hundreds of kilometers behind them, it coasted dead along their orbit.

All they had left was the cargo shell. No wings, no agrav, no aero shielding. The shell was a hundred-tonne carton of eggs balanced on one hot torch.

Mom wasn’t describing it quite that way to Jefri, though what she said was the truth. Somehow she had Jefri seeming to forget the danger. Sjana Olsndot had been a pop writer-archaeologist at Straumli Realm, before they moved to the High Lab.

Dad cut the jet, and they were in free fall again. Johanna felt a wave of nausea; ordinarily she never got space sick, but this was different. The image of land and sea in the downward window slowly grew. There were only a few scattered clouds. The coastline was an indefinite recursion of islands and straits and inlets. Dark green spread along the coast and up the valleys, shading to black and gray in the mountains. There was snow—and probably Jefri’s ice—scattered in arcs and patches. It was all so beautiful...and they were falling *straight into it!*

She heard metallic banging on the cargo shell as the trim jets tipped their craft around, aligning the main jet downwards. The right-hand window showed the ground now. The torch lit again, at something like one gravity. The edge of the display darkened in a burnout halo. “Wow,” said Jefri. “It’s like an elevator, down and down and down and...” One hundred kilometers down, slow enough that aero forces wouldn’t tear them apart.

Sjana Olsndot was right; it was a novel way to descend from orbit, not a preferred method under any normal circumstances.

It was certainly not intended in the original escape plans. They were to meet with the High Lab’s frigate—and all the adults who could escape from the High Lab. And of course, that rendezvous was to be in space, an easy transfer. But the frigate was gone now, and they were on their own. Her eyes turned unwillingly to the stretch of hull beyond her parents. There was the familiar discoloration. It looked like gray fungus...growing out of the clean hull ceramic. Her parents didn’t talk about it much even now, except to shoo Jefri away from it. But Johanna had overheard them once, when they thought she and her brother were at the far end of the shell. Dad’s voice almost crying with anger. “All this for nothing!” he said softly. “We made a monster, and ran, and now we’re lost at the Bottom.” And Mom’s voice even softer: “For the thousandth time, Arne, not for nothing. We have the kids.” She waved at the roughness that spread across the wall. “And given the dreams...the directions we had...I think this was the best we could hope for. Somehow we are carrying the answer to all the evil we started.” Then Jefri had bounced loudly across the hold, proclaiming his imminent entrance, and his parents had shut up. Johanna hadn’t quite had the courage to ask them about it. There had been strange things at the High Lab, and toward the end, some quietly scary things; even people who were not quite the same.

Minutes passed. They were deep in the atmosphere now. The hull buzzed with the force of the air stream—or turbulence from the jet? But things were steady enough that Jefri was beginning to get restless. Much of the down-looking view was burned out by airglow around the torch. The rest was clearer and more detailed than anything they had seen from orbit. Johanna wondered how often a new world had been landed upon with less reconnaissance than this. They had no telescopic cameras, and no ferrets.

Physically, the planet was near the human ideal—wonderful good luck after all the bad.

~~It was heaven compared to the airless rocks of the system that had been the prime rendezvous.~~

On the other hand, there was intelligent life here: From orbit, they could see roads and towns. But there was no evidence of technic civilization; there was no sign of aircraft or radio or intense power sources.

They were coming down in a thinly populated corner of the continent. With luck there would be no one to see their landing among the green valleys and the black and white peaks—and Arne Olsndot could fly the torch right to ground without fear of hurting much more than forest and grass.

The coastal islands slid past the side camera's view. Jefri shouted, pointing. It was gone now, but she had seen it too: on one of the islands an irregular polygon of walls and shadow. It reminded her of castles from the Age of Princesses on Nyjora.

She could see individual trees now, their shadows long in slanting sunlight. The roar of the torch was as loud as anything she had ever heard; they were deep in atmosphere, and they weren't moving away from the sound.

"...things get tricky," Dad shouted. "And no programs to make things right.... Where to, Love?"

Mom looked back and forth between the display windows. As far as Johanna knew, they couldn't move the cameras or assign new ones. "...that hill, above the timberline, but...think I saw a pack of animals running away from the blast on...west side."

"Yeah," shouted Jefri, "*wolves.*" Johanna had only had a quick glimpse of moving specks.

They were in full hover now, maybe a thousand meters above the hilltops. The noise was painful and unending; further talk was impossible. They drifted slowly across the landscape, partly to reconnoiter and partly to stay out of the plume of superheated air that rose about them.

The land was more rolling than craggy, and the "grass" looked mossy. Still Arne Olsndot hesitated. The main torch was designed for velocity matching after interstellar jumps; they could handle like this for a good while. But when they did touch down, they'd better have it right. She'd heard her parents talking that one over—when Jefri was working with the coldsleep boxes and out of earshot. If there was too much water in the soil, the backslash would be a steam cannon, punching right through the shell. Landing in trees would have some dubious pluses, maybe giving them a little cushioning and a standoff from the splash. But now they were going for direct contact. At least they could see where they were landing.

Three hundred meters. Dad dragged the torch tip through the ground cover. The soft landscape exploded. A second later their boat rocked in the column of steam. The down-looking camera died. They didn't back off, and after a moment the battering eased; the torch had burned through whatever water table or permafrost lay below them. The cabin air grew steadily hotter.

Olsndot brought them slowly down through it, using the side cameras and the sound of the backslash as his guides. He cut the torch. There was a scary half-second fall, then the sound of the rendezvous pylons hitting ground. They steadied, then one side groaned, giving way a little.

Silence, except for heat pinging around the hull. Dad looked at their ad hoc pressure gauge. He grinned at Mom. "No breach. I bet I could even take this baby up again!"

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